

# OMRON

2008-2009  
Industrial Automation  
**Product Catalog**



Automation Control Systems

Drives & Motion Controls

Temperature & Process Controls

Sensors & Vision

Code Readers & RFID

Industrial Components

Service & Training

**Automation...simple...powerful.**



## About Omron

We help your business achieve manufacturing excellence by removing barriers and opening new possibilities through machine and plant floor automation. Our sensing and control solutions enable you to operate more quickly, with greater efficiency and agility than your competitors.

Omron offers well-established stability with significant resources invested in R&D to develop innovative technologies and solutions, followed through with global service and support to keep you operating smoothly.

We strive to be your trusted partner in automation. Use our industry expertise and powerful yet simple solutions in your next project.



### Omron Statistics

- 75 years in controls business, founded in 1933
- \$7 billion USD sales (April 2008)
- Over 40% of business comes from industrial automation; electronic components, social systems and healthcare make up the balance
- 35,800 employees worldwide

### Industries using Omron Automation

- Food/Beverage
- Pharmaceutical/Cosmetics
- Automotive
- Semiconductor
- Electronics and Small Parts Assembly

### Automation expertise

- Packaging & Material Handling
- Measurement & Gauging
- Inspection
- Track & Trace
- Quality Improvement

### Core competencies

- Sensing and Controls technologies

# Find Information Fast

## Quick Link Shortens Your Online Search

Quick Links are unique codes assigned to Omron products listed in the Product Catalog. Use Quick Links on **omron247.com** or **omron.ca** in Canada to easily access more information:

- Comprehensive product documentation: datasheets, brochures, manuals
- CAD and EDS files
- Order products online or submit a Request for Quotation (RFQ).



## How to Use Quick Links

1. Find a Quick Link code in the product catalog
2. Enter the four- or five-digit code into the Search Center
3. Click the "SEARCH" button or press the Enter Key

## Give Quick Link a Try

Type B222 into the Search Center, then press "SEARCH." The results displayed are for the popular E3Z Photoelectric Sensor.

## Use our Automation Expertise

Contact an Omron distributor or our Technical Support team to solve your manufacturing automation problems. We offer solid industry expertise that results in higher quality and productivity.

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# Automation...Simple...Powerful.

We are dedicated to developing, manufacturing and supporting automation that improves the quality and efficiency of everything you make. Omron's Smart Platform puts you in control of an incredibly powerful, yet incredibly simple to implement industrial automation approach.



## Smart Platform Advantages

Smart Platform can help you increase the flexibility and efficiency of your machines or production lines by providing these advantages:

- A single software environment for your machine that covers sensing, regulation, control, motion and visualization.
- Easy "drag & drop" object-based programming and configuration of the complete system.
- Distributed intelligent devices that are self-reporting and self-maintaining to reduce downtime and identify the source of production problems.

## Affordable and Comprehensive

Omron created Smart Platform to bring the advantages of integrated automation within reach of all customers. It allows increasingly complex machines to be developed, commissioned and maintained without the need of automation specialists. You can mix and match preferred automation solutions without worrying about hierarchy or other communication issues. Making connectivity as simple and flexible as possible, Omron's Smart Platform creates a harmonious combination of sensing, control, motion and regulation devices.

- Simplify operations and maintenance
- Remove internal barriers to communication and action
- Retain a high level of security and production integrity
- Allow fast turnaround to shorten time-to-market and maximize uptime



## One Software

CX-One is the single programming and configuration software used to build and program networks, PLCs, HMIs, motion control systems, drives, temperature controllers and sensors. It provides seamless communications between components because they all speak a common language. The benefit of using a single software is reduced complexity of configuration so it can be completed with minimal training.

An excellent value, CX-One delivers all five IEC 61131-3 standard programming languages with each license instead of selling them individually, so experienced and new-hire programmers can be productive immediately without learning a new language.

## One Connection

Single point access through one connection to any Smart Platform device on your machine—direct, serial, Ethernet or even modem connection—makes it possible to fully manipulate all settings, programs and configurations. With one connection to your machine, you can both upload and download all programs, comments, settings, fieldbus configurations, HMI and intelligent device configurations.

You can gain remote access to service your complete machine, and reset and restart operations from an HMI.

The transparent communications architecture allows Omron devices to easily communicate together, passing and sharing information and enabling more effective modular machine design.



## One Minute

Accomplish more every minute with Omron's "plug-and-work" functionality. It simplifies control system configuration and HMI visualization so projects are completed in minutes instead of days.

Omron provides pre-built object libraries that only require you to add parameters that automatically establish communications with Omron devices. You can create your own machine-specific objects, too. Simply "drag & drop" these elements to quickly configure complete control systems and HMI projects.

# Wide Product Selection

Omron's latest high-technology solutions and in-stock components fill this catalog. We offer thousands more options, so contact us about your specific needs.

## Automation Systems

Combine Omron's programmable controllers to support machine control, touch-screen terminals for visualization, and network/software products to support easy information exchange with host systems.



## Drives & Motion Control

Open platform and PLC-based motion control systems and electronic cam positioners deliver accurate positioning, speed and torque controls for a wide range of applications.



## Temperature & Process Controllers

Apply reliable control on your machines using single- and multi-loop temperature controllers, universal input process controllers, and digital temperature meters; ramp/soak and valve control models available.



## Sensors & Vision

Use our sensors to detect, measure, analyze and process various changes that occur in production, such as change in position, length, height, displacement and appearance. Color and true color vision sensors offer built-in touch screen terminals to simplify setup and reduce hardware.



## Code Readers & RFID

Accurately track and trace work in process, ingredient pedigree and supply chain movement using laser and CCD bar code readers, linear and 2D code readers, and RFID controllers, antennas, and data carriers.



## Industrial Components

Omron offers one of industry's widest selections of reliable electromechanical and solid state relays, pushbutton and limit switches, metering devices that include panel meters, monitoring relays, level controllers, power supplies, counters and timers.



# Service Plus™ Support

Close the gap between product selection and fully operational system with Omron services and support.

## Engineering Services

Omron supports your automation project with an expert team of field application engineers, field service technicians and technical service representatives. Take advantage of our extensive experience applying Omron controls and systems, from concept and design, commissioning and start-up, and onto maintenance and optimization.

Specifically, we provide:

- PLC programming and HMI project design
- No-cost technical support by phone to solve simple problems
- Affordable technical support packages to resolve complex problems
- Engineering and programming assistance
- Start-up and commissioning services
- System upgrades and retrofits

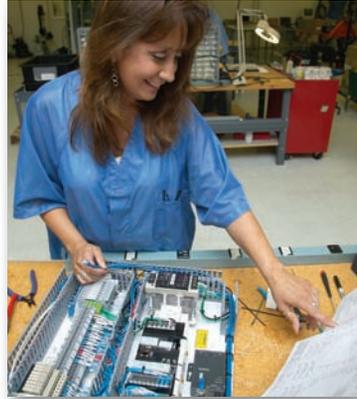
## Training

Keep production flowing and make your operations globally competitive by training your personnel. With technology and systems becoming more complex, training helps reduce costs associated with unpredictable downtime and eliminates knowledge gaps caused by the loss of experienced personnel. Protect your automation investments by upgrading your knowledge and skills.

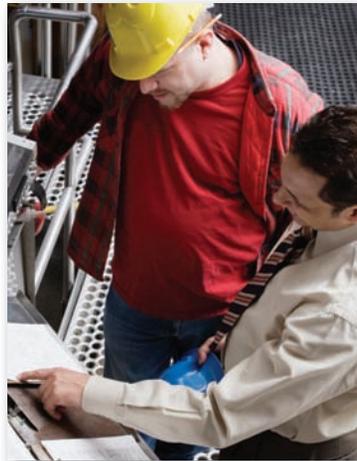
We offer comprehensive training for machine builders and end-user customers, systems integrators and distributors that can be tailored to specific needs. We offer:

- Standard and customized courses
- Interactive training with experienced instructors
- Hands-on learning using real world experiences
- Techniques to improve productivity and drive cost efficiencies for your industry
- Smart scheduling: Complete basic and advanced courses in one week

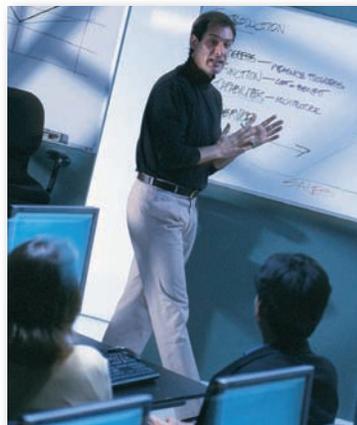
Additional services are available in different countries across the Americas.



Application Engineering



Field Service



Training

## Terms and Conditions of Sale

- Offer, Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
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- Interest.** Omron, at its option, may charge Buyer 1-1/2% Interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders.** Omron will accept no order less than \$200 net billing.
- Governmental Approvals.** Buyer shall be responsible for and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
- Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
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- Shipping, Delivery.** Unless otherwise expressly agreed in writing by Omron:
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  - Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer.
  - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid.
  - Delivery and shipping dates are estimates only, and Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
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    - Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
    - Use in consumer products or any use in significant quantities.
    - Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
    - Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
- NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO

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- Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when a guideline rating or feature is changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
- Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

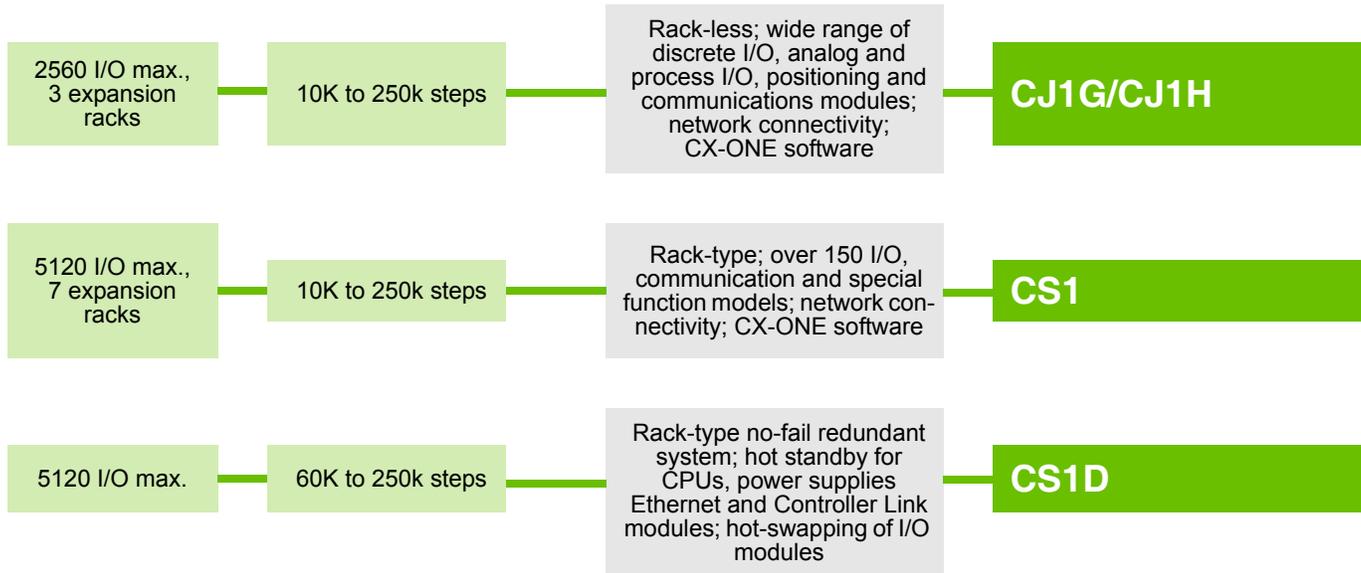
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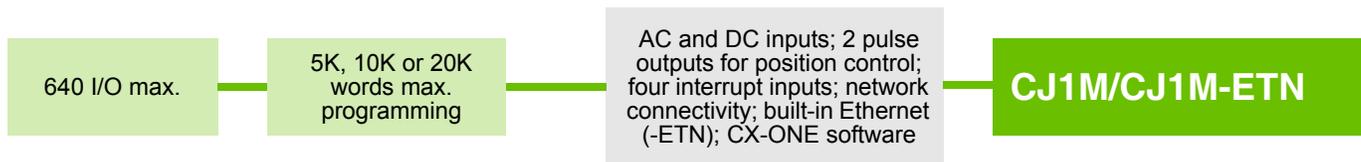
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## Selection Guide

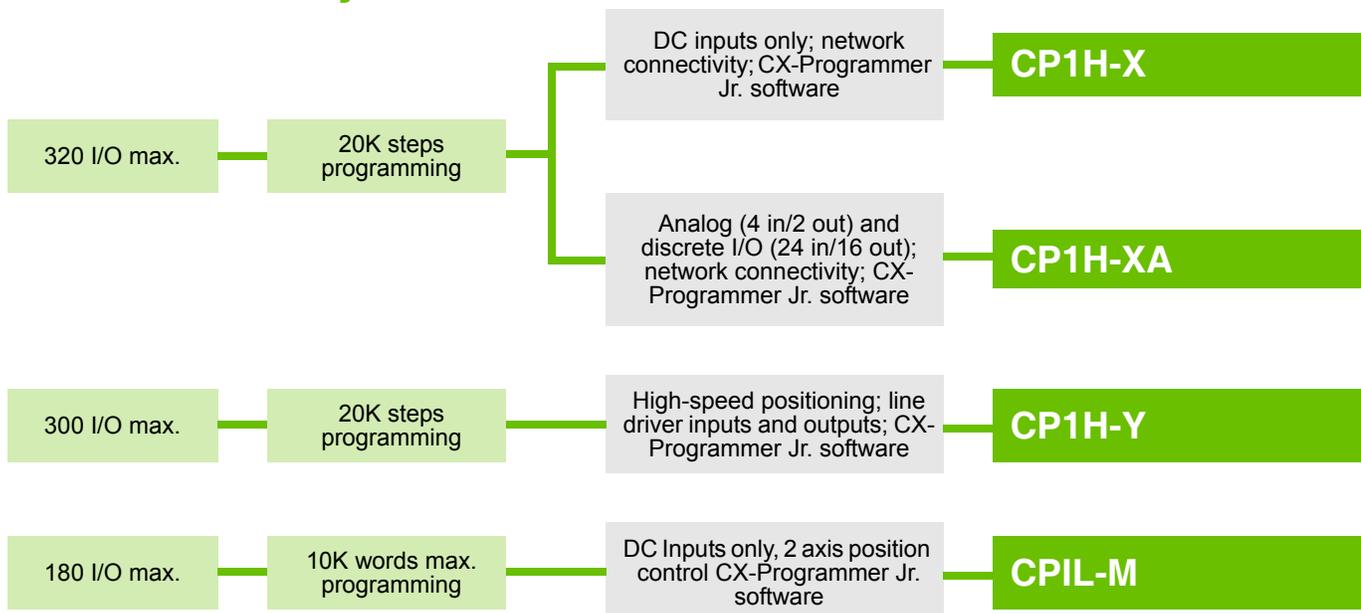
### Mid-Size/Large Controllers



### Small/Mid-Size Controllers

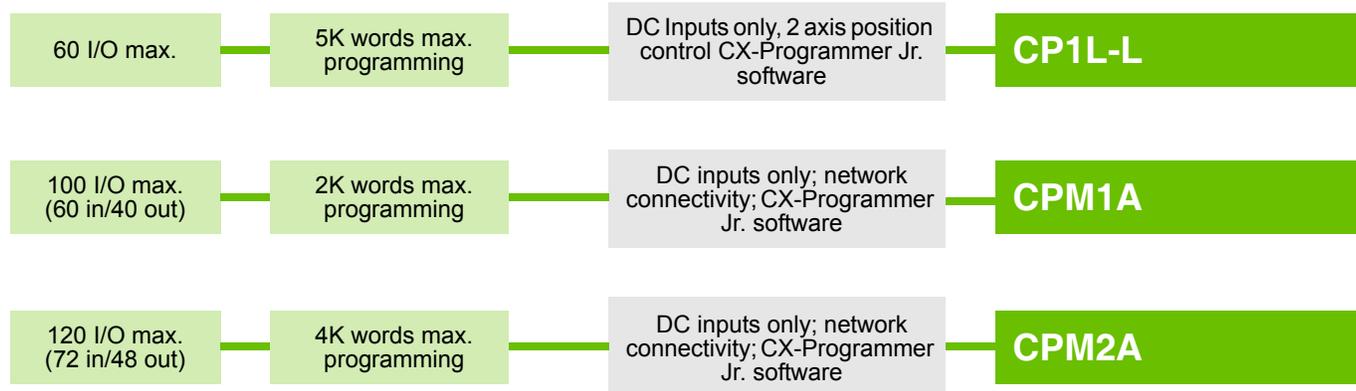


### Micro Brick Style

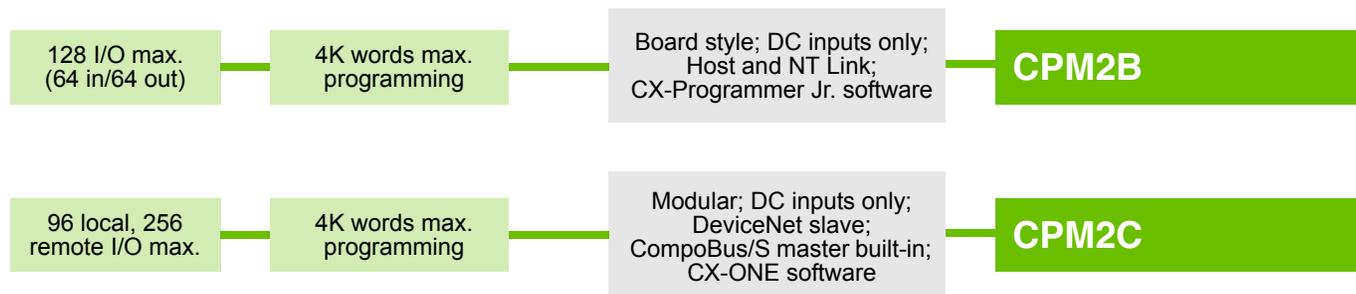


## Selection Guide

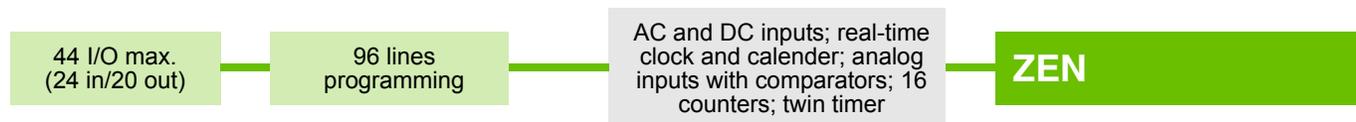
### Micro Brick Style (continued)



### Micro Board and Modular Style



### Nano Brick Style



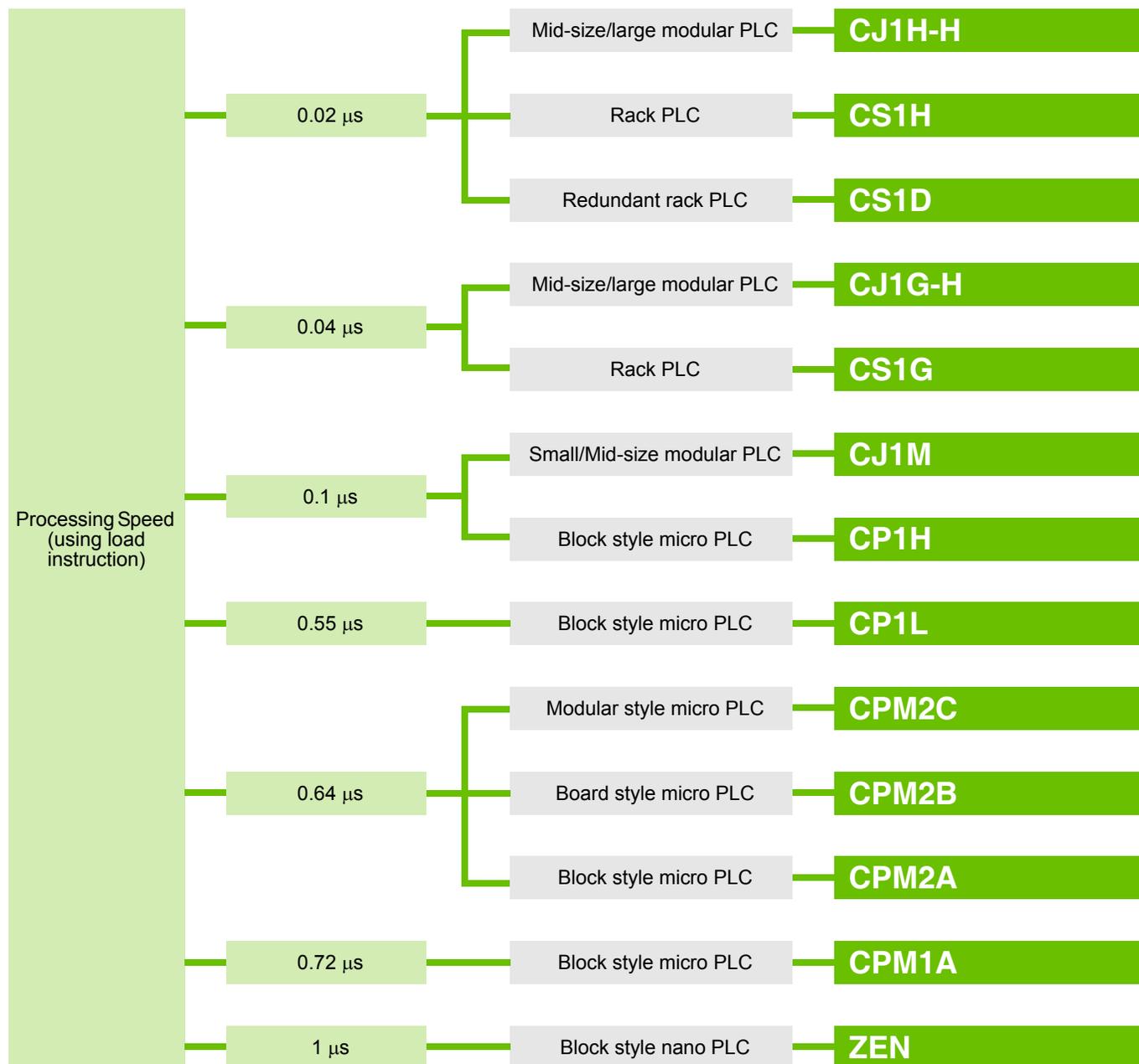
## Selection Guide

### Key Features

Feature	CS1	CS1D	CJ1	CJ1M	CP1H	CP1L	CPM1A	CPM2A	CPM2B	CPM2C	ZEN
Online editing	X	X	X	X	X	X	X	X	X	X	X
Expansion	X	X	X	X	X	X	X	X	X	X	X
Removable terminals	X	X	X	X	X	X	—	X	X	X	—
Analog I/O	X	X	X	X	X	X	X	X	X	X	—
Built-in Programming Port	X	X	X	X	X	X	X	X	X	X	X
Multiple Comm. Ports	X	X	X	X	X	X	—	X	X	X	—
RS-232C/422/485 Support	X	X	X	X	X	X	X	X	X	X	X
Real-time clock	X	X	X	X	X	X	—	X	X	X	X
High-speed counter	X	X	X	X	X	X	X	X	X	X	X
Position control	X	X	X	X	X	X	X	X	X	X	—
Quadrature encoder inputs	X	X	X	X	X	X	X	X	X	X	—
AC inputs	X	X	X	X	—	—	—	—	—	—	X
EEPROM loader	—	—	—	—	X	X	X	X	X	X	X
Temperature sensor input	X	X	X	X	X	X	X	X	X	X	—
DeviceNet slave	X	X	X	X	X	X	X	X	X	X	—

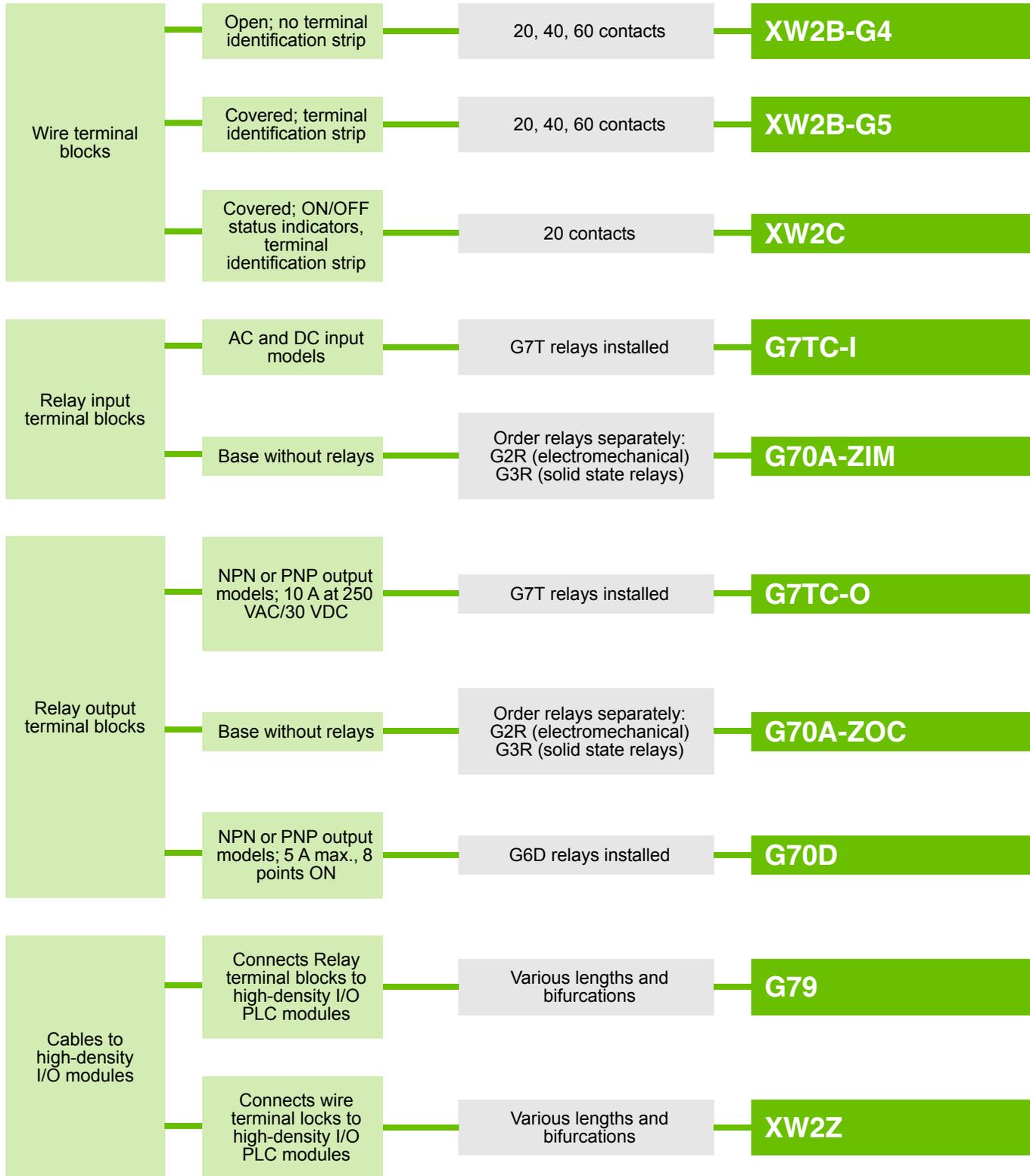
## Selection Guide

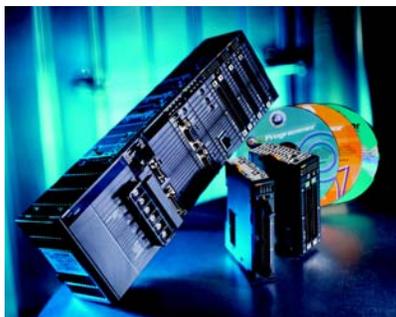
### Wiring Solutions



## Selection Guide

### Wiring Solutions





## Big PLC Capabilities in Space-Saving Micro Size

Get big PLC performance from a product the size of the smallest micro controller on the market. Omron's CJ1/CJ1-M requires just 40% of the panel space of traditional mid-size PLCs. Processor speeds and I/O counts exceed the performance of most rack style controllers to provide the highest level of control and productivity. The communication options associated with larger PLC platforms are all available on CJ1/CJ1-M. Omron's unique FINS protocol transparently ties Ethernet, Controller Link, serial and device level networks together for data exchange and programming. The CJ1/CJ1-M uses CX-Programmer software, the same program development and monitoring package supporting the entire Omron PLC product line.

### CJ1/CJ1-M Series PLCs

- **One platform can meet all your control needs:** The CJ1 platforms can be scaled for systems from simple to the most sophisticated
- **60 to 40% smaller** than typical mid-size PLCs, CJ1 frees up panel space without sacrificing performance
- **Slim I/O modules connect module-to-module** using simple locking connectors
- **Rack-less design** eliminates the need for a PLC rack, simplifying configuration and lowering system costs
- **Control up to 2560 I/O:** typical of mid-sized PLC products
- Fast processor speeds as low as 20 nanoseconds per basic instruction
- **Flash Memory Cards** store up to 512 MB for easy program transfer and data storage
- **Ethernet, DeviceNet, Ethernet/IP, CompoNet and Controller Link** communications supported
- **Industry-leading networking:** Omron's FINS protocol routes data across networks with low setup requirements
- Conforms to CE; UL and cUL approved, Class I, Div. 2 Hazardous Locations

The CJ PLC conforms to the IEC61131-3 programming languages including: Function Block, Structured Text, Ladder, Instruction List and Sequential Function Chart. Hundreds of pre-tested Omron Function Block Libraries reduce machine development time.

#### Shipping Industry Standards:

Certified by UL, cUL, CE, DNV, GOST-R, LR, BV, and ABS

## Mid-Size Rack PLC

The CS1 combines the functionality of large PLCs and the extensive communication connectivity of "open" and PC-based control solutions into a powerful mid-sized package. With support for multiple network types and modules within one system, CS1 can serve as a gateway within a plant environment. The high-speed processor allows basic instruction execution times of 0.02 microseconds to meet your production speed requirements for years to come.

### CS1 Series PLCs

Seven features increase productivity at both machine and plant levels:

- **Duplex Capability** provides redundant CPU, Power Supply and Communications Units that can be replaced under power with "bumpless" transfer and restoration to primary unit. Basic and Special I/O units can also be replaced under power.
- **Enhanced design and development environment** using CX-Programmer allows data entry and program development by importing Microsoft® Excel symbols and comments, and mnemonic programs from a text editor like Notepad.
- **Powerful information management** allows program storage/data transfer by flash memory cards and the sending of customized email messages, error log, production data to a desired individual's PC, pager or other device.
- **Flexible communications and connectivity** offer fast, powerful and open connections to your automation environment by supporting Ethernet Version-2, ControllerLink, DeviceNet, Profibus-DP and CompoNet network types. CS1 supports up to 34 serial connections allowing interface with Omron and third-party field devices, and software support to create custom communication sequences to interface with field devices.
- **Superior performance** by dual RISC processors provides high-speed I/O bus exchange and dedicated scans of logic for up to 5120 local I/O points. Program memory up to 250 K steps with up to 448 K words of data memory on board supports complex functions including floating point math.
- **Extensive up-time maintenance functionality** includes access to module revision data, program tasks and data memory information of multiple controllers through PC connections; logging up to 20 of the most recent errors with time stamp; and a data trace function for monitoring selected addresses on a scheduled or cyclic time chart basis.
- **Easy migration from existing Omron systems.** A dual bus I/O backplane supports both CS1 and C200H I/O modules; CS1 connects directly to existing C200H Alpha and CVM1 network types; and CX-Programmer software has a program conversion utility to convert existing program files to the open channel assignment.
- **Conforms to CE, UL and cUL, Class I, Div.2 Hazardous Locations**

The CS PLC conforms to the IEC61131-3 programming languages including: Function Block, Structured Text, Ladder, Instruction List and Sequential Function Chart. Hundreds of pre-tested Omron Function Block Libraries reduce machine development time.

#### Shipping Industry Standards:

Certified by UL, cUL, CE, DNV, GOST-R, LR, BV, and ABS

# Programmable Controllers

OMRON



	CS1 Series	CJ1 Series	CJ1M Series
<b>Features</b>	<ul style="list-style-type: none"> <li>• Duplex How-Swap CPU's and networks</li> <li>• Fast execution times</li> <li>• Variety of I/O and communications options including Ethernet and Protocol Macro</li> <li>• Process Loop Control CPUs</li> </ul>	<ul style="list-style-type: none"> <li>• Ultra-compact "rackless" interlocking design</li> <li>• High-end processors with a variety of I/O and communications options including Ethernet</li> <li>• Process Loop Control CPUs</li> </ul>	<ul style="list-style-type: none"> <li>• "Rackless" interlocking design</li> <li>• Used for simpler applications with fewer I/O and memory requirements</li> <li>• 10/100 MB Ethernet built-in CPUs</li> </ul>
<b>Number of available CPU's</b>	15	7	9
<b>Control method</b>	Stored program	Stored program	Stored program
<b>Programming method</b>	Ladder program	Ladder program	Ladder program
<b>Number of instructions</b>	400+	400+	400+ pulse I/O instructions
<b>Program memory capacity</b>	Up to 250k words	Up to 250k words	Up to 20k words
<b>Execution time (basic inst.)</b>	As low as 0.06 μs	As low as 0.06 μs	0.3 μs
<b>Data memory</b>	Up to 448k words	Up to 448k words	Up to 32k words
<b>Local I/O capacity</b>	Up to 5120 + RIO*	2560 + RIO*	Up to 640
<b>Communications ports included</b>	Peripheral port and RS-232C	Peripheral port and RS-232C	Peripheral port and RS-232C
<b>Memory storage and backup</b>	Up to 512 MB (Flash) EEPROM, Battery	Up to 512 MB (Flash) EEPROM, Battery	Up to 512 MB (Flash) EEPROM, Battery
<b>Power supplies</b>	100 to 240 VAC, 24 VDC	100 to 240 VAC, 24 VDC	100 to 240 VAC, 24 VDC
<b>Number of expansion racks</b>	Up to 7 racks; 3, 5, 8, 10 slots	Up to 3	Up to 1
<b>Special I/O</b>	Analog I/O, Temperature Control, MotionControl, Position Control, Process Control,RFID Control, High-Speed Counter and many others	Analog I/O, Temperature Control, MotionControl, Position Control, Process Control,RFID Control, High-Speed Counter and many others	Analog I/O, Temperature Control, MotionControl, Position Control, Process Control,RFID Control, High-Speed Counter and many others
<b>Communication and networking</b>	Ethernet, Ethernet/IP, DeviceNet Master/Slave, Controller Link, Profibus-DP Master/Slave, RS-232C, RS-422/485, CompoNet, Protocol Macro, NTLINK, Host Link, Serial Gateway, CompoWay/F	Ethernet, Ethernet/IP, DeviceNet Master/Slave, Controller Link, Profibus-DP Master/Slave, RS-232C, RS-422/485, CompoNet, Protocol Macro, NTLINK, Host Link, Serial Gateway, CompoWay/F	Ethernet, Ethernet/IP, DeviceNet Master/Slave, Controller Link, Profibus-DP Master/Slave, RS-232C, RS-422/485, CompoNet, Protocol Macro, NTLINK, Host Link, Serial Gateway, CompoWay/F, Serial PLCLink
<b>Suggested programming tools, peripheral devices</b>	CX-One Software, NS Series HMI	CX-One Software, NS Series HMI	CX-One Software, NS Series HMI
<p><b>Note:</b> * "RIO" refers to Remote I/O capacity, utilizing Omron options for remote or distributed I/O such as DeviceNet or CompoNet I/O.</p>			

# Programmable Controllers

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	CP1L-L	CP1L-M	CP1H Series
<b>CPU I/O</b>	10, 14, 20	30, 40, 60	20, 40
<b>Max. I/O points (with expansion)</b>	60	180	320; expands with CPM1A and CJ1 Digital I/O, Special I/O and Networking modules
<b>AC power supply</b>	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC
<b>DC power supply</b>	24 VDC	24 VDC	24 VDC
<b>Memory backup</b>	Yes	Yes	Yes
<b>Max. program cap.</b>	5 k	10 k	20 k steps
<b>Basic instruction execution time</b>	.55 μs	.55 μs	0.1 μs
<b>No. of instructions</b>	400+	400+	400+
<b>AC inputs</b>	No	No	No
<b>DC inputs</b>	Yes	Yes	Yes
<b># of inputs (max.)*</b>	36	96	192
<b># of outputs (max.)*</b>	24	64	128
<b>Relay outputs*</b>	24 max.	64 max.	128
<b>Transistor outputs*</b>	24 max.	64 max.	128
<b>High-speed counter</b>	4 x 100 kHz	4 x 100 kHz	Up to 1 MHz; use up to 4 axes for inverter positioning and drive chain control**
<b>Pulse output</b>	2 x 100 kHz	2 x 100 kHz	Up to 1 MHz; use up to 4 axes for servo motion control**
<b>Analog I/O</b>	1-(0-10 V) 8 bit	1-(0-10 V) 8 bit	4 inputs/2 outputs***
<b>Real time clock</b>	Yes	Yes	Yes
<b>External interrupts</b>	2****, 4	6	6**, 8
<b>Network connectivity</b>	RS-232C/422, Hostlink, 1:1 NT Link, CompoBus/S Slave, DeviceNet Slave, Profibus-DP, SlaveSerial Gateway, CompoWay/F, Modbus-RTU Easy Master for inverter, PC Link (Master or Slave), 1:1 Link (Master or Slave)	RS-232C/422, Hostlink, 1:1 NT Link, CompoBus/S Slave, DeviceNet Slave, Profibus-DP, SlaveSerial Gateway, CompoWay/F, Modbus-RTU Easy Master for inverter, PC Link (Master or Slave), 1:1 Link (Master or Slave)	Ethernet, Ethernet/IP, DeviceNet Master/Slave, Controller Link, Profibus-DP Master/Slave, RS-232C, RS-422/485, CompoNet, Protocol Macro, NTLINK, Host Link, Serial Gateway, CompoWay/F, Modbus-RTU Easy Master for inverter speed control, PC Link (Master or Slave), 1:1 Link (Master or Slave)
<b>Suggested programming tools</b>	CX-One software, CX-Programmer Jr.	CX-One software, CX-Programmer Jr.	CX-One software, CX-Programmer Jr.
<b>Built-in comm. port</b>	USB, optional 1 x RS232, RS422/485 for CP1L-L14,20. USB only for CP1L-L10	USB, 2 x optional RS232, RS422/485	USB and peripheral ports; RS-232C, RS-485 (optional)
<b>Approvals</b>	UL, cUL, CE; UL Class 1, Division 2, Groups A, B, C, and D for use in hazardous locations	UL, cUL, CE; UL Class 1, Division 2, Groups A, B, C, and D for use in hazardous locations	UL, cUL, CE; UL Class 1, Division 2, Groups A, B, C, and D for use in hazardous locations

**Note:** \* Indicates CPU with expansion  
 \*\* CP1H-Y models  
 \*\*\* CP1H-XA models with built-in analog I/O  
 \*\*\*\* CP1L-L10 models only

# Programmable Controllers

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	CPM2C	CPM2C-S	ZEN-V2
<b>CPU I/O</b>	10, 20, 32	10	10, 20
<b>Max. I/O points (with expansion)</b>	192	96 local expansion 256 remote expansion	34 (10 I/O CPUs) 44 (20 I/O CPUs)
<b>AC power supply</b>	100 to 240 VAC	—	100 to 240 VAC
<b>DC power supply</b>	24 VDC	24 VDC	24 VDC
<b>Memory backup</b>	Yes	Yes	Yes
<b>Max. program cap.</b>	4 K	4 K	96 lines
<b>Basic instruction execution time</b>	0.64 $\mu$ sec	0.64 $\mu$ sec	0.85 ms
<b>No. of instructions</b>	119	119	15
<b>AC inputs</b>	Yes (with relay terminal)	Yes (with relay terminal)	Yes
<b>DC inputs</b>	Yes	Yes	Yes
<b># of inputs (max.)*</b>	96 max.	186 max.	24 max.
<b># of outputs (max.)*</b>	96 max.	180 max.	20 max.
<b>Relay outputs (CPU)*</b>	48 max.	152 max.	20 max.
<b>Transistor outputs*</b>	96 max.	180 max.	20 max.
<b>High-speed counter</b>	20 kHz	20 kHz	No
<b>Pulse output</b>	10 kHz (Synchronized)	10 kHz	No
<b>Analog I/O</b>	Expansion Module	Expansion and remote	2 points
<b>Real time clock</b>	Yes	Yes	Yes
<b>External interrupts</b>	2, 4	2	No
<b>Network connectivity</b>	RS-232C/422, Hostlink, 1:1 NT Link, CompoWay/F, CompoBus/S Slave	RS-232C/422, Hostlink, 1:1 NT Link, CompoWay/F, CompoBus/S Master CompoBus/S Slave DeviceNet Slave	No
<b>Suggested programming tools</b>	CX-One software, CX-Programmer Jr. software	CX-One software, CX-Programmer Jr. software	ZEN Support Software
<b>Built-in comm. port</b>	Peripheral/RS-232C	Peripheral/RS-232C, DeviceNet	RS-485 available
<b>Approvals</b>	UL/CSA, CE	UL/CSA, CE	UL/CSA, CE
	<b>Note:</b> * Indicates CPU with expansion		

# Programmable Controllers

## Relay Terminal Blocks



	G7TC & P7TF	G70A	G70D
<b>Features</b>	<ul style="list-style-type: none"> <li>G7TC Relay Blocks with G7T installed &amp; P7TF Relay Bases: 8 point output &amp; 16 point input and output relay blocks</li> <li>All connect via industry standard flat ribbon cable connectors to anyone's controller</li> <li>Standard electromechanical and solid state relays are available in a wide variety of coil voltages</li> </ul>	<ul style="list-style-type: none"> <li>10 Amp relay blocks: 16 point input and output relay blocks</li> <li>Up to 10 A switching capacity and both SPST and SPDT configurations available</li> <li>All connect via industry standard flat ribbon cable connectors to anyone's controller</li> <li>Electromechanical and solid state relays are available in a wide variety of coil voltages</li> </ul>	<ul style="list-style-type: none"> <li>Miniature relay output blocks: Miniature PCB style electro-mechanical and solid state relays</li> <li>Significant space savings for relay output blocks and switching capacity up to 3 A</li> <li>All versions connect via industry standard flat ribbon cable connectors to anyone's controller</li> </ul>
<b>Types available</b>	Input & output	Input & output	Output
<b>No. of I/O</b>	8 & 16 pt	16 pt	16 pt
<b>Max. switching (amps)</b>	5 A	10 A	3 A
<b>LED indication (base)</b>	Yes	No*	Yes
<b>Switching</b>	SPST	SPST & SPDT	SPST
<b>Surge suppression</b>	Yes	No*	Yes
<b>Connection method</b>	Snap in cable connector	Snap in cable connector	Snap in cable connector
<b>Relays used</b>	EMR=G7T; SSR=G3TA	EMR=G2R; SSR=G3R	EMR=G6D; SSR=G3DZ
<b>Primary advantage</b>	Large selection	Switching amperage	Compact size

**Note:** \* LED indication and Surge Suppression are not built into the G70A base, but both are available in selected relays the plug into the base.

## Wiring Solutions



	XW2E	XW2B	XW2C	XW2Z
<b>Features</b>	<ul style="list-style-type: none"> <li>Three-tiered input terminal block for Omron PLCs</li> <li>Individual common terminals simplify wiring</li> </ul>	<ul style="list-style-type: none"> <li>Wide variety of wiring terminals that connect to a controller via industry-standard ribbon cable connectors</li> <li>M3 or M3.5 screw terminals</li> </ul>	<ul style="list-style-type: none"> <li>16-point input with screw terminals for Omron PLCs</li> </ul>	<ul style="list-style-type: none"> <li>Single, bifurcated, and threeconnector cables for XW2B screw terminal blocks, XW2C input screw terminals, and motion/ servo applications*</li> </ul>
<b>No. of contacts</b>	16	20, 34, 40, 50, or 60	16, NPN input; (-) common	N/A
<b>Cables used</b>	XW2Z-□□□□D, bifurcated 20 contacts for Omron PLCs XW2Z-□□□□N, bifurcated 20 contacts for Omron PLCs	XW2Z-□□□□A, single 20 contacts for Omron PLCs XW2Z-□□□□B, 40 contacts for Omron PLCs XW2Z-□□□□H1, 60 contacts for Omron PLCs XW2Z-□□□□F, 20 contacts with crimp hooks; connects to any control device	XW2Z-□□□□A, single 20 contacts for Omron PLCs XW2Z-□□□□D, bifurcated 20 contacts for Omron PLCs	N/A
<b>Primary advantage</b>	Simplifies wiring for 16 inputs	Simplifies wiring up to 60 inputs or outputs with a single, connectorized cable	Connects 16 inputs to Omron PLCs; Shows input status with LEDs	Connects up to 48 points to wiring blocks

**Note:** \* For motion/servo see accessory information with servo and motion modules



# Programmable Controllers — Rack Style

# CS1

Quick Link  
H222

## The Solution for Sustained Productivity Gains in Manufacturing

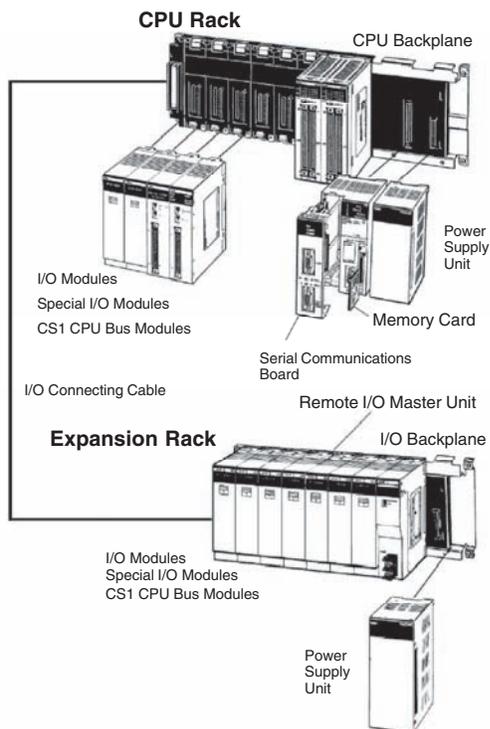
- Ultra fast processing speed: basic instruction execution as fast as 20 ns
- Large local digital I/O capacity of 5,120 points
- Up to 640 analog input/output points for processing applications
- Extensive instruction set involves most control tasks in a minimum of steps
- Large built-in data memory up to 448 kwords
- Program memory up to 250K steps (1 MB)
- Use Compact Flash Memory Cards for up to 512 MB of removable data storage for backup and data logging
- E-mailing using Internet (SMTP protocol)
- Supports a wide variety of communication platforms:
  - Open fieldbus Ethernet
  - DeviceNet
  - Profibus-DP
  - Proprietary Controller Link
  - CompoNet
  - CompoWay/F master
  - Modbus-ASCII master, Modbus-RTU master/slave
- Fully forward- and backward-compatible with Omron's popular C200H platform
- Protocol Macro function creates custom serial communication sequences eliminating trial-by-error development of handshaking scripts
- All Symbols & Comments are stored locally in the CPU's Flash Memory



- High-speed throughput and easily expandable data exchange
- All communication modules use Omron's FINS message routing and formatting tools for fast, expandable, and transparent exchange of data regardless of network type
- Over 150 different I/O, communication and special function modules available
- High-density I/O modules shorten installation time and increased accuracy with pre-terminated cables and wire terminal or relay terminal blocks
- Open fieldbus systems like DeviceNet and Profibus-DP allow the addition of another 10,000 remote I/O modules
- Seamlessly combine continuous path motion control or point-to-point positioning with high-speed sequencing operations using special function I/O modules
- Fast 20 ns per instruction processing speeds help efficiently manage all the data
- 2 Built-in communication ports (RS232 and Peripheral Port for programming)
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details

## Configuring a CS1 System

### Basic Configuration



#### CPU Rack

A CS1 system consists of a power supply, a CPU backplane, a CPU and up to 10 basic I/O, special I/O and CS1 CPU bus units.

#### Expansion Racks

The expansion rack contains a power supply, an expansion I/O backplane, basic I/O units, special I/O units and CS1 CPU bus units.

### CPU Selection

All CPUs contain a built-in Peripheral port and RS-232C port.

Number of I/O points	Program capacity	Data memory storage	Max. I/O expansion racks per CPU	Max. I/O modules per CPU	LD Instruction processing speed	Current consumption	Model
960	10K steps	64K words	2	30	0.04 μs	0.78 A, 5V	CS1G-CPU42H
	20K steps						CS1G-CPU43H
1280	30K steps		3	40			CS1G-CPU44H
5120	60K steps	128K words	7	80	0.02 μs	0.82 A, 5 V	CS1G-CPU45H
	20K steps	64K words					CS1H-CPU63H
	30K steps						CS1H-CPU64H
	60K steps	128K words					CS1H-CPU65H
	120K steps	256K words					CS1H-CPU66H
	250K steps	448K words					CS1H-CPU67H

### CPU Backplanes

Number of slots	Expandable	CS1/C200H module compatibility	Current consumption	Model
2	No	CS1 Only	0.11 A, 5 V	CS1W-BC022
3	Yes			CS1W-BC032
5				CS1W-BC052
8				CS1W-BC082
10				CS1W-BC102
2	No	CS1/C200H		CS1W-BC023
3	Yes			CS1W-BC033
5				CS1W-BC053
8				CS1W-BC083
10				CS1W-BC103

## Power Supply

Calculate the total current consumption for basic I/O, special I/O, and CS1 CPU bus units to determine which power supply to use. **The same power supply units are used for both CPU and expansion racks.**

Input voltage	Output capacity, 5 VDC	Output capacity, 26 VDC	Max. output capacity	Extra functions	Model
100 to 120 VAC or 200 to 240 VAC	4.6 A	0.62 A	30 W	None	C200HW-PA204
				Maintenance monitor	C200HW-PA204C
				Service power output, 24 VDC, 0.8 A	C200HW-PA204S
				Run status output (SPST relay)	C200HW-PA204R
24 VDC				None	C200HW-PD024
100 to 120 VAC or 200 to 240 VAC	9.0 A	1.3 A	45 W	Run status output (SPST relay)	C200HW-PA209R

## Power and Expansion Selection

The following table shows the maximum current and power that can be supplied by Power Supply Modules on CPU Racks and Expansion Racks (both CS1 Expansion Racks and C200H Expansion I/O Racks).

Power supply module	Max. current consumption			Max. total power consumption
	5-V group	26-V group	24-V group	
C200HW-PA204	4.6 A	0.6 A	None	30 W
C200HW-PA204C			0.8 A	
C200HW-PA204S				
C200HW-PA204R				
C200HW-PD024			None	
C200HW-PA209R	9 A	1.3 A		45 W

### Be sure both Condition 1 and Condition 2 are met.

#### Condition 1: Maximum Current Supply

- Current required at 5 VDC by all modules (A)  $\leq$  Max. Current shown in table
- Current required at 26 VDC by all modules (B)  $\leq$  Max. Current shown in table
- Current required at 24 VDC by all modules (C)  $\leq$  Max. Current shown in table

#### Condition 2: Maximum Total Current Supply

- $A \times 5 \text{ VDC} + B \times 26 \text{ VDC} + C \times 24 \text{ VDC} \leq$  Max. Power shown in table

## Dimensions

Item	Dimensions (H x W x D mm)	Model
CPUs	134 x 71 x 104.3	CS1G-CPU□□H CS1H-CPU□□H
CPU backplanes	157 x 198.5 x 22.2	CS1W-BC022/BC023
	130 x 260 x 22.2	CS1W-BC032/BC033
	130 x 330 x 22.2	CS1W-BC052/BC053
	130 x 435 x 22.2	CS1W-BC082/BC083
	130 x 505 x 22.2	CS1W-BC102/BC103
Power supply module	130 x 54 x 105.2	C200HW-PA204/PA204S/PA204R/PD024
	130 x 54 x 111	C200HW-PA204C
	130 x 58 x 135.2	C200HW-PA209R

## Expansion Backplanes

The CS1 system can be expanded using CS1 expansion racks, C200H expansion racks, or CS1 long distance expansion racks. The max. number of expansion racks in any CS1 system will depend on the combination of these expansion racks.

Type	Specifications	CS1/C200H module compatibility	Current consumption, 5 VDC	Model
CS1 expansion I/O	3 slots	CS1/C200H	0.23 A	CS1W-BI033
	5 slots			CS1W-BI053
	8 slots			CS1W-BI083
	10 slots			CS1W-BI103
C200H expansion I/O	3 slots	C200H	0.15 A	C200HW-BI031
	5 slots			C200HW-BI051
	8 slots			C200HW-BI081-V1
	10 slots			C200HW-BI101-V1
I/O interface module	Connects CS1 Expansion Racks. Must be together with I/O Control Module to connect Long-distance Expansion racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.	CS1 Only	0.23 A	CS1W-II102
I/O control unit	Connects to CS1 Expansion Racks (two terminating resistors included). Must be used together with I/O Interface Modules to connect Long-Distance Expansion Racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.		0.92 A	CS1W-IC102

## Expansion Guidelines

Combination of expansion racks	CS1 expansion racks only	CS1 and C200H expansion racks	CS1 long distance expansion racks	CS1 expansion rack and CS1 long distance expansion rack	C200H expansion rack
Max. expansion racks per CPU	7	6 (max. three C200H expansion racks)	7	7 (one CS1 expansion rack and six long distance)	3
Max. distance from CPU rack	12 m	12 m	50 m	50.7 m	12 m

## Expansion Cables

Type	Specifications	Cable length	Model
CS1 I/O connecting cables	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes. (See Note)	0.3 m	CS1W-CN313
		0.7 m	CS1W-CN713
		2 m	CS1W-CN223
		3 m	CS1W-CN323
		5 m	CS1W-CN523
		10 m	CS1W-CN133
		12 m	CS1W-CN133-B2
CS1 to C200H I/O connecting cables	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes	0.3 m	CS1W-CN311
		0.7 m	CS1W-CN711
		2 m	CS1W-CN221
		3 m	CS1W-CN321
		5 m	CS1W-CN521
		10 m	CS1W-CN131
C200H I/O connecting cables	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes	0.3 m	C200H-CN311
		0.7 m	C200H-CN711
		2 m	C200H-CN221
		5 m	C200H-CN521
		10 m	C200H-CN131

**Expansion Cables (Continued)**

Type	Specifications	Cable length	Model
Long-distance connecting cables	For Long-distance Expansion Racks Connects the I/O Control Module to the I/O Interface Modules or connects one I/O Interface Module to the next I/O Interface Module.	0.3 m	CV500-CN312
		0.6 m	CV500-CN612
		1 m	CV500-CN122
		2 m	CV500-CN222
		3 m	CV500-CN322
		5 m	CV500-CN522
		10 m	CV500-CN132
		20 m	CV500-CN232
		30 m	CV500-CN332
		40 m	CV500-CN432
		50 m	CV500-CN532

**Note:** When using a CS1W-CN313 or CS1W-CN713 I/O Connecting Cable with a CS1□-CPU□□H CPU Module, use only Cables produced on or after September 20, 2001 (production number 2091). Cables with no production number, a 6-digit production number, or produced before September 20, 2001, cannot be used.

**Dimensions**

Item	Dimensions (H x W x D mm)	Model
CS1 series expansion backplanes	130 x 260 x 22.2	CS1W-BI032/33
	130x 330 x 22.2	CS1W-BI052/53
	130 x 435 x 22.2	CS1W-BI082/83
	130 x 505 x 22.2	CS1W-BI102/103
	130 x 189 x 17	C200HW-BI031
	130 x 259 x 17	C200HW-BI051
	130 x 364 x 17	C200HW-BI081-V1
	130 x 434 x 17	C200HW-BI101-V1
I/O interface module	130 x 34.5 x 123	CS1W-II102

**Memory Cards**

Compact Flash memory cards are used to download recipes, replace PLC program while operating, auto-boot the PLC upon power up.

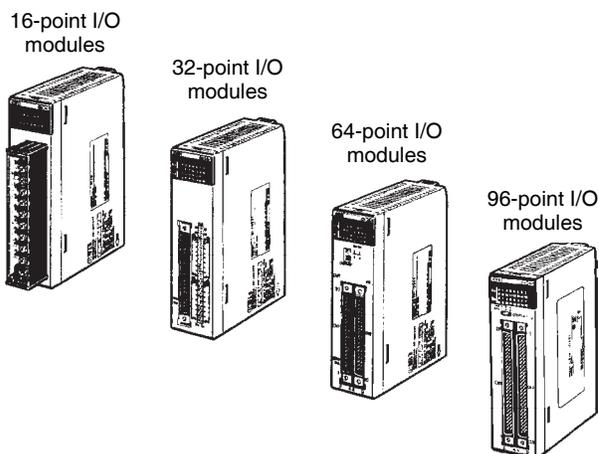
Item	Description	Current consumption	Model
Flash memory card	128 MB	—	HMC-EF183
	256 MB		HMC-EF283
	512 MB		HMC-EF583
Memory card adapter	Mounts memory card to fit the PCMCIA card slot on a computer		HMC-AP001

# Programmable Controllers — Rack Style

## CS1-I/O Modules

### Digital I/O Modules with Up to 96 Points per Module

- 8 to 96 I/O per module
- Input, output and mixed I/O modules available
- AC and DC input modules
- Relay, triac and transistor (sinking or sourcing) modules
- High-density modules help reduce control panel size
- 8- and 16-point modules have screw terminal strips removable for fast servicing without re-wiring
- 32- and 64-point modules are equipped with standard 40-pin flat ribbon cable connectors; 96-point modules have 56-pin connectors
- Use prefabricated cables and wiring terminals for easy interfacing to high-density I/O



## CS1 Programmable Controllers

### Input Modules

Type	Points	Rating	Connection	Current consumption	Model
DC input	16 inputs	7 mA, 24 VDC	Terminal block	0.10 A, 5 VDC	CS1W-ID211
	32 inputs	6 mA, 24 VDC	Fujitsu connector	0.15 A, 5 VDC	CS1W-ID231
	64 inputs			0.20 A, 5 VDC	CS1W-ID261
	96 inputs	5 mA, 24 VDC			CS1W-ID291
High-speed DC input	16 inputs	7 mA, 24 VDC; 0.1 ms minimum pulse width	Terminal block	0.10 A, 5 VDC	CS1W-IDP01
AC input		100 to 240 VAC		0.11 A, 5 VDC	CS1W-IA111
		100 to 240 VAC, EC compliant		0.01 A, 5 VDC	C200H-IA122
		10 mA, 200 to 240 VAC		0.11 A, 5 VDC	CS1W-IA211
AC/DC inputs	8 points	12 to 24 VAC/VDC		0.01 A, 5 VDC	C200H-IM211
	16 points	24 VAC/VDC			C200H-IM212

**Note:** C200H Input Modules work with the CS1: C200H-ID212/215/216/217/218/219; C200H-IA111/121/211/221/222.

### Output Modules

Type	Outputs	Maximum switching capacity	Connection	Current consumption 26 V	Current consumption 5 VDC	Model
Relay contact output	8 pts (independent)	2 A, 250 VAC	Removable terminal block	0.006 A for each point ON at the same time	0.10 A	CS1W-OC201
	16 pts				0.13 A	CS1W-OC211
	5 pts			0.075 A for 8 points ON at the same time	0.01 A	C200H-OC223
	8 pts					C200H-OC221
	12 pts					C200H-OC222

Output Modules (Continued)

Type	Outputs	Maximum switching capacity	Connection	Current consumption 26 V	Current consumption 5 VDC	Model	
Transistor output	16 pts	12 to 24 VDC, 0.5 A/pt, 8 A/unit sinking	Removable terminal block	—	0.17 A	CS1W-OD211	
		24 VDC, 0.5 A/pt, 5 A/unit, sourcing, load short protection, alarm				CS1W-OD212	
	32 pts	12 to 24 VDC, 0.5 A/pt, 5 A/unit sinking	Fujitsu connector		0.27 A	CS1W-OD231	
		24 VDC, 0.5 A/pt, 5 A/unit, sourcing, load short protection, alarm				CS1W-OD232	
	64 pts	12 to 24 VDC, 0.3 A/pt, 6.4 A/unit sinking			0.39 A	CS1W-OD261	
		24 VDC, 0.3 A/pt, 6.4 A/unit, sourcing, load short protection, alarm				CS1W-OD262	
	96 pts	12 to 24 VDC, 0.1 A sinking, 7.2 A/unit			0.48 A	CS1W-OD291	
		12 to 24 VDC, 0.1 A sourcing, 7.2 A/unit				CS1W-OD292	
	8 pts	12 to 48 VDC, 1 A sinking	Removable terminal block		0.14 A	C200H-OD411	
		24 VDC, 2.1 A, sinking				C200H-OD213	
		24 VDC, 0.8 A, sourcing, load short protection				C200H-OD214	
		5 to 24 VDC, 0.3 A sourcing				C200H-OD216	
	12 pts	24 VDC, 0.3 A, sinking			0.075 A for 8 points ON at the same time	0.01 A	C200H-OD216
		5 to 24 VDC, 0.3 A sourcing			—	0.16 A	C200H-OD211
	16 pts	24 VDC, 1.0 A, sourcing, load short protection			0.075 A for 8 points ON at the same time	0.01 A	C200H-OD217
					—	0.16 A	C200H-OD21A
32 pts 64 pts 32 pts (128-pt dynamic outputs possible)	16 mA at 4.5 V to 100 mA at 26.4 V, sinking	Fujitsu connector	0.27 A	C200H-OD218			
			0.48 A	C200H-OD219			
				C200H-OD215			
Triac output	8 pts	1.2 A at 250 VAC, 50/60 Hz	Removable terminal block	0.23 A max. (0.07 + 0.02 x No. of points ON)	CS1W-OA201		
					CS1W-OA211		
	16 pts	0.5 A at 250 VAC, 50/60 Hz		0.406 A max. (0.07 + 0.02 x No. of points ON)	C200H-OA224		
				0.27 A	C200H-OA222V		
12 pts	0.3 A at 250 VAC, 50/60 Hz	0.20 A					

## Mixed I/O Modules

Name	Inputs/Outputs	Input voltage	Maximum switching capacity	Connection	Current consumption 26 V	Current consumption 5 VDC	Model
DC input/transistor output	32 inputs/32 outputs	24 VDC	0.3 A at 12 to 24 VDC, sinking	Fujitsu connector	—	0.27 A	CS1W-MD261
			0.3 A at 24 VDC, sourcing, load short protection, alarm				CS1W-MD262
	48 inputs/48 outputs		0.1 A at 12 to 24 VDC, sinking			0.35 A	CS1W-MD291
	16 inputs/16 outputs		0.1 A at 12 to 24 VDC, sourcing			0.18 A	CS1W-MD292
			16 mA at 4.5 V to 100 mA at 26.4 VDC, sinking				C200H-MD215 (See note 2)
12 VDC	50 mA at 24 VDC, sinking	C200H-MD115 (See note 2)					

**Note:** 1. In addition to the normal I/O functions, C200H high-density I/O units (special I/O units) provide the following functions.

- Dynamic I/O (except for the OD501/OD215): Instead of normal static inputs and normal static outputs, dynamic outputs and dynamic inputs are used to increase I/O capacity to 128 inputs and 128 outputs through the use of strobe signal outputs. These functions can be used to reduce wiring to devices with more digits, such as displays and keyboards.
- High-speed inputs (except OD501/OD215): eight of the inputs can be set as high-speed inputs to accurately input short pulses from devices like photomicrosensors.

2. High-speed inputs, 128-pt dynamic outputs possible.

## Interrupt Module

Classification	Input voltage	Points	Input pulse width	Connection	Allocations (CIO 0319 to CIO 2000)	Current consumption	Model
CS1W basic input	24 VDC	16 inputs	ON: 0.1ms min. OFF: 0.5 ms min.	Removable terminal block	16 bits	0.10 A	CS1W-INT01

**Note:** The interrupt function can be used with the CPU backplane only (up to 2 Interrupt input units can be mounted to a CPU rack.)

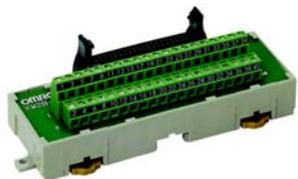
## Dimensions

Item	Dimensions (H x W x D)	Model
C200H 10-pin terminal blocks	130 x 35 x 101	C200H-IA121 / IA221 / ID211 / IM211 / OA221 / OC221 / OC223 / OD216 / OD213 / OD411
	130 x 35 x 121	C200H-OA223
C200H units 19-pin terminal blocks	130 x 35 x 128	C200H-IA122 / IA222 / ID212 / IM212 / OA222V / OA224 / OC222 / OD211 / OD217 / OD21A
CS-Series 20-pin terminal blocks	130 x 35 x 124	CS1W-IA111 / IA211 / ID211 / INT01 / IDP01 / OD211 / OD212 / OA201 / OA211 / OC201 / OC211
CS-Series w/ One 40-pin connector	130 x 35 x 101	CS1W-ID231 / OD231 / OD232
CS-Series w/ Two 40-pin connectors		CS1W-ID261 / OD261 / OD262 / MD261 / MD262
CS-Series w/ Two 56-pin connectors		CS1W-ID291 / OD291 / OD292 / MD291 / MD292
CS-Series Fujitsu connector		CS1W-MD215 / MD115

## Terminal Blocks and Connection Cables

### Terminal Blocks

XW2B-□□G4 (M3 screws, no terminal identification strip)



XW2B-□□G5 (M3.5 screws, protected terminal identification strip)



### Connection Cables



The XW2Z pre-terminated connection cables eliminate wiring errors and simplify installation and servicing. Add cable length to the model number where □□□ is shown: 050 = 0.5 m, 100 = 1 m, 200 = 2 m, 500 = 5 m; other lengths are available.

### Input Modules

Module	Connector type	Terminal block model	Cable model
CS1W-ID211	Removable terminal block	Not required	Not required
CS1W-IDP01			
CS1W-IA111			
CS1W-IA211			
C200H-ID211			
C200H-IA121			
C200H-IA221			
C200H-IA122V			
C200H-IA222V			
C200H-IM211			
C200H-IM212			
CS1W-ID231			
CS1W-ID261	Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>	
CS1W-ID291	Two <b>XW2B-60G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□H-1</b> Two <b>XW2Z-□□□H-2</b> (for XW2B-40G5)	
C200H-ID501	Two <b>XW2B-20G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□A</b>	
C200H-ID111	Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>	

## Output Modules

Module	Connector type	Terminal block model	Cable model
CS1W-OC201	Removable terminal block	Not required	Not required
CS1W-OC211			
CS1W-OD211			
CS1W-OD212			
CS1W-OA201			
CS1W-OA211			
C200H-OC223			
C200H-OC221			
C200H-OC222			
C200H-OD411			
CS1W-OD231			
C200H-OD214			
C200H-OD216			
C200H-OD211			
C200H-OD217			
C200H-OD21A			
C200H-OA222V			
C200H-OA224			
CS1W-OD231	Fujitsu-compatible connector on module	<b>XW2B-40G4</b> or <b>XW2B-40G5</b>	<b>XW2Z-□□□B</b>
CS1W-OD232		<b>XW2B-40G4</b> or <b>XW2B-40G5</b>	<b>XW2Z-□□□B</b>
CS1W-OD261		Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>
CS1W-OD262		Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>
CS1W-OD291		Two <b>XW2B-60G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□H-1</b> Two <b>XW2Z-□□□H-2</b> (for XW2B-40G5)
CS1W-OD292		Two <b>XW2B-60G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□H-1</b> Two <b>XW2Z-□□□H-2</b> (for XW2B-40G5)
C200H-OD215		Two <b>XW2B-20G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□A</b>
C200H-OD218		<b>XW2B-40G4</b> or <b>XW2B-40G5</b>	<b>XW2Z-□□□B</b>
C200H-OD219		Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>
C200H-OD501		Two <b>XW2B-20G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□A</b>

# Programmable Controllers — Rack Style

# CS1-Special I/O

## Special I/O and Control Modules

Mixed analog I/O module  
CS1W-MAD44



High-speed counter modules for  
positioning CS1W-CT021/-CT041



Motion control module for  
4 axes CS1W-MC421



## CS1 Programmable Controllers

### Analog I/O Modules

Classification	I/O Capacity	I/O Isolation	I/O Ranges/types	Conversion time	Remarks	Current consumption	Model
Analog input units	4 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, +/- 10 V, 4 to 20 mA	1 ms/pt	—	0.13 A, 5 VDC 0.10 A, 26 VDC	CS1W-AD041-V1
	8 inputs		1 to 5 V, 0 to 5 V, 0 to 10 V, +/- 10 V, 4 to 20 mA				CS1W-AD081-V1
	4 inputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/ 4 pts	Built-in power supply for 2-wire transmission device, measure value alarms (HH, H, L, LL), other features	0.16 A, 5 VDC 0.16 A, 26 VDC	CS1W-PTW01
			1 to 5 V, 0 to 5 V, 0 to 10 V, +/- 10 V, 4 to 20 mA, 0 to 20 mA				CS1W-PDC01
			No-voltage semiconductor input: 0 to 20,000 pulses/s, Voltage input: 0 to 20,000 pulses/s, Contact input: 0 to 20 pulses/s				Built-in power supply, contact bounce filter, 4 instantaneous value alarms
	8 inputs	No	- 1 mA to 1 mA, 0 to 1 mA	200 ms/ 8 pts	Motor overdrive prevention, measure value alarms (H, L), other features	0.08 A, 5 VDC 0.08 A, 26 VDC	CS1W-PTR01
- 100 mA to 100 mA, 0 to 100 mV			Measured value alarms (H, L), other features				CS1W-PTR02
Analog output units	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, +/- 10 V, 4 to 20 mA	1 ms/pt	—	0.13 A, 5 VDC 0.18 A, 26 VDC	CS1W-DA041
	8 outputs		1 to 5 V, 0 to 5 V, 0 to 10 V, +/- 10 V				CS1W-DA08V
			4 to 20 mA				0.13 A, 5 VDC 0.25 A, 26 VDC
	4 outputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/ 4 pts	Output disconnection alarm, control output answerback input, other features	0.16 A, 5 VDC 0.16 A, 26 VDC	CS1W-PMV01
Analog mixed input/output unit	4 inputs and 4 outputs	No	Inputs: 1 to 5 V, 0 to 5 V, 0 to 10 V +/- 10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, +/- 10 V	1 ms/pt	—	0.20 A, 5 VDC 0.20 A, 26 VDC	CS1W-MAD44
	2 inputs and 2 outputs		Inputs: 1 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA				0.20 A, 5 VDC 0.10 A, 26 VDC

## High-Resolution Analog Input Modules

Classification	I/O Capacity	I/O Isolation	I/O Ranges/types	Conversion time	Remarks	Current consumption	Model
Analog input units	4 inputs	Yes	Thermocouple types B, E, J, K, L, N, R, S, T, U, W/Re5-26, PLII, +/- 100 mV	2 ms/4 pts, 10 ms/2 pts	Scaling (+/-32,000), process value alarms (HH, H, L, LL), other features	0.12 A, 5 VDC 0.08 A, 26 VDC	CS1W-PTS11
			Pt100 Ω (JIS, IEC) JPt100 Ω, Pt50 Ω, Ni508.4 Ω			0.12 A, 5 VDC 0.07 A, 26 VDC	CS1W-PTS12
			4 to 20 mA, 0 to 20 mA, 0 to 10 V, +/- 10 V, 0 to 5 V, +/- 5 V, 0 to 1.25 V, +/- 1.25 V, 1-5 V			0.12 A, 5 VDC 0.12 A, 26 VDC	CS1W-PDC11

## Temperature Sensor Inputs

Classification	I/O Capacity	I/O Isolation	Input types	Conversion time	Remarks	Current consumption	Model
Temperature Sensor Input	4 inputs	Yes	Thermocouple types B, E, J, K, N, R, S, T, +/- 80 mV DC auto range	150 ms/4 pts	Automatic range setting, measured value alarms (HH, H, L, LL) other features	0.15 A, 5 VDC 0.15 A, 26 VDC	CS1W-PTS01-V1
			Pt100 (JIS, DIN, ISO) JPt100	100 ms/4 pts			CS1W-PTS02
			Ni508Ω				CS1W-PTS03
		No	Thermocouple types K, J	4.8 s max.	—	0.45 A	C200H-TS001
			Thermocouple types K, L				C200H-TS002
			JPt100				C200H-TS101
			Pt100				C200H-TS102

## Multiple-Loop Temperature Control Modules

Control Application	Features	Temperature sensor input	Control output type	Current consumption	Model
Heating control	2 control loops with independent settings each loop; heater burnout detection function	Thermocouple (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	0.33 A, 5 VDC	C200H-TC001
			Voltage (pulse)		C200H-TC002
			Current (linear)		C200H-TC003
		Platinum resistance thermometer (JPt100 and Pt100)	Open-collector (pulse)		C200H-TC101
			Voltage (pulse)		C200H-TC102
			Current (linear)		C200H-TC103
Heating/cooling control	2 control loops with independent settings each loop; heater burnout detection function	Thermocouple (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	0.33 A, 5 VDC	C200H-TV001
			Voltage (pulse)		C200H-TV002
			Current (linear)		C200H-TV003
		Platinum resistance thermometer (JPt100 and Pt100)	Open-collector (pulse)		C200H-TV101
			Voltage (pulse)		C200H-TV102
			Current (linear)		C200H-TV103

## PID Control Modules

Type	Features	Analog input	Control output type	Current consumption	Model
PID control	2 channels; self-tuning PID or ON/OFF control; scaling; extensive monitoring; 10 alarm modes	4 to 20 mA, 1 to 5 V, 0 to 5 V, or 0 to 10 V	Open-collector (pulse)	0.33 A, 5 VDC	C200H-PID01
			Voltage (pulse)		C200H-PID02
			Current (linear)		C200H-PID03

## High-Speed Counter Modules

Max. input frequency	Input voltage	Number of counters	Remarks	Connection	Current consumption	Model
50 kHz – 500 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver	2	Configurable digital inputs + outputs; target values trigger interrupt to CPU	1 x 40 pt Fujitsu connector	0.36 A, 5 VDC	CS1W-CT021
		4		2 x 40 MIL-spec connector	0.45 A, 5 VDC	CS1W-CT041
100 kHz to 1.5 MHz	SSI inputs (absolute position data), RS-422/485	2	Baud rate, encoding type, data length, etc. can be set per channel	2 x 40 Fujitsu connectors	0.32 A, 5 VDC	CS1W-CTS21
50 kHz – 200 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver		12 contact inputs (24 VDC), 8 transistor (sinking) outputs and 2 pulse outputs	Connectors	0.80 A, 5 VDC	CS1W-HCP22-V1
	5, 12, 24 VDC and RS-422 line driver				0.75 A, 5 VDC 0.15 A, 26 V	CS1W-HCA22

## Single- and Multiple-Axis Position Control Modules

Axes	Type	Signal type	Remarks	Connection type	Current consumption	Model
1	Position controller	24 V open collector	500 kpps pulse outputs; inputs for origin, limit switches, stop, interrupt	1 x 40 pt (Fujitsu)	250 mA, 5 VDC	CS1W-NC113
2				CS1W-NC213		
4				2 x 40 pt (Fujitsu)		360 mA, 5 VDC
1	Position controller	Line driver		1 x 40 pt (Fujitsu)	250 mA, 5 VDC	CS1W-NC133
2				CS1W-NC233		
4				2 x 40 pt (Fujitsu)		360 mA, 5 VDC
16	Position control module	MECHATROLINK-II	Uses CX-Motion-NCF software; MECHATROLINK-II high-speed bus provides instant communications between the position controller and the Omron servo drives Functions: Position, speed and torque control; accesses all drive parameters	ML-II connector	0.36 A, 5 VDC (counts as CPU bus unit)	CS1W-NCF71

## Motion Control Modules

Use CX-Motion software in CX-One to set up and monitor module operations.

Axes	Signal output	Features	Connection	Current consumption	Model
2	Analog	Semi-closed loop motion controllers; trapezoid or S-curve accel/decel; Linear, arc and helical interpolation; Traverse, infinite and interrupt feed Program in G language Use with Omron servos	Serial	0.6 A, 5 VDC	CS1W-MC221-V1
4	Analog			0.7 A, 5 VDC	CS1W-MC421-V1
30	MECHATROLINK-II	Uses CX-Motion software; MECHATROLINK-II high-speed bus provides instant communications between the motion controller and Omron servo drives Functions: Electronic cam profiles, gear functions, axis synchronization; Registration inputs; accesses all drive parameters	ML-II connector	0.8 A, 5 VDC (counts as CPU bus unit)	CS1W-MCH71

MECHATROLINK-II is a registered trademark of Yaskawa Corporation.

## Cam Positioner Module

Type	Number of cam outputs	Resolver response speed	Current consumption	Model
Cam positioner module	48	800 r/min. max.	0.30 A, 5 VDC	C200H-CP114

## Track & Trace Solutions Modules

Type	Number of read/write heads	Current consumption	Model
ID sensor module for V600 industrial RFID systems	1	0.26 A, 5 VDC	CS1W-V600C11
	2	0.32 A, 5 VDC	CS1W-V600C12
ID sensor module for V680 industrial RFID systems (13.56MHz) ISO 15693 Compliant	1	0.26 A, 5 VDC	CS1W-V680C11
	2	0.32 A, 5 VDC	CS1W-V680C12

## Safety Relay Input Module for Emergency Switches

Main contact	Rated voltage	Auxiliary contact	Number of safety input channels	General-purpose inputs	Current consumption	Model
DPST-NO	24 VDC	None	1 channel or 2 channels possible; 75 mA, 24 VDC	4 inputs; 7 mA, 24 VDC	0.1 A, 5 VDC	CS1W-SF200

## Mixed I/O TTL Modules

Name	Classification	Inputs/outputs	Input voltage	Maximum switching capacity	Connection	Current consumption	Model
TTL input module	C200H Special I/O Unit	32 inputs; 8 pts can be set as high-speed inputs	5 VDC	—	Connector	0.13 A, 5 VDC	C200H-ID501
TTL output module	C200H Special I/O Unit	32 static outputs; 128 dynamic outputs	—	35 mA, 5 VDC		0.22 A, 5 VDC	C200H-OD501
Mixed TTL I/O modules	CS1 Basic I/O Unit	32 inputs / 32 outputs	5 VDC			0.27 A, 5 VDC	CS1W-MD561 (See note)
	C200H Special I/O Unit	16 inputs/ 16 outputs				0.18 A, 5 VDC	C200H-MD501 (See note)

**Note:** High-speed inputs, 128-pt dynamic outputs possible.

## Analog Timer Module

Classification	Timers	Setting range	Time setting method	CPU bits	Current consumption	Model
C200H Basic I/O Unit	4 pts	0.1 to 1.0 s, 1 to 10 s, 2 to 60 s, 1 to 10 min.	Internal or external variable resistor	Timer set input, timer pause input, and time up output	0.06 A, 5 VDC	C200H-TM001

## Dimensions

Item	Dimensions (H x W x D mm)	Model
Analog units	130 x 35 x 126	CS1W-AD041-V1 / AD081-V1 / DA08V / DA08C / DA041 / MAD44 / C200H-MAD01
Isolated analog units		CS1W-PTW01 / PDC01 / PPS01 / PTR01 / PTR02 / PMV01
High-resolution analog units		CS1W-PTS11 / PTS12 / PDC11
Temperature sensor input units		CS1W-PTS01-V1 / PTS02 / PTS03 / C200H-TS001 / TS002 / TS101 / TS102
Multi-loop temperature controller units		C200H-TC001 / TC002 / TC003 / TC101 / TC102 / TC103 / TV001 / TV002 / TV003 / TV101 / TV102 / TV103
PID controller units		C200H-PID01 / PID02 / PID03
High-speed counter units	130 x 35 x 104	CS1W-CT021 / CT041 / CTS21 / HCP22 / HCA22
Position control units		CS1W-NC113 / NC133 / NC213 / NC233 / NC413 / NC433
Motion control unit (2 axes)		CS1W-MC221
Motion control unit (4 axes)	130 x 70 x 104	CS1W-MC421
Motion control unit (30 axes)	130 x 35 x 104	CS1W-MCH71
Cam positioner unit		C200H-CP114
ID sensor unit	130 x 35 x 126	CS1W-V600C11/C12
Safety relay input unit		CS1W-SF200 / CS1W-V680C11/C12
TTL I/O	130 x 35 x 101	CS1W-MD561 / C200H-ID501 / OD501 / MD501
C200H analog timer unit	130 x 35 x 100	C200H-TM001

# Programmable Controllers — Rack Style

# CS1-Com Mods

## Industrial Networking and Communications Modules

- Open to any communication, standard or user-defined
- Both standardized open network interfaces and cost-efficient high-speed proprietary network links available
- Use open Serial or Ethernet links or proprietary Controller Link between PLCs and to higher-level information systems
- Omron supports open field networks: DeviceNet and Profibus-DP
- For high-speed field I/O, choose Omron's CompoBus/S for unsurpassed ease of installation
- Fully user-configurable Serial communications can emulate a variety of application-specific protocols



## CS1W Programmable Controllers

### Industrial Networking and Communication Modules

Type	Protocols	Rating	Ports/media	Unit class	Connection type	Current consumption	Model	
Ethernet	UDP, TCP/IP, FTP server, SMTP (e-mail), SNMP (time adjust), socket services, DNS client, FINS routing	100 Mbps max. speed; 2.5 km distance; 254 nodes; twisted pair cable	1 x 100 Base-TX	CPU bus unit	RJ45	038 A, 5 VDC	CS1W-ETN21	
Ethernet/IP	Tag data link, CIP Msg, FINS/TCP, FINS/UDP	100 Mbps max. speed; 100 M distance; 256 max. connections					CS1W-EIP21	
Serial communications board	Exchanges data using Protocol Macro for automatic handshaking with Omron serial devices; Host Link computers; and 1:N NT Link for Omron HMIs	—	RS-232C x 2	Inner Board	9-pin D-Sub	—	CS1W-SCB21-V1	
Serial communications unit			RS-232C x 1 and RS-422A/485 x 1				CPU bus unit	0.29 A
			RS-232C x 2					CS1W-SCU21-V1 (See note)
			2 RS-422A/485 port					CS1W-SCU31-V1
Serial converter	RS-232C to RS-422A conversion module		1 RS-232C port and 1 RS-422A	—	Terminal block	—	NT-AL001	
Controller link	Omron proprietary; data links and message communications between PLCs and computers; includes support software	2 Mbps max. speed; 1 km distance; 62 nodes (using repeater units)	2-wire twisted pair (special)	CPU bus unit	2-wire screw + ground	0.33 A, 5 VDC	CS1W-CLK23	
			Optical HPCF fiber cable		2 x HPCF connector	0.52 A, 5 VDC	CS1W-CLK13	
			Optical graded-index (GI) fiber cable		4 x ST connectors	0.65 A, 5 VDC	CS1W-CLK53	
Controller link PCI board	Personal computer board using Omron propriety network; includes support software		Special twisted pair	—	PCI plus 2-wire screw + ground	—	3G8F7-CLK23-E	
			Optical HPCF fiber cable		PCI and HPCF connectors		3G8F7-CLK13	
			Optical graded-index (GI) fiber cable		PCI and ST connectors		3G8F7-CLK53	

## Industrial Networking and Communication Modules (Continued)

Type	Protocols	Rating	Ports/media	Unit class	Connection type	Current consumption	Model
Controller link repeater unit	Repeats signal to expand network and extend distance	—	Special twisted pair	—	Screw – Screw	—	CS1W-RPT01
			Optical HPCF fiber cable		Screw – HPCF connector		CS1W-RPT02
			Optical graded-index (GI) fiber cable		Screw – ST connector		CS1W-RPT03
SYSMAC link unit	CS1 CPU Bus Unit; Data links and message service	2 Mbps max. speed; 1 km distance; 62 nodes	Coaxial cable	CPU bus unit	Screw	0.48 A, 5 VDC	CS1W-SLK21
		2 Mbps max. speed; 10 km distance; 62 nodes	Optical cable	CPU bus unit	HPCF connectors	0.47 A, 5 VDC	CS1W-SLK11
SYSMAC link support board	Personal computer board for PCI bus	2 Mbps max. speed; 1 km distance; 62 nodes	Coaxial cable	—	Screw	—	3G8F7-SLK21-E
		2 Mbps max. speed; 10 km distance; 62 nodes	Optical cable		HPCF connectors		3G8F7-SLK11-E
DeviceNet	Master unit provides remote and message communications; functions as both master and/or slave	500 kbps max. speed; 500 m distance; 63 nodes; can control up to 32,000 points max. per master	DeviceNet cable	CPU bus unit	5-pin detachable connector	0.29 A, 5 VDC	CS1W-DRM21-V1
Profibus-DP	Master unit provides data exchange, diagnostics and message communications	12 Mbps max. speed; 1200 m at 9600 bps; 100 m at 12 Mbps; 125 nodes	Shielded-twisted pair cable	CPU bus unit	9-pin D-Sub	0.60 A, 5 VDC	CS1W-PRM21
	I/O Link slave unit			C200H Special I/O unit		0.25 A, 5 VDC	C200HW-PRT21
CompoNet master unit	Master unit remote I/O data exchange with up to 2560 points	4 Mbps max. speed; 384 max. nodes	2-core or 4-core VCTF cable Flat Cable	—	—	0.4 A, 5 VDC	CS1W-CRM21

**Note:** Add 0.15 A per port when the NT-AL001 is connected.

## Programming and Diagnostic Software Tools

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	1 license	CXONE-AL01C-V□
		3 licenses	CXONE-AL03C-V□
		10 licenses	CXONE-AL10C-V□

**Note:** The box next to EV indicates the current version of software (2, 3, 4, etc.).

## Programming Cables

Name	Connector	Cable length	Model
Peripheral Device Connecting Cables (for peripheral port)	D-Sub 9-pin	0.1 m	CS1W-CN118
		2.0 m	CS1W-CN226
		6.0 m	CS1W-CN626
Peripheral Device Connecting Cable (for RS-232C port)		2.0 m	C200H-CN229-EU CBL-202 in Canada

# Programmable Controllers — Rack Style

# CS1D



## Redundant Controls for Sustained Plant Floor Productivity Gains

- Delivers hot standby for CPU and power supplies
- Offers on-line replacement (hot-swapping) of CPU, power supplies, communication units, basic, and special I/O modules for a quick recovery from equipment failures
- Get duplex communications and loop-back capability with Controller Link and Ethernet network
- Expands with up to 7 racks
- Up to 500 control blocks, such as control blocks (for PID and other calculations) and operation blocks (for dead time and other calculations) can be combined in response to a wide range of applications
- Fast PID operation execution provides flexibility for multi-loop control
- A wide range of calculation functions includes floating point calculations, character string processing, and PID calculations
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details

## High Reliability is Key

- Ideal for process intensive applications
- Backup power supplies and CPUs and communication units
- Eliminate unexpected downtime in many process applications, especially in the middle of the process, which can be extremely costly



- Use CS1D with a Loop Control Board (CS1D-LCB05D) and process control modules
- Provide reliability for process control applications in these industries: semiconductor, food and beverage, petrochemicals, marine vessel, water/wastewater treatment, and corrections

## Perform Maintenance Without Downtime

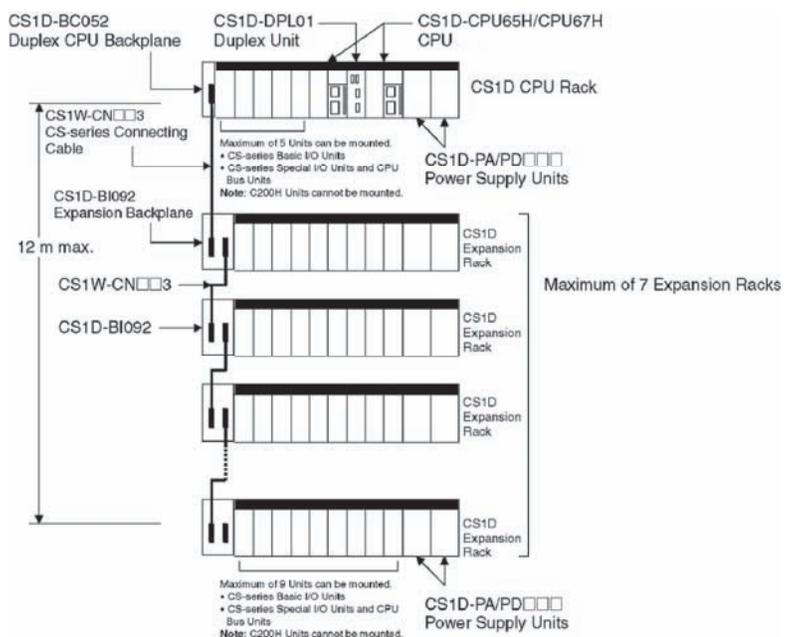
Critical processes such as boiler control or lighting control cannot shut down for maintenance. Omron's CS1D allows hot-swapping of I/O modules without the need to cut power or stop the PLC's program functions.

## Communications Interface Keeps Operating

In many cases, controller-to-controller communication is vitally important to the process. Not all manufacturers provide redundant Controller Link capabilities found in Omron's CS1D. If one module faults, the second one will take over immediately.

## Basic Configuration

A CS1D system consists of two duplex power supplies, two duplex CPUs, one duplex unit, one duplex CPU backplane, and up to 5 basic I/O, special I/O, and CS1 CPU bus modules.



## CPU Selection

Number of I/O points	Program capacity	Data memory storage	Max. I/O expansion units	LD instruction processing speed	Current consumption	Additional functions	Model
5120	250K steps	448K words	71	0.02 μs	0.82 A, 5 VDC	Supports duplex power supply and I/O hot-swapping	CS1D-CPU67S
			68			CPU for dual redundancy	CS1D-CPU67H
	60K steps	128K words	71			Supports duplex power supply and I/O hot-swapping	CS1D-CPU65S
			68			CPU for full dual-redundancy	CS1D-CPU65H
1280	30K steps	64K words	35	0.04 μs	0.78 A, 5 VDC	Supports duplex power supply and I/O hot-swapping	CS1D-CPU44S
960	10K steps		26				CS1D-CPU42S

## Duplex Unit

The duplex unit is the unit that controls duplex system operation. It monitors for errors and switches operation when an error occurs.

Description	Model
Duplex unit with bumpless transfer between CPUs + Single I/O Expansion	CS1D-DPL01
Duplex unit with bumpless transfer between CPUs + Dual I/O Expansion	CS1D-DPL02D

## CPU Backplanes

Number of slots	Expandable	CS1/C200H module compatibility	Current consumption	Additional functions	Model
5	Yes	CS1 Only	0.55 A, 5 VDC (See note)	For duplex CPU + power supplies	CS1D-BC052
8				For duplex power supplies	CS1D-BC082S
5			1.2 A, 5 VDC	For duplex CPU + dual I/O exp.	CS1D-BC042D

**Note:** Total for backplane and duplex unit.

## Power Supply

Input voltage	Output capacity	Output rating	Model
100 to 120 VAC or 200 to 240 VAC (with RUN output)	35 W	7 A, 5 VDC	CS1D-PA207R
24 VDC	28 W	4.3 A, 5 VDC	CS1D-PD024
	40 W	5.3 A, 5 VDC	CS1D-PD025

## Power and Expansion Selection

The following table shows the maximum current and power that can be supplied by Power Supply Modules on CPU Racks and Expansion Racks. When the number of modules and exceeds the capability of the power supply available, I/O expansion racks solve the problem. If

the number of modules in the CPU rack exceeds 5 or the current consumption is greater than the capacity of the power supply unit, use the CPU and expansion rack configuration.

Power supply module	Max. current consumption			Max. total power consumption
	5-V group	26-V group	24-V group	
CS1D-PA207R	7A	1.3A	None	35 W

## Be sure both Condition 1 and Condition 2 are met.

### Condition 1: Maximum Current Supply

1. Current required at 5 VDC by all modules (A) is less than 7 A
2. Current required at 26 VDC by all modules (B) is less than 1.3 A
3. Current required at 24 VDC by all modules (C) ≤ Max. Current shown in table

### Condition 2: Maximum Total Current Supply

1.  $A \times 5 \text{ VDC} + B \times 26 \text{ VDC} + C \times 24 \text{ VDC}$  is less than 35 W

## Dimensions

Item	Dimensions (H x W x D mm)	Model
CPUs	134 x 71 x 104.3	CS1D
CPU backplanes	130 x 505.1 x 26.8	CS1D-BC052
Duplex unit	130 x 34.5 x 100.5	CS1D-DPL01
Power supply unit	130 x 58 x 130	CS1D-PA207R

## Expansion Backplanes

The CS1D expansion rack contains duplex power supplies, two duplex CPUs, one duplex unit, one duplex CPU backplane, and up to 5 basic I/O, special I/O, and CS1CPU bus units.

Name	Specifications	Current consumption	Model
CS1 expansion	9 slots	0.28 A, 5 VDC	CS1D-BI092
I/O Interface Unit	For expansion racks connected over a distance of more than 12 m (C200H modules cannot be used on long-distance expansion racks)	0.23 A, 5 VDC	CS1W-II102
I/O Control Unit	For expansion racks connected over 12 m (two terminating resistors included). Must be used together with I/O Interface Modules to connect long-distance expansion racks.	0.92 A, 5 VDC	CS1W-IC102
CS1 expansion	8 slots CS1D expansion with Duplex CPU, Dual I/O Expansion system only	1.21 A, 5 VDC	CS1D-BI082D
I/O Interface Unit	I/O Interface Unit for Dual Expansion system only. Must be used with I/O Control Unit	0.23 A, 5 VDC	CS1D-II102D
I/O Control Unit	I/O Control Unit for Dual Expansion system only. Must be used together with I/O Interface Modules to connect long-distance expansion racks.	0.92 A, 5 VDC	CS1D-IC102D

## Expansion Limitations

Combination of expansion racks	CS1D expansion racks only	CS1D long distance expansion racks
Max. expansion racks per CPU	7	7
Max. distance from CPU rack	12 m	90 m

## Expansion Cables

Name	Specifications	Cable length	Model
CS1 I/O connecting cables	Connects CS1D Expansion I/O Backplanes to CPU Backplanes or other CS1D Expansion I/O Backplanes.	0.3 m	CS1W-CN313
		0.7 m	CS1W-CN713
		2 m	CS1W-CN223
		3 m	CS1W-CN323
		5 m	CS1W-CN523
		10 m	CS1W-CN133
		12 m	CS1W-CN133-B2
Long-distance connecting cables	Connects I/O Control Unit to I/O Interface Unit or connects two I/O Interface Modules	0.3 m	CV500-CN312
		0.6 m	CV500-CN612
		1 m	CV500-CN122
		2 m	CV500-CN222
		3 m	CV500-CN322
		5 m	CV500-CN522
		10 m	CV500-CN132
		20 m	CV500-CN232
		30 m	CV500-CN332
		40 m	CV500-CN432
50 m	CV500-CN532		

## Dimensions

Item	Dimensions (H x W x D mm)	Model
CS1D expansion backplane	130 x 505.1 x 26.8	CS1D-BI092
I/O Control Unit	130 x 34.5 x 123	CS1W-IC102
I/O Interface Unit	130 x 34.5 x 123	CS1W-II102

## Memory Modules

Memory cards are used to download recipes, replace PLC program while operating, auto-boot the PLC upon power up.

Item	Description	Model
Flash memory card	128 MB	HMC-EF183
	256 MB	HMC-EF283
	512 MB	HMC-EF583

## Programming and Diagnostic Software Tools

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	1 license	CXONE-AL01C-V□
		3 licenses	CXONE-AL03C-V□
		10 licenses	CXONE-AL10C-V□

**Note:** The box next to EV indicates the current version of software (2, 3, 4, etc.).

## Programming Cables

Name	Specifications	Model
Peripheral Device Connecting Cables (for peripheral port)	Connects DOS computers, D-Sub 9-pin (Length: 0.1 m)	CS1W-CN118
	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	CS1W-CN226
	Connects DOS computers, D-Sub 9-pin (Length: 6.0 m)	CS1W-CN626
Peripheral Device Connecting Cable (for RS-232C port)	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	C200HS-CN220-EU
		CBL-202 in Canada

# Programmable Controllers — Rack Style

# CS1D-I/O Modules

## Digital Input and Output Modules

- CS1D redundant systems use a subset of the CS1W I/O modules
- 8 to 96 points per unit to match your application needs
- Input, output or mixed I/O
- Up to 16 I/O can be wired to modules with detachable screw terminal strips
- High-density 32- and 64-point modules have standard 40-pin flat ribbon cable connectors; 96-point modules have 56-pin flat ribbon cable connectors
- Use prefabricated cables and wiring terminals for easy interfacing to high-density I/O



## CS1D Programmable Controllers

### Input Modules

Type	Points	Rating	Connection	Current consumption	Model
DC input	16 inputs	7 mA, 24 VDC	Terminal block	0.10 A, 5 VDC	CS1W-ID211
	32 inputs	6 mA, 24 VDC	Fujitsu connector	0.15 A, 5 VDC	CS1W-ID231
	64 inputs				CS1W-ID261
	96 inputs	5 mA, 24 VDC		0.20 A, 5 VDC	CS1W-ID291
High-speed DC input	16 inputs	24 VDC, 0.1 ms minimum pulse width	Terminal block	0.10 A, 5 VDC	CS1W-IDP01
AC input		100 to 240 VAC/VDC		0.11 A, 5 VDC	CS1W-IA111
		200 to 240 VAC			CS1W-IA211

### Output Modules

Type	Points	Rating	Connection	Current consumption	Model
Relay bit output	8 points, independent commons	2 A, 250 VAC	Terminal block	0.10 A, 5 VDC	CS1W-OC201
	16 points			0.006 A, 26 VDC for each point ON at the same time	
Transistor output	16 pts	12 to 24 VDC, 0.5 A/pt, 8 A/unit sinking	Terminal block	0.13 A, 5 VDC	CS1W-OC211
				24 VDC, 0.5 A/pt, 5 A/unit, sourcing, load short protection, alarm	
	32 pts	12 to 24 VDC, 0.5 A/pt, 5 A/unit sinking	Fujitsu connector	0.17 A, 5 VDC	CS1W-OD211
				24 VDC, 0.5 A/pt, 5 A/unit, sourcing, load short protection, alarm	
	64 pts	12 to 24 VDC, 0.3 A/pt, 6.4 A/unit sinking	Terminal block	0.39 A, 5 VDC	CS1W-OD231
				24 VDC, 0.3 A/pt, 6.4 A/unit, sourcing, load short protection, alarm	
	96 pts	12 to 24 VDC, 0.1 A sinking, 7.2 A/unit	Terminal block	0.48 A, 5 VDC	CS1W-OD261
					12 to 24 VDC, 0.1 A sourcing, 7.2 A/unit
Triac output	8 pts	250 VAC, 1.2 A, 50/60 Hz	Terminal block	0.23 A max., 5 VDC (0.07+0.02xNo. of points ON)	CS1W-OD291
	16 pts			0.406 A max., 5 VDC (0.07+0.02xNo. of points ON)	CS1W-OD292
					CS1W-OA201
					CS1W-OA211

## Mixed I/O Modules

Type	Inputs/outputs	Input voltage	Maximum switching capacity	Connection	Current consumption	Model
DC input/transistor output modules	32 inputs / 32 outputs	24 VDC	12 to 24 VDC, 0.3 A, sinking	Fujitsu connector	0.27 A, 5 VDC	<b>CS1W-MD261</b>
			24 VDC, 0.3 A, sourcing, load short protection, alarm		0.27 A, 5 VDC	<b>CS1W-MD262</b>
	48 inputs/ 48 outputs		12 to 24 VDC, 0.1 A, sinking		0.35 A, 5 VDC	<b>CS1W-MD291</b>
			12 to 24 VDC, 0.1 A, sourcing		0.35 A, 5 VDC	<b>CS1W-MD292</b>
TTL I/O modules	32 inputs / 32 outputs	5 VDC	5 VDC, 35 mA		0.27 A, 5 VDC	<b>CS1W-MD561</b> (See note)

**Note:** High-speed inputs, 128-pt. dynamic outputs are possible.

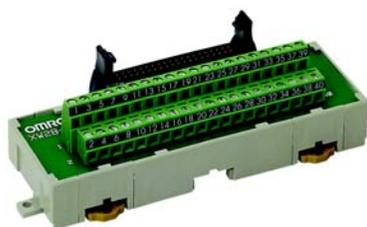
## Dimensions

Item	Dimensions (H x W x D mm)	Model
CS-Series 20-pin terminal blocks	130 x 35 x 124	<b>CS1W-IA111 / IA211 / ID211 / IDP01 / OD211 / OD212 / OA201 / OA211 / OC201 / OC211</b>
CS-Series w/ One 40-pin connector	130 x 35 x 101	<b>CS1W-ID231 / OD231 / OD232</b>
CS-Series w/ Two 40-pin connectors		<b>CS1W-ID261 / OD261 / OD262 / MD261 / MD262</b>
CS-Series w/ Two 56-pin connectors		<b>CS1W-ID291 / OD291 / OD292 / MD291 / MD292</b>
CS-Series Special I/O Fujitsu connector		<b>CS1W-MD561</b>

## Terminal Blocks and Connection Cables

### Terminal Blocks

XW2B-□□G4 (M3 screws, no terminal identification strip)



XW2B-□□G5 (M3.5 screws, protected terminal identification strip)



### Connection Cables



The XW2Z pre-terminated connection cables eliminate wiring errors and simplify installation and servicing. Add cable length to the model number where □□□ is shown: 050 = 0.5 m, 100 = 1 m, 200 = 2 m, 500 = 5 m; other lengths are available.

## Input Modules

Module	Connector type	Terminal block model	Cable model (Specify length)
CS1W-ID211	Removable terminal block	Not required	Not required
CS1W-IDP01			
CS1W-IA111			
CS1W-IA211			
CS1W-ID231	Fujitsu-compatible connector on module	<b>XW2B-40G4</b> or <b>G5</b>	<b>XW2Z-□□□B</b>
CS1W-ID261		Two <b>XW2B-40G4</b> or <b>G5</b>	Two <b>XW2Z-□□□B</b>
CS1W-ID291		Two <b>XW2B-60G4</b> or <b>G5</b>	Two <b>XW2Z-□□□H-1</b> Two <b>XW2Z-□□□H-2</b> (for XW2B-40G5)

## Output Modules

Module	Connector type	Terminal block model	Cable model (Specify length)
CS1W-OC201	Removable terminal block	Not required	Not required
CS1W-OC211			
CS1W-OD211			
CS1W-OD212			
CS1W-OA201			
CS1W-OA211			
CS1W-OD231	Fujitsu-compatible connector on module	<b>XW2B-40G4</b> or <b>G5</b>	<b>XW2Z-□□□B</b>
CS1W-OD232		Two <b>XW2B-40G4</b> or <b>G5</b>	Two <b>XW2Z-□□□B</b>
CS1W-OD261			
CS1W-OD262		Two <b>XW2B-60G4</b> or <b>G5</b>	Two <b>XW2Z-□□□H-1</b> Two <b>XW2Z-□□□H-2</b> (for XW2B-40G5)
CS1W-OD291			
CS1W-OD292			

# Programmable Controllers — Rack Style

## CS1D-Special I/O

### Special I/O and Control Modules

- Modules support Analog I/O, Process Control, Motion and Position Control
- RFID system controller for 1 or 2 read/write antennas



## CS1D Programmable Controllers

### Analog I/O Modules

Type	I/O Capacity	I/O Isolation	I/O Ranges/types	Conversion time	Current consumption 26 V	Current consumption 5 VDC	Model	
Analog input units	4 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA	1 ms/pt	0.10 A	0.13 A	CS1W-AD041-V1	
	8 inputs						CS1W-AD081-V1	
	4 inputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	0.16 A	0.16 A	CS1W-PTW01	
			1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA, 0 to 20 mA				CS1W-PDC01	
			No-voltage semiconductor input: 0 to 20,000 pulses/s, Voltage input: 0 to 20,000 pulses/s, Contact input: 0 to 20 pulses/s				CS1W-PPS01	
8 inputs	No	- 1 mA to 1 mA, 0 to 1 mA	200 ms/8 pts	0.08 A	0.08 A	CS1W-PTR01		
		- 100 mA to 100 mA, 0 to 100mV				CS1W-PTR02		
Analog output units	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA	1 ms/pt	0.18 A	0.13 A	CS1W-DA041	
	8 outputs		1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V				0.25 A	CS1W-DA08V
			4 to 20 mA					CS1W-DA08C
4 outputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	0.16 A	0.16 A	CS1W-PMV01		
Analog mixed input/output unit	4 inputs and 4 outputs	No	Inputs: 1 to 5 V, 0 to 5 V, 0 to 10 V ±10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V	1 ms/pt	0.20 A	0.20 A	CS1W-MAD44	

### Temperature Sensor Inputs

Type	I/O Capacity	I/O Isolation	I/O Ranges/types	Conversion time	Current consumption	Model
Temperature sensor input	4 inputs	Yes	B, E, J, K, N, R, S, T, ±80 mVDC auto range	150 ms/4 pts	0.15 A, 5 VDC 0.15 A, 26 VDC	CS1W-PTS01-V1
			Pt100 (JIS, DIN, ISO) JPt100	100 ms/4 pts		CS1W-PTS02
			Ni508 Ω			CS1W-PTS03
High-resolution temperature and process input	4 inputs	Yes	B, E, J, K, L, N, R, S, T, U, Wre5-26, PLII, ±100 mV	2 ms/4 pts, 10 ms/2 pts	0.12 A, 5 VDC 0.08 A, 26 VDC	CS1W-PTS11
			Pt100 Ω (JIS, IEC) JPt100 Ω, Pt50 Ω, Ni508.4 Ω	0.12 A, 5 VDC 0.07 A, 26 VDC		CS1W-PTS12
			4 to 20 mA, 0 to 20 mA, 0 to 10 V, ±10 V, 0 to 5 V, ± 5 V, 0 to 1.25 V, ±1.25 V, 1 - 5 V			0.16 A, 5 VDC 0.16 A, 26 VDC

## High-Speed Counter Modules

Type	Max. input frequency	Input voltage	Number of counters	Remarks	Current consumption 26 V	Current consumption	Model
High-speed counter module	50 kHz – 500 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver	2	—	—	0.36 A, 5 VDC	CS1W-CT021
			4			0.45 A, 5 VDC	CS1W-CT041
	50 kHz – 200 kHz with line driver input		2	Programmable unit with PLC functionality and 2 pulse outputs		0.80 A, 5 VDC	CS1W-HCP22
				Programmable unit with PLC functionality and 2 analog outputs		0.15 A	0.75 A, 5 VDC
	1.5 MHz		RS-422/485	SSl (Synchronous Serial Interface) encoder inputs		—	0.32 A, 5 VDC

## Position and Motion Control Modules

Cables used to connect position control modules to Omron servos and relay terminal blocks are available.

Type	Channels/axes	Output type	Rating	Connection	Current consumption	Model	
Position control module	1 axis	Open collector, 24 V	500 kpps pulse outputs, inputs for origin, limit switches, stop interrupt	Connector	0.25 A, 5 VDC	CS1W-NC113	
		Line driver				CS1W-NC213	
	2 axes	Open collector, 24 V				CS1W-NC413	
		Line driver				CS1W-NC133	
	4 axes	Open collector, 24 V				0.36 A, 5 VDC	CS1W-NC233
		Line driver				CS1W-NC433	
16 axes	MECHATRO-LINK-II	Uses CX-Motion-NCF software; MECHATROLINK-II high-speed bus provides instant communications between the position controller and the Omron servo drives Functions: Position, speed and torque control; accesses all drive parameters	ML-II connector	0.36 A, 5 VDC (counts as CPU bus unit)	CS1W-NCF71		
Motion control module	2 axes	Analog	Uses G language; compatible with Omron servos	Connector	0.60 A (w/ Teaching Box: 0.80)	CS1W-MC221-V1	
	4 axes					0.70 A (w/ Teaching Box: 1.00)	CS1W-MC421-V1
	30 axes	MECHATRO-LINK-II				Uses CX-Motion software; MECHATROLINK-II high-speed bus provides instant communications between the motion controller and Omron servo drives Functions: Electronic cam profiles and axis synchronization; Registration inputs; accesses all drive parameters; gear functions	ML-II connector

MECHATROLINK-II is a registered trademark of Yaskawa Corporation.

## ID Sensor Modules

Type	Number of R/W Heads	Current consumption 5 VDC	Model
ID sensor module for V600 RFID system (530 kHz)	1	0.26 A	CS1W-V600C11
	2	0.32 A	CS1W-V600C12
ID sensor module for V680 industrial RFID systems (13.56 MHz) ISO 15693 Compliant	1	0.26 A	CS1W-V680C11
	2	0.32 A	CS1W-V680C12

## Dimensions

Item	Dimensions (H x W x D mm)	Model
CS-Series Analog Units	130 x 35 x 126	CS1W-AD041-V1/AD081-V1/DA08V/DA08C/DA041/MAD44

# Programmable Controllers — Rack Style CS1D-Com Mods

## Industrial Networking and Communications Modules

- Open to any communication, standard or user-defined
- Both standardized open network interfaces and cost-efficient high-speed proprietary network links available
- Use open Serial or Ethernet links or proprietary Controller Link between PLCs and to higher-level information systems
- Omron supports open field networks: DeviceNet and Profibus-DP
- Ethernet and Controller Link masters
- Fully user-configurable Serial communications can emulate a variety of application-specific protocols



## Industrial Networking and Communication Modules

Type	Protocols	Rating	Ports/media	Unit class	Connection type	Current consumption	Model
Ethernet	UDP, TCP/IF, FTP server, SMTP (e-mail), SNMP (time adjust), socket services, DNS client, FINS routing	100 Mbps max. speed; 2.5 km distance; 254 nodes; twisted pair cable	1 x 100 Base-TX	CPUbus unit	RJ45	038 A, 5 VDC	CS1D-ETN21D
Serial communications board	Exchanges data using Protocol Macro for automatic handshaking with Omron serial devices; Host Link computers; and 1:N NT Link for Omron HMIs	—	RS-232C x 2	Inner Board	9-pin D-Sub	—	CS1W-SCB21-V1
Serial communications unit			RS-232C x 1 and RS-422A/ 485 x 1				CS1W-SCB41-V1
Serial converter	RS-232C to RS-422A conversion module	—	RS-232C x 2	CPUbus unit	Terminal block	0.29 A	CS1W-SCU21-V1 (See note)
Controller link	Omron proprietary; data links and message communications between PLCs and computers; includes support software		2 RS-422A/485 port				CS1W-SCU31-V1
Controller link PCI board	Personal computer board using Omron propriety network; includes support software	2 Mbps max. speed; 1 km distance; 62 nodes (using repeater units)	1 RS-232C port and 1 RS-422A	—	2-wire screw + ground	—	NT-AL001
			2-wire twisted pair (special)	CPUbus unit	2-wire screw + ground	0.33 A, 5 VDC	CS1W-CLK23
			Optical HPCF fiber cable	CPUbus unit	2 x HPCF connector	0.52 A, 5 VDC	CS1W-CLK13
Controller link PCI board	Personal computer board using Omron propriety network; includes support software	2 Mbps max. speed; 1 km distance; 62 nodes (using repeater units)	Optical graded-index (GI) fiber cable	—	4 x ST connectors	0.65 A, 5 VDC	CS1W-CLK53
			Special twisted pair	—	PCI plus 2-wire screw + ground	—	3G8F7-CLK23-E
			Optical HPCF fiber cable	—	PCI and HPCF connectors	—	3G8F7-CLK13
			Optical graded-index (GI) fiber cable	—	PCI and ST connectors	—	3G8F7-CLK53

## Industrial Networking and Communication Modules (Continued)

Type	Protocols	Rating	Ports/media	Unit class	Connection type	Current consumption	Model
Controller link repeater unit	Repeats signal to expand network and extend distance	—	Special twisted pair	—	Screw – Screw	—	CS1W-RPT01
			Optical HPCF fiber cable		Screw – HPCF connector		CS1W-RPT02
			Optical graded-index (GI) fiber cable		Screw – ST connector		CS1W-RPT03
SYSMAC link unit	CS1 CPU Bus Unit; Data links and message service	2 Mbps max. speed; 1 km distance; 62 nodes	Coaxial cable	CPU bus unit	Screw	0.48 A, 5 VDC	CS1W-SLK21
			Optical cable		HPCF connectors		0.47 A, 5 VDC
SYSMAC link support board	Personal computer board for PCI bus	2 Mbps max. speed; 1 km distance; 62 nodes	Coaxial cable	—	Screw	—	3G8F7-SLK21-E
			Optical cable		HPCF connectors		3G8F7-SLK11-E
DeviceNet	Master unit provides remote and message communications; functions as both master and/or slave	500 kbps max. speed; 500 m distance; 63 nodes; can control up to 32,000 points max. per master	DeviceNet cable	CPU bus unit	5-pin detachable connector	0.29 A, 5 VDC	CS1W-DRM21-V1
Profibus-DP	Master unit provides data exchange, diagnostics and message communications	12 Mbps max. speed; 1200 m at 9600 bps; 100 m at 12 Mbps; 125 nodes	Shielded-twisted pair cable		9-pin D-Sub		

Note: Add 0.15 A per port when the NT-AL001 is connected.

## Programming and Diagnostic Software Tools

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMLs, motion control systems, temperature controllers and sensors	1 license	CXONE-AL01C-V□
		3 licenses	CXONE-AL03C-V□
		10 licenses	CXONE-AL10C-V□

## Programming Cables

Name	Connector	Cable length	Model
Peripheral Device Connecting Cables (for peripheral port)	D-Sub 9-pin	0.1 m	CS1W-CN118
		2.0 m	CS1W-CN226
		6.0 m	CS1W-CN626
Peripheral Device Connecting Cable (for RS-232C port)		2.0 m	C200H-CN229-EU
			CBL-202 in Canada

# Programmable Controllers — Rackless

# CJ1

Quick Link

H224

## Smallest, Most Powerful Controller for Advanced Production Systems

- Faster processing than most micro controllers: Basic instruction execution time from 0.1  $\mu$ s
- Ultra-compact size for thinner control panels: 90 H x 65 D mm; width depends on model; I/O modules are 20 or 31 mm wide
- Rackless design: Modules lock together to create a flexible “through plane” eliminating the need for a backplane
- I/O and memory sizes to match simpler control applications:
  - Up to 2560 I/O points
  - Data memory up to 256K words
  - Program memory up to 448K steps
- Fully IEC61131-3 compatible for all programming styles: Ladder, Mnemonic, Function Block, Structured Text & Sequential Function Chart programming
- Built-in serial PLC Link function communicates exclusively between CJ1M CPUs
- General-purpose I/O built into CPU21/22/23 offers advanced capabilities in less space
  - Offers four of 10 inputs to use as interrupt inputs or quick-response inputs
  - Two high-speed counter inputs rated 50 kHz for phase differential or 100 kHz for single-phase input from high-speed line driver
  - 2 pulse outputs for 1- or 2-axis positioning applications
- Special I/O includes process, position and motion control modules
- All symbols & comments are stored locally in the CPU's Flash Memory

## Outstanding Connectivity and Communications

- Built-in Ethernet models (-ETN) offer 10/100 Base-Tx speeds
  - FINS/TCP, FINS/UDP communications options
  - FTP Server for file access to the Compact Flash



- Clock Adjustment Function
- Easy Ethernet setup using built-in web pages so CX-Programmer is not needed
- Communication capabilities available for full Ethernet with socket service/email, DeviceNet, Profibus-DP and high-speed Controller Link and CompoNet, PC Link 1:N (CJ1M CPU), Modbus-ASCII master, Modbus-RTU master/slave
- Outstanding connectivity and compatibility with built-in serial protocols:
  - General-purpose serial components using built-in Protocol Macro handshaking scripts
  - Omron operator interface terminals using NT-Link
  - Support software tools using Peripheral bus
  - Communications between PLCs, operator interface terminals and computers using Host Link
- 2 Built-in communication ports (RS232 and Peripheral Port for programming)
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details

## Five Reasons to Design CJ1 PLCs into Your Application

### 1. Ultra-compact Size

- Measures just 90 mm H x 65 mm D; width depends on modules selected. Modules are either 20 mm or 31 mm wide
- Shallow 65 mm mounting depth allows thinner control panels
- Modules lock together to create a flexible “through plane” eliminating the need for a backplane

### 2. Huge Capabilities

- Control up to 2,560 local I/O, plus 32,000 DeviceNet I/O using multiple DeviceNet masters
- Instructions to facilitate every application

- PID with auto-tuning ideal for multi-loop temperature control and analog process I/O
- Floating-point decimal math operations ensure precise positioning with X-Y tables
- Conversion between floating-point decimal and ASCII character string data allows measuring device data to be used in operations
- High-resolution line approximation allows conversion from a level measurement in millimeters to tank capacity in liters according to the shape of the tank
- Built-in flash memory backup protects user program and parameter areas

- Optional Omron flash memory cards hold up to 512 MB of data to transfer program modifications, load recipes for quick production changeover or store logged data values from the CPU

### 3. One Platform Can Meet All Your Control Needs

Standardizing on the CJ1 platform means that you have chosen a control solution that can be scaled for systems from simple to the most sophisticated. It all starts with choosing the CPU to fit your needs. From there every application will use the same Communications, Specialty, and Basic I/O modules. This versatility preserves your hardware and training investment while delivering the same look and programming feel for every application.

### 4. Speed

Ultra-fast cycle time any way you measure it:

- Basic instruction processing time from 20 nanoseconds
- Executes 38K steps of basic instructions or 22K of basic and special instructions in a cycle time of 1 ms
- Fast processing of 20 most-frequently-used data manipulation instructions, including compares, transfers, moves, jumps, subroutine/reset call and more
- Parallel program execution shortens peripheral processing time by about half
- Large amounts of data can be exchanged with the host without dependence on the program size in the CPU
- Data can be refreshed smoothly with uniform timing for data exchanges with SCADA software

- No effect on cycle time in the event of future network expansions
- 32 MHz system bus transfer speed between CPU and Special I/O impacts overall performance
- Immediate refresh available for Data Links, DeviceNet, Remote I/O communications from the ladder program
- Increased number of cyclic tasks (from 32 to 288) improves efficiency by breaking long programs into sections by function or by developer

### 5. Communications

- Easy to set up network communications from device level to controller level to enterprise (information) level
  - Using a common data memory area and routing tables, Omron's networked PLCs and computers can exchange data regardless of DeviceNet, Profibus-DP, Ethernet or Controller Link formatting
  - Omron networks transparently break down barriers to expansion and change in data collection by eliminating the need for rigid block transfers of data
- Simple connections to general-purpose serial components
  - Built-in Protocol Macros contain handshaking scripts for most Omron temperature controllers and other serial devices for automatic communications
  - CX-Protocol software quickly sets up script and transmission data for serial devices from any manufacturer
- Maintenance can be performed from remote locations
  - Ethernet Module can send e-mail to alert personnel
- Perform diagnostics and corrective actions locally using CX-One software, then implement those corrections and restart the system by modem

## Which CJ1 CPU is Right for You?

CPU selection	CJ1G-H/CJ1H-H	CJ1M
<b>Appearance</b>		
<b>Application</b>	High-end, sophisticated applications with critical response times and large memory requirements <ul style="list-style-type: none"> <li>• Execution time per basic instruction from: 0.02 μs</li> <li>• Program memory from 10 to 250K steps</li> <li>• Data memory from 64 to 448K words (Includes extended memory)</li> </ul>	Simpler applications with fewer I/O and memory requirements: faster processing than most micro controllers <ul style="list-style-type: none"> <li>• Execution time per basic instruction from: 0.1 μs</li> <li>• Program Memory from 10 to 20K steps</li> <li>• Data memory up to 32K words (No extended memory)</li> </ul>
<b>Effective system size</b>	I/O counts up to 2560 points	I/O counts up to 640 points
<b>PLC to PLC communications</b>	Uses a controller link communications module	Built-in serial PLC Link function communicates exclusively between CJ1M CPUs
<b>Built-in basic input/output signals</b>	Uses basic input and output modules	CPU22 and CPU23 have built-in general purpose I/O: 10 inputs/6 outputs
<b>Interrupt inputs</b>	Uses interrupt input I/O module CJ1W-INT01	Four of the 10 inputs on CPU22 and CPU23 can be designated as interrupt inputs
<b>Pulse catch input</b>	Uses separate pulse catch input module CJ1W-IDP01	Four of the 10 inputs on CPU22 and CPU23 can be designated as quick-response inputs

## Which CJ1 CPU is Right for You? (Continued)

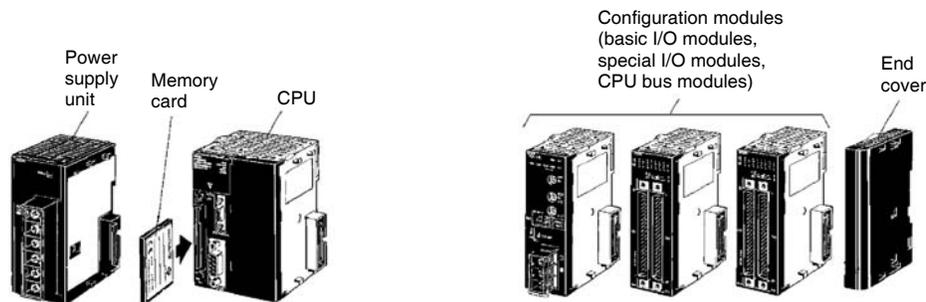
CPU selection	CJ1G-H/CJ1H-H	CJ1M
High-speed counters	Uses high-speed counter module CJ1W-CT021	CPU21, CPU22 and CPU23 have two built-in high-speed counter inputs rated 50 kHz for phase differential input; 100 kHz for single-phase input from high-speed line driver.
Pulse train for position control	Uses a position control module CJ1W-NC□□□□, depending on the number of axes (1, 2, or 4)	CPU21, CPU22 and CPU23 have 2 pulse outputs for 1 or 2-axis positioning applications
Program storage/exchange medium	Flash memory cards	Flash memory cards

## Configuring a CJ1 System

Omron's CJ1 and CJ1M systems are easy to configure to match your automation requirements.

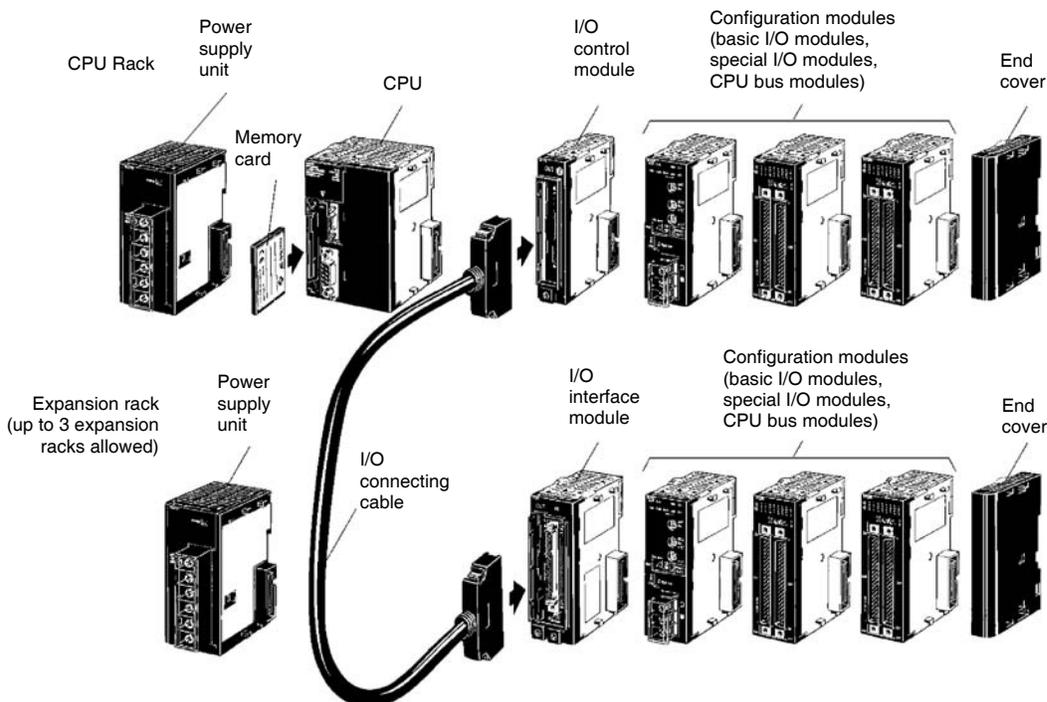
### Basic Configuration

A CJ1 Series basic configuration consists of a CPU, power supply unit, and up to 10 basic I/O, special I/O and bus units, and an end cover. Add up the current consumption for all the modules and the CPU, then select the power supply unit suitable for the application.



### CPU and Expansion Racks

If the number of modules per rack exceeds 10 or the current consumption is greater than the capacity of the power supply units, use the CPU and expansion rack configuration. This divides the load from the modules across two power supply units. To allow communication and automatic channel assignment in programming, order an I/O control module for the CPU rack and an I/O interface module on each expansion rack.



## Select the CPU

Depending on the CPU chosen, the system can be expanded with an additional rack of basic I/O, special I/O and CPU bus units. Models with “-ETN” are ready to communicate via ethernet.

Built-in I/O	Number of I/O	Program capacity	Data memory storage	Maximum I/O modules	Maximum I/O expansion racks	Current consumption	Model
— 10 in, 6 out	160 points	5K steps	32K words	10	0	0.58 A, 5 V	CJ1M-CPU11
				9			CJ1M-CPU11-ETN
				10			CJ1M-CPU21
— 10 in, 6 out	320 points	10K steps		9	0.58 A, 5 V	0.65 A, 5 V	CJ1M-CPU12
				10			CJ1M-CPU12-ETN
				10			CJ1M-CPU22
— 10 in, 6 out	640 points	20K steps		20	1	0.58 A, 5 V	CJ1M-CPU13
				19			CJ1M-CPU13-ETN
				20			CJ1M-CPU23
—	960 points	10K steps	64K words	30	2	0.91 A, 5 V	CJ1G-CPU42H
		20K steps					CJ1G-CPU43H
	1280 points	30K steps	128K words	40	3	0.99 A, 5 V	CJ1G-CPU44H
		60K steps					CJ1G-CPU45H
	2560 points	120K steps	256K words				CJ1H-CPU65H
		250K steps	448K words				CJ1H-CPU66H
							CJ1H-CPU67H

## Expansion Rack Units

Item	Description	Current consumption	Model
I/O Control module	Mount next to CPU for expansion rack connection	0.02 A, 5 V	CJ1W-IC101
I/O Interface module	Mount next to expansion rack power supply for CPU interface	0.13 A, 5 V	CJ1W-II101

**Note:** Order one CJ1W-IC101 I/O control module for the CPU rack and one CJ1W-II101 I/O interface module for each I/O expansion rack. Connect the modules with a cable of the appropriate length. Second and third I/O expansion racks connect between I/O interface modules.

## Expansion Rack Connecting Cables

Description	Function	Length	Model
Expansion rack connecting cables	Connects expansion racks to the CPU rack or another expansion rack	0.3 m	CS1W-CN313
		0.7 m	CS1W-CN713
		2 m	CS1W-CN223
		3 m	CS1W-CN323
		5 m	CS1W-CN523
		10 m	CS1W-CN133
		12 m	CS1W-CN133-B2

## Memory Modules

Item	Description/specifications	Current consumption	Model
Flash memory cards	128 MB	—	HMC-EF183
	256 MB		HMC-EF283
	512 MB		HMC-EF583
Memory card adapter	Mounts a memory card to fit the PCMCIA card slot on a computer		HMC-AP001

## Power Supply

Input Voltage	Output rating		Output capacity	Model
100 to 240 VAC	5 A, 5 VDC with 2 A RUN output	0.8 A, 24 VDC	25 W max.	CJ1W-PA205R
	2.8 A, 5 VDC	0.4 A, 24 VDC	14 W max.	CJ1W-PA202
	5 A, 5 VDC with maintenance monitor	0.8 A, 24 VDC	25 W max.	CJ1W-PA205C
24 VDC	5 A, 5 VDC			CJ1W-PD025
	2 A, 5 VDC	0.4 A, 24 VDC	10 W max.	CJ1W-PD022

### Guidelines for Power Supplies

Design your system so the total current consumption of the modules fits within the maximum current for each voltage group and the total power consumption fits within the maximum output capacity for the Power Supply Unit.

- Total the current consumptions from 5 VDC modules and 24 VDC modules then multiply by the respective voltages to get watts of power consumption.

- If more than 10 modules are required or the current consumption exceeds the output capacity of the power supplies, configure the system using CPU and I/O expansion racks.
- When using CPU and I/O expansion racks, add in the current consumption of I/O control module on the CPU rack and I/O interface module on the expansion rack.

### Dimensions

Item	Dimensions (H x W x D mm)	Models
CPUs	90 x 62 x 73.9	CJ1G, CJ1H, CPU1□-ETN
	90 x 31 x 73.9	CJ1M-CPU11/12/13
	90 x 49 x 83.6	CJ1M-CPU21/22/23
Power supply unit	90 x 80 x 81.6	CJ1W-PA205R
	90 x 45 x 81.6	CJ1W-PA202
	90 x 60 x 81.6	CJ1W-PD025
End cover	90 x 14.7 x 62	CJ1W-TER01
I/O control module	90 x 20 x 69.3 (140 w/cable)	CJ1W-IC101
I/O interface module	90 x 31 x 69.3 (140 w/ cable)	CJ1W-II101

# Programmable Controllers CJ1-I/O Modules

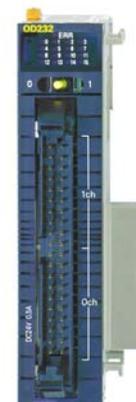
## Digital Input and Output Modules

- 8 to 64 points per unit to match your application needs
- Input, output or mixed I/O
- Up to 16 I/O can be wired to modules with detachable screw terminal strips
- High-density 32- and 64-point modules are equipped with standard 40-pin flat ribbon cable connectors
- Use prefabricated cables and wiring terminals for easy interfacing to high-density I/O

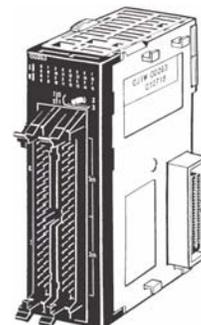
8- and 16-point modules



32-point modules



64-point modules



## CJ1 Programmable Controllers

Type	Points	Rating	Connection	Current consumption	Model
DC input	16 inputs	7 mA, 24 VDC	Terminal block	0.08 A, 5 VDC	CJ1W-ID211
	32 inputs	4.1 mA, 24 VDC	Fujitsu connector	0.09 A, 5 VDC	CJ1W-ID231
			MIL-type connector		CJ1W-ID232
	64 inputs		Fujitsu connector		CJ1W-ID261
			MIL-type connector		CJ1W-ID262
AC input	16 inputs	7 mA, 100-120 VAC	Terminal block		
Interrupt input		7 mA, 24 VDC		0.08 A, 5 VDC	CJ1W-INT01
Relay bit output	8 outputs	2 A, 250 VAC/24 VDC, independent contacts		0.048 A, 24 VDC	CJ1W-OC201
	16 outputs	2 A, 250 VAC/24 VDC, independent contacts		0.096 A, 24 VDC	CJ1W-OC211
Transistor output		0.5 A, 12 to 24 VDC, NPN (sinking)		0.10 A, 5 VDC	CJ1W-OD211
		0.5 A, 24 VDC, PNP (sourcing) load short-circuit protection, disconnection detection, alarm			CJ1W-OD212
		32 outputs	0.5 A, 12 to 24 VDC, NPN (sinking)	Fujitsu connector	0.14 A, 5 VDC
	0.5 A, 12 to 24 VDC, PNP (sourcing)				CJ1W-OD232
	64 outputs	0.3 A, 12 to 24 VDC, NPN (sinking)		0.17 A, 5 VDC	CJ1W-OD261

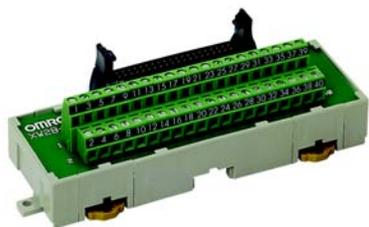
## Dimensions

Item	Dimensions (H x W x D mm)	Models
8-/16-point I/O modules	90 x 31 x 89	CJ1W-ID201/211, CJ1W-IA111/-201
		CJ1W-OD201/202/203/204
		CJ1W-OD211/212
		CJ1W-OC201/211
		CJ1W-OA201
32-point I/O modules	90 x 20 x 69.3 (140 w/connector)	CJ1W-ID231/232
		CJ1W-OD231/232
64-point I/O modules	90 x 31 x 66.5 (112.5 w/connector)	CJ1W-ID261/262
		CJ1W-OD261/262/263
Interrupt input module	90 x 31 x 69.3 (140 w/connector)	CJ1W-INT01

## Terminal Blocks and Connection Cables

### Terminal Blocks

XW2B-□□G4 (M3 screws, no terminal identification strip)



XW2B-□□G5 (M3.5 screws, protected terminal identification strip)



### Connection Cables



The XW2Z pre-terminated connection cables eliminate wiring errors and simplify installation and servicing. Add cable length to the model number where □□□ is shown: 050 = 0.5 m, 100 = 1 m, 200 = 2 m, 500 = 5 m; other lengths are available.

### Input Modules

Module	Connector type	Terminal block model	Cable model
CJ1W-IA111	Removable terminal block	Not required	Not required
CJ1W-IA201			
CJ1W-ID211			
CJ1W-ID231	Fujitsu-compatible connector on module	XW2B-40G4 or XW2B-40G5	XW2Z-□□□B
CJ1W-MD231		Two XW2B-40G4 or XW2B-40G5	Two XW2Z-□□□B
CJ1W-ID261			
CJ1W-MD261			
CJ1W-ID232	MIL-type flat ribbon connector on module	XW2B-40G4 or XW2B-40G5	XW2Z-□□□K
CJ1W-MD233		Two XW2B-40G4 or XW2B-40G5	Two XW2Z-□□□K
CJ1W-ID262			
CJ1W-MD263			
CJ1W-MD563			

## Output Modules

Module	Connector type	Terminal block model	Cable model
CJ1W-OC201	Removable terminal block	Not required	Not required
CJ1W-OC211			
CJ1W-OD211			
CJ1W-OD212			
CJ1W-OA201			
CJ1W-OD202			
CJ1W-OD203			
CJ1W-OD204			
CJ1W-OD231	Fujitsu-compatible connector on module	<b>XW2B-40G4</b> or <b>XW2B-40G5</b>	<b>XW2Z-□□□B</b>
CJ1W-MD231		Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>
CJ1W-OD261	MIL connector	Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>
CJ1W-MD261		Two <b>XW2B-60G4</b> or <b>XW2B-60G5</b>	Two <b>XW2Z-□□□H-1</b>
CJ1W-OD232		Two <b>XW2B-60G4</b> or <b>XW2B-60G5</b>	Two <b>XW2Z-□□□H-1</b>
CJ1W-OD233		Two <b>XW2B-20G4</b> or <b>XW2B-20G5</b>	Two <b>XW2Z-□□□A</b>
CJ1W-OD262		Two <b>XW2B-20G4</b> or <b>XW2B-20G5</b>	Two <b>XW2Z-□□□A</b>
CJ1W-OD263		<b>XW2B-40G4</b> or <b>XW2B-40G5</b>	<b>XW2Z-□□□B</b>
CJ1W-MD232/233		Two <b>XW2B-40G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□B</b>
CJ1W-MD563	Two <b>XW2B-20G4</b> or <b>XW2B-40G5</b>	Two <b>XW2Z-□□□A</b>	

# Programmable Controllers CJ1-Special I/O

## Special I/O and Control Modules

Analog input module  
CJ1W-AD081-V1



Isolated thermocouple  
input module CJ1W-PTS51



Two-loop temperature controller  
module CJ1W-TC102



Four-loop temperature controller  
module CJ1W-TC104



## CJ1 Programmable Controllers

### Analog I/O Modules Units

Points	Type	Ranges	Resolution	Accuracy	Conversion time	Current usage	Features	Connection	Model
4 8	Analog input	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	V: 0.2% of PV I: 0.4% of PV	250 μs/point	0.42 A, 5 VDC	Offset/gain adjustment, peak hold, moving average, alarms	Terminal block	CJ1W-AD041-V1 CJ1W-AD081-V1
2 4	Analog output		1/4,000	V: 0.3% of PV I: 0.5% of PV	1 ms/point	0.12 A, 5 VDC	Offset/gain adjustment, output hold		CJ1W-DA021 CJ1W-DA041
8	Voltage output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V,	1/8,000	0.3% of PV	250 μs/point	0.14 A, 5 VDC	Offset/gain adjustment, output hold		CJ1W-DA08V
8	Current output	4 to 20 mA		0.5% of PV					CJ1W-DA08C
4 + 2	Analog input + output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA		Input: 0.2% of PV Output: 0.3% of PV	1 ms/point	0.58 A, 5 VDC	Offset/gain adjustment, scaling, peak hold, moving average, alarms, output hold		CJ1W-MAD42
2	Process input	1 to 5V, 0 to 5V, ±5V, 0 to 10V, ±10V, 0 to 1.25V, ±1.25V, 4 to 20 mA, 0 to 20 mA	1/64,000	0.05% of PV	5 ms/point	0.18 A, 5 VDC (Requires an external 90 mA, 5 VDC power supply)	Isolated inputs, configurable alarms, maintenance functions, user-defined scaling		CJ1W-PDC15

## 18 Bit Ultra-High Resolution Universal Analog Input Module

Classification	I/O Capacity	I/O Isolation	I/O Ranges/types	Conversion time	Remarks	Current consumption	Model
Analog input units	4 inputs	Yes	Pt100, JPt100, Pt1000, Pt100 TC: K, J, T, E, L, U, N, R, S, B, W, PLII Current: 4 to 20 mA, 0 to 20 mA Voltage: 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, 100 mV, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V Potentiometer	5 ms to 60 ms depending on the resolution set	Scaling, offset compensation, process value alarm, rate-of-change calculation and alarm, peak and bottom detection	5 VDC at 300 mA max.	CJ1W-PH41U

## Temperature Input Modules

Number of inputs	Input type	Resolution	Accuracy	Conversion time	Connection	Current consumption	Model
2 inputs	Isolated thermocouple input: Types B, E, J, K, L, N, R, S, T, U, WRe-5-26, PL2; -100 to 100 mV	1/64,000	0.05% of PV	5 ms/point	Terminal block	0.18 A, 5 VDC (Requires an external 60 mA, 24 VDC power supply)	CJ1W-PTS15
2 inputs	Isolated RTD input: Pt100, JPt100, Pt50, or Ni508.4					0.18 A, 5 VDC (Requires an external 70 mA, 24 VDC power supply)	CJ1W-PTS16
4 inputs	Isolated thermocouple input: Types K, J, L, R, S, T, B	—	±0.3% of PV	62.5 ms/point		0.25 A, 5 VDC	CJ1W-PTS51
4 inputs	Isolated RTD input: Pt100, JPt100						CJ1W-PTS52

## Temperature Controller Modules

Control loops	Input type	Resolution	Accuracy	Conversion time	Connection	Current consumption	Model
4 loops	Thermocouple input, NPN output	0.1 C	0.3% of PV	500 ms total	Terminal block	0.25 A, 5 VDC	CJ1W-TC001
4 loops	Thermocouple input, PNP output						CJ1W-TC002
2 loops	Thermocouple input, NPN output, heater burnout detect						CJ1W-TC003
2 loops	Thermocouple input, PNP output, heater burnout detect						CJ1W-TC004
4 loops	Platinum RTD input, NPN output						CJ1W-TC101
4 loops	Platinum RTD input, PNP output						CJ1W-TC102
2 loops	Thermocouple input, NPN output						CJ1W-TC103
2 loops	Thermocouple input, PNP output						CJ1W-TC104

## Position and Motion Control Modules

4-axis position controller CJ1W-NC413 with pulse train output

16-axis position controller CJ1W-NCF71 with MECHATROLINK-II communications



Cables used to connect position control modules to Omron servos and relay terminal blocks are available.

## Position and Motion Control Modules (continued)

Item	Channels /axes	Output type	Rating	Connection	Current consumption	Model
High-speed counter module	2 inputs	Line driver, 24 V	Input frequency: 500 kHz max. Functions: Simple counter; linear or ring counter 2 configurable digital inputs + outputs	Connector	0.28 A, 5 VDC	CJ1W-CT021
	2 SSI inputs (absolute position data)	Synchronous Serial Protocol	Functions: Baud rate, encoding type, data length, etc. can be set per channel	Terminal	0.30 A, 5 VDC	CJ1W-CTS21-E
	4 inputs	Line driver, 24 V	Input frequency: 100 kHz max. Function: Target values trigger interrupt to CPU 4 configurable digital inputs + outputs	Connector	0.32 A, 5 VDC	CJ1W-CTL41-E
Position control module	1 axis	Open collector, 24 V	500 kpps pulse outputs, inputs for origin, limit switches, stop interrupt	ML-II connector	0.25 A, 5 VDC	CJ1W-NC113
		Line driver				CJ1W-NC133
	2 axes	Open collector, 24 V				CJ1W-NC213
		Line driver				CJ1W-NC233
	4 axes	Open collector, 24 V				CJ1W-NC413
Line driver		CJ1W-NC433				
16 axes	MECHATROLINK-II	Uses CX-Motion-NCF software; MECHATROLINK-II high-speed bus provides instant communications between the position controller and the Omron servo drives Functions: Position, speed and torque control; accesses all drive parameters	0.36 A, 5 VDC (counts as CPU bus unit)	CJ1W-NCF71		
Motion control module	30 axes	MECHATROLINK-II	Uses CX-Motion software; MECHATROLINK-II high-speed bus provides instant communications between the motion controller and Omron servo drives Functions: Electronic cam profiles and axis synchronization; Registration inputs; accesses all drive parameters	0.6 A, 5 VDC (counts as CPU bus unit)	CJ1W-MCH71	

MECHATROLINK-II is a registered trademark of Yaskawa Corporation.

## RFID Track &amp; Trace

These modules easily integrate RFID system data with PLC control for fast communications between data collected on tags and actionable results.

Item	Description	Compatible system components	Connection	Current consumption	Model
RFID controller	Single Head RFID Module	Uses Omron's V600 industrial hardened (530 kHz) tags and reader/writers	Connector	0.26 A, 5 VDC	CJ1W-V600C11
	Double Head RFID Module			0.32 A, 5 VDC	CJ1W-V600C12
	Single Head RFID Module	Uses Omron's V680 industrial hardened (13.56MHz tags and reader/writers)		0.26 A, 5VDC	CJ1W-V680C11
	Double Head RFID Module			0.32 A, 5 VDC	CJ1W-V680C12

## Dimensions

Item	Dimensions (H x W x D mm)	Models
Special I/O modules	90 x 31 x 65	All versions
Motion controller	90 x 80 x 65	CJ1W-MCH71

## Programmable Controllers

## CJ1-Com Modules

## Industrial Networking and Communications Modules

Network type	Description	Rating	Current consumption	Model
Ethernet, 100 Base TX/ 10 Base T	UDP, TCP/IP, FTP server, socket services, DNS client, SMTP (email services), SNTP (time adjust services), FINS routing	100 Mbps max. speed; 2.5 km distance; 254 nodes; twisted pair cable	0.38 A, 5 VDC	CJ1W-ETN21
	Ethernet/IP	Tag data link, CIP Msg, FINS/TCP, FINS/UDP, FTP server		100 Mbps max. speed; 100 M distance; 256 max. connections
Controller Link	Data links and message communications between PLCs and computers; Omron proprietary protocol	2 Mbps max. speed; 1.5 km distance; 62 nodes (using 2 repeater units); shielded twisted pair cable	0.35 A, 5 VDC	CJ1W-CLK23
	PCI board with support software	Shielded twisted pair cable		3G8F7-CLK23-E
DeviceNet	Master unit provides remote I/O and message communications; functions as master and/or slave	500 kbps; 500 m distance; 63 nodes; DeviceNet cable; can control up to 32,000 points max. per master	0.33 A, 5 VDC	CJ1W-DRM21
Profibus-DP	Master unit provides data exchange, diagnostics and message communications	12 Mbps; 1200 m distance; 125 nodes; shielded twisted pair cable; allows 7,168 words of I/O data per PLL; one RS-485 port	0.40 A, 5 VDC	CJ1W-PRM21
	Slave unit	Max. 180 words of input and output; one RS-485 port		CJ1W-PRT21
CompoNet Master	CompoNet Master	2560 max. I/O, 384 Nodes		CJ1W-CRM21
Serial	Exchanges data using Protocol Macro for automatic handshaking with Omron serial devices (CompoWay/F); Host Link to computers; and 1:N NT link for Omron HMIs; Modbus and user-defined protocols	Two RS-232C ports	0.28 A, 5 VDC	CJ1W-SCU21-V1
		One RS-232C port and one RS-422/RS-485 port	0.38 A, 5 VDC	CJ1W-SCU41-V1
		2RS-422A/485 port		CJ1W-SCU31-V1
	RS-232C to RS-422A conversion module	One RS-232C port and one RS-422A terminal block	0.15 A, 5 VDC	NT-AL001-E
	RS-232C to RS422/RS-485 adapter	Used for serial PLC Link with CJ1M. Converts an RS-232C port to an RS-422/RS-485 port. Mounts directly to the CPU.	—	CJ1W-CIF11

## Dimensions

Item	Dimensions (H x W x D mm)	Models
Industrial Network and Communications Modules (CPU Bus type)	90 x 31 x 89	All versions

## Programming and Diagnostic Software and Tools

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	1 license	CXONE-AL01C-V□
		3 licenses	CXONE-AL03C-V□
		10 licenses	CXONE-AL10C-V□

**Note:** The box next to EV indicates the current version of software (2, 3, 4, etc.).

## Programming Cables

Name	Specifications	Cable length	Model
Peripheral Device Connecting Cables (for peripheral port)	Connects DOS computers, D-Sub 9-pin	0.1 m	CS1W-CN118
		2.0 m	CS1W-CN226
		6.0 m	CS1W-CN626
Peripheral Device Connecting Cable (for RS-232C port)		2.0 m	C200H-CN229-EU
			CBL-202 in Canada

# Programmable Controllers CP1H



## High-Speed, High-Performance Compact PLC with 20 or 40 I/O Built-In

### System Advantages

- Brick style controller features powerful position control and communications capabilities
- Built-in functions include digital I/O, high-speed counters, pulse outputs and analog input/outputs integrate process data with sequential control
- Integrated communications gateway functions make CP1H the first compact PLC in Omron's Smart Platform concept
- All Omron devices connected to CP1H by Ethernet, DeviceNet, or Serial link can be configured, programmed and monitored through a single connection, using CX-One software suite
- CX-Programmer Jr. software, economical package for simple ladder diagram programming
- Built-in USB (A-B) port and two optional plug-in serial modules for RS-232C and RS-422/485 connection to serial devices and programming tools
- Function blocks, Structured text - use the IEC61131-3 programming for easy software development that is standard in the industry; both are included at no additional cost
- Save time - program comments and symbols are stored locally in the PLC ensuring programs and documentation always stay up-to-date



- Solve complex programming issues - built-in floating-point math and trigonometric functions
- Quick modifications - online editing allows you to make quick PLC program changes
- Network communication capabilities via serial, Profibus-DP and Omron's CompoNet and DeviceNet I/O Link help integrate process or machine activity with other plant floor operations
- 40 I/O point CPU, Expandable up to 320 I/O points using CPM1A expansion I/O units and CJ1 Special I/O modules
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details
- Built-in 0 to 10 V analog input (8 bit) and analog potentiometer (8 bit)

## CP1H Programmable Controllers

### CP1H Controller CPU

No. of I/O points	Appearance/dimensions (H x W x D mm)	Input voltage	Built-in capabilities	No. of inputs	No. of outputs	Output type	Model
40	 110 x 150 x 85	100-240 VAC, 50/60 Hz	4 encoder inputs (100 kHz) 8 Interrupts/Counters	24 DC	16	Relay	CP1H-X40DR-A
		24 VDC	4 encoder inputs (100 kHz) 4 Pulse outputs: 2 x 100 kHz, 4 x 100 kHz 8 interrupts/counters			NPN transistor (sinking)	CP1H-X40DT-D
						PNP transistor (sourcing)	CP1H-X40DT1-D

No. of I/O points	Appearance/ dimensions (H x W x D mm)	Input voltage	Built-in capabilities	No. of inputs	No. of outputs	Output type	Model
40	 110 x 150 x 85	100-240 VAC, 50/60 Hz	4 Analog inputs, 2 Analog outputs (1/12,000 resolution); 4 encoder inputs (100 kHz) 8 Interrupts/Counters	24 DC	16	Relay	CP1H-XA40DR-A
		24 VDC	4 Analog inputs, 2 Analog outputs (1/12,000 resolution) 4 encoder inputs (100 kHz) 4 Pulse outputs: 2 x 100 kHz, 4 x 100 kHz 8 interrupts/counters			NPN transistor (sinking)	CP1H-XA40DT-D
						PNP transistor (sourcing)	CP1H-XA40DT1-D
20	 110 x 150 x 85		4 encoder inputs: 2 x 1 MHz, 2 x 100 kHz 4 Pulse outputs 2 x 1 MHz, 2 x 50 kHz 4 Line driver inputs: 2 input side; 2 output side 6 interrupts/counters	12 DC	8	NPN transistor (sinking)	CP1H-Y20DT-D

### Option Boards

Item	Appearance	Description	Model
RS-232C option board		Converts CPU unit option port for RS-232C devices; use up to 2 per CPU	CP1W-CIF01
RS-422/RS-485 option board		Converts CPU unit option port for RS-422/RS-485 devices; use up to 2 per CPU	CP1W-CIF11
Memory cassette		Use to back up programs or auto-booting	CP1W-ME05M
LCD Display option board		4 line 12 character display. Will only operate from option slot #1 (left port). Used to monitor and change user-specified messages, time or other data of the CPU Unit	CP1W-DAM01

### I/O Expansion Tools

Item	Appearance	Description	Cable length	Model
I/O Connecting Cable		Use the cable to connect CPM1A Expansion I/O Units when using a CJ Unit Adapter	80 cm	CP1W-CN811
CJ Unit Adapter		Connects 2 CJ1W Special I/O or CPU Bus modules to CP1H (includes End Cover)	—	CP1W-EXT01

## Expansion I/O and Special I/O Modules

Name	Output method	Inputs	Outputs	Model
Expansion I/O Units 	Relay	24	16	CP1W-40EDR
	Transistor (sinking)			CP1W-40EDT
	Transistor output (sourcing)			CP1W-40EDT1
	Relay	12	8	CP1W-20EDR1
	Transistor (sinking)			CP1W-20EDT
	Transistor output (sourcing)			CP1W-20EDT1
	Relay	—	16	CP1W-16ER
	—			8
	Relay	—	8	CP1W-8ER
	Transistor (sinking)			CP1W-8ET
Transistor output (sourcing)	CP1W-8ET1			
Analog Input Unit 	Analog (resolution: 1/6000)	4	—	CP1W-AD041
Analog Output Unit 		—	4	CP1W-DA041
Analog I/O Unit 		2	1	CP1W-MAD11
CompoBus/S I/O Link Unit 	—	8 (I/O link input bits)	8 (I/O link input bits)	CP1W-SRT21
Temperature Sensor Unit 	2 thermocouple inputs			CP1W-TS001
	4 thermocouple inputs			CP1W-TS002
	2 platinum resistance thermometer inputs			CP1W-TS101
	4 platinum resistance thermometer inputs			CP1W-TS102

## CJ-series Special I/O Units and CPU Bus Units

Category	Name	Specification	Model
CJ-series special I/O units	Analog input units	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000; Conversion speed: 250 $\mu$ s/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD081-V1
		4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000; Conversion speed: 250 $\mu$ s/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD041-V1
	Analog output units	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8,000, 250 $\mu$ s/output.)	CJ1W-DA08V
		8 outputs (4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8,000, 250 $\mu$ s/output.)	CJ1W-DA08C
		4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/point max.	CJ1W-DA041
		2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max.	CJ1W-DA021
	Analog I/O unit	4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/point max. (Can be set to 1/8,000, 250 $\mu$ s/point)	CJ1W-MAD42
	Process input units	4 inputs, B, J, K, L, R, S, T; Conversion speed: 250 ms/4 inputs	CJ1W-PTS51
		4 inputs, Pt100 $\Omega$ (JIS, IEC), JPt100 $\Omega$ , Conversion speed: 250 ms/4 inputs	CJ1W-PTS52
		2 inputs, B, E, J, K, L, N, R, S, T, U, W, Re5-26, PL $\pm$ 100 mV, Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS15
		4 input, 18 bit resolution universal analog input - Pt100, JPt100, Pt1000, Pt100, TC: K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, $\pm$ 100 mV, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V, Potentiometer Speed dependant on resolution used	CJ1W-PH41U
		2 inputs, 0 to 1.25 V, -1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, -5 to 5 V, 0 to 10 V, -10 to 10 V, $\pm$ 10-V selectable range, 0 to 20 mA, 4 to 20 mA	CJ1W-PDC15
	Temperature control units	4 loops, thermocouple input, NPN output	CJ1W-TC001
		4 loops, thermocouple input, PNP output	CJ1W-TC002
		2 loops, thermocouple input, NPN output, heater burnout detection function	CJ1W-TC003
		2 loops, thermocouple input, PNP output, heater burnout detection function	CJ1W-TC004
		4 loops, platinum resistance thermometer input, NPN output	CJ1W-TC101
		4 loops, platinum resistance thermometer input, PNP output	CJ1W-TC102
		2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function	CJ1W-TC103
		2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function	CJ1W-TC104
CompoNet Master	CompoNet Master 2560 Max. I/O, 384 Nodes	CJ1W-CRM21	
CJ-series CPU bus units	Controller link units	Wired (Shielded twisted-pair cable)	CJ1W-CLK23
	Serial communications units	1 RS-232C port and 1 RS-422A/485 port	CJ1W-SCU41-V1
		2 RS-422A/485 port	CJ1W-SCU31-V1
		2 RS-232C ports	CJ1W-SCU21-V1
	Ethernet unit	100 Base-TX	CJ1W-ETN21
	Ethernet/IP unit	100 Base-TX	CJ1W-EIP21
	DeviceNet unit	Functions as master and/or slave; allows control of 32,000 points max. per master.	CJ1W-DRM21
	Profibus-DP master unit	Provides data exchange, diagnostics and message communications at 12 Mbps; 1200 m distance; 125 modes; shielded twisted pair cable; allows 7,168 words of I/O data per PLL.	CJ1W-PRM21
Profibus-DP slave unit	Max. 180 words of input and output	CJ1W-PRT21	

## Communications Adapters and Cables

Item	Appearance/dimensions (H x W x D mm)	Description	Cable length	Model
RS-232C cables		RS-232C to RS-232C; PC connector for program download	2 m	<b>C200H-CN229-EU</b> <b>CBL-202</b> in Canada
		RS-232C to RS-232C; for serial communications from PLC to PC	2 m	<b>C200H-CN320-EU</b> <b>CBL-804</b> in Canada
USB-serial conversion cable		Converts between USB and RS-232C; PC Driver included (CD-ROM); Applicable OS: Windows® 98, Me, 2000, or XP. This adapter will work when connected to the optional serial ports on the CP1 family (CP1W-CIF01) when used with the C200H-CN229-EU cable	0.5 m	<b>CS1W-CIF31</b>

## Programming and Diagnostic Software and Tools

Software name	Description	Quantity	Model
CX-Programmer Jr.	Windows®-based programming software; for Omron's micro PLC's: CP1, CPM, SRM	1 license	<b>WS02-CXPC2-V□</b>
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors. * At this time Windows® 64 bit operating systems are not supported	1 license	<b>CXONE-AL01C-V□</b>
		3 licenses	<b>CXONE-AL03C-V□</b>
		10 licenses	<b>CXONE-AL10C-V□</b>

**Note:** The box next to EV indicates the current version of software (2, 3, 4, etc.).

## Manuals

Product	Description	Model
Operation manual	CP1H programmable controllers operation manual	<b>W450</b>
Programming manual	CP1H CPU unit programming manual	<b>W451</b>

## Specifications

Controller	CP1H-XA CPU units	CP1H-X CPU units	CP1H-Y CPU unit
Type	Analog I/O built-in	Standard	High-speed positioning
CPU I/O	40 (24 inputs/16 outputs)		20 (12 inputs/8 outputs) Line driver inputs: Phases A, B, and Z for 2 axes Line driver outputs: CW and CCW for 2 axes
Effective system size	CPUs expandable to 320 I/O max. using CPM1A and CJ1 Special I/O or CPU Bus modules		CPU expandable to 300 I/O max. using CPM1A and CJ1 Special I/O or CPU Bus modules
Program capacity	20K steps (32K words data memory)		
Basic instruction execution time	0.1 $\mu$ s		
No. of instructions	Approx. 400		
Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VDC		24 VDC
AC inputs	None		
DC inputs	Yes		
Max. # of inputs	192		180
Max. # of outputs	128		120
Max. # of relay outputs	128		120
Max. # of transistor outputs	128		120
High-speed counter	100 kHz (single-phase), 50 kHz (differential phases), 4 axes		1 MHz (single-phase), 500 kHz (differential phases) for 2 axes (line-driver input), 100 kHz (single-phase), 50 kHz (differential phases) for 2 axes (4 axes total)
Pulse output (transistor output models only)	100 kHz for 4 axes (4 axes total)		1 MHz for 2 axes (line-driver output), 50 kHz for 2 axes (4 axes total)
Analog I/O	4 analog inputs, 2 analog outputs built in (0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 ma, 4 to 20 ma)	Use expansion I/O module	Use expansion I/O module
Real time clock	Yes		
Memory backup	Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to flash memory as initial values. Battery backup: The Holding Area, DM Area, and counter values (flags, PV) are backed up by a battery.		
External interrupts	8 inputs		6 inputs
Network connectivity	RS-232C/RS-422, Host Link, NT Link 1:N (for HMI), DeviceNet master/slave, Profibus-DP master/ slave, CompoNet, PC Link 1:N, Ethernet, Controller Link, CompoWay/F master, Modbus-ASCII master, Modbus-RTU master/slave		
Built-in comm. ports	USB; option boards for RS-232C and RS-422/485		
Peripheral devices	NP or NS series HMI		
Programming software	CX-Programmer Jr. or CX-One		

# CPU Units and Expansion Units

# CP1L



When it comes to controllers for compact machines, Omron's new CP1L series offers the compactness of a micro-PLC with the capability of a modular PLC.

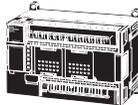
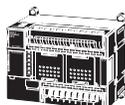
But this new and exciting range is not only compact, it is scaleable, has a faster processing speed than other controllers and is in a class of its own when it comes to price/performance. Naturally, it is compatible with all other devices in the Omron PLC line up.

- 4 high-speed encoder inputs and 2 high-speed pulse outputs
- CPUs with AC or DC supply and 10, 14, 20, 30, 40, & 60 I/O built-in
- Instruction set compatible with CP1H-, CJ1-, and CS1 series PLC
- Optional RS-232C and RS-422A/485 serial module, LCD option module
- Built-in USB (A-B) port
- Scaleable with wide range of I/O units (maximum up to 180 I/O points)
- Easy set-up single instruction to perform motion control
- One and the same software as other Omron controllers
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details
- Built-in 0 to 10 V analog input (8 bit) and analog potentiometer (8 bit)
- Function blocks, Structured text - use the IEC61131-3 programming for easy software development that is standard in the industry; both are included at no additional cost
- Save time - program comments and symbols are stored locally in the PLC ensuring programs and documentation always stay up-to-date
- Solve complex programming issues - built-in floating-point math and trigonometric functions
- Quick modifications - online editing allows you to make quick PLC program changes



## Ordering Information

### CP1L Controller CPU

CPU Unit	Specifications				Model
	Power supply	Output method	Inputs	Outputs	
CP1L-M CPU Units with 60 points Up to 3 CP1W expansion units. All CPU's have 0 to 10 V (8 bit) A/D, 2 optional ports available 	100-240 VAC, 50/60 Hz 24 VDC	Relay output	36	24	CP1L-M60DR-A
		Transistor output (sinking)			CP1L-M60DR-D
		Transistor output (sourcing)			CP1L-M60DT-D
					CP1L-M60DT1-D
CP1L-M CPU Units with 40 Points Up to 3 CP1W expansion units. All CPU's have 0 to 10 V (8 bit) A/D, 2 optional ports available 	100-240 VAC, 50/60 Hz 24 VDC	Relay output	24	16	CP1L-M40DR-A
		Transistor output (sinking)			CP1L-M40DR-D
		Transistor output (sourcing)			CP1L-M40DT-D
					CP1L-M40DT1-D
CP1L-M CPU Units with 30 Points Up to 3 CP1W expansion units. All CPU's have 0 to 10 V (8 bit) A/D, 2 optional ports available 	100-240 VAC, 50/60 Hz 24 VDC	Relay output	18	12	CP1L-M30DR-A
		Transistor output (sinking)			CP1L-M30DR-D
		Transistor output (sourcing)			CP1L-M30DT-D
					CP1L-M30DT1-D

CPU Unit	Specifications				Model
	Power supply	Output method	Inputs	Outputs	
CP1L-L CPU Units with 20 Points Up to 1 CP1W expansion units. All CPU's have 0 to 10 V (8 bit) A/D, 1 optional port available 	100-240 VAC, 50/60 Hz 24 VDC	Relay output	12	8	CP1L-L20DR-A
		Transistor output (sinking)			CP1L-L20DR-D
		Transistor output (sourcing)			CP1L-L20DT-D
					CP1L-L20DT1-D
CP1L-L CPU Units with 14 Points Up to 1 CP1W expansion units. All CPU's have 0 to 10 V (8 bit) A/D, 1 optional port available 	100-240 VAC, 50/60 Hz 24 VDC	Relay output	8	6	CP1L-L14DR-A
		Transistor output (sinking)			CP1L-L14DR-D
		Transistor output (sourcing)			CP1L-L14DT-D
					CP1L-L14DT1-D
CP1L-L CPU Units with 10 Points No expansion units possible. All CPU's have 0 to 10 V (8 bit) A/D, No optional ports available 	100-240 VAC, 50/60 Hz 24 VDC	Relay output	6	4	CP1L-L10DR-A
		Transistor output (sinking)			CP1L-L10DR-D
		Transistor output (sourcing)			CP1L-L10DT-D
					CP1L-L10DT1-D

### Options for CPU Units

Name	Specifications	Model
RS-232C Option Board	For CPU Unit option port	CP1W-CIF01
RS-422A/485 Option Board		CP1W-CIF11
LCD Display Option Board		CP1W-DAM01
Memory Cassette	Can be used for backing up programs or auto-booting	CP1W-ME05M

### Programming Devices

Name	Specifications	Model	
CX-One FA Integrated Tool Package	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors *At this time Windows 64 bit operating systems are not supported	1 license	CXONE-AL01C-V□
		3 license	CXONE-AL03C-V□
		10 license	CXONE-AL10C-V□
		50 licenses	CXONE-AL50C-V□
USB-Serial Conversion Cable (See note 1)	USB-RS-232C Conversion Cable (Length: 0.5 m) and PC driver (on a CD-ROM disc) are included. Complies with USB Specification 1.1 On personal computer side: USB (A plug connector, male) On PLC side: RS-232C (D-sub 9-pin, male) Driver: Supported by Windows 98, Me, 2000, XP, and Vista. This adapter will work when connected to the optional serial ports on the CP1 family (CP1W-CIF01) when used with the C200H-CN229-EU cable	CS1W-CIF31	
CX-Programmer Jr.	Windows based programming software for Omron's micro PLC's: CP1, CPM, SRM	1 license	WS02-CXPC2-V□

- Note:**
- Cannot be used with a peripheral USB port.
  - CP1L PLCs are supported by CX-Programmer version 7.1 or higher.

## Expansion Units

Name	Output method	Inputs	Outputs	Model
Expansion I/O Units 	Relay	24	16	CP1W-40EDR
	Transistor (sinking)			CP1W-40EDT
	Transistor output (sourcing)			CP1W-40EDT1
	Relay	12	8	CP1W-20EDR1
	Transistor (sinking)			CP1W-20EDT
	Transistor output (sourcing)			CP1W-20EDT1
	Relay	—	16	CP1W-16ER
	—			8
	Relay	—	8	CP1W-8ER
	Transistor (sinking)			CP1W-8ET
	Transistor output (sourcing)			CP1W-8ET1
	Analog Input Unit 	Analog (resolution: 1/6000)	4	—
Analog Output Unit 	—		4	CP1W-DA041
Analog I/O Unit 	2		1	CP1W-MAD11
CompoBus/S I/O Link Unit 	—	8 (I/O link input bits)	8 (I/O link input bits)	CP1W-SRT21
Temperature Sensor Unit 	2 thermocouple inputs			CP1W-TS001
	4 thermocouple inputs			CP1W-TS002
	2 platinum resistance thermometer inputs			CP1W-TS101
	4 platinum resistance thermometer inputs			CP1W-TS102

## Optional Products, Maintenance Products, and DIN Track Accessories

Name	Specifications	Model
Battery Set	For CP1L CPU Units (Use batteries within two years of manufacture.)	CJ1W-BAT01
DIN Track	Length: 0.5 m; Height: 7.3 mm	PFP-50N
	Length: 1 m; Height: 7.3 mm	PFP-100N
	Length: 1 m; Height: 16 mm	PFP-100N2
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.	PFP-M

# Programmable Controllers CPM1A



## Micro Controller for Small-Scale Automation

- 10, 20, 30 and 40 point I/O CPUs
- Expandable up to 100 I/O points
- Peripheral communications port built in
- 2K words max. of programming
- DC inputs only
- Analog expansion modules available
- Temperature sensor input expansion modules available
- Auxiliary 24 VDC supply (AC type only)
- Relay or Transistor outputs (available as NPN or PNP)
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details



## System Advantages

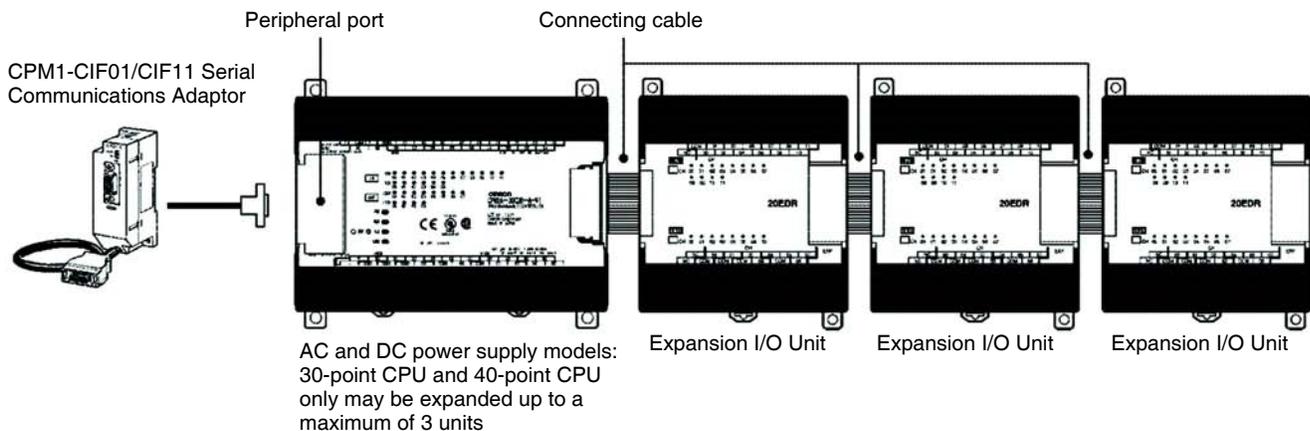
- All-in-one brick style package contains the CPU, I/O and power supply makes design and installation fast and easy
- Dedicated expansion modules for mixed analog I/O and temperature sensor input help integrate process data with sequential control
- Expandable to 100 I/O points (60 in/40 out) max. for future changes within the same controller platform
- CX-Programmer Jr. software, economical package for simple ladder diagram programming
- Network communication capabilities via serial, Profibus-DP and Omron's CompoBus/S and DeviceNet I/O Link help integrate process or machine activity with other plant floor operations

## Configuring a CPM1A System

Omron's CPM1A systems are easy to configure to match your automation requirements and offer communications to integrate your plant floor operations.

## Basic Configuration

Up to 3 Expansion I/O modules can be connected to 30- and 40-point CPUs; 10- and 20-point CPUs are not expandable.



### CPM1A Controller CPU

No. of I/O points	Appearance/ dimensions (H x W x D mm)	Input voltage	No. of inputs	No. of outputs	Output type	Model
10	 90 x 66 x 70	100-240 VAC, 50/60 Hz	6 DC	4	Relay	CPM1A-10CDR-A-V1
	 90 x 66 x 50	24 VDC				CPM1A-10CDR-D-V1
20	 90 x 86 x 70	100-240 VAC, 50/60 Hz	12 DC	8	NPN transistor	CPM1A-20CDR-A-V1 CPM1A-20CDT-A-V1
	 90 x 86 x 50	24 VDC			Relay	CPM1A-20CDR-D-V1
30	 90 x 130 x 70	100-240 VAC, 50/60 Hz	18 DC	12	NPN transistor	CPM1A-30CDR-A-V1
	 90 x 130 x 50	24 VDC				Relay
40	 90 x 150 x 70	100-240 VAC, 50/60 Hz	24 DC	16	Relay	CPM1A-40CDR-A-V1
	 90 x 150 x 50	24 VDC				CPM1A-40CDR-D-V1

## Expansion I/O and Special I/O Modules

Name	Output method	Inputs	Outputs	Model	
Expansion I/O units	Relay	24	16	CPM1A-40EDR	
	Transistor (sinking)			CPM1A-40EDT	
	Transistor (sourcing)			CPM1A-40EDT1	
	Relay	12	8	CPM1A-20EDR1	
	Transistor (sinking)			CPM1A-20EDT	
	Transistor (sourcing)			CPM1A-20EDT1	
		—	8	—	CPM1A-8ED
	Relay	—	8	CPM1A-8ER	
	Transistor (sinking)			CPM1A-8ET	
	Transistor (sourcing)			CPM1A-8ET1	
	Analog input unit	Analog resolution 1/6000	4	—	CPM1A-AD041
	Analog output unit		—	4	CPM1A-DA041
Analog I/O units	Analog resolution 1/256	2	1	CPM1A-MAD01	
	Analog resolution 1/6000			CPM1A-MAD11	
DeviceNet slave I/O link unit	—	32 I/O link input bits	32 I/O link output bits	CPM1A-DRT21	
Profibus-DP slave module		16	16	CPM1A-PRT21	
CompoBus/S slave I/O link unit		8 I/O link input bits	8 I/O link output bits	CPM1A-SRT21	
Temperature sensor input units	Thermocouple Type J or K inputs	2	—	CPM1A-TS001	
		4		CPM1A-TS002	
	Platinum resistance thermometer inputs	2		CPM1A-TS101	
		4		CPM1A-TS102	

## Communications Adapters and Cables

Item	Appearance/dimensions (H x W x D mm)	Description	Cable length	Model
RS-232C adapter	 90 x 30 x 56	Converts data communications from peripheral port for RS-232C devices	—	CPM1-CIF01
RS-232C cables		RS-232C to RS-232C; PC connector for program download	2 m	C200H-CN229-EU CBL-202 in Canada
		RS-232C to RS-232C; for serial communications from PLC to PC		C200H-CN320-EU CBL-804 in Canada
RS-422/RS-485 adapter	 90 x 30 x 61	Converts data communications from peripheral port for RS-422/RS-485 devices	—	CPM1-CIF11
USB-Serial conversion cable		Converts between USB and RS-232C; PC Driver included (CD-ROM); Applicable OS: Windows® 98, Me, 2000, or XP	0.5 m	CS1W-CIF31

## Support Software and Programming Devices

Item	Description	Model
CX-Programmer Jr. support software	Windows®-based programming software; for Omron's micro PLC's: CP1, CPM, SRM	WS02-CXPC2-V□
CX-One software	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	CXONE-AL01C-V□
External memory unit	Uploads and downloads program and sets up memory areas to and from the controller	CPM1-EMU01-V1

## Manuals

Product	Description	Model
Operation manual	CPM1A programmable controllers operation manual	W317
Programming manual	CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) programming manual	W353

## Specifications

Controller	CPM1A-V1
CPU I/O	10, 20, 30, 40
Effective system size	10 and 20 point CPUs, not expandable 30 and 40 point CPUs expandable to 100 I/O max. (60 in/40 out)
Program capacity	2 K
Basic instruction execution time	0.72 $\mu$ s
No. of instructions	91
Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VDC
AC inputs	None
DC inputs	Yes
Max. # of inputs	60 max.
Max. # of outputs	40 max.
Max. # of relay outputs	40 max.
Max. # of transistor outputs	40 max.
High-speed counter	5 kHz
Pulse output	2 kHz
Analog I/O	Expansion module (2 inputs, 1 output)
Real time clock	No
Memory backup	No
External interrupts	2 or 4
Network connectivity	RS-232C/RS-422, Hostlink, 1:1 NT Link (for HMI), DeviceNet slave, Profibus-DP slave, CompoBus/S slave, PC Link 1:1
Built-in comm. Ports	Peripheral port with adapter
Peripheral devices	Hand-held programmer, NT/NS series HMI
Programming support software	CX-Programmer Jr. or CX-One

# Programmable Controllers CPM2A



## Micro Controller for Advanced, Small-Scale Automation

- 20, 30, 40 or 60 I/O point CPU
- Expandable up to 120 I/O points; uses CPM1A expansion I/O units
- Peripheral and RS-232C ports built in for direct connection to serial devices and programming tools
- Real-time clock
- Two, 10 kHz pulse outputs for position control applications
- 20 kHz high-speed counter input
- Synchronized pulse control coordinates input devices with control devices
- Powerful instruction set
- 4K words max. of programming
- DC inputs only
- Analog I/O expansion modules available
- Temperature sensor input expansion modules available
- Auxiliary 24 VDC supply (AC type only)
- Relay or Transistor outputs (available as NPN or PNP)
- Removable terminals for fast servicing
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details



## System Advantages

- Brick style controller features powerful position control and communications capabilities
- Easy-to-install with CPU, I/O and power supply all in one body
- Dedicated expansion modules for mixed analog I/O and temperature sensor input help integrate process data with sequential control
- Expandable to 120 I/O points (72 in/48 out) max. for future changes within the same controller platform
- CX-Programmer Jr. software, economical package for simple ladder diagram programming
- Network communication capabilities via serial, Profibus-DP and Omron's CompoBus/S and DeviceNet I/O Link help integrate process or machine activity with other plant floor operations

## Specifications

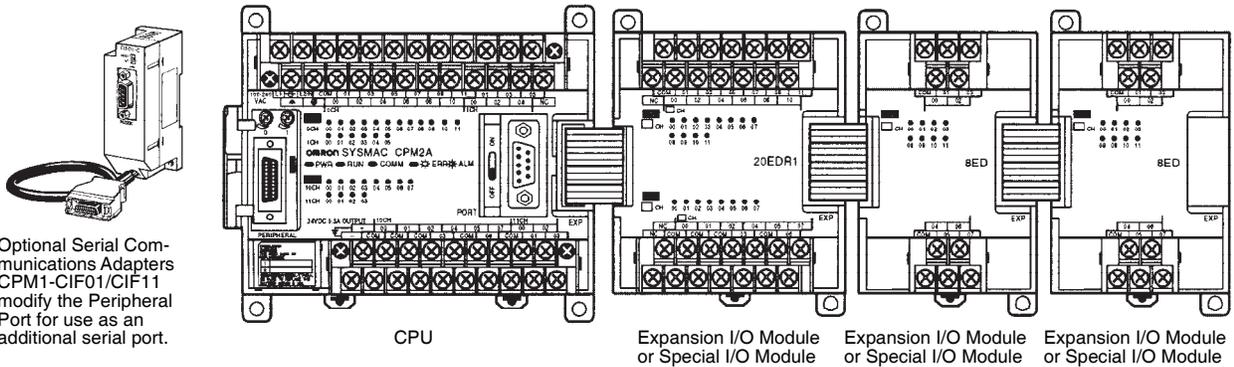
Controller	CPM2A
CPU I/O	20, 30, 40, 60
Effective system size	CPUs expandable to 120 I/O max. (72 in/48 out)
Program capacity	4 K
Basic instruction execution time	0.64 μs
No. of instructions	119
Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VDC
AC inputs	None
DC inputs	Yes
Max. # of inputs	72 max.
Max. # of outputs	48 max.
Max. # of relay outputs	48 max.
Max. # of transistor outputs	48 max.
High-speed counter	20 kHz
Pulse output	10 kHz (synchronized)
Analog I/O	Expansion module (2 inputs, 1 output)
Real time clock	Yes
Memory backup	Yes
External interrupts	2 or 4
Network connectivity	RS-232C/RS-422, Hostlink, 1:1 NT Link (for HMI), DeviceNet slave, Profibus-DP slave, CompoBus/S slave, PC Link 1:1
Built-in comm. ports	RS-232C and Peripheral port with adapter
Peripheral devices	Hand-held programmer, NT/NS series HMI
Programming support software	CX-Programmer Jr. or CX-One

## Configuring a CPM2A System

Omron's CPM2A systems are easy to configure to match your automation requirements and offer communications to integrate your plant floor operations.

### Basic Configuration

Up to three Expansion I/O Modules or Special I/O Modules can be connected to any CPM2A CPU. The mounting order does not affect the number of modules that can be mounted.



### CPM2A Controller CPU

No. of I/O points	Appearance/dimensions (H x W x D mm)	Input voltage	No. of inputs	No. of outputs	Output type	Model
20	 90 x 130 x 90	100-240 VAC, 50/60 Hz	12 DC	8	Relay	CPM2A-20CDR-A
	 90 x 130 x 55	24 VDC			NPN transistor	CPM2A-20CDT-D
					PNP transistor	CPM2A-20CDT1-D1
30	 90 x 130 x 90	100-240 VAC, 50/60 Hz	18 DC	12	Relay	CPM2A-30CDR-A
	 90 x 130 x 55	24 VDC			Relay	CPM2A-30CDR-D
					NPN transistor	CPM2A-30CDT-D
40	 90 x 150 x 90	100-240 VAC, 50/60 Hz	24 DC	16	Relay	CPM2A-40CDR-A
	 90 x 150 x 55	24 VDC				CPM2A-40CDR-D
					NPN transistor	CPM2A-40CDT-D
					PNP transistor	CPM2A-40CDT1-D1

### CPM2A Controller CPU (Continued)

No. of I/O points	Appearance/dimensions (H x W x D mm)	Input voltage	No. of inputs	No. of outputs	Output type	Model
60	 90 x 195 x 90	100- 240 VAC, 50/60 Hz	36 DC	24	Relay	CPM2A-60CDR-A
	 90 x 195 x 55	24 VDC			NPN transistor	CPM2A-60CDR-D
						CPM2A-60CDT-D

### Expansion I/O and Special I/O Modules

Name	Output method	Inputs	Outputs	Model	
Expansion I/O units	Relay	24	16	CPM1A-40EDR	
	Transistor (sinking)			CPM1A-40EDT	
	Transistor (sourcing)			CPM1A-40EDT1	
	Relay	12	8	CPM1A-20EDR1	
				Transistor (sinking)	CPM1A-20EDT
				Transistor (sourcing)	CPM1A-20EDT1
	—	8	—	CPM1A-8ED	
	Relay	—	8	CPM1A-8ER	
				Transistor (sinking)	CPM1A-8ET
Transistor (sourcing)				CPM1A-8ET1	
Analog input unit	Analog resolution 1/6000	4	—	CPM1A-AD041	
Analog output unit		—	4	CPM1A-DA041	
Analog I/O units	Analog resolution 1/256	2	1	CPM1A-MAD01	
	Analog resolution 1/6000			CPM1A-MAD11	
DeviceNet slave I/O link unit	—	32 I/O link input bits	32 I/O link output bits	CPM1A-DRT21	
Profibus-DP slave module		16	16	CPM1A-PRT21	
CompoBus/S slave I/O link unit		8 I/O link input bits	8 I/O link output bits	CPM1A-SRT21	
Temperature sensor input units	Thermocouple type J or K inputs	2	—	CPM1A-TS001	
		4		CPM1A-TS002	
		2		CPM1A-TS101	
	Platinum resistance thermometer inputs	2		CPM1A-TS101	
		4		CPM1A-TS102	

### Communications Adapters and Cables

Item	Appearance/dimensions (H x W x D mm)	Description	Cable length	Model
RS-232C adapter	 90 x 30 x 56	Converts data communications from peripheral port for RS-232C devices	0.5 m	CPM1A-CIF01
RS-232C cables		RS-232C to RS-232C; PC connector for program download	2 m	C200H-CN229-EU CBL-202 in Canada
		RS-232C to RS-232C; for serial communications from PLC to PC		C200H-CN320-EU CBL-804 in Canada
RS-422/RS-485 adapter	 90 x 30 x 61	Converts data communications from peripheral port for RS-422/RS-485 devices	0.5 m	CPM1-CIF11
USB-serial conversion cable		Converts between USB and RS-232C; PC Driver included (CD-ROM); Applicable OS: Windows® 98, Me, 2000, or XP		CS1W-CIF31

## Support Software and Programming Devices

Item	Description	Model
CX-Programmer Jr. support software	Windows®-based programming software; for Omron's micro PLC's: CP1, CPM, SRM	WS02-CXPC2-V□
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	CXONE-AL01C-V□
External memory unit	Uploads and downloads program and sets up memory areas to and from the controller	CPM1-EMU01-V1

## Manuals

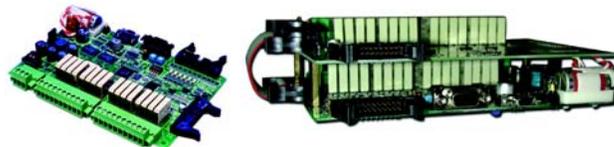
Product	Description	Model
Operation manual	CPM2A programmable controllers operation manual	W352
Programming manual	CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) programming manual	W353

# Programmable Controllers CPM2B



## Brick Style Micro Controller in a Board Package

- 32-point and 40-point I/O CPU boards, expand to 168 I/O
- Peripheral communications port standard
- 20 kHz high-speed counter input
- Two, 10 kHz pulse outputs for motion applications
- LED indicators show status
- Synchronized pulse control matches input devices to control devices for positioning
- Relay or Transistor outputs
- Analog I/O expansion boards available
- Built-in CompoBus/S master and DeviceNet slave model with 72-point CPU board allows high-speed network communication
- RS-232C port, backup battery and real-time clock are available on standard models
- Custom options include number/type of I/O, communication interfaces, package size and layout, real-time clock and connector types; contact your Omron representative
- UL, cUL and CE;UL Class I, Division 2, Groups A, B, C and D for use in hazardous locations; contact Omron for rating details



## System Advantages

- Reduce development costs compared to custom control boards
- Advanced programmable controller flexibility with significant space savings
- Dedicated expansion modules for mixed analog I/O and temperature sensor input help integrate process data with sequential control
- Expandable to 168 I/O points (64 in/64 out) max. within the same controller platform
- CX-Programmer Jr. software, economical package for simple ladder diagram programming
- Host computer and HMI communications help integrate machine activity with other plant floor operations and simplifies troubleshooting

## Specifications

Controller	CPM2B	CPM2B-S100M-DRT-V1
CPU I/O	32, 40	74
Effective system size	CPUs expandable to 168 I/O max.	CPUs expandable to 170 I/O max.
Program capacity	4 K	4 K
Basic instruction execution time	0.64 μs	0.64 μs
No. of instructions	119	119
Power supply voltage	24 VDC or 12 VDC	24 VDC
AC inputs	None	None
DC inputs	Yes	Yes
Max. # of inputs	88 max.	86 max.
Max. # of outputs	80 max.	84 max.
Max. # of relay outputs	48 max.	48 max.
Max. # of transistor outputs	80 max.	84 max.
High-speed counter	20 kHz	20 kHz
Pulse output	10 kHz	10 kHz
Analog I/O	Expansion module (2 inputs, 1 output)	No
Real time clock	Yes	No
Memory backup	Yes	Yes
External interrupts	4	4
Network connectivity	RS-232C/RS-422, Hostlink, 1:1 NT Link (for HMI), PC Link 1:1	RS-232C, Hostlink, 1:1 NT Link (for HMI), DeviceNet, CompoBus/S, PC Link 1:1
Built-in comm. ports	RS-232C and Peripheral port with adapter	RS-232C, DeviceNet, CompoBus/S and Peripheral port with adapter
Peripheral devices	Hand-held programmer, NT/NS series HMI	
Programming support software	CX-Programmer Jr. or CX-One	

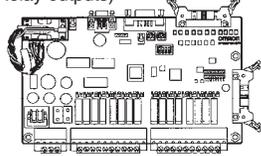
## Configuring a CPM2B System

Omron's CPM2B systems are easy to configure to match your automation requirements and offer communications to integrate your plant floor operations.

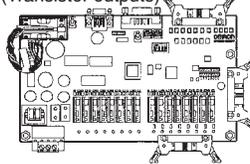
### Basic Configuration

Up to three Expansion I/O boards can be connected to a CPM2B CPU board. Connecting cable CPM2B-CN601 is supplied with each Expansion I/O board. Standoffs and mounting screws are included with all boards. Order the mounting bracket CPM2B-ATT01 separately.

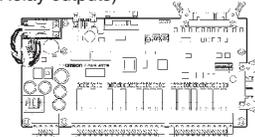
CPU Board with 32 I/O points (Relay outputs)



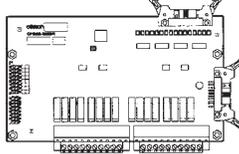
CPU Board with 32 I/O points (Transistor outputs)



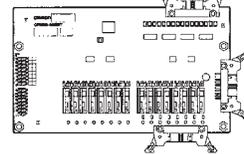
CPU Board with 40 I/O points (Relay outputs)



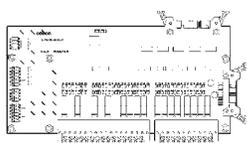
Expansion I/O board with 32 I/O points (Relay outputs)



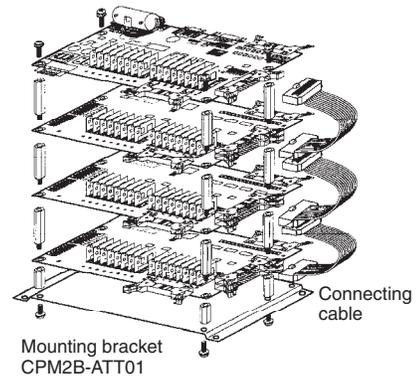
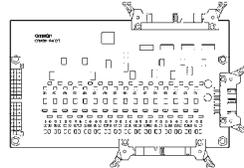
Expansion I/O board with 32 I/O points (Transistor outputs)



Expansion I/O board with 40 I/O points (Relay outputs)



Expansion I/O board with 64 I/O points (Transistor outputs)



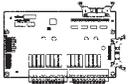
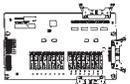
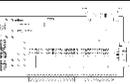
### CPM2B Controller CPU

The height shown is the minimum headroom for board components.

No. of I/O points	Appearance/dimensions (H x W x D mm)	Input voltage	No. of inputs	No. of outputs	Output type	RS-232C port, real-time clock and battery backup	Model
32	 28 x 174 x 108	24 VDC	16 DC	16	Relay	—	CPM2B-32C1DR-D
	NPN transistor				Yes	CPM2B-32C2DR-D	
		—			Yes	CPM2B-32C1DT-D	
	CPM2B-32C2DT-D				No	CPM2B-32C1D1T-D12	
12 VDC		Yes	CPM2B-32C2D1T-D12				
	28 x 174 x 108	24 VDC	24 DC	—	Relay	—	CPM2B-40C2DR-D
NPN transistor					38 DC		36
	74	 28 x 174 x 108	—	—	—	—	—

## Expansion I/O Boards

The height shown is the minimum headroom for board components.

No. of I/O points	Appearance/ dimensions (H x W x D mm)	Input voltage	No. of inputs	No. of outputs	Output type	Model
32	 28 x 209 x 108	24 VDC	16	16	Relay	CPM2B-32EDR
32	 28 x 209 x 108	12 VDC			NPN transistor	CPM2B-32EDT
32						CPM2B-32ED1T
40	 28 x 209 x 108	24 VDC	24		Relay	CPM2B-40EDR
64	 28 x 174 x 108		32	32	NPN transistor	CPM2B-64EDT

## Analog I/O Boards

The height shown is the minimum headroom for board components.

Item	Appearance/ dimensions (H x W x D mm)	Description	Max. number of modules	Inputs	Outputs	Model
Analog I/O boards	 90 x 66 x 50	High resolution: 1/6000 FS Voltage input: 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, -10 to 10 VDC	3	2 analog	1 analog	CPM2B-MAD21
	 90 x 86 x 50	Current input: 0 to 20 mA or 4 to 20 mA Voltage output: 1 to 5 VDC, 0 to 10 VDC or -10 to 10 VDC	2	4 analog	2 analog	CPM2B-MAD42
	 90 x 86 x 50	Current output: 0 to 20 mA or 4 to 20 mA	1	6 analog	3 analog	CPM2B-MAD63

## Expansion I/O Accessories

Item	Description	Model
I/O expansion cable	Connects CPU board with expansion I/O boards	CPM2B-CN601
Mounting bracket	Provides a platform for mounting CPU and additional I/O boards	CPM2B-ATT01

## Communications Adapters and Cables

Item	Appearance/ dimensions (H x W x D mm)	Description	Cable length	Model
RS-232C adapter	 90 x 30 x 56	Converts data communications from peripheral port for RS-232C devices; DIN mount	0.2 m	<b>CPM1A-CIF01</b>
		—	Program download cable to 9-pin computer serial port	3.3 m
RS-232C cables		RS-232C to RS-232C; PC connector for program download	2 m	<b>C200H-CN229-EU</b> <b>CBL-202</b> in Canada
		RS-232C to RS-232C; for serial communications from PLC to PC		<b>C200H-CN320-EU</b> <b>CBL-804</b> in Canada
RS-422/RS-485 adapter	 90 x 30 x 61	Converts data communications from peripheral port for RS-422/RS-485 devices; DIN mount	0.5 m	<b>CPM1-CIF11</b>
USB-Serial conversion cable		Converts between USB and RS-232C; PC Driver included (CD-ROM); Applicable OS: Windows 98, Me, 2000, or XP	0.5 m	<b>CS1W-CIF31</b>

## Support Software and Programming Devices

Item	Description	Model
CX-Programmer Jr. support software	Windows®-based programming software; for Omron's micro PLC's: CP1, CPM, SRM	<b>WS02-CXPC2-V□</b>
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	<b>CXONE-AL01C-V□</b>
External memory unit	Uploads and downloads program and sets up memory areas to and from the controller	<b>CPM1-EMU01-V1</b>

## Manuals

Product	Description	Model
Operation manuals	CPM2B programmable controllers operation manual	<b>W371</b>
	CPM2B-S001M-DRT programmable controllers operation manual	<b>W399</b>
Programming manual	CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) programming manual	<b>W353</b>

# Programmable Controllers

# CPM2C

Quick Link  
H232

## Powerful Modular Micro Controller for Machine Automation

- 10, 20, and 32 I/O point standard CPM2C CPU models available
- Standard CPM2C controllers expandable up to 192 I/O (Transistor Output) or 180 I/O (Relay Output) with 5 modules
- Built-in combination RS-232C/Peripheral port for direct connection to serial devices and programming tools
- Connect high-density I/O modules to Omron relay or wiring terminal blocks for easy wiring and choice of I/O style
- Network gateway controllers (CPM2C-S) offer CompoBus/S Master and DeviceNet Slave functions built into 10 I/O point CPU modules
- CPM2C-S controllers expandable up to 96 local I/O with 3 modules, 256 remote I/O points via CompoBus/S and 1024 I/O points via DeviceNet
- Transistor outputs available in NPN (sinking) or PNP (sourcing) models
- Two, 10 kHz pulse outputs for position control applications
- 20 kHz high-speed counter input
- Synchronized pulse control coordinates input devices with control devices
- DC inputs only
- Analog I/O and temperature sensor input expansion modules available
- Optional real-time clock versions
- UL, cUL and CE;UL contact Omron for rating details



## System Advantages

- Slim modular controller (just 33 mm wide) delivers exceptional flexibility for optimum decentralized control and powerful communications capabilities
- Standard CPM2C controllers provide reliable input for position and motion applications
- Communications gateway controllers (CPM2C-S) use CompoBus/S to control up to 256 remote I/O on slave units; optional built-in DeviceNet Slave capabilities allow explicit message communications
- Dedicated expansion modules for mixed analog I/O and temperature sensor input help integrate process data with sequential control

## Specifications

Controller	CPM2C	CPM2C-S
CPU I/O	10, 20, 32	10
Effective system size	CPUs expandable to 192 I/O max. (96 in/96 out) with transistor output; 180 I/O with relay output	CPUs expandable to 96 local I/O max. Up to 256 remote I/O max.
Program capacity	4 K words	4 K words
Basic instruction execution time	0.64 $\mu$ s	0.64 $\mu$ s
No. of instructions	119	119
Power supply voltage	100 to 240 VAC, 50/60 Hz or 24 VDC	24 VDC
AC inputs	None	None
DC inputs	Yes	Yes
Max. # of inputs	96 max.	186 max.
Max. # of outputs	96 max.	180 max.
Max. # of relay outputs	48 max.	152 max.
Max. # of transistor outputs	96 max.	180 max.
High-speed counter	20 kHz	20 kHz
Pulse output	10 kHz (synchronized)	10 kHz
Analog I/O	Expansion module (2 inputs, 1 output)	Expansion module (2 inputs, 1 output)
Real time clock	Yes	Yes
Memory backup	Yes	Yes

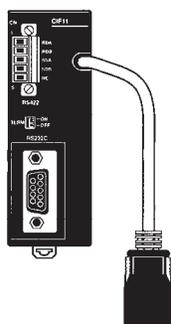
## Specifications (Continued)

Controller	CPM2C	CPM2C-S
External interrupts	2 or 4	2
Network connectivity	RS-232C/RS-422, Hostlink, 1:1 NT Link (for HMI), CompoWay/F serial, CompoBus/S slave, PC Link 1:1	RS-232C/RS-422, Hostlink, 1:1 NT Link, CompoWay/F, CompoBus/S Master, CompoBus/S Slave, DeviceNet Slave, PC Link 1:1
Built-in comm. ports	RS-232C and Peripheral port with adapter	Peripheral/RS-232C and Devicenet
Peripheral devices	Hand-held programmer, NT/NS series HMI	Hand-held programmers, NT/NS series HMI
Programming support software	CX-Programmer Jr. or CX-One	CX-One

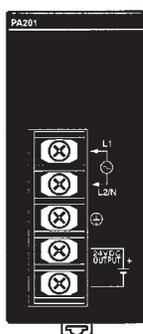
## Configuring a CPM2C System

### Standard CPM2C Configuration

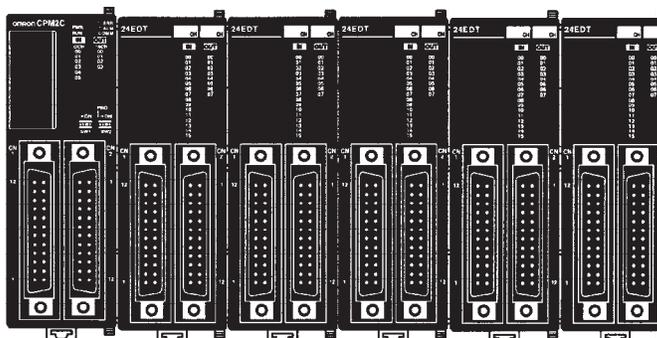
Up to five Expansion Modules or Expansion I/O Modules can be connected to a CPM2C CPU. The AC Power Supply Unit and the CPM2C-CIF01 or CPM2C-CIF11 Serial Communications Adapters can also be used with the CPU.



CPM2C-CIF01/CIF11 Serial Communications Adapters for the Mini-peripheral Port (optional)

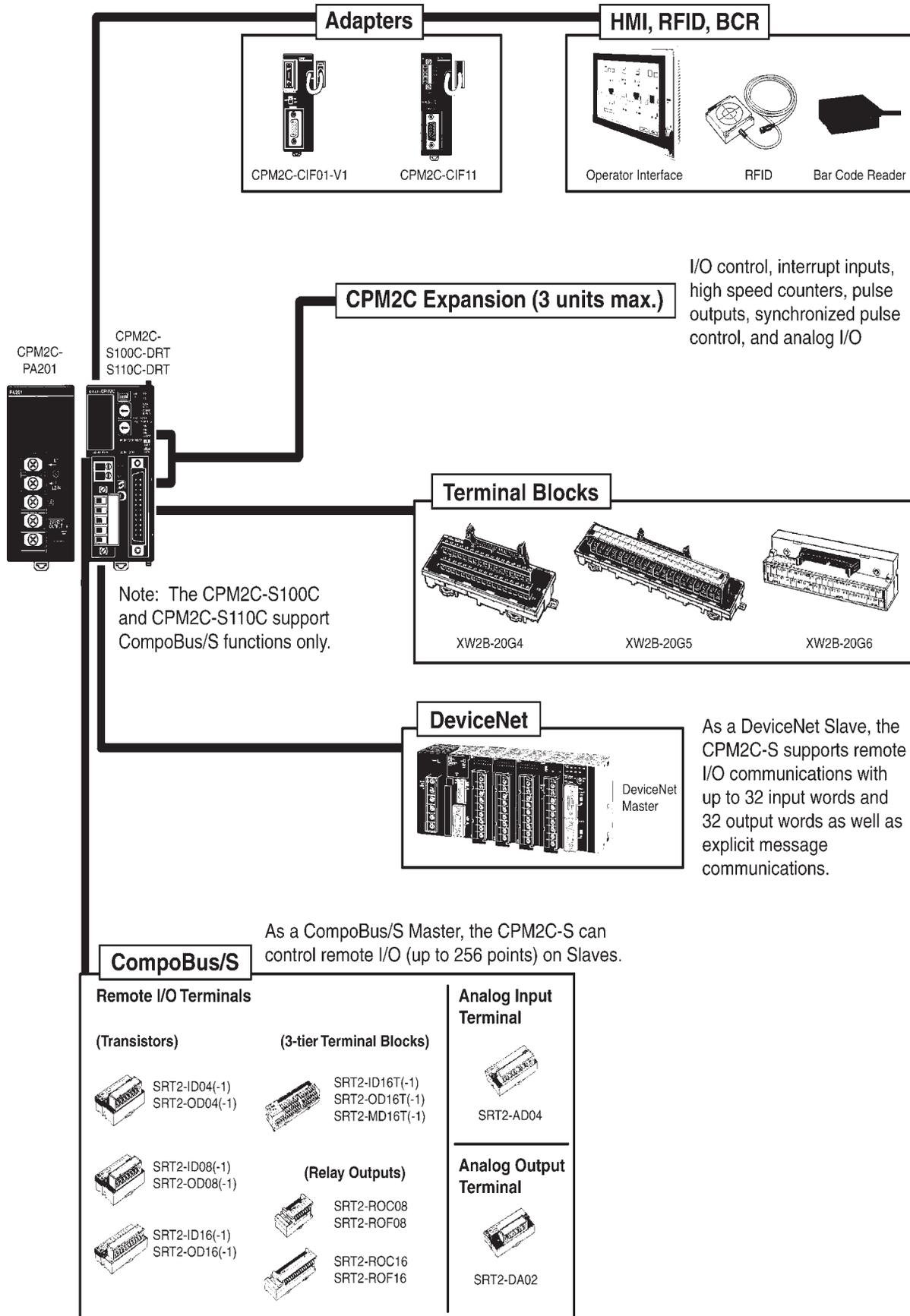


AC Power Supply Unit



CPU Up to 5 Expansion Modules or Expansion I/O Modules

# Communications Gateway CPM2C-S Configuration



## CPM2C Controller CPU

No. of I/O points	Appearance/ dimensions (H x W x D mm)	Input voltage	No. of inputs	No. of outputs	Output type	Clock function	Communications gateway	Model
10	 90 x 33 x 65	24 VDC	6 DC	4	Relay	No	No	CPM2C-10CDR-D
20			12 DC	8				CPM2C-20CDR-D
10	 90 x 40 x 65	24 VDC	6 DC	4	NPN transistor	Yes	CompoBus/S and DeviceNet slave	CPM2C-S100C-DRT
					PNP transistor		CompoBus/S	CPM2C-S110C

## Power Supply

Appearance/ Dimensions (H x W x D mm)	Input voltage	Output voltage	Output current	Model
 90 x 40 x 65	100 to 240 VAC, 50/60 Hz	24 VDC	600 mA	CPM2C-PA201

## Expansion I/O Modules

Description	Inputs	Outputs	I/O Connector	Model	
DC inputs	8	—	24 pt Fujitsu	CPM2C-8EDC	
			20 pt MIL-spec	CPM2C-8EDM	
	16		24 pt Fujitsu	CPM2C-16EDC	
			20 pt MIL-spec	CPM2C-16EDM	
Relay outputs	—	8	Terminal block	CPM2C-8ER	
Transistor output (sourcing)			24 pt Fujitsu	CPM2C-8ET1C	
				20 pt MIL-spec	CPM2C-8ET1M
			16	24 pt Fujitsu	CPM2C-16ET1C
	20 pt MIL-Spec	CPM2C-16ET1M			
DC inputs/relay outputs	6	4	2 terminal blocks	CPM2C-10EDR	
	12	8		CPM2C-20EDR	
DC inputs/ transistor (sourcing) outputs	16	—	2 Fujitsu	CPM2C-24EDT1C	
			2 MIL-spec	CPM2C-24EDT1M	
			16	2 Fujitsu	CPM2C-32EDT1C
				2 MIL-spec	CPM2C-32EDT1M

## Terminal Blocks and Cables for I/O

CPM2C-S CPU	Description	No. of cables	Cable length (m)	Cable model	Terminal block description	No. of terminal blocks	Wire terminal block model
CPM2C-S100C-DRT	6 DC in/ 4 NPN out	1	1	XW2Z-050A	20 contacts, no ID strip	1	XW2B-20G4
CPM2C-S110C					20 contacts, ID strip		XW2B-20G5

## Special I/O Modules

Item	Appearance/ dimensions (H x W x D mm)	Description	Max. number of modules	Inputs	Outputs	Model
Analog I/O module	 90 x 33 x 65	High resolution: 1/6000 FS Voltage input: 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, -10 to 10 VDC Current input: 0 to 20 mA or 4 to 20 mA Voltage output: 1 to 5 VDC, 0 to 10 VDC or -10 to 10 VDC Current output: 0 to 20 mA or 4 to 20 mA	5 for CPM2C; 3 for CPM2C-S	2 analog	1 analog	CPM2C-MAD11
Temperature sensor input modules	 90 x 33 x 65	Thermocouple types J and K Platinum resistance input	5 for CPM2C; 3 for CPM2C-S	2	—	CPM2C-TS001 CPM2C-TS101

## Communications Adapters and Cables

Item	Dimensions (H x W x D mm)	Description	Cable length	Model
RS-232C adapter	90 x 33 x 65	Converts data communications from peripheral port for RS-232C devices	0.2 m	CPM2C-CIF01-V1
RS-422/RS-485 adapter		Converts data communications from peripheral port for RS-422 and RS-232C devices		CPM2C-CIF11
RS-232 cable	—	For 9-pin computer serial port	2 m	C200H-CN229-EU CBL-202 in Canada
CompoWay/F serial interface module	90 x 33 x 65	Allows direct serial communication with up to 32 Omron devices without additional ladder programming. Transfers data between temperature controllers and the CPU.	0.2 m	CPM2C-CIF21
USB-serial conversion cable	—	Converts between USB and RS-232C; PC Driver included (CD-ROM); Applicable OS: Windows 98, Me, 2000, or XP	0.5 m	CS1W-CIF31
CPM2C CPU to HMI cable	—	Directly connects NS series and NT21/31/631/20/600/11 HMIs to CPM2C mini-peripheral port	2 m	XW2Z-200T-2
CPM2C CPU to NT2S display cable		Directly connects NT2S-SF message displays to CPM2C mini-peripheral port		NT2S-CN224

## Support Software and Programming Devices

Item	Description	Model
CX-Programmer Jr. support software	Windows®-based programming software; for Omron's micro PLC's: CP1, CPM, SRM	WS02-CXPC2-V□
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	CXONE-AL01C-V□
External memory unit	Uploads and downloads program and sets up memory areas to and from the controller	CPM1-EMU01-V1

## Manuals

Product	Description	Model
Operation manuals	CPM2C programmable controllers operation manual	W356
	CPM2C-S programmable controller operation manual	W377
Programming manual	CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) programming manual	W353

# Nano Controller ZEN

Quick Link  
H233

## Omron's Easy-To-Use Programmable Relay Offers Precision and Space Savings for Small Scale Control Applications

- Accurate analog inputs  $\pm 1.5\%$  FS
- Wide supply voltage range of 10.8 to 28.8 VDC
- Flexible mounting — either horizontal or vertical
- New CPUs with built-in RS-485 communications for data sharing
- Advanced high-value counting with 8-digit counter and 8-digit comparators, in addition to 16 standard counters
- One 150-Hz high-speed counter available on models with DC power supply
- Twin-timer operation allows you to set ON and OFF times separately, greatly simplifying intermittent operation
- Password function ensures security
- Display user-set messages or analog-converted values

### ZEN Support Software

- Easily write ladder programs, monitor programs online, set parameters, print, and save files in the Windows® environment
- Offers simulation capability to simplify program debugging; allows programs to be simulated on a personal computer without connecting to ZEN

### System Advantages

- Delivers the flexibility and functionality of separate timers, counters, and relays for control applications with up to 44 I/O
- New economy CPU models — perfect for applications that require less than 10 or 20 points of I/O. (Does not accept expansion units)
- Save time by using the memory cassette to transfer programs between ZEN units and standardize updates to end users
- Reduce wiring and engineering time using simple ladder logic programming with the push of a button or click of the mouse
- Easily add up to 3 ultra-slim 35 mm, 8 I/O expansion units when more points of control are required



## ZEN Starter Kits — Great introduction to the power and simplicity of the ZEN Series

Includes everything for self-training, system design, and installation:

- 10 I/O CPU
- PC programming cable (RS-232 to ZEN)
- Support software
- Manuals
- Simulator switches



ZEN-STARTER01-V2	AC I/O Kit with ZEN-10C1AR-A-V2
ZEN-STARTER02-V2	DC I/O Kit with ZEN-10C1DR-D-V2

## 10-Point CPU Programmable Relay Units

Appearance	Description	Inputs/power supply	Outputs	Analog input/comparators	8-digit counter/comparators	Model
 90 H x 70 W x 56 D mm	10 I/O CPU Expandable up to 34 I/O	6 100 to 240 VAC 12 to 24 VDC	4 Relays	— 2 Ch. 0 - 10V / 4	Yes / 4	ZEN-10C1AR-A-V2
	10 I/O CPU Economy model (non-expandable)	100 to 240 VAC 12 to 24 VDC	Relays	— 2 Ch. 0 - 10V / 4		ZEN-10C1DT-D-V2
	9 I/O CPU with RS-485 Communications Expandable up to 33 I/O	100 to 240 VAC 12 to 24 VDC	3	— 2 Ch. 0 - 10V / 4		ZEN-10C3DR-D-V2
				ZEN-10C4DR-D-V2		

## 20-Point CPU Programmable Relay Units

Appearance	Description	Inputs/power supply	Outputs	Analog input/comparators	8-digit counter/comparators	Model
 90 H x 122.5 W x 56 D mm	20 I/O CPU Expandable up to 44 I/O	12 100 to 240 VAC 12 to 24 VDC	8 Relays	— 2 Ch. 0 - 10V / 4	Yes / 4	ZEN-20C1AR-A-V2
	20 I/O CPU Economy model (non-expandable)	100 to 240 VAC 12 to 24 VDC	Relays	— 2 Ch. 0 - 10V / 4		ZEN-20C1DT-D-V2
						ZEN-20C3DR-D-V2

10 and 20 I/O models available without display. Please refer to datasheet for more information.

## I/O Expansion Units

Appearance	Description	Inputs/power supply	Outputs	Model	
 90 H x 35 W x 56 D mm	8 I/O Expansion units	4 100 to 240 VAC 12 to 24 VDC	4 Relays	ZEN-8E1AR	
					ZEN-8E1DR
			4 Transistors	ZEN-8E1DT	

## ZEN Accessories

Appearance	Description	Model
	ZEN Support Software	ZEN-SOFT01V4
	ZEN Programming cable - Serial to ZEN (2 m)	ZEN-CIF01
	Memory cassette – Copies program to multiple units	ZEN-ME01
	ZEN Battery – Use with controller CPU to provide 10 years of memory protection to prevent data loss in the event of an extended power outage (45 H x 17.5 W x 44 D mm)	ZEN-BAT01

## Wiring Solutions

## XW2□/G7□□

**Connect High-Density I/O to Real World Inputs and Outputs****Easy-to-Configure Wiring Solutions Reduce Time, Materials, Costs of Installation, and Troubleshooting****Clean, Orderly Control Cabinets**

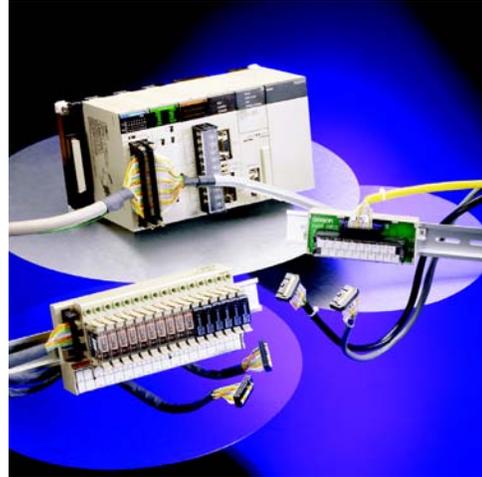
When you plan the wiring for a control system, the fewer cables coming into the control cabinet the better. This reduces the costs of wiring, tagging and verification at installation and simplifies troubleshooting to reduce downtime. Omron's high-density I/O modules and other socket-based I/O products use pre-terminated cables to eliminate wiring errors between terminal blocks and the PLC modules.

**Connector Types on High-Density Modules**

Two types of sockets are used on Omron's high-density I/O modules: Fujitsu style sockets with flange screws and MIL style with locking tabs. The ordering tables specify the cable with the proper connector to match the socket on each model.

**Issues to Consider**

- **Distance between block and controller:** Wire terminal blocks and relay terminal blocks allow up to 10 meters distance from the controller card.
- **Number of I/O transmitted:** Wire terminal blocks and relay terminal blocks can transmit up to 48 I/O on a single cable.
- **Cabling:** Wire terminal blocks and relay terminal blocks have pre-made cables that plug into the high-density module or block connector at one end and a single or multiple connectors for the blocks.

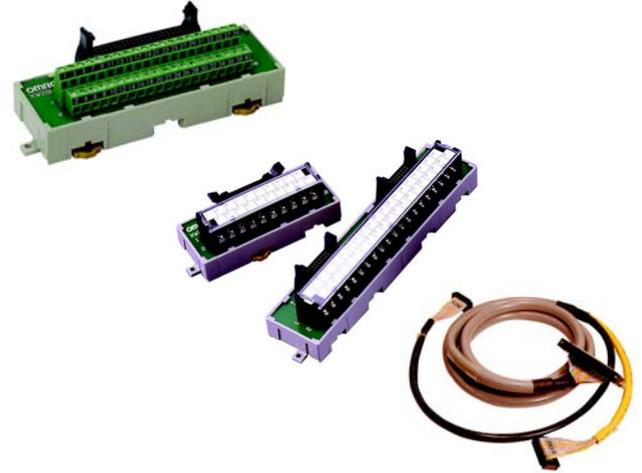


# Wiring Solutions XW2 □



## Wire Terminals Convert I/O Wiring to Pre-Terminated Cables

- Use with Omron high-density PLC input/output modules
- Reduce labor costs
- Eliminate wiring errors
- Conserve PLC rack capacity and panel space
- Reduce overall wiring back to the PLC



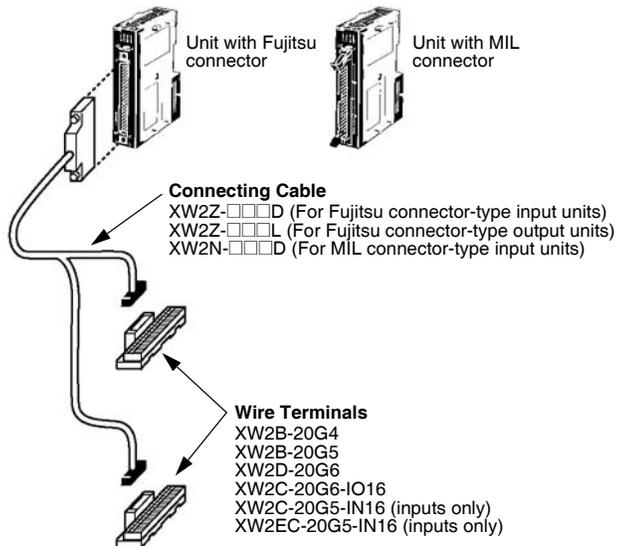
## Ordering Information

Description	Appearance	Contacts	Model
M3 screws, no terminal identification strip	 <p>XW2B-□□G4 (Regular M3 screws)</p>	20	XW2B-20G4
		40	XW2B-40G4
		60	XW2B-60G4
M3.5 screws and protected terminal identification strip	 <p>XW2B-□□G5 (M3.5 screws)</p>	20	XW2B-20G5
		40	XW2B-40G5
		60	XW2B-60G5
M3 Phillips screws and protected terminal identification strip	 <p>XW2D-□□G6 (M3 Phillips screws)</p>	20	XW2D-20G6
ON/OFF status indicators; terminal identification strip	 <p>XW2C-20G5-IN16 XW2C-20G6-IO16</p>		XW2C-20G5-IN16
Use short bars to handle PLC input or output units; terminal identification strip; ON/OFF status indicators			XW2C-20G6-IO16
Three-tier block for easy wiring; equipped with common terminal on the power supply tier; terminal identification strip	 <p>XW2E-20G5-IN16</p>		XW2E-20G5-IN16

# Configuration

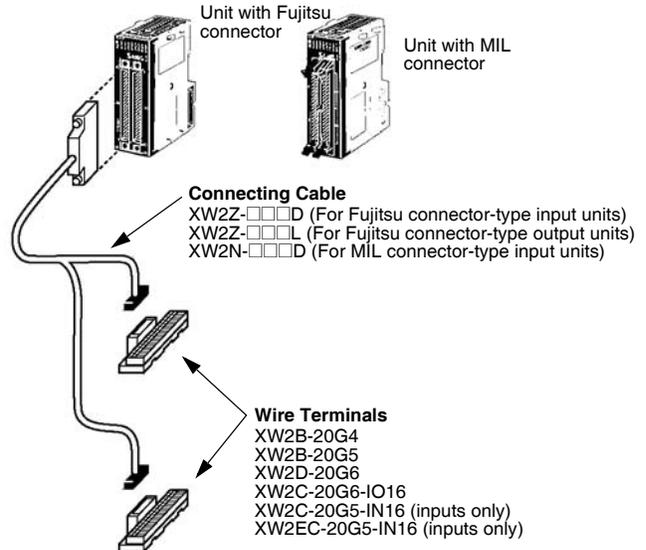
## CJ-Series Basic I/O Unit (32 points)

- CJ1W-ID231 (Fujitsu connector/input unit)
- CJ1W-OD231 (Fujitsu connector/output unit)
- CJ1W-ID232 (MIL connector/input unit)
- CJ1W-OD232 (MIL connector/output unit)



## CJ-Series Basic I/O Unit (64 points)

- CJ1W-ID261 (Fujitsu connector/input unit)
- CJ1W-OD261 (Fujitsu connector/output unit)
- CJ1W-MD261 (Fujitsu connector, I/O unit)
- CJ1W-ID262 (MIL connector/input unit)
- CJ1W-OD263 (MIL connector/output unit)
- CJ1W-MD263 (MIL connector, I/O unit)
- CJ1W-MD563 (MIL connector, I/O unit)

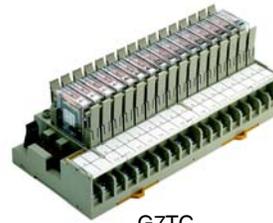


# Wiring Solutions G7□

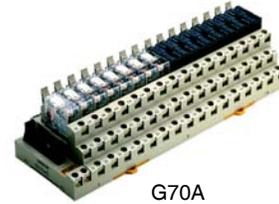


## Relay Terminals Buffer and Isolate I/O for the PLC Module

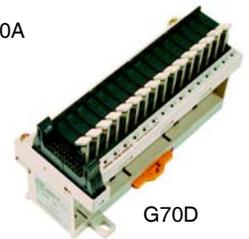
- Models with interchangeable relays allow a mix of SSR and electromechanical relays to match the switching frequency of the attached device
- G79 cables provide error-proof wiring between high-density PLC modules and relay terminals
- Simple DIN track mounting



G7TC



G70A



G70D

## Ordering Information

Additional models and relay terminal bases are available; visit these Quick Links:

G7TC Quick Link #H080

G70A Quick Link #H062

G70D Quick Link #H063

## Relay Terminal Blocks

Description	Specifications	Relays	Model	
Relay input terminal	NPN, 10 mA/pt., AC inputs	G7T relays installed	G7TC-IA16 AC110/120V	
	NPN, 10 mA/pt., DC inputs		G7TC-ID16 DC24V	
Relay output terminal	NPN, 10 A at 250 VAC/30 VDC		G7TC-OC16 DC24V	
	PNP, 10 A at 250 VAC/30 VDC		G7TC-OC16-1 DC24V	
Relay terminal base	NPN/PNP, 100 mA at 240 VAC/110 VDC		Order separately	G70A-ZIM16-5 DC24V
	NPN, 10 A 380 VAC/125 VDC			G70A-ZOC16-3 DC24V
	PNP, 10 A 380 VAC/125 VDC	G70A-ZOC16-4 DC24V		
Covered output terminal	NPN, 5 A max. 8 pt ON	G6D relays installed	G70D-SOC16 DC24	
	PNP, 5 A max. 8 pt ON		G70D-SOC16-1 DC24	
Vertical output terminal	NPN, 5 A max. 8 pt ON		G70D-VSOC16 DC24	
	PNP, 5 A max. 8 pt ON		G70D-VSOC16-1 DC24	

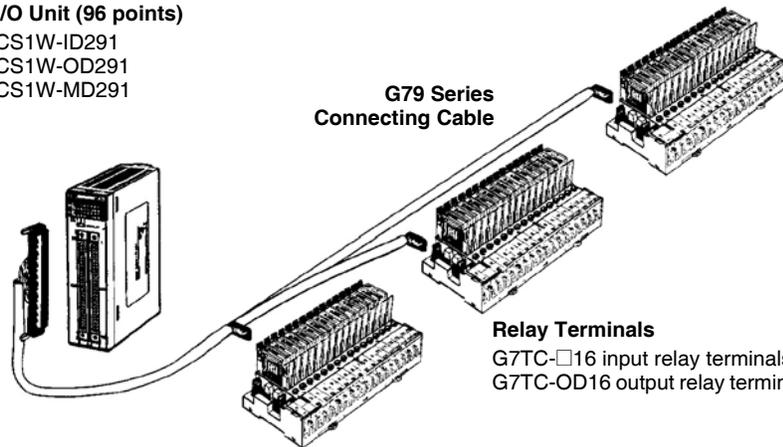
## Relays/SSRs for G70A

Type	G70A Terminal Base	Electromechanical Relay Model	Solid State Relay Model
Input	G70A-ZIM16-5 DC24V	G2R-1A3-SND DC24V	G3R-IAZR1SN AC100-240
		G2R-13-SND DC24V	G3R-IDZR1SN DC12-24
			G3R-IDZR1SN DC5
Output	NPN: G70A-ZOC16-3 DC24V PNP: G70A-ZOC16-4 DC24V	G2R-1-SND DC24	G3R-OA202SZN DC5-24
		G2R-1-SND DC12	G3R-ODX02SN DC5-24
			G3R-OD201SN DC5-24

## Configuration

**G79 Series  
I/O Unit (96 points)**

CS1W-ID291  
CS1W-OD291  
CS1W-MD291



**G79 Series  
Connecting Cable**

**Relay Terminals**

G7TC-□16 input relay terminals  
G7TC-OD16 output relay terminals, etc.

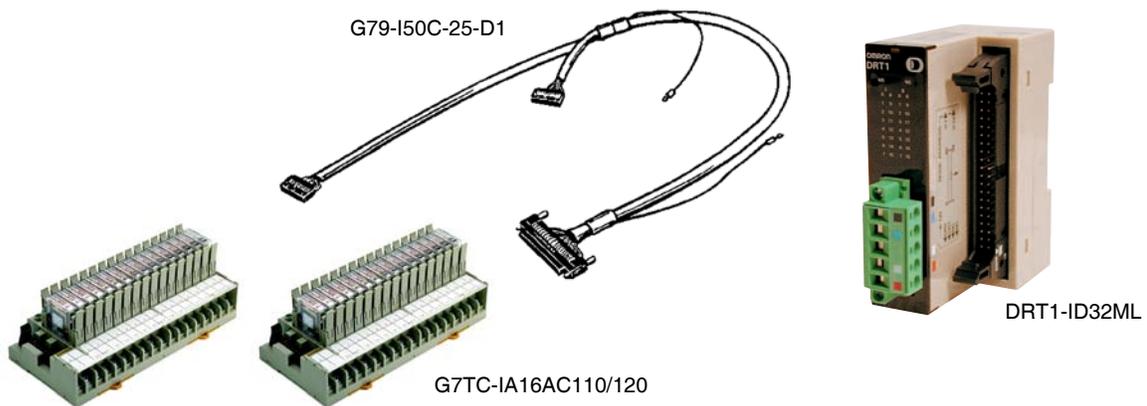
## Mixed I/O Modules

High-density modules that combine both inputs and outputs into the same module contain “MD” in the part number. They offer flexibility to match your exact needs by connecting a combination of wire terminals and relay terminals. Choose wire terminals to simplify input wiring; use relay terminals to boost the load of PLC output signals or match the switching frequency by using solid state relays instead of electromechanical relays.

## AC Inputs for DeviceNet

To support intelligent local control, Omron offers a pre-terminated cable dedicated to AC inputs that connect AC relay terminal blocks with a compact DeviceNet input node. It offers individually replaceable relays to expedite servicing.

To support intelligent local control, Omron offers a pre-terminated cable dedicated to AC inputs that connect AC relay terminal blocks with a compact DeviceNet input node. It offers individually replaceable relays to expedite servicing.



G79-I50C-25-D1

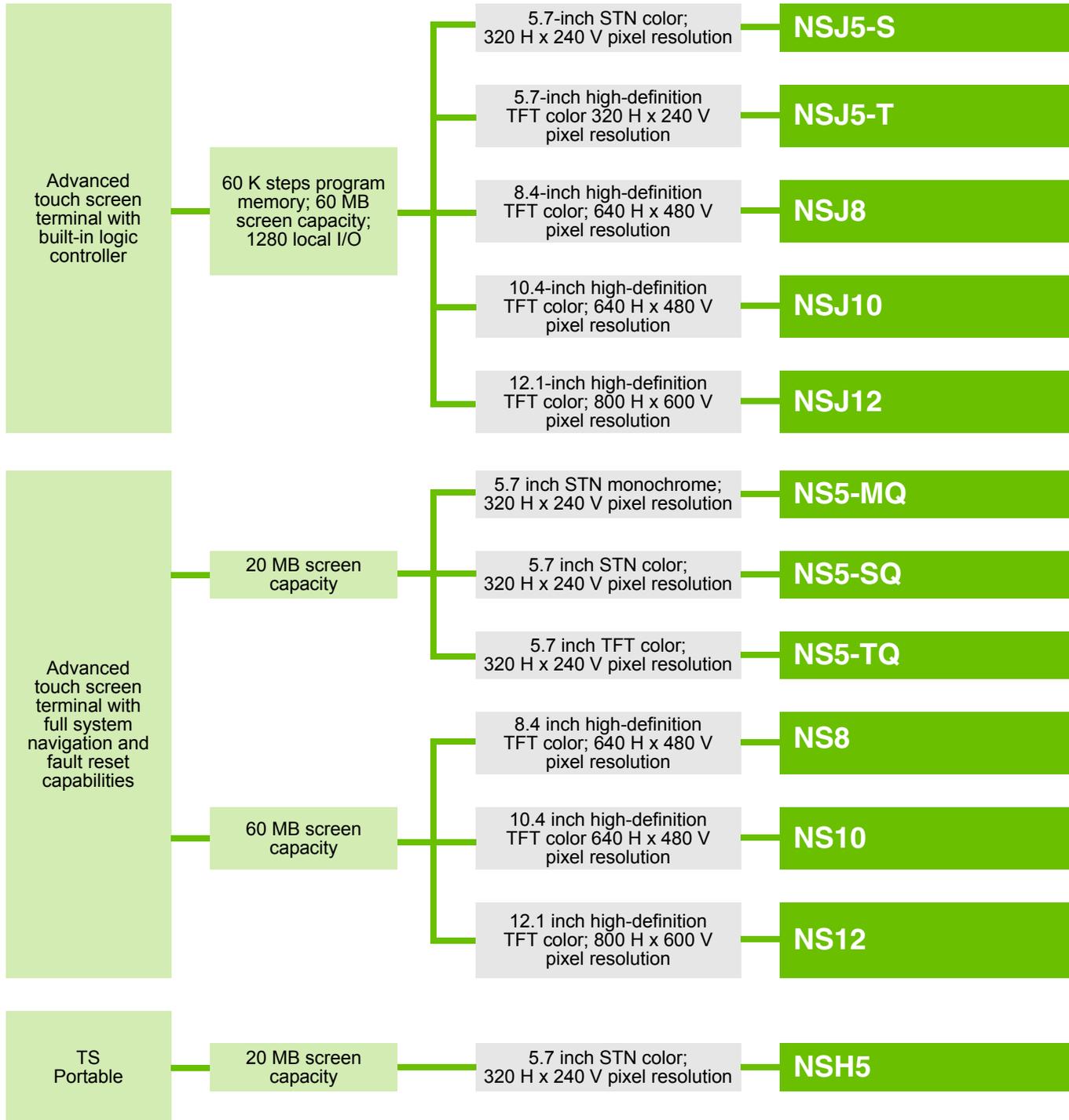
G7TC-IA16AC110/120

DRT1-ID32ML

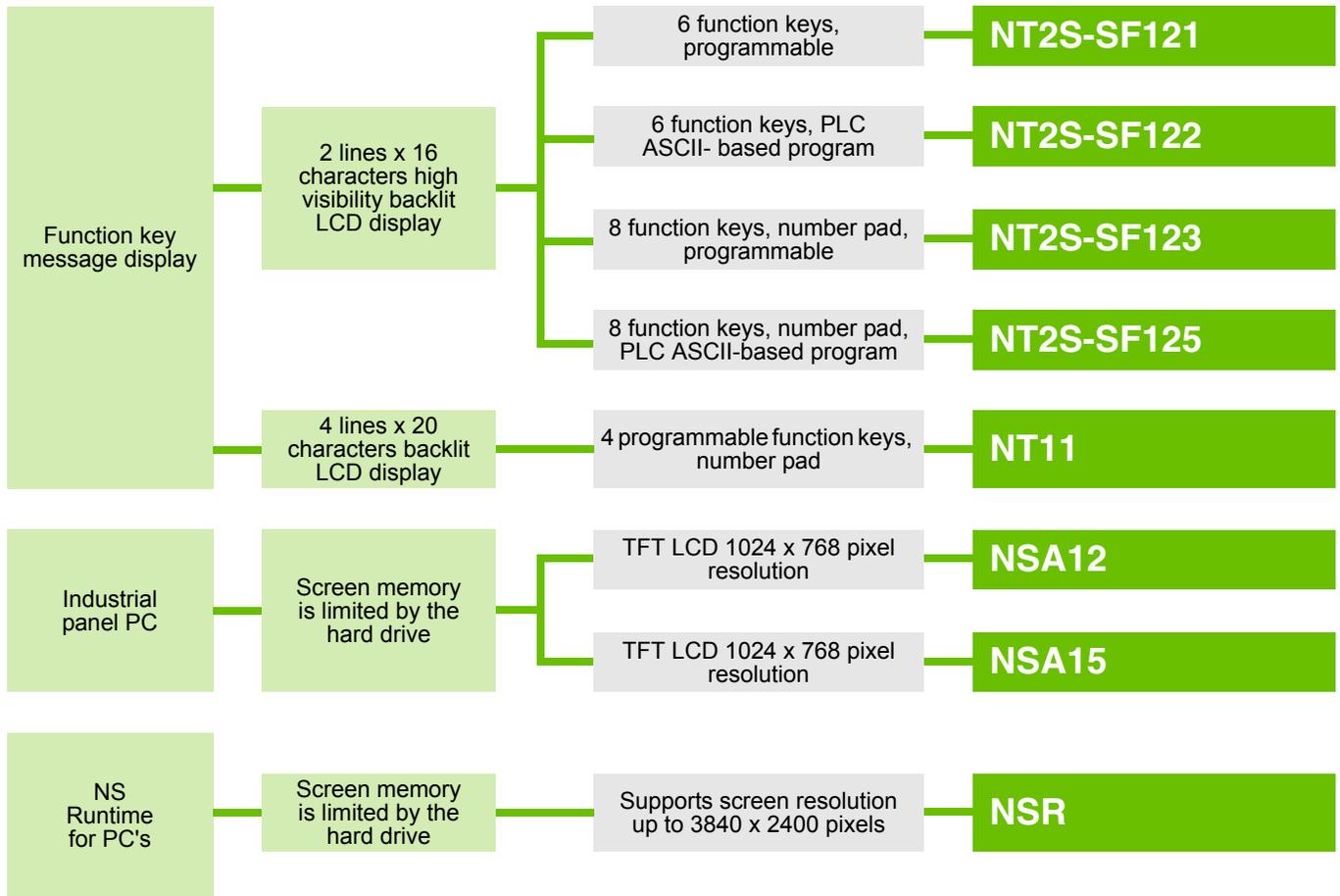
## Contents

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<b>NS</b>	Complete system navigation and fault reset capabilities	B-8
<b>NSR</b>	Complete NS terminal functions on a PC	B-17
<b>NSA</b>	Industrial Panel PC with RAS function	B-19
<b>Function Key Message Displays</b>		
<b>NT11</b>	Large alphanumeric 4-line display with function keys	B-22
<b>NT2S</b>	Compact, powerful 2-line message display with function keys	B-23

## Selection Guide



## Selection Guide



## Selection Guide

# Integrated HMI Controller

# NSJ

Quick Link  
N522

## HMI Series Integrates Control, Display, and an Open I/O Network

Omron's NSJ HMI series delivers the industry's most cost-effective and flexible combination of control, display and I/O capabilities in a single, space-saving package. True deterministic control, all NSJ HMIs have separate but integrated processors for display and control tasks, so control response is never compromised due to heavy graphics demands. Omron's vast and proven expertise in engineering world-class control and display products has been combined to provide this unique integrated solution.



## Reduced Control Panel Requirements

Realize direct cost savings by eliminating control panels. Combining the HMI and logic control into a single slim package design eliminates the space, and in most cases panels, normally required by a separate HMI and logic controller. Eliminate money spent on connecting cables, and the wiring costs for separate HMI and logic controller, too.

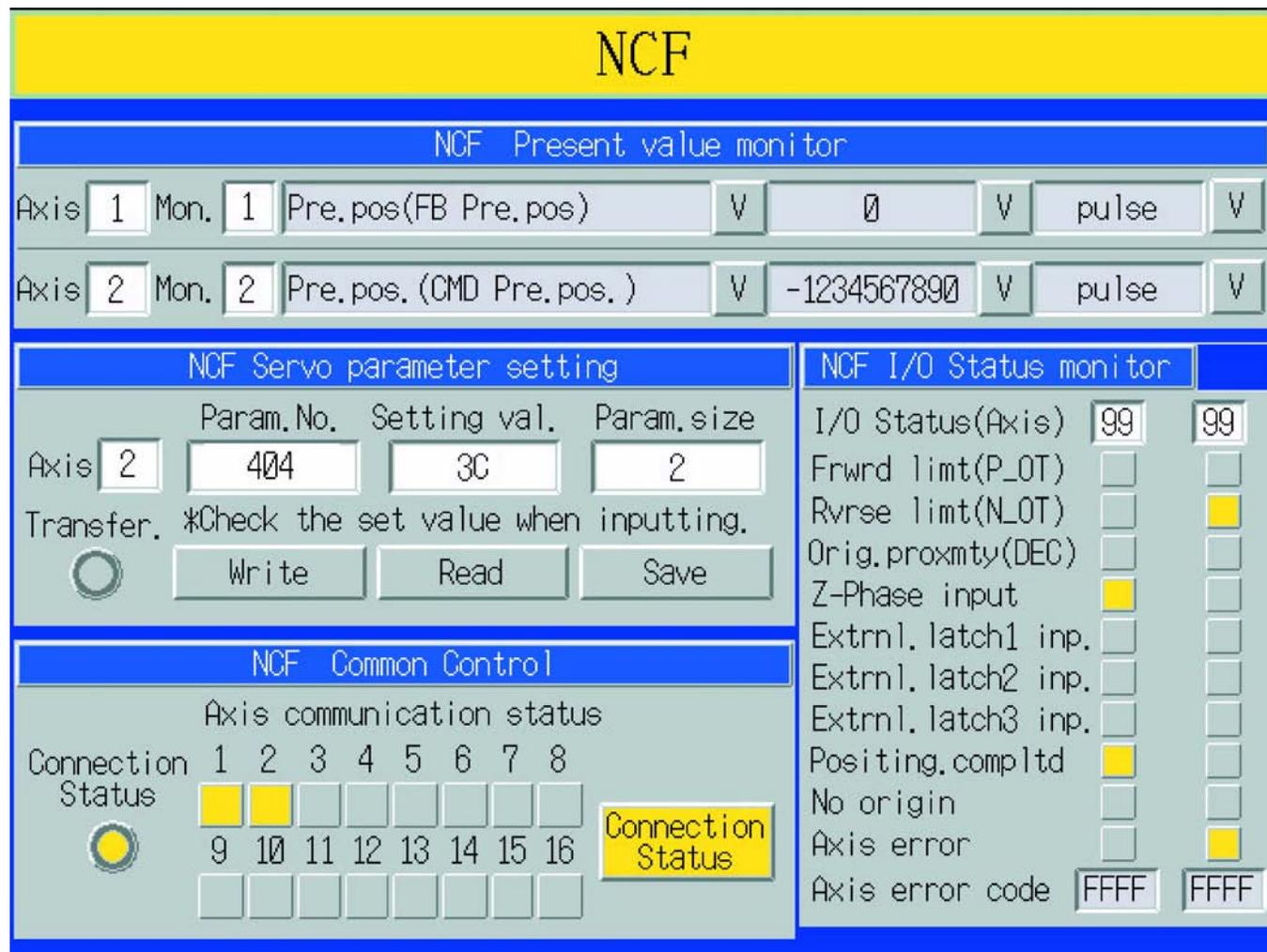
## Distributed I/O

Save more money by reducing I/O wiring to a single open network cable. All NSJ HMI models contain a built-in DeviceNet master for field I/O connections. Distribute I/O using industry standard DeviceNet, Profibus, and CompoNet (coming soon), mixing and matching combinations of I/O to meet any of your application needs. NSJ HMIs can support up to 32,000 points of DeviceNet I/O.

- **Hardware Cost Savings** - reduced number of components from a minimum seven to one, smaller control panel, less wires and conduit
- **Space Savings** - only one compact device to mount in a panel
- **Installation Time Savings** - one device installation, built-in self-diagnostic screens, monitor control program from display
- **Reduced Design Time** - no backplate layout required, easy to incorporate into existing systems, standardization, expandable and flexible hardware
- **Lower Operational Costs** - reduced spares, 45% less power, 3-yr warranty
- **Faster System Swap-Out** - done in less than 5 minutes
- **InnerBus Technology** - built-in, fast, enriched communications, no need to purchase, set-up or install Ethernet

### Eliminate Programming

Omron's patented Smart Active Parts are pre-designed screens and components that drag-and-drop from a library and communicate directly with control-system components (i.e., temperature controllers, inverters and motion controllers). They all feature commonly required customer functionality as standard, and they bring powerful functionality to your machine without programming. This saves time and money, and enables you to add complex features that were previously not available.



Smart Active Part for Position Control shows the HMIs ability to communicate via Mechatrolink-II when tied directly to a motion controller such as Trajexia.

## One Software, One Connection, One Minute

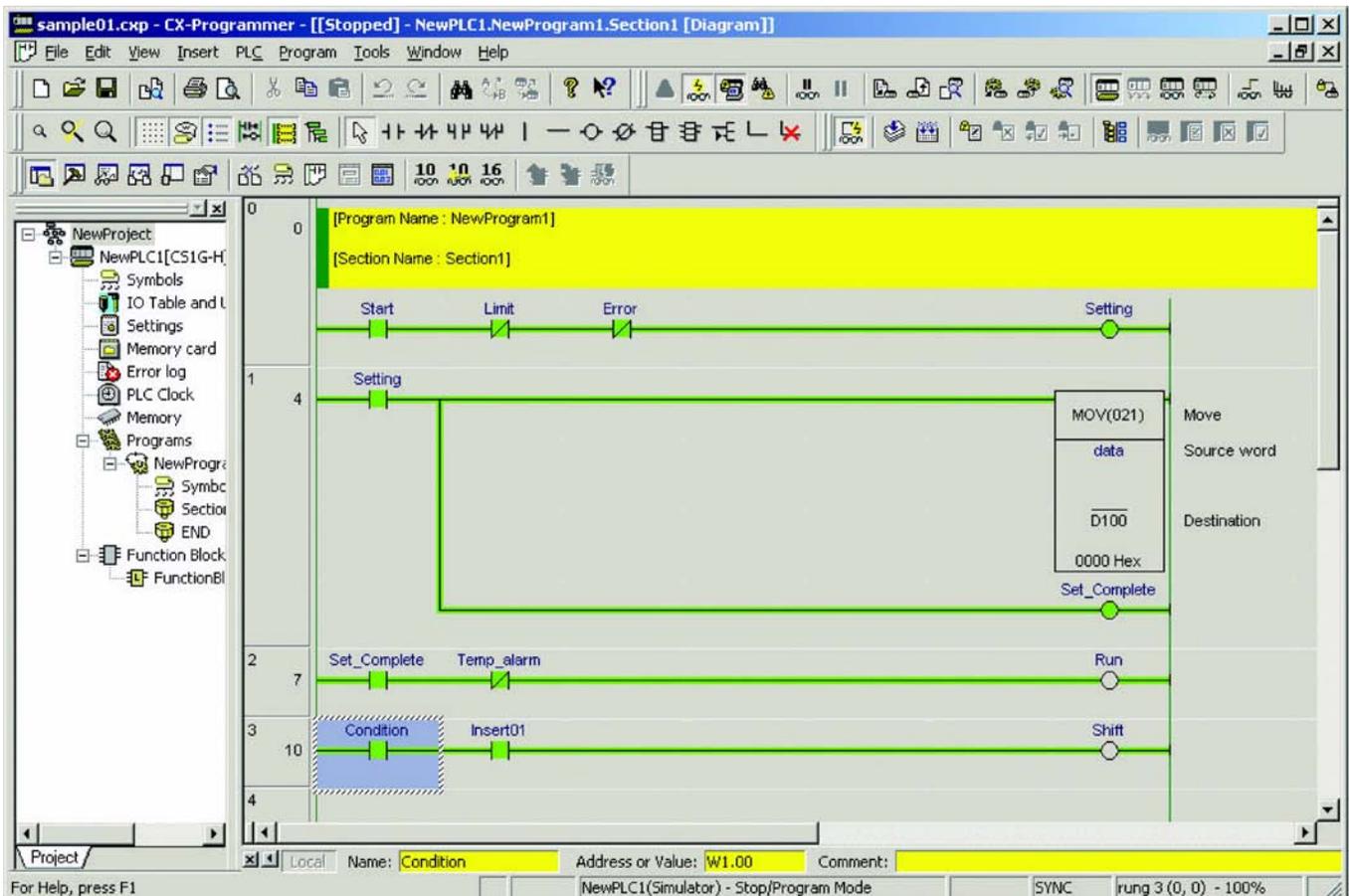
CX-ONE, Omron's single programming tool, is all that is needed to create your entire NSJ application, from a single connection point — either USB, serial, or Ethernet — and in less time. Application development can be achieved in minutes by using function blocks and Smart Active Parts libraries.

## All the Features You Want!

- Wide range of display sizes: 5.7" to 12.1"
- High-end TFT LCD or economical STN LCD displays available, tailored to suit your application
- Highest clarity of screens on the market with best in class: contrast ratio, brightness, MTBF, and viewing angle specifications presenting a spectacular "face to the machine"
- Large controller capacity: 60K steps program memory, 128K Words data memory
- Standard on-board DeviceNet Master for distributed I/O applications
- Compact Flash memory slots (CF cards optional) — store screen/controller data, read/write recipes, download applications, ftp transfers
- Conventional PLC I/O expansion (CJ1W I/O unit optional) — can support up to three Omron CJ1 local I/O configurations, supporting up to 30 CJ1W I/O units - communications, motion, positioning, process and digital control
- One software tool for display/logic development: CX-ONE supports IEC 61131 Ladder, Function Blocks, and Structured Text for advanced logic programming
- Remote Diagnostics: Access NSJ units over modems or Internet for remote monitoring and servicing
- Also available with Profibus

## Integrated Simulation with the PLC Ladder Program

The screen data and ladder program can be checked independently or simultaneously in the computer. The CX-Designer and CX-Programmer interconnects the test functions in the computer through the CX-Simulator. The screens and ladder program checks are performed simultaneously, which significantly increases debugging efficiency.



## Model Number Structure

### Model Number Legend

#### NSJ Integrated HMI Controllers

NSJ -0-  
 1 2 3 4 5 6 7

##### 1. Display size

- 5: 5.7-inch
- 8: 8.4-inch
- 10: 10.4-inch
- 12: 12.1-inch

##### 2. Display type

- T: TFT
- S: STN available for 5.7" only, 5.7" also available in TFT

##### 3. Resolution

- Q: 320 x 240, 5.7" only
- V: 640 x 480, 8" and 10" only
- S: 800 x 600, 12" only

##### 4. Device ports

- 0: USB and Serial
- 1: Ethernet, Serial, and USB

##### 5. Case color

- Blank: Contact factory for availability of Ivory Bezels
- B: Black Bezel

##### 6. Controller

- G5: Advanced PLC with 60 K steps and 32 K words
- M3: Basic PLC with 20 K steps and 32 K words, 5.7" and 8" only

##### 7. I/O Port

- D: DeviceNet Master
- P: Profibus Master

## Ordering Information

### NSJ Integrated HMI Controllers

Description	Display size	Resolution	Features	Model
NSJ series HMI with integrated logic, and I/O network controller	5.7-inch STN color LCD	320 x 240	USB/Serial programming/device ports, DeviceNet Master I/O port	NSJ5-SQ00B-G5D/M3D
			Ethernet/USB/Serial programming/device ports, DeviceNet Master I/O port	NSJ5-SQ01B-G5D/M3D
	5.7-inch high-definition TFT color LCD	320 x 240	USB/Serial programming/device ports, DeviceNet Master I/O port	NSJ5-TQ00B-G5D/M3D
			Ethernet/USB/Serial programming/device ports, DeviceNet Master I/O port	NSJ5-TQ01B-G5D/M3D
	8.4-inch high-definition TFT color LCD	640 x 480	USB/Serial programming/device ports, DeviceNet Master I/O port, USB printer port	NSJ8-TV00B-G5D/M3D
			Ethernet/USB/Serial programming/device ports, DeviceNet Master I/O port, USB printer port	NSJ8-TV01B-G5D/M3D
	10.4-inch high-definition TFT color LCD	640 x 480	USB/Serial programming/device ports, DeviceNet Master I/O port, USB printer port	NSJ10-TV00B-G5D
			Ethernet/USB/Serial programming/device ports, DeviceNet Master I/O port, USB printer port	NSJ10-TV01B-G5D
12.1-inch high-definition TFT color LCD	800 x 600	USB/Serial programming/device ports, DeviceNet Master I/O port, USB printer port	NSJ12-TS00B-G5D	
		Ethernet/USB/Serial programming/device ports, DeviceNet Master I/O port, USB printer port	NSJ12-TS01B-G5D	

**Note:** Models with built-in Ethernet do not support socket, ftp, or mail services. If these are required, order a plug-in NSJW-ETN21 Ethernet Unit and an NSJ without built-in Ethernet.

## Networking and I/O Expansion Options

Item	Description	Specifications	Model
Controller Link Unit	Peer-to-peer network for data links and message communications between PLCs and computers	2 Mbps max. speed; 1.5 km distance; 62 nodes (using 2 repeater units); shielded twisted pair cable	NSJW-CLK21-V1
Ethernet Unit	Full 10 Base-T/100 Base-TX capability: FTP server, socket services, DNS client, Mail services, SMTP services, FINS communications	100 Mbps max. speed; 2.5 km distance; 254 nodes; twisted pair cable; supports socket, ftp, and mail services	NSJW-ETN21
I/O Control Unit	Controls additional local I/O	Connects up to 30 standard CJ1W I/O, Special I/O or communication modules in 3 remote configurations	NSJW-IC101

## Accessories

Item	Description	Specifications	Model
Anti-reflection sheets	For NSJ12 and NSJ10 models	5 sheets; applied to screen surface	NS12-KBA04
	For NSJ8 models		NS7-KBA04
	For NSJ5 models		NT30-KBA04
Protective covers	For NSJ12 and NSJ10 models	5 covers; protects screen surface	NS12-KBA05
	For NSJ8 models		NS7-KBA05
	For NSJ5 models		NT31C-KBA05
Chemical resistant covers	For NSJ5 models	5 covers	NT30-KBA01
Memory card	Store screen data and firmware; requires Memory Card Adapter	30 MB	HMC-EF183
		64 MB	HMC-EF572
Memory card adapter	Enables use of Memory Cards	—	HMC-AP001

## Cables

Function	Connections	Applicable models	Cable length	Model
Connect NSJ to printer	USB to USB	NSJ8, NSJ10, NSJ12	2 m	NS-US22
			5 m	NS-US52
				CBL-USB A/B-2M - in Canada
				CBL-USB A/B-6M - in Canada
Converts USB to RS-232C	USB to 9-pin D-sub	NSJ5, NSJ8, NSJ10, NSJ12	0.5 m	CS1W-CIF31
Connects NSJ to Omron PLCs	9-pin to PLC mini-peripheral port	CPM2C, CQM1H, CJ1, CS1	2 m	CS1W-CN118
	9-pin to 9-pin PLC peripheral port	CPM1A, CPM2A, CQM1, C200H/C200HE/C200HG/C200HX CP1H, CP1L	0.5 m	C200H-CN510-EU
			3 m	C200H-CN320-EU
			5 m	C200H-CN520-EU CBL-804 - in Canada
Connect NSJ to a PC for programming	RS-232C serial port 9-pin to 9-pin	All NS-V2 models	2 m	C200H-CN229-EU CBL-202 - in Canada
	USB, commercially available	Connects slave port on all NS-V2 models	Various	—

## Software

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	1 license	CXONE-AL01C-V□
		3 licenses	CXONE-AL03C-V□
		10 licenses	CXONE-AL10C-V□

## Specifications

### Controller Section

#### Advanced G5□ Series

- CPU 45H
- Up to 32,000 distributed DeviceNet I/O
  - Expansion racks 3 max.
- Local I/O bits: 1280
- User program memory: 60 K Steps
- Data memory: 128 K Words
- Function block definitions: 1024 max.
- Function block instances: 2048 max.
- Flash memory:
  - Function block program memory: 1024 Kbytes
  - Comment file: 64 Kbytes
  - Program index file: 64 Kbytes
  - Symbol table: 64 Kbytes
- Supply voltage: 24 VDC

#### Basic M3□ Series

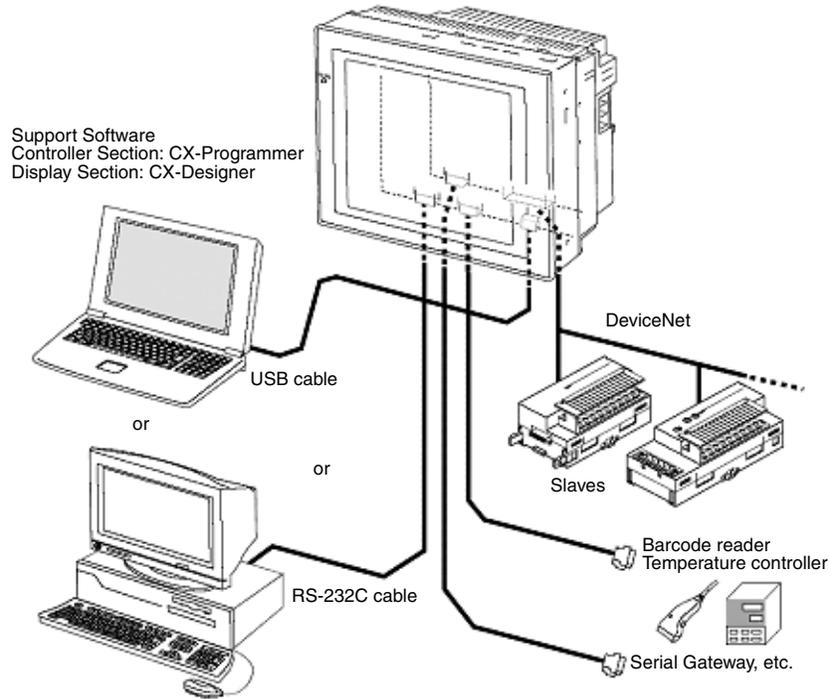
- CPU 13
- Up to 32,000 distributed DeviceNet I/O
  - Expansion racks 1 max.
- Local I/O bits: 640
- User program memory: 20 K Steps
- Data memory: 32 K Words
- Function block definitions: 256 max.
- Function block instances: 256 max.
- Flash memory:
  - Function block program memory: 1024 Kbytes
  - Comment file: 64 Kbytes
  - Program index file: 64 Kbytes
  - Symbol table: 64 Kbytes
- Supply voltage: 24 VDC

### Display Section

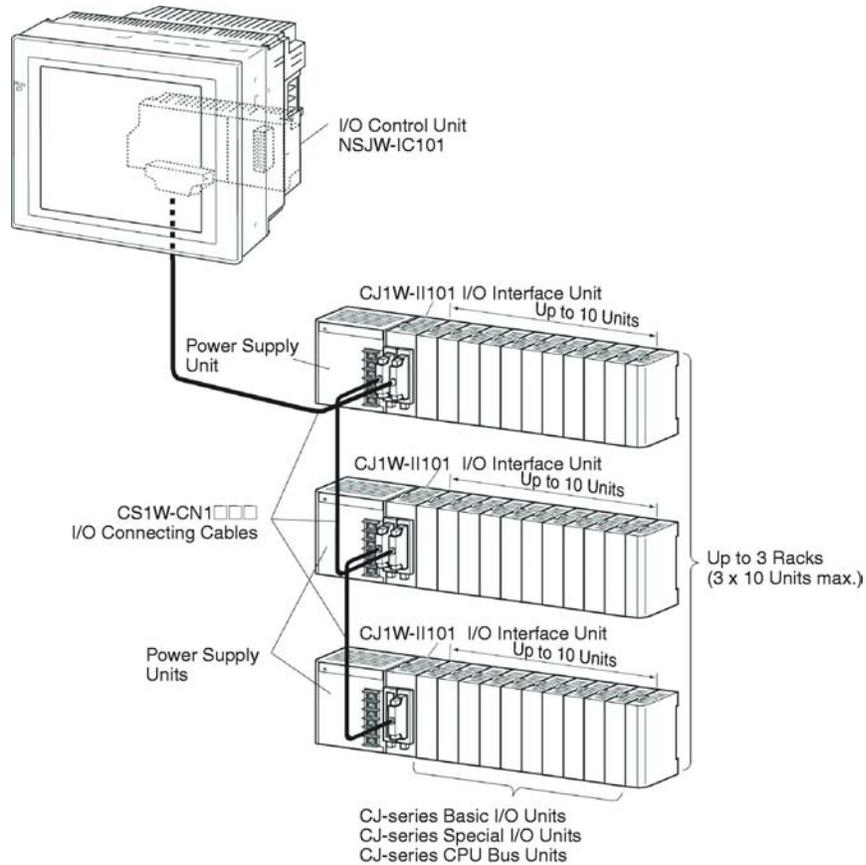
Model	NSJ5-SQ	NSJ5-TQ	NSJ8-TV	NSJ10-TV	NSJ12-TS
Effective display area	115.2 x 86.4 mm	117.2 x 88.4 mm	170.9 x 128.2 mm	215.2 x 162.4 mm	246.0 x 184.5 mm
Maximum screen capacity	20 MB		60 MB		
Number of switches	300 (20 horizontal x 15 vertical)		768 (32 horizontal x 24 vertical)	1,200 (40 horizontal x 30 vertical)	1,900 (50 horizontal x 58 vertical)
Resolution	320 x 240		640 x 480		800 x 600
View angle	±50 left/right; 45 top; 50 bottom	±70 left/right; 70 top; 50 bottom	±65 left/right; 50 top; 60 bottom	±60 left/right; 35 top; 65 bottom	±60 left/right; 45 top; 75 bottom
Backlight life	75,000 hours	50,000 hours			
Contrast Ratio	55:1	450:1	500:1		
Brightness (cd/m <sup>2</sup> )	350	470	480	400	
Ratings	NEMA 4, IP65F				
Certifications	CE, cULus Class I Div 2, Groups A, B, C, D				
Dimensions (W x H x D) mm	195 x 142 x 79; 95 D with expansion		232 x 177 x 73.3; 89.3 D with expansion	315 x 241 x 73.3; 89.3 D with expansion	

# Configuration

## Standard Configuration



## Standard Configuration with I/O Expansion Unit



# Operator Interfaces/HMIs NS



## Complete System Navigation with Fault Reset Capabilities

The NS advanced operator interfaces have brilliant display screens that maximize visualization of graphics. They support Omron's Smart Platform for small and medium size manufacturing operations with fully integrated design, programming, operation, monitoring and troubleshooting accessed from a single operator interface. This affordable solution brings the benefits of high-end interoperability within reach to give you a competitive production advantage on the plant floor.



## Smart Active Parts (SAP Library)

**Dramatically reduces the effort required to create ladder programming and screens.**

More than 2,000 Library parts (Smart Active Parts) are available, which can directly access OMRON PLCs and components. The objects can just be pasted from the Smart Active Parts (SAP Library) Library to the screen; it is completely unnecessary to create screens and ladder programming.

**Support tool objects can be incorporated to check for errors and make settings, even without a computer.**

Plenty of support tool objects (the Tool Function SAP Library) are available, which can be easily incorporate support tool functions in the NS-series PT. Just paste the support tool objects in the screen to check for errors and make settings.

The screenshot displays the NCF (NCF Servo) HMI interface. At the top, it says "NCF". Below that is a "NCF Present value monitor" section with two rows of data:

Axis	1	Mon.	1	Pre.pos(FB Pre.pos)	V	0	V	pulse	V
Axis	2	Mon.	2	Pre.pos.(CMD Pre.pos.)	V	-1234567890	V	pulse	V

Below this is the "NCF Servo parameter setting" section:

Axis	2	Param.No.	404	Setting val.	30	Param.size	2
------	---	-----------	-----	--------------	----	------------	---

Transfer.  \*Check the set value when inputting. Buttons: Write, Read, Save.

At the bottom left is the "NCF Common Control" section with "Axis communication status" and a grid of 16 connection status indicators (9-16). A "Connection Status" button is also present.

At the bottom right is the "NCF I/O Status monitor" section:

I/O Status(Axis)	99	99
Frwrld limit(P_OT)	<input type="checkbox"/>	<input type="checkbox"/>
Rvrse limit(N_OT)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Orig.proxmty(DEC)	<input type="checkbox"/>	<input type="checkbox"/>
Z-Phase input	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Extrnl.latch1 inp.	<input type="checkbox"/>	<input type="checkbox"/>
Extrnl.latch2 inp.	<input type="checkbox"/>	<input type="checkbox"/>
Extrnl.latch3 inp.	<input type="checkbox"/>	<input type="checkbox"/>
Positing.compltd	<input checked="" type="checkbox"/>	<input type="checkbox"/>
No origin	<input type="checkbox"/>	<input type="checkbox"/>
Axis error	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Axis error code	FFFF	FFFF

Smart Active Part for Position Control shows the HMIs ability to communicate via Mechatrolink-II when tied directly to a motion controller such as Trajexia.

### Single Port Multi Access (SPMA)

The ladder program and screen data can be transferred from a single port!

The ladder program can be transferred through the PLC and the PT's screen data can also be transferred, all while the computer remains connected to the PT's port (such as a USB port).

The PT can transfer data over network levels by the following routes.

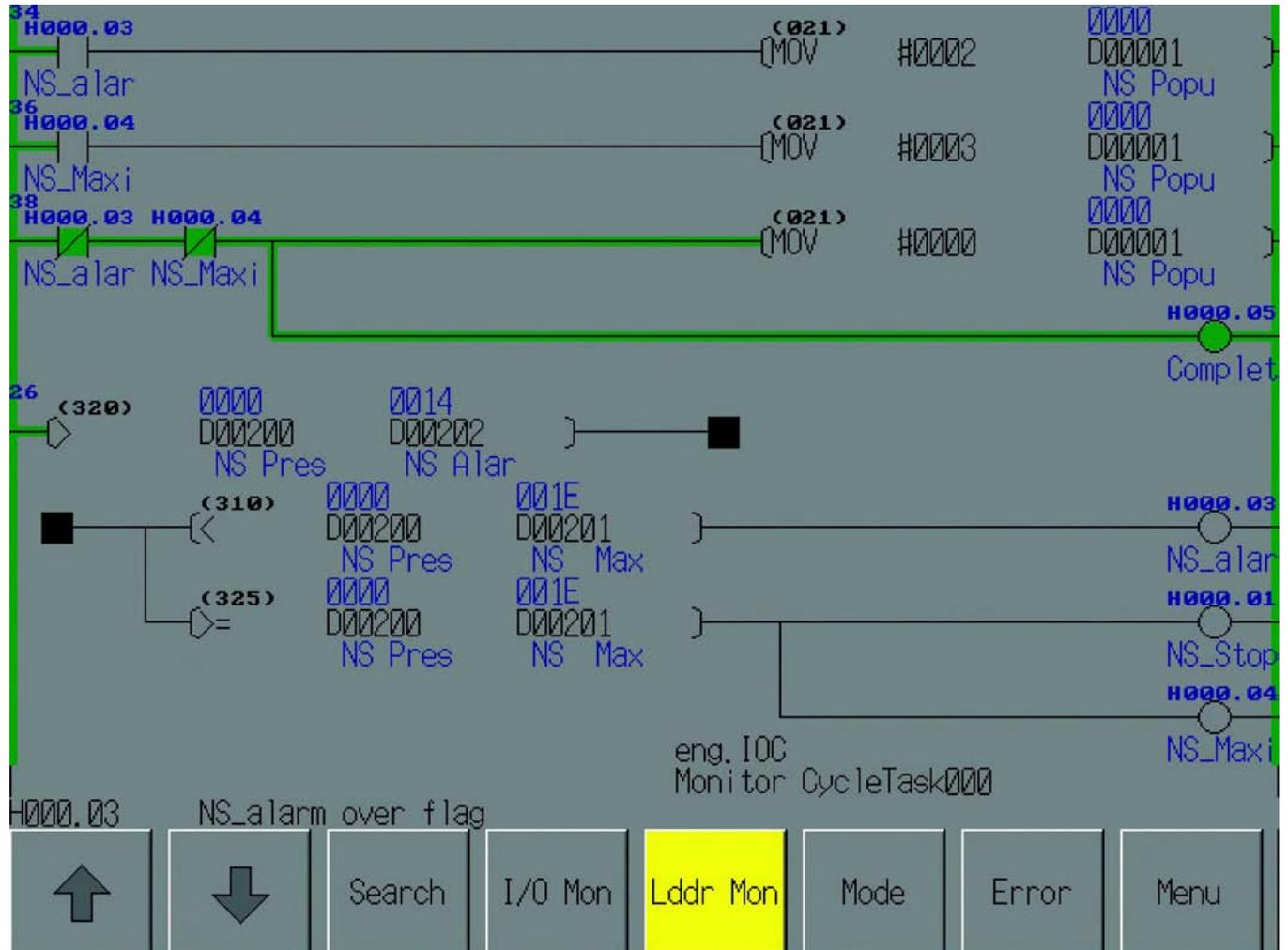
Computer (Serial/USB) → NS-series PT (Ethernet) → PLC (Ethernet or Controller Link) → PLC

### Ladder Monitor

The ladder program can be monitored onsite without a laptop!

Ladder programs with I/O comments can be monitored on the HMI's screen and the data tables can also be edited with the Programming Console function.

**Note:** The Ladder Monitor function is not supported by the 5.7-inch models, but the Programming Console function can be used if the required software is copied to the Memory Card.



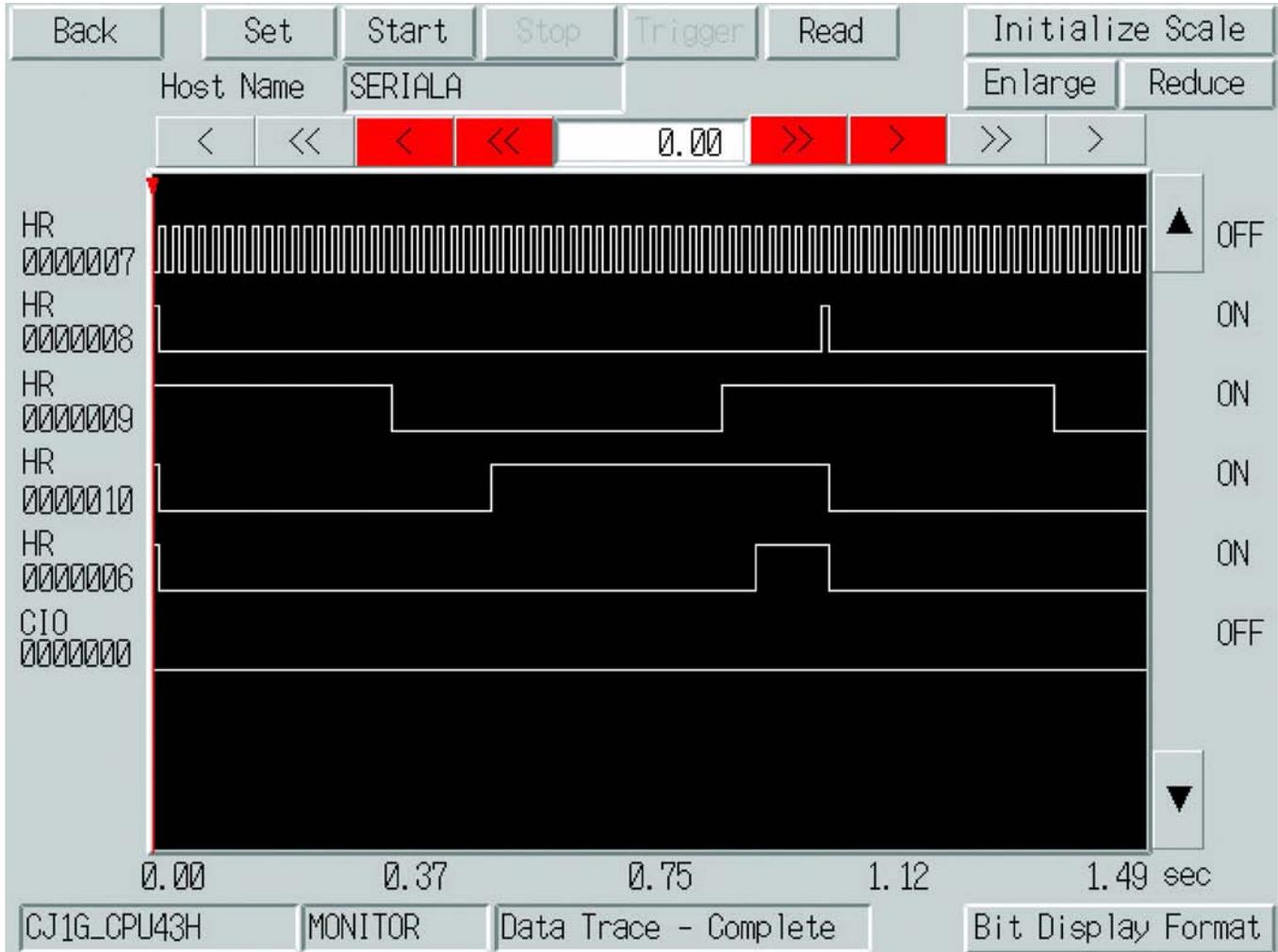
Monitor ladder diagram for active status and comments

### PLC Data Trace

**The PLC's operation can be checked!**

The PLC Data Trace function is built into the PT in addition to the Ladder Monitor and Device Monitor. A bit's status and operation can be viewed in a time chart just by setting the desired PLC bit's address in the PT.

**Note:** There are differences between this Data Trace function and the CX Programmer's Data Trace function. Refer to the NS-series Programmable Terminal Programming Manual (Cat. No. V073) for details.



Data trace allows you to compare I/O points as they change over time.

### PLC Troubleshooter

Constantly monitors PLC errors.

Automatically detects PLC errors and displays the error details and recovery procedure on the screen. Even if a problem occurs, it can be resolved quickly without referring to the manuals.



PLC Troubleshooter shows alarm screen with button/status indicator.

## Direct Connection to Temperature Controllers

Connect OMRON Temperature Controllers directly to the NS-series PT.

OMRON Temperature Controllers can be connected directly to the NS series PT's RS-232C port. Data does not pass through the PLC, so ladder programming is not required. Also, there are plenty of objects in the SAP Library for Temperature Controllers, and Temperature Controller screens can be created easily just by pasting objects from the SAP Library to the screens.

EJ1 Temperature Monitor

CH1	CH2	CH3	CH4
35	36	30	35
40	50	20	40
24.5	100.0	0.0	23.8
RUN	AT	STOP	RUN

PID		Set Value Write			
		CH1	CH2	CH3	CH4
BANK	Mode	CH1 Copy			
P	[oF]	8.0	7.0	8.0	8.0
I	[s]	233	200	233	233
D	[s]	40.0	42.0	40.0	40.0

SP	[oC]	Set Value Write			
	[oF]	CH1	CH2	CH3	CH4
BANK0		35	50	20	40
BANK1		40	50	25	50
BANK2		35	45	30	55
BANK3		55	60	20	50

RUN / STOP	ALL CH RUN		ALL CH STOP	
CH/BANK	CH1	CH2	CH3	CH4
STATUS	RUN	AT	STOP	RUN
RUN/STOP				

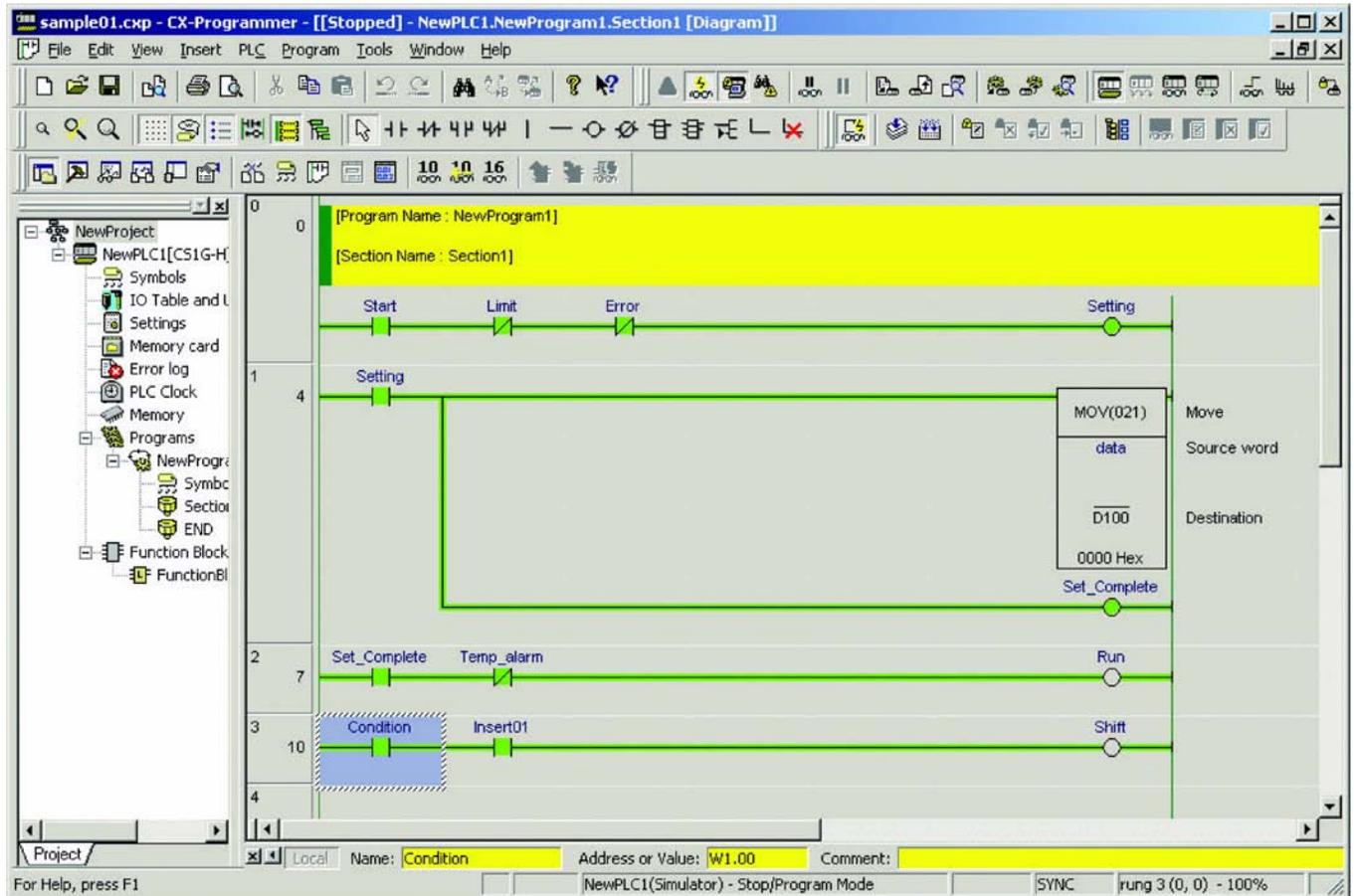
AT				
CH/BANK	CH1	CH2	CH3	CH4
STATUS	RUN	AT	STOP	RUN
START/STOP				

Direct Connection to Temperature Controllers via CompoWay/F (serial communications protocol) eliminates the need for PLC to enable HMIs to speak directly with temp controllers.

## Integrated Simulation with the PLC Ladder Program

The screen data and ladder program can be checked simultaneously in the computer.

The CX-Designer and CX-Programmer interconnects the test functions in the computer through the CX-Simulator. The screens and ladder program checks are performed simultaneously, which significantly increases debugging efficiency.



## Multi-Language Support

There are 41 languages supported and useful label switch functions are also built into the PT.

Unicode is supported and 41 Asian and European languages can be combined in screens. Also, it is possible to switch between up to 16 labels using the label switching function, so it is possible to support up to 16 languages in a single screen just by specifying the language to be displayed in each label.

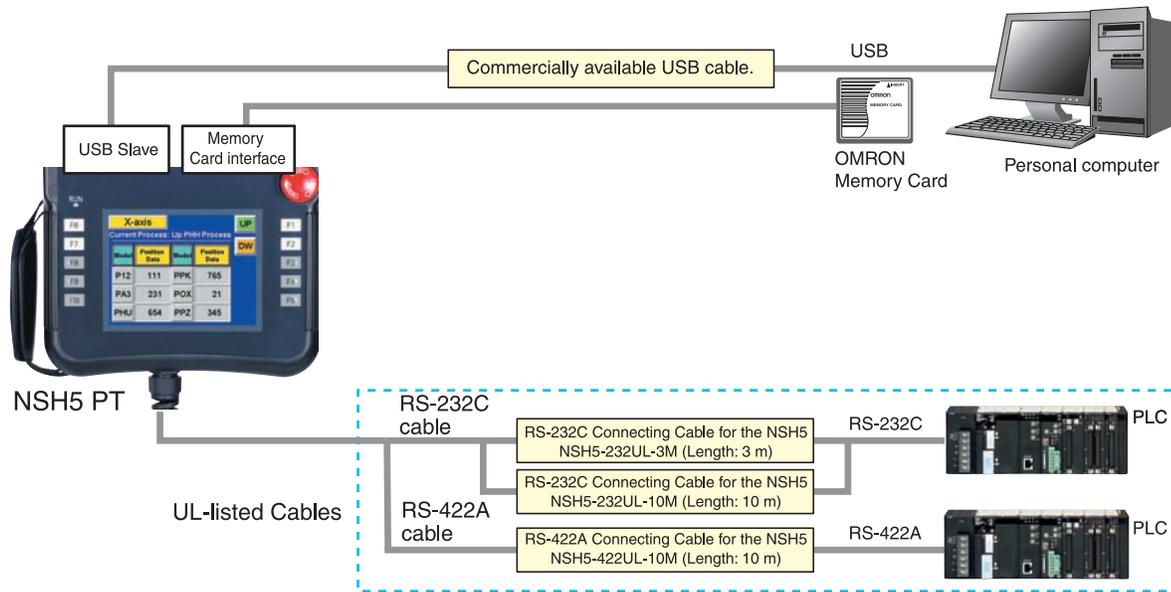


## Specifications

Series		NS5			NSH
Dimensions (W x H x D mm)		195 x 142 x 54			223 x 179 x 70.5
Effective display area		5.7 inch			
Display device		STN (monochrome)	STN (color)	TFT (color)	STN (color)
Resolution		320 x 240 pixels			
View angle		±45 left/right, 20 top, 40 bottom	±50 left/right, 45 top, 50 bottom	±70 left/right, 70 top, 50 bottom	±50 left/right, 45 top, 50 bottom
Maximum screen capacity		20 MB			
Number of switches		300			
Display colors	Basic colors (objects, background, etc.)	Monochrome/16 gray scale levels	256 colors	256 colors	256 colors
	Image data (BMP or JPG images) Images displayed	Monochrome/16 gray scale levels	4,096 colors	32,768 colors	4,096 colors
Screen data capacity via video input		—			
Brightness (cd/m <sup>2</sup> )		350	350	470	
Backlight life expectancy		75,000 hours min.	75,000 hours min.	50,000 hours min.	75,000 hours min.
Memory card capacity		64 Mbytes			20 Mbytes
Expansion interface		—			—
Function switches	Wire outputs				F1, F2, F6, F7
	Communications outputs				F3 to F5, F8 to F10
3-Position enable switch					Increased safety with DPST-NO structure (wired outputs)
Emergency stop switch	3PST-NC				Structure
	DPST-NC				Increase safety (wired outputs)
	SPST-NC				Input to internal NSH5 memory, output to a lamp for emergency stop switch operation, or output via communications, e.g., to a PLC
Water resistance to IP65					The water-resistant structure is equivalent to IP65 on all surfaces <b>Note:</b> The PT may not be suitable for use in environments with long-term water exposure.

Series		NS8	NS10	NS12
Dimensions (W x H x D mm)		232 x 177 x 48.5	315 x 241 x 48.5	315 x 241 x 48.5
Effective display area		8.4 inch	10.4 inch	12.1 inch
Display device		High-definition TFT		
Resolution		640 x 480 pixels	640 x 480 pixels	800 x 600 pixels
View angle		±65 left/right, 50 top, 60 bottom	±60 left/right, 35 top, 65 bottom	±60 left/right, 45 top, 75 bottom
Maximum screen capacity		60 MB	60 MB	60 MB
Number of switches		768	1200	1900
Display colors	Basic colors (objects, background, etc.)	256 colors	256 colors	256 colors
	Image data (BMP or JPG images) Images displayed	32,768 colors	32,768 colors	32,768 colors
Communications		Two serial ports, two USB ports (one Master and one Slave), and Ethernet available		
Screen data capacity via video input		260,000 color	260,000 colors	260,000 colors
Brightness (cd/m <sup>2</sup> )		480	400	400
Backlight life expectancy		50,000 hours min.		
Memory card capacity		64 Mbytes		
Expansion interface		Controller Link and video input board		

## System Configuration Diagram (NSH5 Hand-Held PT)



## Ordering Information

### NS-Series HMI Terminals

Description	Size	Resolution	Memory size	Features	Model
Full system navigation HMI	5-inch STN monochrome	320 x 240	20 MB onboard	—	<b>NS5-MQ00B-V2</b>
				Ethernet	<b>NS5-MQ01B-V2</b>
	—			<b>NS5-SQ00B-V2</b>	
	Ethernet			<b>NS5-SQ01B-V2</b>	
	—			<b>NSH5-SQR00B-V2</b>	
	—			<b>NS5-TQ00B-V2</b>	
	Ethernet			<b>NS5-TQ01B-V2</b>	
	—			<b>NS8-TV00B-V2</b>	
	Ethernet			<b>NS8-TV01B-V2</b>	
	—			<b>NS10-TV00B-V2</b>	
—	<b>NS10-TV01B-V2</b>				
—	<b>NS12-TS00B-V2</b>				
Ethernet	<b>NS12-TS01B-V2</b>				
—	<b>800 x 600</b>	—	—	<b>NS10-TV00B-V2</b>	
—	—	—	—	<b>NS12-TS00B-V2</b>	
—	—	—	—	<b>NS12-TS01B-V2</b>	

### Software

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	1 license	<b>CXONE-AL01C-V</b> <input type="checkbox"/>
		3 licenses	<b>CXONE-AL03C-V</b> <input type="checkbox"/>
		10 licenses	<b>CXONE-AL10C-V</b> <input type="checkbox"/>

## Accessories

Item	Description	Specifications	Model
Video input unit	Enables HMI to display machine vision and CCTV camera images	Inputs 4 channels of NTSC/PAL to display on NS8, NS10 and NS12 HMIs	NS-CA001
		Inputs 2 channels of NTSC/PAL to display on NS8, NS10 and NS12 HMIs	NS-CA002
Vision system console cable	Allows manipulation of vision system parameters from HMI	2 m cable	F150-VKP 2M
		5 m cable	F150-VKP 5M
Controller link interface unit	Establishes HMI as a node for Controller Link communications	Attaches to port on back of HMI	NS-CLK21
RS-422A adapter	Enables monitoring of multiple PLCs	500 m total transmission distance	NS-AL002
		50 m total transmission distance	CJ1W-CIF11
Anti-reflection sheets	For NS10 and NS12 models	5 sheets; applied to screen surface	NS12-KBA04
	For NS8 models		NS7-KBA04
	For NS5 models		NT30-KBA04
Protective covers	For NS10 and NS12 models	5 covers; protects screen surface	NS12-KBA05
	For NS8 models		NS7-KBA05
	For NS5 models		NT31C-KBA05
Chemical resistant covers	For NS5 models	5 covers	NT30-KBA01
Memory card	Store screen data and firmware; requires Memory Card Adapter	30 MB	HMC-EF183
		64 MB	HMC-EF582
Memory card adapter	Enables use of Memory Cards	—	HMC-AP001
Battery	Backs up HMI memory	—	CJ1W-BAT01

## Cables

Function	Connections	Applicable models	Cable length	Model
Connect NS HMIs to printer	USB to USB	NS8, NS10, NS12	2 m	NS-US22
			5 m	NS-US52
			2 m	CBL-USB A/B-2M-in Canada
			6 m	CBL-USB A/B-6M-in Canada
Converts USB to RS-232C	USB to 9-pin D-sub	NS5, NS8, NS10, NS12	0.5 m	CS1W-CIF31
Connect NS-V2 HMIs to Omron PLCs	9-pin to PLC mini-peripheral port	CPM2C, CQM1H, CJ1, CS1	2 m	CS1W-CN118
Connect NS-V2 HMIs to Omron PLC	9-pin to 9-pin PLC peripheral port	CPM1A, CPM2A, CQM1, C200H/C200HE/C200HG/C200HX CP1H, CP1L	0.5 m	C200H-CN510-EU
			3 m	C200H-CN320-EU
			5 m	C200H-CN520-EU
Connect NS-V2 HMIs to a PC	RS-232C serial port 9-pin to 9-pin	All NS-V2 models	2 m	C200H-CN229-EU CBL-202 in Canada
	USB, commercially available	Connects slave port on all NS-V2 models	Various	—

# PC-Based HMI Software NSR

Quick Link  
N524

## Emulates NS HMI Capabilities on a PC, Runs CX-Designer Projects

NS-Runtime provides the ability to operate a CX-Designer application on a PC where an open platform environment is required. This allows the PC to function as a dedicated HMI in factory automation settings. It can also be used as a supervisory tool to view factory run rates.

- Run an existing NS-Series HMI application created with CX-Designer on any Windows XP PC
- Run a new application created with CX-Designer (up to 3840 x 2400 pixels) on any Windows XP PC
- Communicate with Omron CJ, CP1 and CS PLCs via Ethernet, Controller Link or Serial
- Add functionality to and reuse existing NS-Series HMI applications, such as .PDF document viewer and launching other Windows XP applications
- Run an existing NS-Series HMI application as additional PC-based HMIs, either on-site or at remote locations. Ideal when combined with the NSA industrial panel PC and for OEMs for remote maintenance
- Have NS-Runtime available on-site as a PC-based backup in case of NS-Series HMI damage



- Supplied with USB dongle
- Barcode reader to USB port support
- Additional macros for string manipulation, window manipulation, and launching applications
- Expansive data log capacity: 160,000 points compared to NS-Series' 50,000 points

## Features

<b>Machine monitoring</b>	Able to monitor the machine condition through the host computer. Data logger and maintenance are available
<b>Recipe management</b>	Manage recipes through the host computer easily
<b>Large screen size</b>	Provides larger screen size options for factory floor
<b>External application launch</b>	Able to start another software package (such as Excel) from the NS-Runtime application
<b>HMI Back-up</b>	Use the NS-Runtime to keep a machine operational during maintenance outages of the primary HMI
<b>Network located application</b>	Store the NS application on a network drive and launch it without performing a file transfer

## Specifications

<b>Display size</b>	XGA (1024 x 768) is available. max. 3800 x 2400
<b>Display file etc.</b>	In addition to the functions for the NS-Series, able to start up PDF and applications created by other users
<b>Data collection (data log)</b>	Max. 160,000 points
<b>Macro</b>	In addition to the functions for the NS-Series, add 31 types of macro
<b>Connection with external input devices</b>	USB barcode connection, USB keyboard, mouse etc.
<b>System exit</b>	1) Able to select "Runtime+Windows Exit" or "Runtime Exit only" from system menu 2) Able to exit "RUNTIME only" by \$SB630N
<b>Connection device</b>	Connect with PLC and barcode only
<b>PLC connection</b>	OMRON CS/CJ, C series, CP series, NSJ series (does not support the CV series in this version)
<b>Method of connection with PLC</b>	Serial (tool bus/host link) Ethernet, CLK
<b>2 points push at the same time</b>	Not available. For displaying the system menu, double-click somewhere in the 4 corners of window.
<b>Video board</b>	Not available
<b>Built-in system</b>	The functions of ladder monitor and switch box are not built. Call up the CX-Programmer and Switchbox Utility from the system menu. The data trace is available from the CX-Programmer.
<b>SAP library</b>	SAP library which connects with temperature controller directly isn't available

## Comparison between NS-Series HMI and NS-Runtime Functionality

Item	NS-Series	NS-Runtime
Display size	NS12 (max. 800x600)	XGA(1024x768) is available. Max. 3840x2400
Display files	.TXT, .BMP, .JPG	As NS-Series, plus able to view PDF and applications created by other users
Data log	Max. 50,000 points	Max. 160,000 points
Macro	Yes	In addition to the functions for the NS-Series, add 31 macros for string and window handling
Barcode connection	Serial (RS-232C)	USB
System exit	N/A	1) Able to select "Runtime+Windows Exit" or "Runtime Exit only" from system menu 2) Able to exit "RUNTIME only" by \$SB63ON
Connectable devices	PLC, temperature controller, memory link, modem connection, barcode	Connect with PLC and barcode only
PLC connection	OMRON CS/CJ, C/CV series, CP series, NSJ series, Mitsubishi A/FX, Siemens PLC	OMRON CS1/CJ1/CP1/NSJ
Method of connection with PLC	Serial connection (NT link 1:1, 1:N, host link) Ethernet, CLK	Serial, Ethernet, Controller Link
2-points push at the same time	Available	Not available. For displaying the system menu, double-click somewhere in the 4 corners of window.
Video board	NS-CA001, NS-CA002	Use 3rd-party PC video card + custom app.
Built-in system	Ladder monitor, device monitor/switch box function, data trace, programming console	Launch CX-Programmer and Switchbox Utility from the system menu. Data trace is available from CX-Programmer.
SAP library	All SAPs available	SAPs to connect with temperature controller directly not available

## Ordering Information

Description	Model
NS-Runtime (1) License, CD ROM, USB Dongle, Documentation	<b>NS-NSRCL1</b>
NS-Runtime (3) Licenses, CD ROM, USB Dongle, Documentation	<b>NS-NSRCL3</b>
NS-Runtime (10) Licenses, CD ROM, USB Dongle, Documentation	<b>NS-NSRCL10</b>

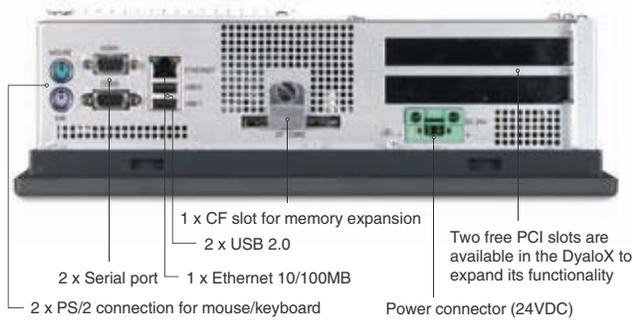
# Integrated HMI Controller NSA



## Guaranteed Continuity

The NSA IPC is designed to provide exceptional performance operating round-the-clock throughout its lifetime. Besides this, Omron offers you a full 3 year warranty and a guarantee of repair of your NSA IPCs for up to 7 years after purchase. So unlike many office-PC type products that have, for instance, very short life cycles, the NSA IPC is a product with guaranteed continuity.

## No Moving Parts to Fail



Fewer moving parts mean fewer potential causes of failure and hence a more reliable product. So instead of a hard disk drive, the new NSA IPC series uses a silicon storage module that offers fast access and exceptional ruggedness. And instead of an electric fan to cool the CPU, heat is radiated away by a heavy heatsink with cooling fins.



### No Hard Disk Drive

“Disk on Module” is a very reliable silicon storage type with bad sector management and industrial operating temperatures.



### No Fan

A fan is a very critical part of a PC. If the fan fails the complete system eventually breaks down. That’s why we chose a fan-less concept.



## RAS Board for Continuous Monitoring

Inside the NSA IPC series, a separate RAS board, interfaced by embedded RAS utility software, continually monitors the motherboard. Because the RAS board is a stand-alone board, it can gather data from the motherboard no matter what the Operating System or hardware conditions are. RAS stands for Reliability, Availability, Serviceability.



## Specifications

Item		Specifications
<b>OS</b>		Preinstalled Windows XP Embedded
<b>Processor</b>		1.3 GHz Intel Celeron® M Processor
<b>Storage device</b>	<b>Type</b>	DiskOnModule (flash memory)
	<b>Capacity</b>	2 GByte
	<b>Service life (write cycles)</b>	300,000 cycles
<b>Memory</b>	<b>Main memory</b>	512 Mbyte DDR-SDRAM (No-ECC)
	<b>Cache memory</b>	512 Kbyte Level 2 cache memory (built into the CPU)
<b>Display panel</b>	<b>Type</b>	TFT color LCD
	<b>Size</b>	12.1 or 15 inches
	<b>Resolution</b>	1024 x 768 dots
	<b>Contrast</b>	300 cd/m <sup>2</sup> (typical) (See note 1)
	<b>Viewing angle</b>	130° left to right, 90° up and down
<b>Backlight</b>	<b>Colors displayed</b>	262,144
	<b>Type</b>	2 cold-cathode fluorescent lamps (CCFL) 4 x CCFL for 15"
	<b>Contrast adjustment</b>	Three-level software adjustment. (See note 2)
	<b>Backlight not lit detection</b>	The software reads the lamp burnout detection signal from the inverter. (See note 3)
<b>Service life</b>	<b>Service life</b>	50,000 hours min. (See note 4)
	<b>Type</b>	Analog resistive type
	<b>Effective input area</b>	12" : 247 mm x 185.5 mm 15" : 305 mm x 229 mm
<b>Operating service life</b>	<b>Operating service life</b>	10,000,000 operations (with non-stop key stroking using fingers to input) 100,000 characters (with non-stop character entry using a stylus to input)
	<b>Keyboard</b>	PS/2 keyboard with 6-pin Mini DIN connector
<b>Interface</b>	<b>Mouse</b>	PS/2 mouse with 6-pin Mini DIN connector
	<b>Serial ports</b>	2 ports conforming to EIA RS-232C for 9-pin D-SUB female connectors Pin No. 6 output: +5 V (250 mA max.) (See note 5)
	<b>Ethernet</b>	One 10 BASE-T/100 BASE-TX port for an RJ45 connector
	<b>USB ports</b>	2 USB 2.0/1.1 ports for USB-type A connectors
	<b>Memory card</b>	Type I CF Card, 1 slot
	<b>Expansion slots</b>	PCI expansion bus, 2 slots
<b>Special RAS board</b>	<b>External input port</b>	3-pin connector port for the UPS power interruption signal
	<b>Status LED indicators</b>	4 (RUN/BATLOW/ERR/DIAG)
<b>RAS functions</b>	<b>Special RAS board functions</b>	Alive connection monitoring, device restart, timer start, startup and shutdown monitoring, backlight lit time measurement, UPS power interrupt signal output, and logging functions
	<b>Motherboard</b>	RAS functions Standard PC RAS info, post error logging, post error retry, CMOS data recovery
<b>POWER indicator</b>		Yes (green)
<b>Service life</b>		50,000 hours at 40 C (See note 6)
<b>Battery life</b>	<b>Main board</b>	5 years at 25 C (NSA-BAT01)
	<b>RAS board</b>	5 years at 25 C (NSA-BAT02)

**Note:** 1. This contrast value is strictly a reference value at maximum contrast.

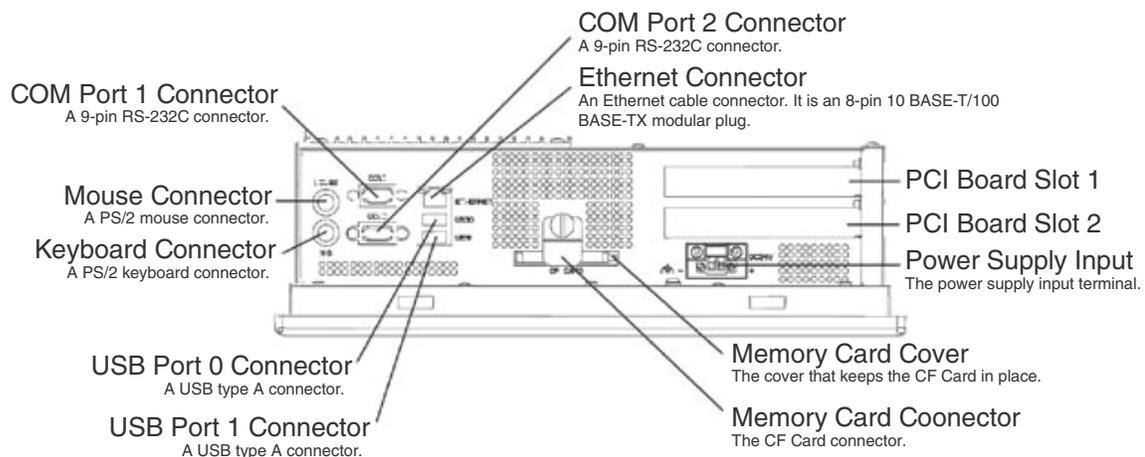
- The contrast cannot be adjusted significantly.
- It is not the service life, but rather lamp failure due to the hardware problems such as a broken wire that is detected. Backlight not lit detection means both backlight lamps have burnt out.
- The service life is a guideline for maximum contrast at room temperature with normal humidity and is provided strictly for reference. It varies significantly with the ambient temperature. The service life will be shorter under extreme (high or low) temperature conditions and falls off sharply particularly under low-temperature conditions.
- The service life is a guideline that is provided strictly for reference. It varies with factors such as the installation location and operating conditions.
- Serial ports 1 and 2 cannot output +5 V at the same time.
- The service life is a guideline that is provided strictly for reference. It varies with factors such as the installation location and operating conditions.

## General Specifications

Item	Specifications
Rated supply voltage	24 V DC
Allowable supply voltage range	20.0 V DC to 27.6 V DC (24 V DC $\pm$ 15%)
Power consumption	12" : 80 W max. 15" : 100 W max.
Ambient operating temperature	0 to 50 C (See notes 1 and 2)
Ambient storage temperature	-10 to 60 C (See notes 1 and 2)
Ambient operating humidity	10% to 80% with no condensation (See note 2)
Ambient storage humidity	10% to 85% with no condensation (See note 2)
Operating atmosphere	Must be free of corrosive gases Must be fairly dust free
Noise resistance	Conforms to IEC6100-4-4, power supply line: 2 kV
Vibration resistance (in operating)	Confirm to JIS C0041, 0.05 mm amplitude at 10 to 55 Hz for 50 min each in the X, Y and Z directions (IEC60068-2 equivalent)
Shock resistance (in operating)	Conforms to JIS C0041, 196 m/s <sup>2</sup> three times each in the X, Y and Z directions (IEC60068-2 equivalent)
Dimensions (excluding protrusions)	12" : 322 mm x 264 mm x 100 mm (W x H x D) 15" : 384 mm x 312 mm x 108 mm (W x H x D)
Weight	12" : 5 kg 15" : 7 kg
Degree of protection	Front panel: IP65 or the equivalent (display side only) (See note 3)

Notes: For notes see user manual V233-E1-0.

## Nomenclature



## Ordering Information

Description	Specifications	Model
NSA Industrial PC 12"	1.3 Ghz Celeron M, 512 MB RAM, 2 GB storage, XPe, no fan, no HDD, black	NSA12-TX01B-E
	1.3 Ghz Celeron M, 512 MB RAM, 2 GB storage, XPe, no fan, no HDD, silver	NSA12-TX01S-E
NSA Industrial PC 15"	1.3 Ghz Celeron M, 512 MB RAM, 2 GB storage, XPe, no fan, no HDD, black	NSA15-TX01B-E
	1.3 Ghz Celeron M, 512 MB RAM, 2 GB storage, XPe, no fan, no HDD, silver (Q4-2006)	NSA15-TX01S-E
NSA Industrial PC Main board battery	—	NSA-BAT01
NSA Industrial PC RAS board battery	—	NSA-BAT02
CS1G-CPU45H PLC PCI board	CS1-CPU45H, DeviceNet Master and CF interface	CS1PC-PCI01H-DRM
Interface for CS1 extension backplanes	—	CS1PC-EIC01
Controller Link Support Board for PCI Bus	H-PCF cable optical ring	3G8F7-CLK12-E
	GI cable optical ring	3G8F7-CLK52-E
	Twisted-pair cable	3G8F7-CLK21-E

# Operator Interfaces/HMIs NT11



## Large Alphanumeric 4-Line Display with Function Keys

Compact and easy to operate, this full-featured operator interface allows accurate monitoring and controlling, and includes slide-in legend for custom labeling of function keys. The extra-large keys on the numeric keypad provide operators the tactile feedback for quick data input or screen change, even when wearing thick work gloves.



- 4 line x 20 character backlit LCD display
- Mix 1- and 2-wide characters in one display; inverse display selectable
- 32KB memory (up to 250 screens)
- 4 global programmable function keys use menu-based screen navigation
- Keypad allows operators to input and enter numeric data
- Bar graph capability
- Password protected screens
- Printer port built in (25-pin female connector)
- Host link/1:1 NT link communication
- Contrast control
- NEMA 4
- Black or ivory front bezel



Class I Div 2, Groups A, B, C, and D.

## Specifications

- Text message capacity: 250 screens max.
  - Adding function keys, scrolling messages, etc. decreases capacity
- Resolution: 64 V x160 H pixels
- View angle: 20 degrees left/right
- Memory: Flash EPROM; 512KB
- Data format: Control by PLC (displays numeric and ASCII text strings)
- Dimensions: 113 H x 218 W x 38.2 D mm front panel; 98.8 H x 204.2 W mm panel cutout
- Backlight service life: 50,000 hours min.

## Ordering Information

### Operator Interfaces

Display data source	External settings	Power supply	Features	Model
Programmable	4 function keys	External 24 VDC	Ivory case	NT11-SF121-EV1
			Black case	NT11-SF121B-EV1

### Accessories

Function	Connections	Applicable models	Cable length	Model
Connect NT11 to Programming cable	9-pin RS-232C to RS-232C for PC	—	2 m	C200H-CN229-EU CBL-202 in Canada
Connect NT11 to Omron PLC	9-pin D-sub to PLC peripheral port	CPM1A, CPM2A, CQM1, C200H/C200HE/ C200HG/C200HX	0.5 m	C200H-CN510-EU
			3 m	C200H-CN320-EU
			5 m	C200H-CN520-EU
	9-pin D-sub to PLC mini-peripheral port	CPM2C, CQM1H, CJ1, CS1	2 m	CS1W-CN118
NT Series Support Tool Software	—	—	—	NT-ZJCAT1-EV4

# Operator Interfaces/HMIs NT2S



## Compact Powerful 2-Line Message Display with Function Keys

- High visibility backlit LCD display shows 2 lines of 16 characters
- Programmable or PLC message display models available
- Multi-vendor PLC support models available
- 6 or 8 function keys available for screen and project level assignment
- Easy numeric entry using arrow or numeric keypad
- Two bit-assignable LED indicators on 6-key models
- Power from PLC peripheral port or external 24 VDC power supply
- Password protect any programmable function key
- Built-in bar graph display capability
- IP65 enclosure rating
- All models meets cULus, CE, and Class I, Division 2 ratings for use in hazardous areas
- Programming software available FREE from our website



## Specifications

- Text message capacity: 250 screens max. (6-key models); 750 screens max. (8-key models)
  - Adding function keys, scrolling messages, etc. decreases capacity
- Effective display area: 13 H x 60 W mm; Character height: 4.35 mm
- Memory: EEPROM; 8K (6-key models); 24K (8-key models)
- Data format: Hex, BCD, Octal, Binary, signed, unsigned (NT2S-SF121/122/125/126); Control by PLC (NT2S-SF123/127)
- Multi-vendor support (NT2S-SF121/125): Omron, Allen-Bradley Micrologix and SLC 5/0x, GE Micro, Modicon, Keyence KV series, Toshiba T series, Koyo 305, 405 and DL205 series
- Dimensions:
  - 6-key models: 60 H x 109 W mm panel face; 44 H x 91 W x 28 D mm panel cutout
  - 8-key models: 107 H x 107 W mm panel face; 91 H x 91 W x 26 D mm panel cutout
- Backlight life: 50,000 hours min.

## Ordering information

### Operator Interfaces

Display data source	External settings	Features	Power supply	Model
Programmable	6 function keys	Real-time clock; multi-vendor PLC support	External 24 VDC (1.5 W)	NT2S-SF121B-EV2
PLC ASCII-based program		—	5 VDC (0.75 W)	NT2S-SF122B-EV2 NT2S-SF123B-EV2
Programmable	8 function keys, number pad	Real-time clock, multi-vendor PLC support	External 24 VDC (1.5 W)	NT2S-SF125B-E
PLC ASCII-based program		—	5 VDC (0.75 W)	NT2S-SF126B-E
PLC ASCII-based program		—	—	NT2S-SF127B-E

## Software

Download software from Omron's website.

Software name	Support for 3rd party PLCs	Applicable models	Operating system	Model
NT-XS	Allen-Bradley DF1: Micrologix and SLC 5/0x; Allen Bradley DH485: SLC500; Modicon: Modbus and Modbus Generic; Modicon PLCs (slave): Modbus slave Omron Host Link: K-type, H-type, CQM1, CQM1H (CPU41-CPU45), CPM1□, CPM2□, CS1 and CJ1; Omron/Yaskawa inverters: Yaskawa; Siemens Step-7 Micro: S7-200; Twindo PLCs: Twdlmda40dtk	NT2S-SF121, NT2S-SF125	Microsoft Windows XP Home and XP Professional	<b>NT-XS V1.01</b>
NT2ST	Allen-Bradley DF1: Micrologix and SLC 5/0x, GE Micro, Modicon, Keyence KV series, Koyo 305, 405 and DL205 series Omron Host Link: K-type, H-type, CQM1, CQM1H (CPU41-CPU45), CPM1□, CPM2□, CS1 and CJ, Toshiba T series. <b>Note:</b> NT2ST programs are not transferable to NT-XS.		Microsoft Windows 95, 98, Me, 2000, or NT 4.0	<b>NT-ZJCAT1-EV4</b>

## Cables

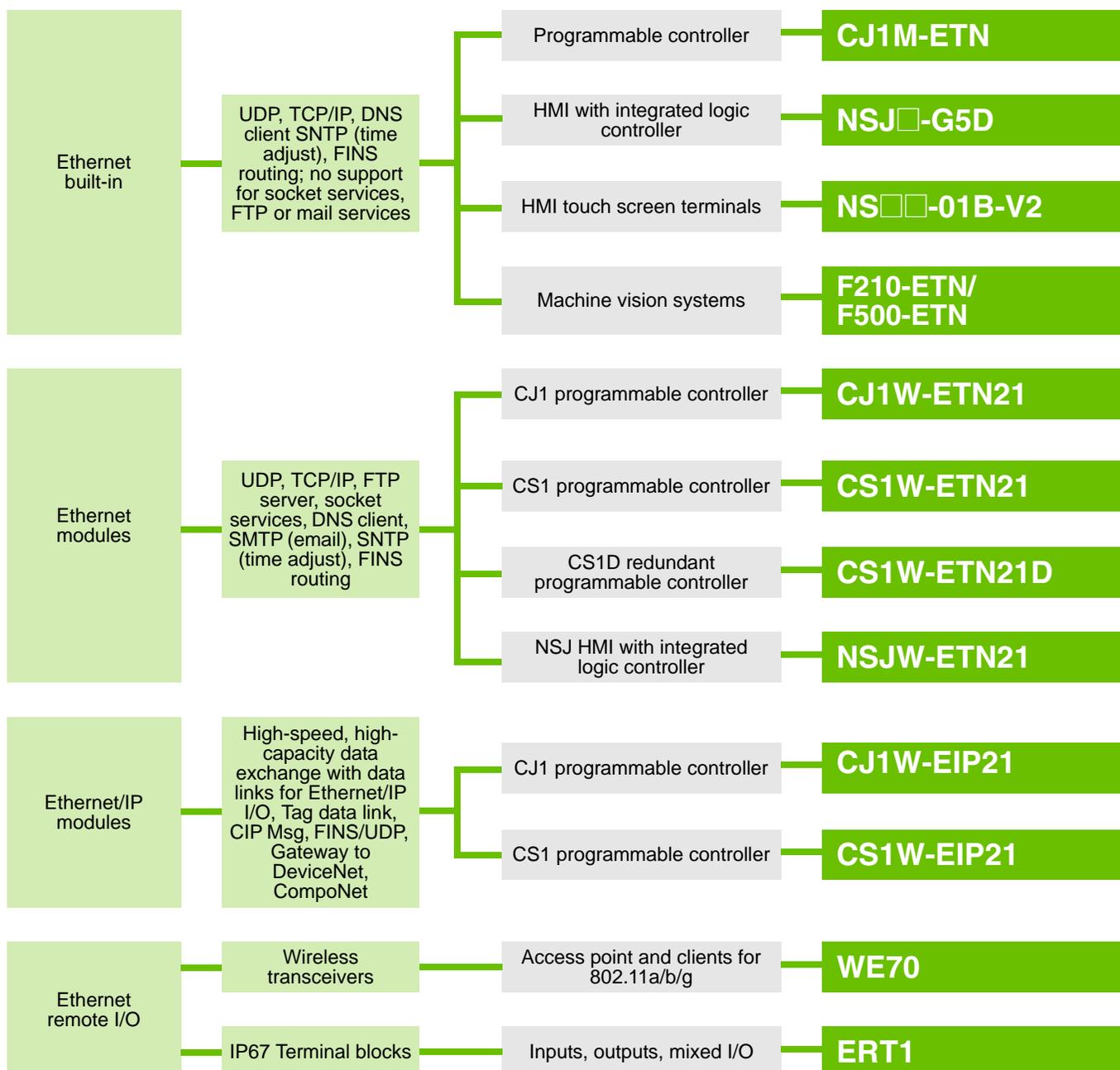
Function	Connections	Applicable models	Cable length	Model
Connect NT2S-SF121 to Omron PLC	9-pin D-sub to PLC peripheral port	CPM1A, CPM2A, CQM1, C200H/C200HE/C200HG/ C200HX	2 m	<b>NT2S-CN212</b>
			5 m	<b>NT2S-CN215</b>
Connect NT2S-SF122/123 to Omron PLC	9-pin D-sub to PLC mini-peripheral port	CPM2C, CQM1H, CJ1, CS1	2 m	<b>NT2S-CN223-V1</b>
			5 m	<b>NT2S-CN225-V1</b>
Connect NT2S-SF121 to Allen-Bradley SLC500 PLC	9-pin D-sub to PLC peripheral port	CPM1A, CPM2A, CQM1, C200H/C200HE/C200HG/ C200HX	2 m	<b>NT2S-CN222-V1</b>
			5 m	<b>NT2S-CN225-V1</b>
Connect NT2S-SF121/122 to PC for programming	9-pin D-sub to PLC mini-peripheral port	CPM2C, CQM1H, CJ1, CS1	2 m	<b>NT2S-CN224-V1</b>
				<b>NT2S-CN212-485</b>
Connect NT2S-SF121 to Allen-Bradley SLC500 PLC	9-pin D-sub to DH485 network	—		<b>C200H-CN229-EU</b> <b>CBL-202 in Canada</b>

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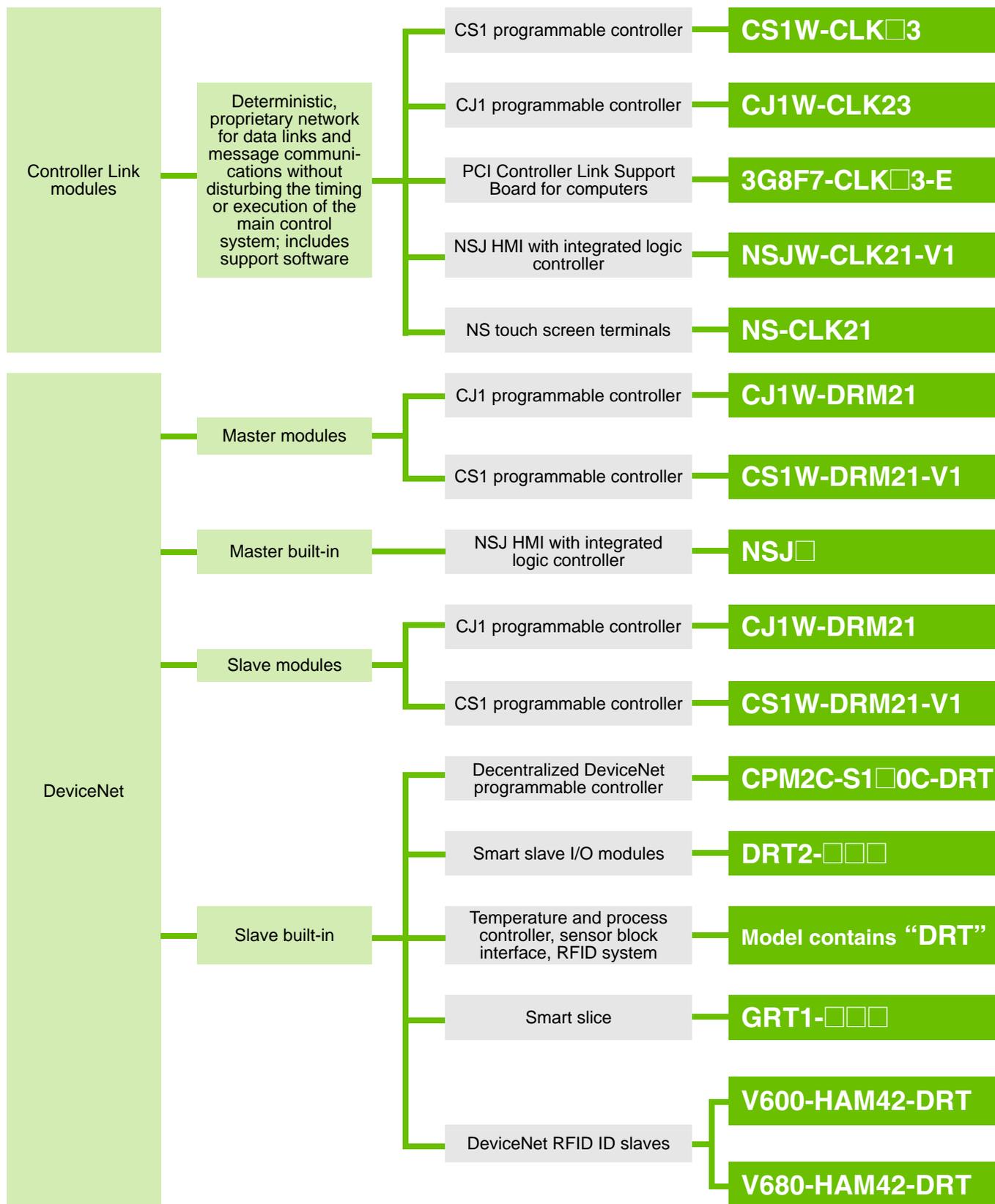
## Selection Guide

### Ethernet and Controller Link Peer-to-Peer Networks



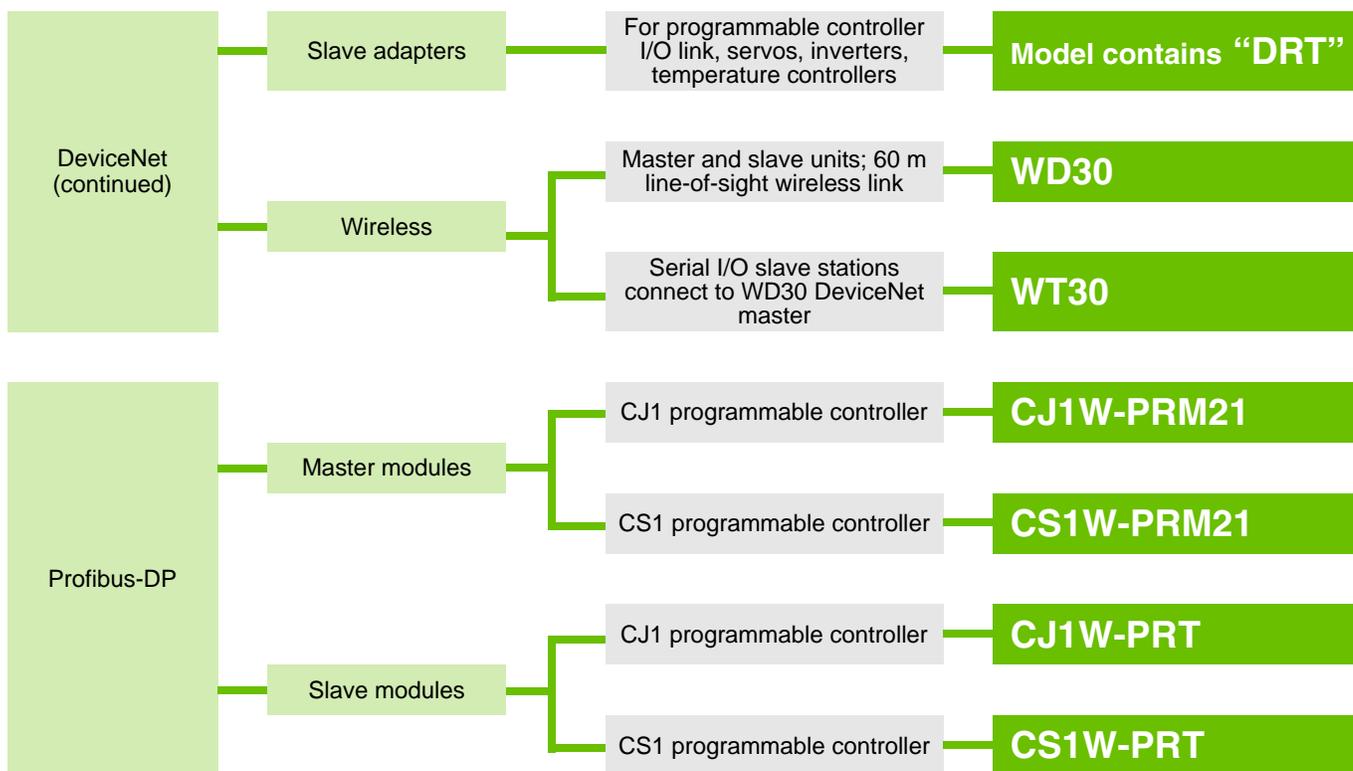
## Selection Guide

### DeviceNet, Profibus-DP and SmartSlice I/O for Device Level Networks

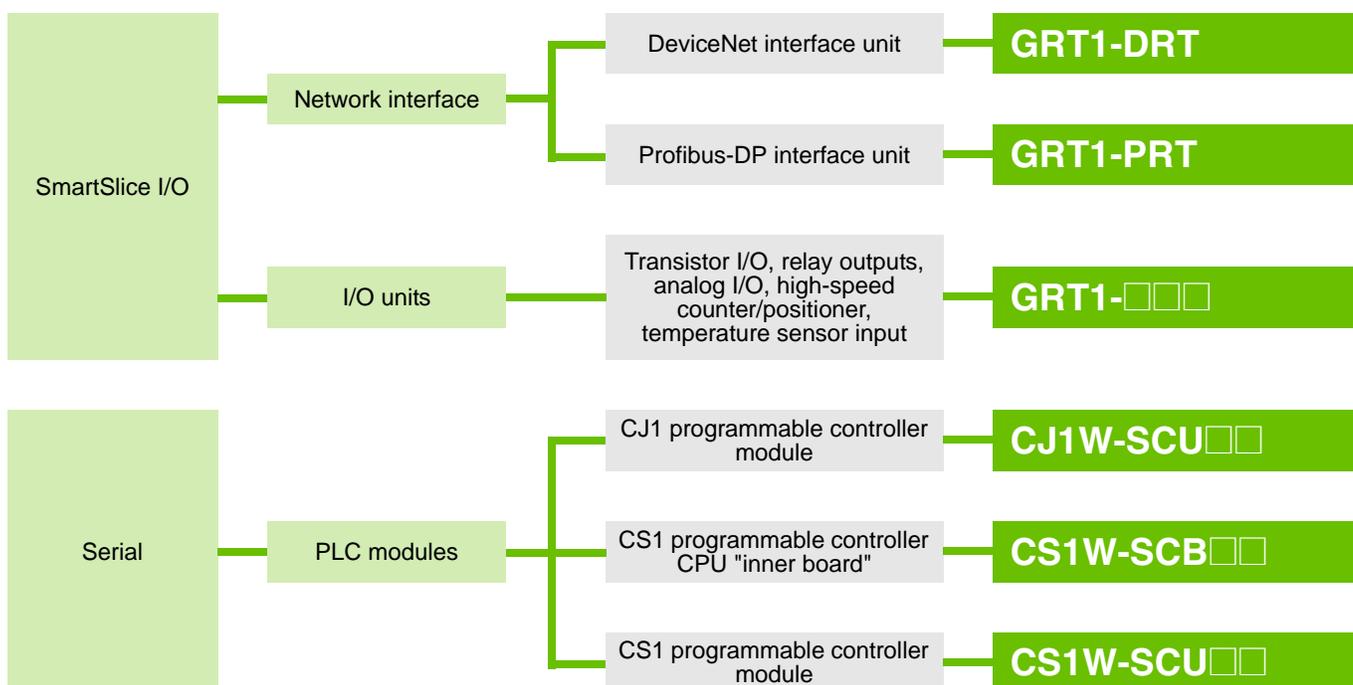


## Selection Guide

### DeviceNet, Profibus-DP and SmartSlice I/O for Device Level Networks

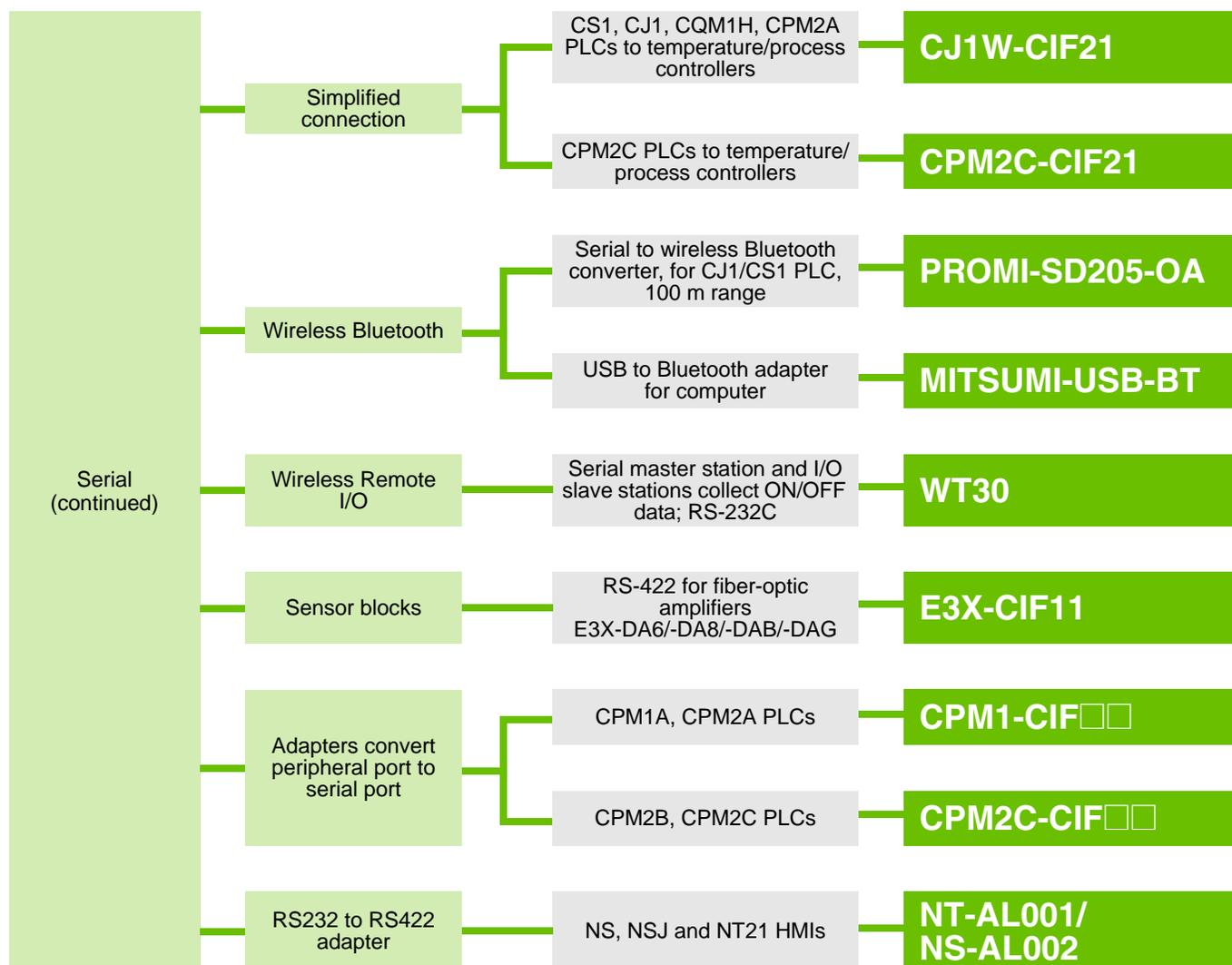


### Remote I/O Communications



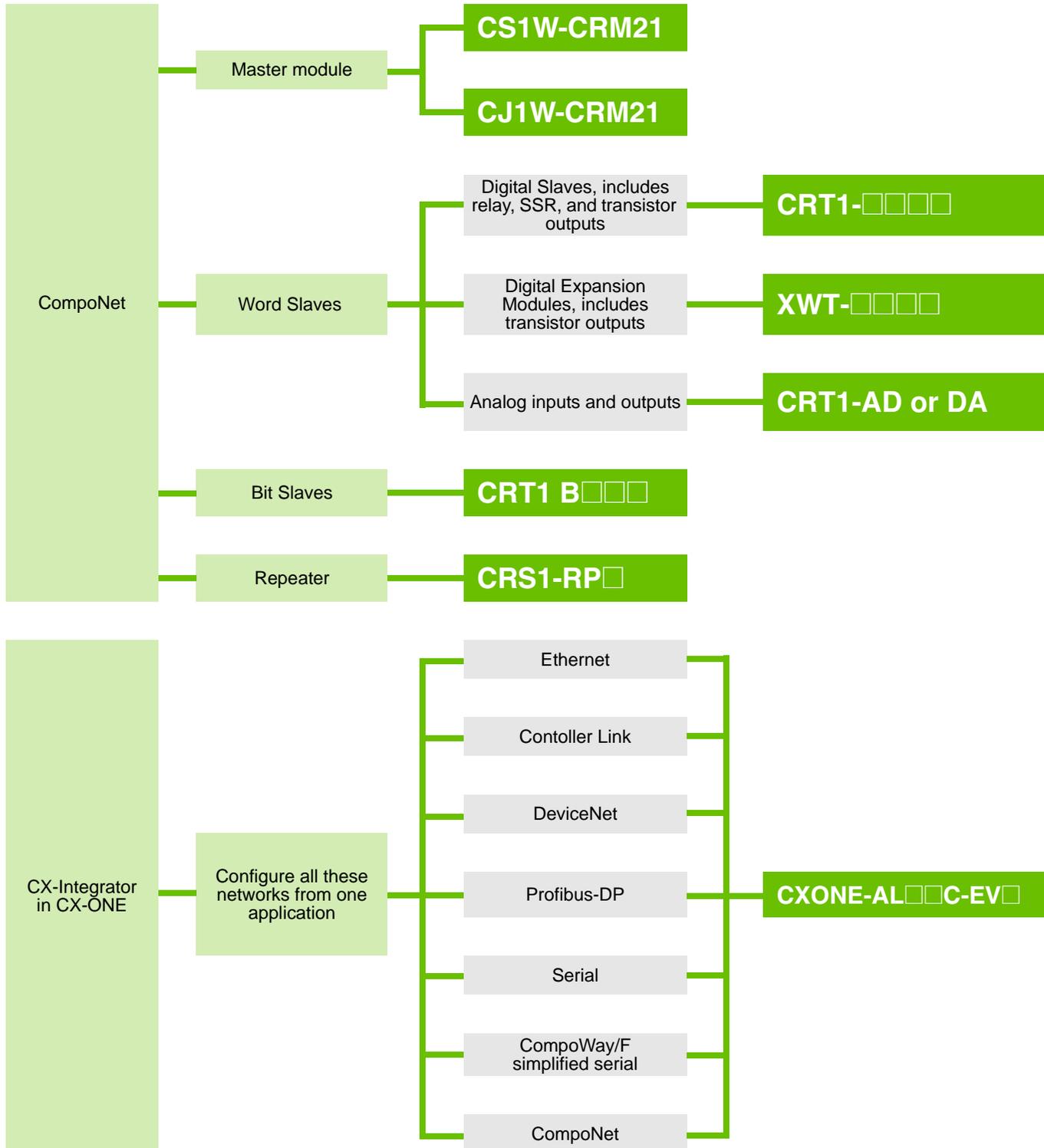
## Selection Guide

### Remote I/O Communications (continued)



## Selection Guide

### Network Configuration Software



# Networking Solutions Networking Intro



## Networking Solutions to Collect and Share Valuable Data

Omron's Industrial Networking options deliver easy-to-implement connections from controllers to Data Acquisition Systems and Supervisory Control Systems that are unmatched in the industry today. This is very easy to accomplish using Omron's Programmable Controllers because:

1. the Communications Modules provide the intelligence for routing the commands or data, and
2. the memory of the processor is organized so that communications requests can access data areas in the processor without interrupting CPU control functions to do "block transfers."



## Choosing the Right Solution

Application requirement	Network type	Quick link code
Need to exchange large volumes of large messages enterprise-wide	Ethernet Ethernet/IP	H224 for CJ1 H222 for CS1 N523 for NS N522 for NSJ G353 for F210-ETN G359 for F500
Need a deterministic network between PLCs and between computers and PLCs	Controller Link	H224 for CJ1 H222 for CS1 N523 for NS N522 for NSJ
Need an Open network that exchanges device data and status	DeviceNet Wide range of connectivity options Wide range of slave I/O and master options	—
	Profibus-DP	—
	CompoNet is CompBus/S built on top of the CIP protocol. This provides improved connectivity to Ethernet/IP and DeviceNet while providing high-speed low cost connectivity.	—
Need a high-speed distributed I/O network	CompoNet	K227
Need to exchange data and make remote settings available to host computers, controllers and other serial devices	Serial Communications Protocol Macros allow immediate connectivity to serial controllers, offer customer protocol development and ladder program access	H224 for CJ1 H222 for CS1 H225 for CP1H

## Features

- Platforms to match all data and command exchange communications
  - Ethernet for large volumes of large messages enterprise-wide
  - Controller Link for deterministic network between PLCs and computers and PLCs
  - DeviceNet open network that exchanges device data and status
  - Profibus-DP for high-speed open networking between automation control systems and distributed I/O
  - CompoBus/S for high-speed networking of distributed I/O
  - CompoNet for high-speed bit and word I/O applications. Based on the Common Information Protocol (CIP).
  - CompoNet for high-speed networking within a CIP based network
  - Serial communications to exchange data and make remote settings available to host computers, controllers and other serial devices
- Easy-to-implement connections and access unmatched in the industry
  - Communications modules provide the intelligence for routing the commands or data
  - Modules with on-board processors have memory organized so that communications requests can access data areas in the processor without interrupting CPU control functions to do "block transfers"
- Seamless routing of messages and information across up to eight networks
  - Unique FINS middleware exchanges content regardless of platform protocol
  - Flexibility to handle changing requirements easily
  - Allows easy integration with legacy products

## Overview

Level	Network	Functions	Communications	CPU bus module
Information networks	Ethernet Ethernet/IP	Host computer to PLC/HMI	FINS messages	Ethernet Module Ethernet/IP
	PLC to PLC	PLC to PLC	FTP server	
		Host computer to CPU memory card		
		UNIX computer or other socket service to PLC		
Controller Link	Computers connected directly to network and PLC	FINS messages	Controller Link Support Board and Module	
		Data links (offsets and automatic setting)		
Control networks	PLC to PLC or HMI	FINS messages	Controller Link Module	
		Data links (offsets and automatic setting)		
Field device networks	DeviceNet	PLC or HMI to components (slaves)	FINS messages on open network	DeviceNet Module and Configurator
	CompoNet		High-capacity remote I/O on open network (fixed or user allocations)	
	Profibus-DP		High-speed remote I/O on open network	
			High-capacity remote I/O on open network (fixed or user allocations)	Prof bus-DP Master and Configurator

## Communication Specifications

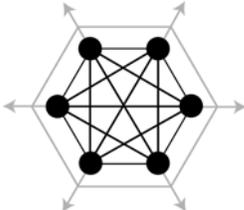
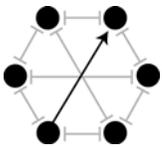
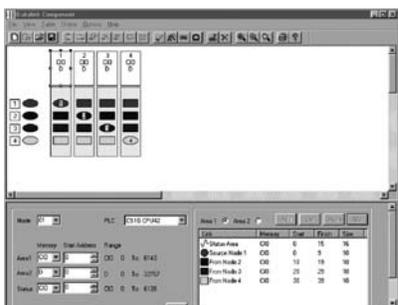
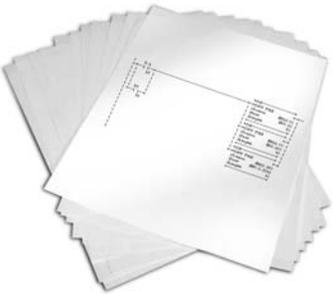
The network type identifying characters in parentheses can appear at the end of a part number or as the family name.

Network type	Ethernet (ETN21)	Controller Link (CLK23)	DeviceNet (DRM21 master) (DRT2 slaves)	CompoNet	Ethernet/IP (EIP21)	Profibus-DP (PRM21 master) (PRT slaves)
Messages	Yes	Yes	Yes	—	Yes	Yes
Data links	—	—	—	Yes	—	—
Remote I/O	—	—	Yes	—	—	Yes
Maximum speed	10/100 Mbps Send and receive 156 words: 166 ms	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2K word data links)	500 kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	4 Mbps Comm cycle: < 1ms	100 Mbps max. speed Tag data link, CIP Msg FINS/UDP FINS/TCP	12 Mbps Comm cycle: Approx. 1 ms
Total distance	2.5 km	Twisted-pair cable: 1.5 km max. using 2 repeater units (at 2 Mbps) 1 km max. without repeater units	500 m (at 125 bps)	500 m max. (at 93.75 kbs) 1,500 m with two repeaters	100 M	1200 m at 9600 bps; 100 m at 12 Mbps; Up to 4800 m with 3 repeaters
Maximum nodes	254	62 when used with 2 repeater units and CLK-V1 units	63	128 input and 128 output	256	125
Communications media	Unshielded twisted-pair cable using RJ45 modular connectors	Shielded twisted-pair cable Optical fiber cable	DeviceNet cable	<ul style="list-style-type: none"> <li>VCTF 2-conductor cable (JIS C 3306, 2-conductor)</li> <li>Standard Flat Cable (DCA4-4F10)</li> <li>Sheathed Flat Cable (DCA5-4F10)</li> </ul>	Shielded twisted-pair 100 Ohms, 5, 5e	Shielded twisted-pair
Network data link	—	32,000 points	—	—	184,832 words	—
Remote I/O capacity	—	—	32,000 pts (with Configurator); 2,048 pts (without Configurator)	2560 pts	512,000 digital 32,000 analog	4800 (with Configurator); 1600 (without Configurator)
Supporting PLCs	CJ1, CJ1M, CS1 Series	CJ1, CJ1M, CS1 Series	CJ1, CJ1M, CS1 Series, CVM1, CV Series, C200HX/HG/HE, C200HS, CQM1/CQM1H (with I/O link)	CS Series and CJ Series PLCs	CJ, CS, CP1H Series	CJ1, CJ1M, CS1 Series, C200HS, C200HX/HG/HE, CQM1, CQM1H (with I/O link) CPM1A/CPM2A (with I/O link)
Supporting HMIs	NS, NSJ	—	NS, NSJ	NS, NSJ	—	NS, NSJ
Supporting Motion Controls	—	—	W-Series servos	—	—	—

## Omron Simplifies Setup for Network Communications

Examine the realities and costs involved in building the network communications that let you integrate plant floor data with front office systems. Two considerations move to the top of the list: flexibility to handle changing requirements easily and the ability to integrate legacy products. The table below clarifies the advantages of Omron's approach. Data Link is supported by Omron's Ethernet/IP Modules (CJ1W-EIP□□, CS1W-EIP□□) and it is also supported by Omron's Controller Link devices as well (CJ1W-CLK□□, CS1W-CLK, NSJW-CLK□□)

### Comparison of Omron's Data Link to Traditional Block Transfer

Data exchange method	Data link	Block transfer
<b>What it accomplishes</b>	<p>Makes available an easily expanded area of data that is accessible to all PLCs on the network. Data requests are handled outside the scan time by co-processors in the communications modules.</p> 	<p>Defines a point-to-point connection between a desired individual data point in a PLC to make a specific link to the requesting PLC and define the amount of data that can be exchanged. Typically limited to 64 words.</p> 
<b>Setup procedure</b>	<ul style="list-style-type: none"> <li>• Use dialog box "wizard" setup</li> <li>• User defines how much data is to be sent via the Data Link, what memory location is to be used and how much to "read" from all other network nodes</li> </ul>	<ul style="list-style-type: none"> <li>• Use special Move instructions</li> <li>• Must follow any Read or Write command</li> <li>• Error checking is done by programming and data consistency must be checked due to scan cycle mismatches</li> </ul>
<b>Setup example</b>	<p>The screen capture shows a typical Data Link setup in progress. The user can define:</p> <ul style="list-style-type: none"> <li>• How much data gets sent</li> <li>• What memory area is the source of the data and</li> <li>• Where to put received data</li> </ul> 	<p>Printout shows the first rung of an extensive program required to define point-to-point data exchange and to verify data consistency.</p> <ul style="list-style-type: none"> <li>• Error checking is done by programming</li> <li>• Size of transfer affects program cycle timing</li> </ul> 
<b>Making changes</b>	<ul style="list-style-type: none"> <li>• Amount of data to be handled, changing where it goes or adding a new node is as simple as the initial setup</li> <li>• No impact on program execution</li> </ul>	<ul style="list-style-type: none"> <li>• Program must be adjusted if data size changes; program execution time changes</li> <li>• If different models are communicating, up to 3 programming software packages could be required</li> </ul>
<b>Costs and future expandability</b>	<p>Data Link reduces the original cost of programming in setting up the routing tables for exchange and offers maximum flexibility for future changes, requiring minimal editing to routing table data.</p>	<p>Long hours of programming each individual point-to-point exchange followed by system testing to be sure cycle time is acceptable, followed by any modifications to bring cycle time back into bounds. Future changes are time consuming editing projects.</p>
<b>Handling legacy systems</b>	<p>Omron's CX-Programmer software covers all Omron's programmable controllers with networking capability, from micros up to large rack systems. Access to the memory areas available for each model is selected in a dialog box when the specific model is designated.</p>	<p>Depending on the manufacturer, multiple programming software packages are required to set up and modify the block transfer ladder programming across the full range of PLCs in an installation. Finding and hiring programmers with experience in older platforms becomes difficult as time goes by.</p>

# Networking Solutions

# Ethernet

Quick Link

K222

## Exchange High Volumes of Large Messages Enterprise-Wide

Omron offers full-service Ethernet modules that support the full TCP/IP model for maximum flexibility in data exchange for PLCs and HMIs. Omron also builds the essential Ethernet communications capabilities into PLCs, HMIs and machine vision systems to provide effective reporting capabilities without extra hardware. These models do not support socket, FTP, or mail services. If these are required, use a full-service Ethernet Unit.

## Omron's Ethernet Advantage- Modifications are Easy

We use easy-to-establish routing tables to share common data table contents instead of programming requests to share specific blocks of data with specific PLCs. This eliminates impact on the control program processing speed and reduces errors by involving hundreds fewer programming steps. With Omron, all communication modules can share data within PLC memory. It also allows great flexibility for future control modifications without substantial reprogramming effort. This removes a costly barrier to Continuous Improvement of your manufacturing processes.



## Network Capabilities

### Basic Capabilities

- Compatible with 100Base-TX (100 Mbps)
- 254 total nodes possible
- SNTP client functionality for automatic clock adjustment
- DNS client functionality to specify servers by host name
- Compatible with earlier CS1 Ethernet modules

### E-Mail Capability

- Transmit e-mail attachments from the Ethernet module using an SMTP server to acquire user-created data, error log data, and module status data
- Using a POP3 server, the user can send commands to the Ethernet unit via e-mail

### Internet Capability

- Host computers that acquire a dynamic IP address (using DHCP) can send commands to the PLC and receive responses
- Multiple FINS supported applications within the computer can go on-line simultaneously
- Using FINS communications, both TCP/IP and UDP/IP are supported
- Using the built-in FTP server, files can be read from or written to the mounted memory card
- Using FINS communications, connectivity with devices on other networks is possible (renting services)
- Socket services (TCP or UDP protocols) allow for Ethernet connected devices to send and receive data
- FINS commands can be sent or received by PLCs or computers on the same Ethernet network

## Ordering Information

### Ethernet Modules for Programmable Controllers and HMIs

These modules support the full range of Ethernet services, including socket services, FTP and mail services.

Applicable device	Description	Rating	Model
CJ1 PLC	UDP, TCP/IP, FTP server, socket services, DNS client, SMTP (email), SNTP (time adjust), FINS routing	100 Mbps max. speed; 2.5 km distance; 254 nodes; twisted pair cable	CJ1W-ETN21
CS1 PLC			CS1W-ETN21
CS1D PLC			CS1W-ETN21D
NSJ HMI with integrated logic and I/O network controller			NSJW-ETN21

### PLCs with Built-In Ethernet Communications

Models with built-in Ethernet do not support socket, FTP, or mail services. If these are required, use a standard CJ1M controller and CJ1W-ETN21 Ethernet Unit.

Number of I/O	Program capacity	Data memory storage	Maximum I/O modules per CPU	Max. I/O expansion racks per CPU	Current consumption	Model
160 points	5K steps	32K words	9	0	0.58 A, 5 V	CJ1M-CPU11-ETN
320 points	10K steps					CJ1M-CPU12-ETN
640 points	20K steps		19	1		CJ1M-CPU13-ETN

### HMI with Integrated Logic Controller and Built-In Ethernet Communications

Description	Display size	Resolution	Features	Model
NSJ series HMI with integrated logic, and I/O network controller <b>Note:</b> Models with built-in Ethernet do not support socket, FTP, or mail services. If these are required, order a plug-in NSJW-ETN21 Ethernet Unit and an NSJ without built-in Ethernet.	5.7-inch STN color LCD	320 x 240	Ethernet/USB/Serial programming/device ports, DeviceNet Master I/O port	NSJ5-SQ01B-G5D
	5.7-inch high-definition TFT color LCD			NSJ5-TQ01B-G5D
	8.4-inch high-definition TFT color LCD	640 x 480	Ethernet/USB/Serial programming/device ports DeviceNet Master I/O port, USB printer port	NSJ8-TV01B-G5D
	10.4-inch high-definition TFT color LCD			NSJ10-TV01B-G5D
	12.1-inch high-definition TFT color LCD			800 x 600

### NS-Series HMI Terminals with Built-In Ethernet

Description	Size	Resolution	Memory size	Model
Full system navigation HMI with 100BaseTX Ethernet	5-inch STN monochrome	320 x 240	20 MB onboard	NS5-MQ01B-V2
	5-inch STN			NS5-SQ01B-V2
	5-inch TFT			NS5-TQ01B-V2
	8-inch TFT	640 x 480	60 MB onboard	NS8-TV01B-V2
	10-inch TFT			NS10-TV01B-V2
	12-inch TFT			800 x 600

### Machine Vision Systems with Built-In Ethernet

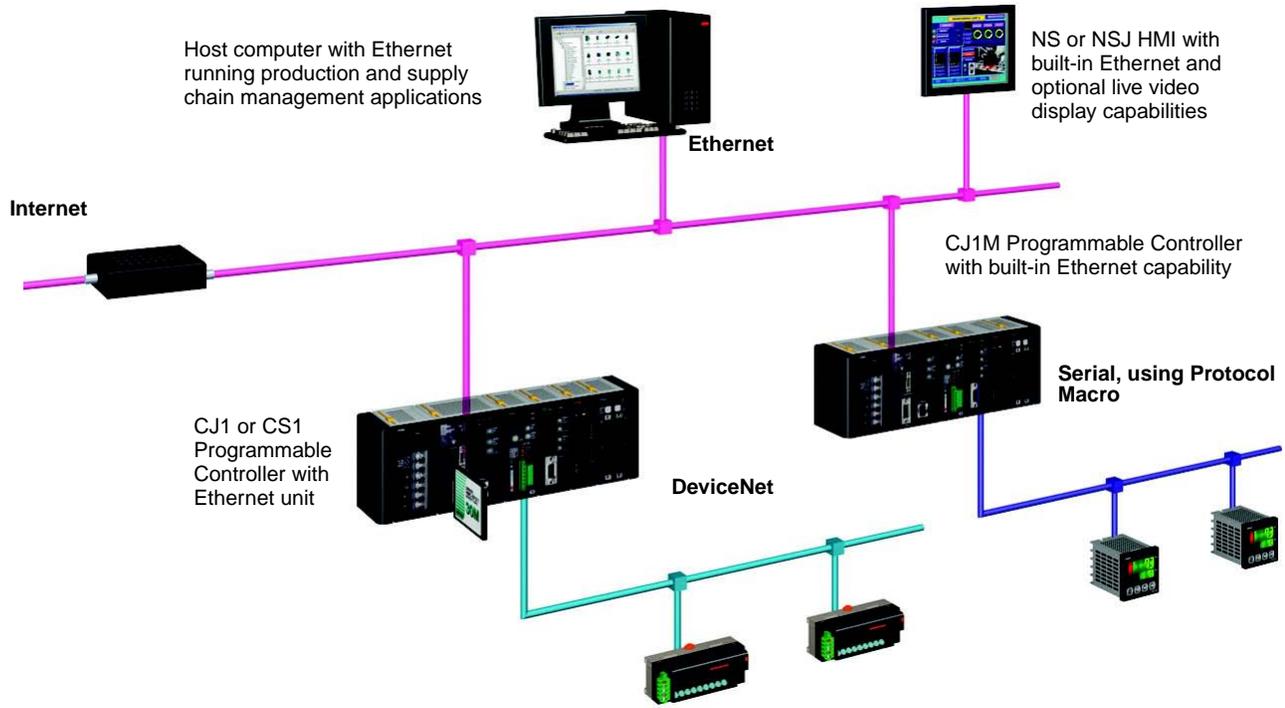
Description	Specifications	Dimensions	Model
High-speed vision sensor system	NPN input/output	198 H x 100 W x 134 D mm	F210-C10-ETN
	PNP input/output		F210-C15-ETN
High-resolution digital vision sensor system	NPN input/output		F500-C10-ETN
	PNP input/output		F500-C15-ETN

### Technical Documentation

Description	Model
Ethernet Unit Operation Manual	W343
CS/CJ Series Ethernet Unit Operation Manual: Ethernet Units Construction of Networks Operation Manual	W420
CS/CJ Series Ethernet Unit Operation Manual: Ethernet Units Construction of Applications Operation Manual	W421
CJ1M CPU Units with Ethernet Functions Operation Manual	W441
CS1D-ETN21D (100 Base-TX) Ethernet Units for CS1D PLCs Operation Manual	W430

**Note:** Ethernet Communication Cable, Belden (800-235-3361, [www.belden.com](http://www.belden.com))

# System Configuration



# WE70 AP/CL



## Wireless Ethernet Access Points and Clients

This wireless unit set supports world-standard IEEE802.11a/b/g: both 5GHz band in IEEE 802.11a and 2.4GHz band in IEEE 802.11b/g.

Connecting the wireless unit to a PLC via Ethernet allows wireless monitoring of facility information through the network as if it were a wired Ethernet connection.



## Capabilities

Standards	IEEE 802.11a	IEEE802.11b	IEEE 802.11g
Maximum speed	54 Mbit/s	11 Mbit/s	54 Mbit/s
Frequency band	5 GHz band	2.4 GHz band	2.4 GHz band
Modulation	OFDM	DS-SS	OFDM
Characteristics	<ul style="list-style-type: none"> <li>• 5 times higher in speed than 11b</li> <li>• Noise resistant</li> <li>• Less cross talk with other devices</li> <li>• All of 24 channels can be used at the same time</li> </ul>	<ul style="list-style-type: none"> <li>• Wide selection of products</li> <li>• Long communication distance</li> <li>• Can be used outdoors</li> <li>• Compatible with 11b</li> </ul>	<ul style="list-style-type: none"> <li>• 5 times higher in speed than 11b</li> <li>• Less vulnerable to obstacles</li> <li>• Long communication distance</li> <li>• Can be used outdoors</li> </ul>

## Ordering Information

Description	Specifications	Model
Access point	—	WE70-AP
Client	—	WE70-CL
Magnet-based antenna	2 pieces per set, 2.4 GHz/5 GHz dual-band	WE70-AT001
Flat diversity antenna	1 piece, 2.4 GHz	WT30-AT002
DIN rail mounting bracket	—	WT30-FT001 (for TH35-7.5) WT30-FT002 (for TH35-15)
Flat diversity antenna bracket	—	WT30-FT011

# Networking Solutions

# Ethernet/IP

Quick Link

K223

## High-speed, High-capacity Data Exchange through Data Links for Connectivity to Ethernet/IP I/O

The Ethernet/IP protocol supports implicit communications, which allows cyclic communications with Ethernet/IP I/O devices. Data can be exchanged at high speed between Controllers and devices, using high-volume tag sets of 722 words x 256 units or up to 184,832 words between PLCs.

### Tag Data Link (Cyclic Communications) Cycle Time

Tag data links (cyclic communications) can operate at the cyclic period specified for each application, regardless of the number of nodes. Data is exchanged over the network at the refresh cycle set for each connection, so the communications refresh cycle will not increase even if the number of nodes is increased, i.e., the synchronicity of the connection's data is preserved. Since the refresh cycle can be set for each connection, each application can communicate at its ideal refresh cycle. For example, a processes interlocks can be transferred at high speed while the production commands and the status monitor information are transferred at low speed.

**Note:** The communications load to the nodes must be within the Units' allowed communications bandwidth.

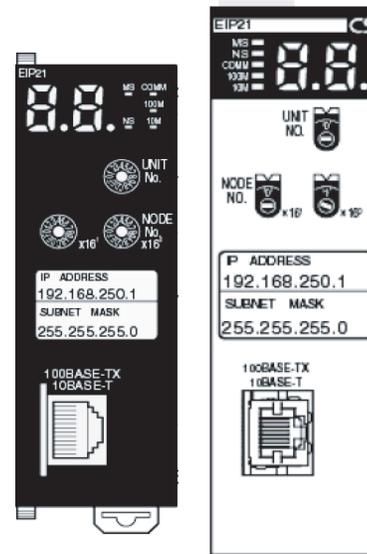
### Multi-vendor Communications with CIP Messages

Data can be exchanged with a variety of devices connected by Ethernet/IP because it supports the standard CIP (Common Industrial Protocol) message communications. This allows easy communication from an Omron PLC to other vendors Ethernet/IP PLCs.

### Communicating with FINS Messages (FINS/TCP and FINS/UDP)

Data can be exchanged with other OMRON FA devices using SEND, RECV, and CMND instructions from the ladder program, because Ethernet/IP supports OMRON's standard FINS message communications services. There are two kinds of message services, using UDP/IP and TCP/IP (called FINS/UDP and FINS/TCP), allowing flexible data exchange for different applications.

**Note:** There are no particular restrictions when sending FINS messages to OMRON Ethernet Units (CS1W-ETN21 or CJ1W-ETN21) in an Ethernet network.



### Network Connections with DeviceNet Devices

When a PLC has an Ethernet/IP Unit and DeviceNet Unit mounted, the PLC can be used as a gateway to exchange data with DeviceNet Devices through CIP messages.

### Network Connections with Controller Link

Mutual connections of Controller Link and Ethernet/IP are also supported (using the FINS communications service). The Controller Link connection allows a PLC on the Controller Link network to be monitored from a PLC on the Ethernet/IP network. Conversely, data can be exchanged with a PLC on the Ethernet/IP network from a PLC on the Controller Link network.

### Many Troubleshooting Functions

A variety of functions are provided to quickly identify and handle errors.

- Self-diagnosis at power ON
- PING command to check the connection with another node
- Error Log functions record the time of occurrence and other error details

## Ordering Information

### Ethernet/IP Modules

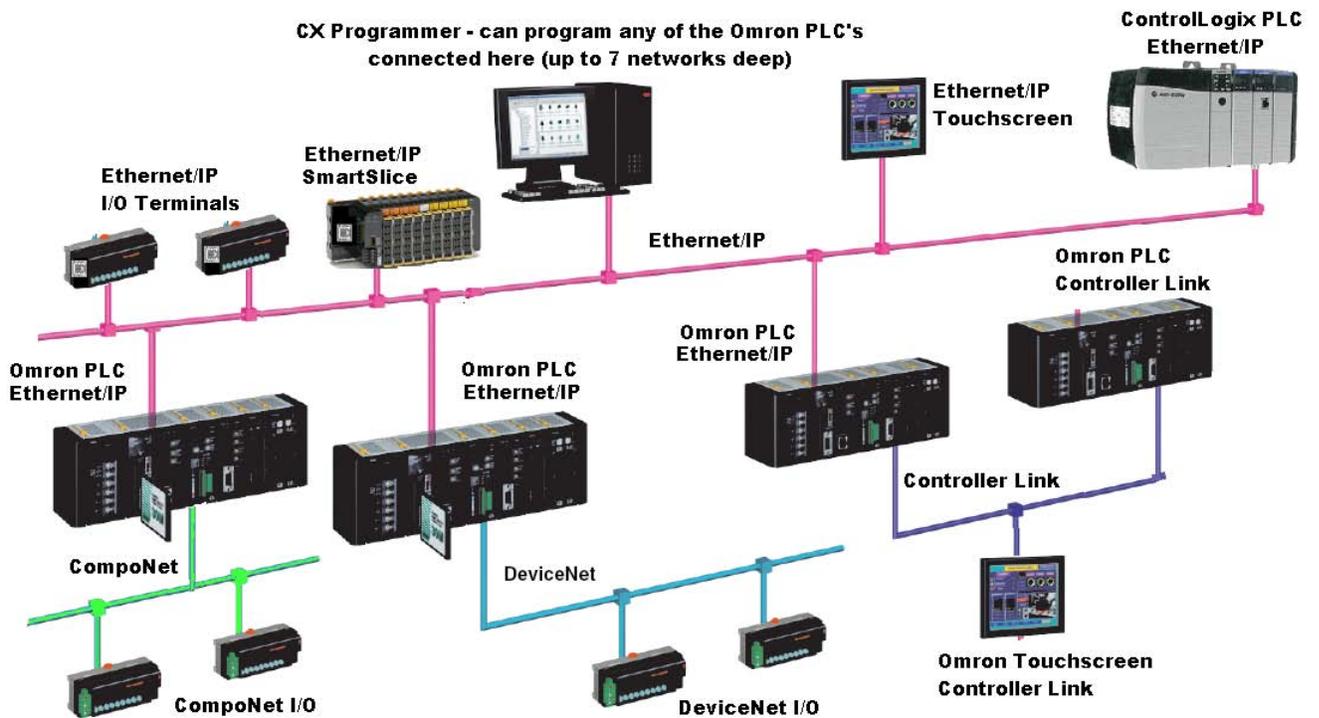
Applicable device	Description	Rating	Model
CJ1 PLC	Tag data link, CIP Msg, FINS/UDP, FINS/TCP	100 Mbps max. speed; 100 M distance; 256 max connections	CJ1W-EIP21
CS1 PLC			CS1W-EIP21

### Technical Documentation

Description	Model
Ethernet/IP Unit Operation Manual	W465

**Note:** Ethernet/IP Communications Cable, Belden (800-235-3361, [www.belden.com](http://www.belden.com))

## System Configuration



# ERT1

Quick Link  
K244

## IP67 Rated Ethernet/IP Remote I/O Terminals

- Remote I/O on Ethernet/IP for harsh environments and washdown
- Available in 16 points of digital inputs, outputs, or mixed I/O
- Save installation costs and wiring costs using these Omron solutions
- Visit Omron's website and use the Quick Link code for details



# Networking Solutions DeviceNet

## High-Speed Open Network for Plant Floor Automation

### Multi-Vendor, Multi-Bit Network

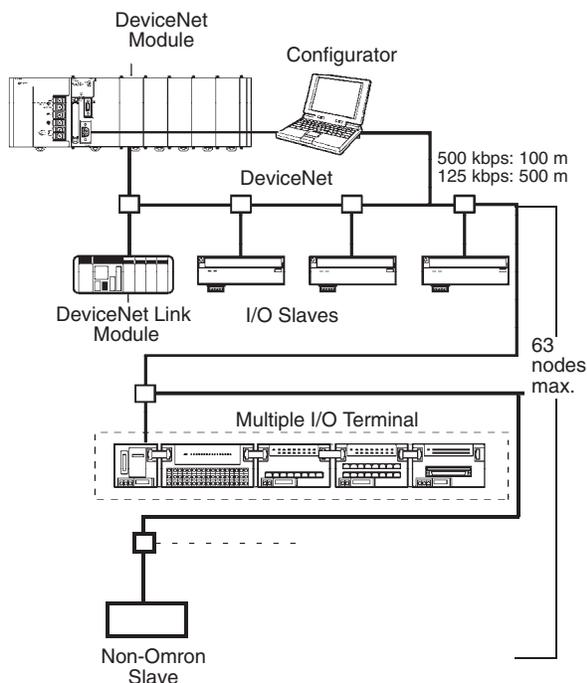
DeviceNet is an open vendor network optimized for applications that require control of I/O on factory floor machinery. Omron has developed an extensive offering of DeviceNet compatible products that reflect Omron's commitment to meeting two overriding operating performance principles:

1. intuitive operation and
2. ease of deployment

To accomplish these objectives, powerful features have been built into Omron's DeviceNet Master Modules-features not seen in DeviceNet Masters from other vendors. Omron's DeviceNet Master Modules provide the best possible DeviceNet performance while simplifying network setup and configuration. Omron also pioneered the DeviceNet Safety operational standards and developed a cost-effective way to network safety system and control system data using a single DeviceNet network.

As a founding member of ODVA (Open DeviceNet Vendor's Association), Omron has implemented DeviceNet in a manner that assures ease of use and deployment. In the list that follows, you will see that our DeviceNet master units offer powerful features not found in the DeviceNet masters from other vendors.

### System Configuration



### Highlights of Omron's DeviceNet Master Modules

- Automatic network enrollment and I/O allocation. Configuration tools are not required to set up, map and allocate the network into controller memory
- I/O allocation with basic devices can be created simply by turning ON a bit in the Omron's PLC using CX-Programmer software
- Omron DeviceNet Master has FINS communications protocol embedded for efficient routing of data, programming commands and messages
- Large buffer memory ensuring data integrity for explicit messaging. Omron's master has 200 words of buffer memory to ensure consistent data integrity
- Message handling capacity eliminates the need for any space between messages. Send FINS messages between Omron PLCs, and Explicit Messages between Omron PLCs and devices from other vendors

All of the above features provide the best possible DeviceNet performance while simplifying network setup and configuration. Omron's DeviceNet slaves are fully compatible with the latest standards to ensure open communication with legacy masters from other vendors. Wireless DeviceNet, an Omron exclusive combination of transmitter and receiver, opens many new networking possibilities. It removes the barriers of wires and fixed topologies, opening the door to distributed intelligence and more flexibility in the location of networked I/O.

# CS1W-DRM21/CJ1W-DRM21



## DeviceNet PLC-Based Master Modules

DeviceNet offers an open, device-level network optimized for applications that require control of I/O on factory floor machinery. Omron's DeviceNet Master Modules provide the best possible DeviceNet LAN performance while simplifying network setup and configuration.



## Capabilities

- Control up to 32,000 points (2,000 words) per master module
- Supports automatic allocation of up to 63 nodes without the need for Configurator software
- Up to 16 DeviceNet Master Modules can be mounted for each CPU (3 max. without Configurator)
- DeviceNet Master Modules support Poll, Bit-Strobe, COS, cyclic communications and explicit messaging
- Using DeviceNet Master Modules, setup files can be transferred from or downloaded to compact flash, allowing for switch on-site response
- No PLC CPU programming required for remote I/O communications and automatic data transfers between master and slaves
- DeviceNet Master Modules utilize Omron's FINS messaging allowing for peer-to-peer PLC message communications or remote programming and monitoring
- DeviceNet Master Modules can be used as both a master and slave simultaneously
- Use DeviceNet Configurator software for simple network setup and I/O allocation

## Ordering Information

Description	Compatible Omron PLC CPUs	Model
CS1 DeviceNet Master	CS1H-H CS1G-H CS1D-H	CS1W-DRM21-V1
CJ1 DeviceNet Master	CJ1M CJ1M-ETN CJ1-H	CJ1W-DRM21

## DeviceNet Communication Cable

Belden (800-235-3361, [www.belden.com](http://www.belden.com))

Part #

- 3082A PVC (Thick)
- 3082F High-Flex (Thick)
- 3082K CL2 (Flat)
- 3082KP Auxiliary Power (Flat)
- 3083A CPE (Thick)
- 3084A PVC (Thin)
- 3084F High-Flex (Thin)
- 3085A CPE (Thin)
- 7895A CL2 PVC (Cable III Mid)
- 7896A CL1 PVC (Type V Trunk Cable)
- 7897A CL1 PVC (Thick)
- 7900A CL1 Unshielded (Drop Cable IV)

# WD30



## Wireless DeviceNet I/O Link

Allocate Omron's Wireless DeviceNet units to any DeviceNet Master/Scanner and utilize wireless sub-network communications to remote DeviceNet slave devices up to 240 meters away.



## Capabilities

- 60 m line-of-sight wireless link, extendable up to 240 m (trunk link extension also support) utilizing additional wireless slave devices as wireless network repeaters
- Up to 64 wireless slave units can be allocated to each wireless master
- Connect up to 3,200 I/O (1600 in/1600 out) to each wireless master unit
- Utilize explicit messaging to remote DeviceNet slave devices connected to the wireless slave subnetwork to acquire parameter settings and send specific commands (i.e., read, write, etc.)

## Ordering Information

Description	Messaging capability	Antenna style	Model
Wireless DeviceNet Subnetwork Master Unit	With explicit messaging	Pencil style	WD30-ME
		Remote magnetic	WD30-ME01
Wireless DeviceNet Subnetwork Slave Unit	—	Pencil style	WD30-SE
		Remote magnetic	WD30-SE01
16 pt DC input slave (antennas not included)		Antennas not included	WT30-SID16
8 pt DC input and 8 pt NPN output slave			WT30-SMD16
8 pt DC input and 8 pt PNP output slave			WT30-SMD16-1
Magnet-based antennas (2 per set)	—		WT30-AT001
Flat diversity antenna			WT30-AT002
Pencil antenna (32 per set)			WT30-AT003
Antenna extension cable (2 m)			WT30-CA2M

# CX-One



## DeviceNet Network Configuration Software

Omron's powerful CX-Integrator software application configures network communications for DeviceNet as well as Ethernet, serial and Omron proprietary systems. The user-friendly GUI (graphical user interface) simplifies configuring slave devices and assigning memory. CX-Integrator launches from CX-One software.

- Use the interactive monitoring capability to identify the health of the network or to troubleshoot lost nodes
- Automatically or manually allocate PLC memory for each DeviceNet Slave device
- Easily configure Omron or third party DeviceNet slave devices
- Communicate and configure your network locally via serial communications or remotely via Ethernet communication



## Ordering Information

Description	Specifications	Model
CX-Integrator software	Windows® NT 4.0, 2000, XP, or Vista operating systems	Included in CX-One
DeviceNet Configurator software	Microsoft Windows 98 SE Microsoft Windows NT (Service Pack 6a) Microsoft Windows 2000 (Service Pack 3 or higher) or Microsoft Windows Me Microsoft Windows XP Microsoft Windows Vista (except 64-bit edition)	3G8E2-DRM21-EV1

# CPM2C-S



## Decentralized DeviceNet Controller

Modular, intelligent programmable DeviceNet slave that expands I/O both locally and over a flexible back-plane link, CompoBus/S.



## Capabilities

- 512 input bits and 512 output bits can be setup for remote I/O communication with the DeviceNet Master
- Up to 362 I/O (106 local I/O and 256 CompoBus/S I/O)
- Supports NT Link 1:1, Host Link, user-defined, and PL Link 1:1 protocols for connection to serial devices
- CPU has 10 built-in I/O points (6 inputs and 4 transistor outputs) includes:
  - 2 high-speed, interrupt inputs or 1 high-speed counter input
  - 2 high-speed pulse outputs
- Utilizes FINS communications for pass-through programming via the Omron DeviceNet network

## Ordering Information

Description	Outputs	Model
Modular PLC with CompoBus/S Master and DeviceNet Slave	NPN	CPM2C-S100C-DRT
	PNP	CPM2C-S110C-DRT

# E3X-DRT21S



## Sensor Block Communication Unit

Connect up to 16 sensors with this DeviceNet-ready communication unit. A wide range of sensor models can be grouped together to match application needs.



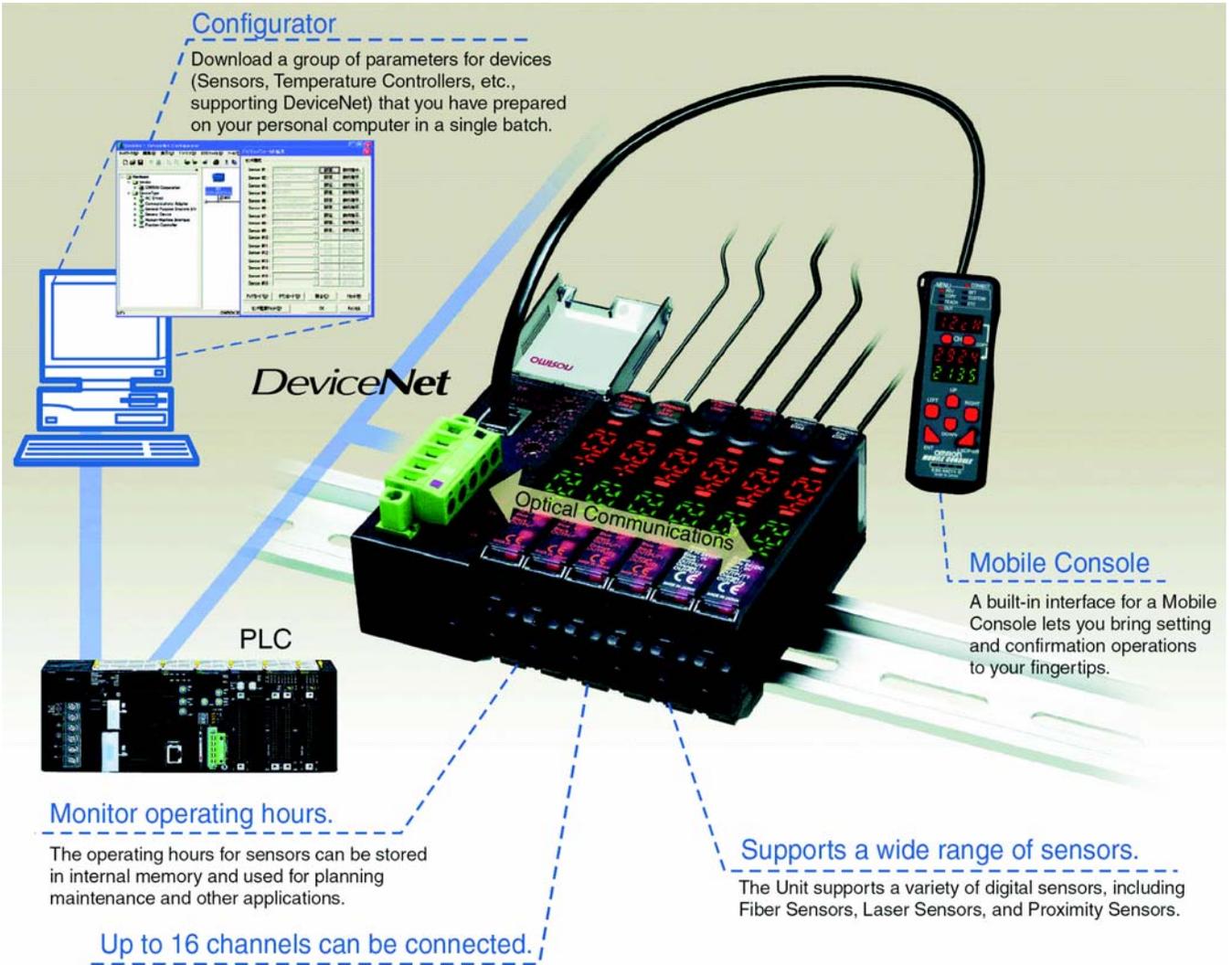
## Capabilities

- Remote setting, monitoring and operating through CX-Integrator software
- Supports explicit message communications
- Reduces wiring back to control cabinet
- Compatible sensors with connector-type amplifier units:
  - E3X-DA-S Series or E3X-MDA Series Digital Fiber-Optic Sensor Amplifier
  - E3C-LDA Series Laser Photoelectric Sensor with Separate Digital Amplifier
  - E2C-EDA High-resolution Digital Proximity Sensor with Separate Amplifier
- Use the E3X-CN02 Cordless Slave Connector for each sensor
- Mobile programming console for simple setting and monitoring locally
- Send ON/OFF signals and incident light levels to the host PLC without any need for programming (using the Remote I/O Communications Slave function)
- Threshold values and function settings can be read, written, or taught (using the Message Communications function)
- Device parameters prepared on a personal computer connected to the network can be downloaded in a batch operation using the configurator in CX-Integrator

## Ordering Information

Description	Specifications	Model
DeviceNet photoelectric sensor communication module	71.3 H x 30 W x 34.6 D mm	E3X-DRT21S
Cordless slave connector	Fits space saving connector models of sensor amplifiers	E3X-CN02

# Configuration



# R88A-DRT



## Servo DeviceNet Comm Unit

Install these optional DeviceNet Communications Units to provide open network compatibility for AC servo drives.



## Capabilities

- AC servo unit provides both DeviceNet communications and Position Control function
- Unifies management of all servo system operating information
- Both contribute to error prediction and diagnosis

## Ordering Information

Description	Inverter/servo drive series	Style	Model
DeviceNet communication units for servo drives	W-series servo drives (R88D-WT/WN)	Enclosed module	R88A-NCW152-DRT

# EJ1-DRT



## Multi-Loop Temperature and Process Controller DeviceNet Comm Unit



### Capabilities

- Up to 16 Temperature Controllers can be connected to a single DeviceNet Communications Unit.
- All of the parameters for the Temperature Controllers connected to the DeviceNet Communications Unit can be uploaded or downloaded in one operation.
- EJ1 features compact 2- and 4-loop control modules that enable construction of temperature control systems optimally suited to the application.
- Connection can be made to a Programmable Controller without any programming required, reducing the number of steps required in ladder programming design.
- One fully multi-input unit includes a thermocouple, platinum-resistance thermometer, and analog input for easy selection and reduced inventory requirements.

### Ordering Information

Description	Temperature controller series	Model
DeviceNet communication unit	EJ1, 2- and 4-loop modular controllers	EJ1N-HFUB-DRT

# E5ZN-DRT



## Multi-Loop Process Controller DeviceNet Comm Unit

The DeviceNet communications unit for modular E5ZN temperature controllers allows the user to monitor process values, write parameters and control operation.



## Capabilities

- Up to 16 E5ZN units (32 control loops) can be connected to one DeviceNet communications unit
- DeviceNet communications unit is able to exchange I/O data with the DeviceNet master/scanner
- Remote I/O communications can be set up without DeviceNet Configurator (when using Omron master unit)
- Support explicit message communications
- Automatic baud rate detection
- Supports a wide range of DeviceNet maintenance features (Smart Active Parts available for NS-series HMI)

## Ordering Information

Description	Temperature controller series	Model
DeviceNet multi-loop process control communications unit	E5ZN, 2-loop, socket-mount controllers	E5ZN-DRT-DC24

# E5□R-DRT/E5EK-DRT



## Process Controllers with Built-In DeviceNet

These process controllers have DeviceNet communications built in to simplify installation and maintenance. Omron E5□R series process controllers offer multi-loop control with high precision and very high-speed response. The E5EK process controller offers single-loop control.



## Capabilities

- 50 ms sampling response (E5□R); 250 ms temperature/100 ms analog (E5EK)
- 0.01°C high input temperature resolution (E5□R)
- 0.1% PV accuracy (E5□R); ±0.3%, ±1 digit max. (E5EK)
- Programmable using intuitive CX-Thermo software
- 8 banks store 8 PID sets for operational flexibility and quick changeover (E5□R)
- Position proportional control models support floating control and closed control
- Supports explicit message communications
- CompoWay/F serial communications commands are supported
- Configure DeviceNet using the CX-Integrator application in CX-One software
- Automatic baud rate detection

## Ordering Information

### Process Controllers

Description	Control loops	Output points	Output type	Model
1/4 DIN process controller	1	2	Pulse voltage (1)	E5AR-Q4B-DRT-AC100-240V
			Pulse voltage/current output (1)	E5AR-Q4B-DRT-AC24V
	2	4	Current (1)	E5AR-C4B-DRT-AC100-240V
			Current transfer output (1)	E5AR-C4B-DRT-AC24V
		4	Pulse voltage (1)	E5AR-QQ4W-DRT-AC100-240V
			Pulse voltage/current (2)	E5AR-QQ4W-DRT-AC24V
1/4 DIN position-proportional controller	1	2	Current (2)	E5AR-CC4WW-DRT-AC100-240V
			Relay output (1 open, 1 close)	E5AR-PR4F-DRT-AC100-240V
		3	Relay output (1 open, 1 close)	E5AR-PR4F-DRT-AC24V
1/8 DIN process controller	1	2	Current transfer output (1)	E5AR-PRQ4-DRT-AC100-240V
			Order output option boards separately	E5AR-PRQ4-DRT-AC24V
	2	2	Pulse voltage output control (1)	E5EK-AA2-DRT-500 AC100-240 (USA only)
			Pulse voltage/current output transfer (1)	E5EK-AA2-DRT AC100-240 (Canada only)
			Current output control (1)	E5ER-QTW-DRT-AC100-240V (USA only)
		Current output transfer (1)	E5ER-CTW-DRT-AC100-240V (USA only)	

## Control Output Units for E5EK-DRT

Install a maximum of two output units per controller.

Description	Specifications	Model
Relay	SPST, 5 A, 250 VAC	<b>E53-R</b>
SSR (solid state relay)	1 A, 75-250 VAC	<b>E53-S</b>
Voltage pulse	NPN, 12 VDC	<b>E53-Q</b>
	NPN, 24 VDC	<b>E53-Q3</b>
	PNP, 24 VDC	<b>E53-Q4</b>
Linear current	4 to 20 mA	<b>E53-C3</b>
	0 to 20 mA	<b>E53-C3D</b>
Linear voltage	0 to 10 VDC	<b>E53-V34</b>
	0 to 5 VDC	<b>E53-V35</b>

# V600-HAM42-DRT



## Intelligent Flag RFID System with DeviceNet

- Innovative RFID electronic flags replace mechanical flags and printed cards for applications from Kanban replenishment to quality control systems
- 32 input bits and 32 output bits are allocated for communication via DeviceNet
- Compact data carriers, read-only and read/write heads described in Track & Trace Solutions section
- Precise installation not required with transmission distance of 100 mm max.



## Ordering Information

Type	Power supply	Dimensions (H x W x D mm)	Input	Output	Model
Read/write (24-bit/16-bit)	18 to 26.4 VDC	69 x 65 x 63	2 input words in DeviceNet master	2 output words in DeviceNet master	V600-HAM42-DRT

# V680-HAM42-DRT Series



## V680-series DeviceNet-Compatible Slaves for RFID Systems Read and Write up to 58 Bytes

Next-generation RFID Systems with ISO/IEC 18000-3 (ISO/IEC15693) Compliance

- V680-series DeviceNet-compatible Slaves for RFID systems
- Includes a built-in amplifier, yet has a compact size of 65 x 65 x 65 mm; compatible with V680-series ID Tags and Antennas
- Read and write 4, 26, or 58 bytes of data
- Includes an Access Mode compatible with the V600-HAM42-DRT to enable the use of existing programs
- Complies with international standards, including CE, UL/CSA, and radio wave regulations. (Radio wave regulation compliance is applicable to Japan, Europe, the U.S.A., and Canada. Radio wave regulation compliance for China and South Korea is pending.
- Approval for UL/CSA is pending



## ID Controller

No. of connectable R/W Heads	Dimensions (H x W X D mm)	Transmission interface	Power Supply	Model
Square	 65 x 65 x 65 mm	DeviceNet slave	DC power supply	V680-HAM42-DRT

- Note:**
1. Attach an antenna to the V680-HAM42-DRT DeviceNet ID Slave to read and write V680 ID Tag data.
  2. The DeviceNet ID Slave can communicate with ID Tags that comply with ISO/IEC 18000-3 (ISO/IEC 15693) in addition to V680-series ID Tags. Communications with ID Tags other than V680-series ID Tags, however, may not be stable. Always check compatibility completely before using other ID Tags.
  3. Use a V680-HS51/-HS52 Antenna if the V680-D1KP52MT or V680-D2KF52M is to be embedded in metal. Communications cannot be performed if a V680-HS63 Antenna is used in combination with the V680-D1KP52MT or V680-D2KF52M. Communications cannot be performed if a V680-HS65 Antenna is used in combination with the V680-D1KP52MT or V680-D2KF52M.
  4. High temperature (200°C) storage.

# Networking Solutions

# GRT1

Quick Link  
K224

## SmartSlice I/O System for DeviceNet and Profibus-DP

Omron's new SmartSlice I/O system is compact, intelligent and easy to use. When combined with Omron's CS1/CJ1 DeviceNet master units, no configuration tool is required. By using built-in functions such as pre-scaling, totalizing, differentiation and alarming in analog I/O units, PLC programming can be minimized. Preventive maintenance data can be accessed using CX-Integrator software, standard PLC function blocks or NS-series Smart Active Parts.

- Most compact I/O in the market-just 80 mm high
- Easy setup, backup and restore functions
- Diagnostics and preventive maintenance data at I/O level
- Detachable terminal blocks allow hot-swapping without re-wiring
- 3-wire connection with "push-in" technology requires no screwdriver for installation



## Built-In Maintenance Features Provide Predictive Monitoring

### Maintenance Data Logging Minimizes Downtime

All SmartSlice I/O units autonomously collect and store the information that will help you plan machine maintenance. Timely detection of reduced performance will minimize unplanned downtime and keep machine performance fast and reliable.

- Each unit remembers its last maintenance date: maintenance personnel can check per unit if there have been any replacements or repairs.
- A descriptive comment can be entered per node, per unit, even per I/O point. This can help you troubleshoot a machine without having to know PLC-internal tag names or programs.
- All communication that is required passes through multiple network layers without any special PLC programming to gather or store the data.

### Early-Warning System Prevents Breakdowns

Every SmartSlice unit has its own built-in early-warning functions, enabling you to schedule maintenance and prevent breakdowns. Warnings include:

- Supply voltage out of safe range – e.g. due to damaged cable or poor connection
- Preset maintenance interval exceeded – which can be a time interval or a target number of operations, to indicate that an inspection of (electro-) mechanical parts is required

- Maximum allowed delay between two I/O signals is exceeded – to indicate that wear or lack of lubrication is causing a machine to work slower than intended

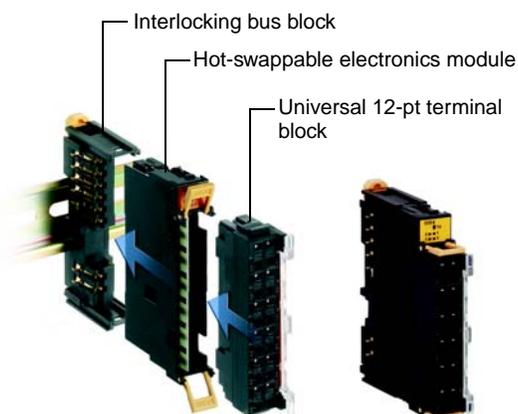
### Convenient Access to Warning Information

These warnings would be useless if you cannot easily find the underlying cause. Omron provides several convenient ways to access the information, with little or no PLC programming:

- Directly from the network maintenance view of CX-One
  - By using Smart Active Parts on the NS-series HMIs
  - By using predefined Function Blocks in the PLC
- Transparent message routing built into Omron devices makes sure that you can reach them all through a single connection. Device status and preventive maintenance data are readily accessible.

## Reliable 3-Piece Construction

All SmartSlice modules have a 3-piece construction:



Interlocking bus blocks build the backplane of the system. The electronics module and removable terminal block plug into the backplane, enabling you to:

- Replace electronic modules while the bus structure and field wiring stay intact. During hot-swapping, all other I/O units continue to operate
  - Detach I/O terminals for pre-wiring, maintenance or testing
- All contact surfaces between the electronics module and connectors are gold-plated for 100% reliable connections.

## Ordering Information

### Network Interface Units

Description	Specifications	Width	Connection type	Model
DeviceNet interface unit	Supports up to 64 I/O units. Integrated I/O power supply terminals	58 mm	Open-style DeviceNet connector	GRT1-DRT
PROFIBUS-DP interface unit			9-pin D-sub PROFIBUS-DP connector	GRT1-PRT

### SmartSlice I/O Units

Description	Specifications	Width	Connection type	Model
4 NPN inputs	7 mA, 24 VDC; 3-wire connection NPN-type signal	15 mm	Push-in screwless	GRT1-ID4
4 PNP inputs	7 mA, 24 VDC; 3-wire connection PNP-type signal			GRT1-ID4-1
4 NPN outputs	500 mA, 24 VDC, 2-wire connection; sinking (NPN type) outputs			GRT1-OD4
4 PNP outputs	500 mA, 24 VDC, 2-wire connection; sinking (PNP type) outputs			GRT1-OD4-1
2 relay outputs	2 A, 240 VAC normally-open contacts			GRT1-ROS2
100 kHz counter/positioner with NPN outputs	A/B/Z encoder input (line driver or 24 V selectable) 1 control input + 2 NPN outputs			GRT1-CT1
100 kHz counter/positioner with PNP outputs	A/B/Z encoder input (line driver or 24 V selectable) 1 control input + 2 PNP outputs			GRT1-CT1-1
2 thermocouple inputs	Type B, E, J, K, L, R, S, T, U, W, PLII selectable; $\pm 0.3\%$ of PV or $\pm 0.8$ C accuracy 250 ms conversion time			GRT1-TS2T
2 PT100 inputs	PT100/JPT100 selectable $\pm 0.3\%$ of PV or $\pm 1.0$ C accuracy 250 ms conversion time			GRT1-TS2P
2 analog inputs, current/voltage	-10 to +10 V, 0 to 10 V, 0 to 5 V, 1 to 5 V, 0 to 20 mA, 4 to 20 mA			GRT1-AD2
2 analog outputs, voltage	10 to +10 V, 0 to 10 V, 0 to 5 V, 1 to 5 V 1/6000 resolution; 2 ms conversion time			GRT1-DA2V
2 analog outputs, current	0 to 20 mA, 4 to 20 mA, 1/6000 resolution; 2 ms conversion time			GRT1-DA2C

## 8 Point I/O Modules

Model	GRT-OD8	GRT1-OD8-1	GRT1-OD8G-1
Signal type	Transistor output (NPN type, sinking)	Transistor output (PNP type, sourcing)	Transistor output (PNP type, sourcing), with short-circuit protection
Number of points	8 outputs		
Power terminals	4 x V (24 V)	4 x G (0 V)	
Rated voltage	24 VDC (20.4 to 26.4 VDC)		
Rated output current	500 mA max. /point		
Residual voltage	1.2 VDC max. [at 500 mA]		
Leakage current	0.1 mA max.		
ON delay / Off delay	0.5 / 1.5 ms max.		

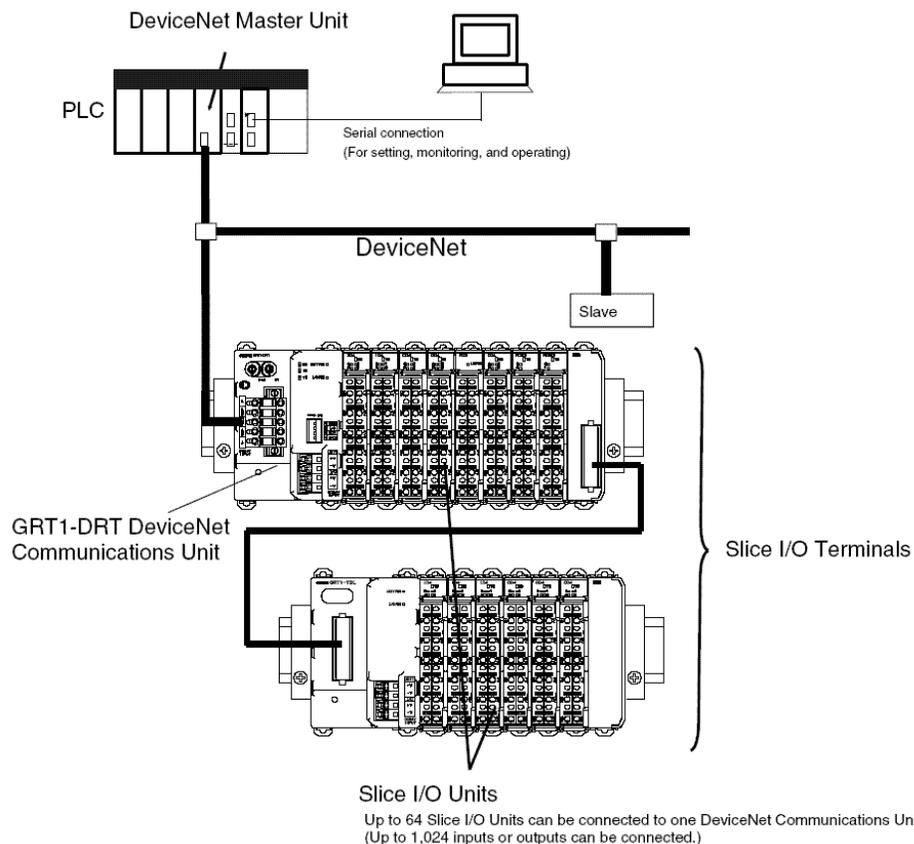
## Expansion

Description	Width	Connection type	Model
I/O power feed unit; separates power supply between groups of I/O units	15 mm	Push-in screwless	GRT1-PD2
Turnback unit, right-hand side	19.5 mm		GRT1-TBR
Turnback unit, left-hand side	58 mm		GRT1-TBL
Turnback cable, max. 2 per DeviceNet station	1 m length		GCN2-100
End plate, one unit required per bus interface	19.5 mm		GRT1-END

## PLC Master Units

Description	Model
DeviceNet Master Unit for CS1-series PLCs	CS1W-DRM21
DeviceNet Master Unit for CJ1-series PLCs	CJ1W-DRM21
Profibus-DP Master Unit for CS1-series PLCs	CS1W-PRM21
Profibus-DP Master Unit for CJ1-series PLCs	CJ1W-PRM21

## SmartSlice I/O System Configuration



# DRT2

Quick Link  
K234

## DeviceNet Smart Slaves

Omron's DRT2 Smart DeviceNet Slaves offer diagnostic intelligence within the slave module. These diagnostic capabilities support an easy-to-use interactive maintenance focus that reduces network setup and startup time; provides a preventative maintenance focus to ensure no loss in production up-time; and provides a predictive maintenance focus to isolate and repair any network problems.



## Capabilities

- Use Configurator software to access diagnostic information from DRT2 slave devices
- Access diagnostic status information within the connected PLC without the need for Configurator software. Display bit status information on a panel or through CX-Programmer
- Fully utilize the maintenance focus of the modules by displaying all diagnostic information using Smart Active Parts within Omron's NS-Series HMIs
- Modules automatically collect and report data useful in preventive maintenance including these:
  - Automatic baud rate detection
  - Network power voltage
  - Last maintenance date storage
  - The naming of each smart slave device
  - The naming on connected devices
  - A contact operation counter
  - Many others to improve production

## Ordering Information

Type	Description	Inputs	Outputs	Model
General-purpose I/O slaves	Digital inputs	16, NPN	—	DRT2-ID16
		16, PNP		DRT2-ID16-1
	Digital outputs	—	16, NPN	DRT2-OD16
			16, PNP	DRT2-OD16-1
	Digital input expansion unit	—	8, NPN	XWT-ID08
			8, PNP	XWT-ID08-1
			16, NPN	XWT-ID16
			16, PNP	XWT-ID16-1
	Digital output expansion unit	—	8, NPN	XWT-OD08
			8, PNP	XWT-OD08-1
16, NPN			XWT-OD16	
16, PNP			XWT-OD16-1	
Relay outputs	—	16	DRT2-ROS16	
3-tier slave devices with independent commons	Digital inputs	16, NPN	—	DRT2-ID16TA
		16, PNP		DRT2-ID16TA-1
	Digital outputs	—	16, NPN	DRT2-OD16TA
			16, PNP	DRT2-OD16TA-1
	Mixed inputs and outputs	8, NPN	8, NPN	DRT2-MD16TA
		8, PNP	8, PNP	DRT2-MD16TA-1

## Ordering Information (Continued)

Type	Description	Inputs	Outputs	Model
Mil-style connector slave devices	Digital inputs	32, NPN	—	DRT2-ID32ML
		32, PNP		DRT2-ID32ML-1
	Digital outputs	—	32, NPN	DRT2-OD32ML
			32, PNP	DRT2-OD32ML-1
	Mixed inputs and outputs	16, NPN	16, NPN	DRT2-MD32ML
16, PNP		16, PNP	DRT2-MD32-ML-1	
Input slave with self-clamping terminals	Digital inputs	16, NPN	—	DRT2-ID16S
		16, PNP		DRT2-ID16S-1
Analog slave devices	Analog input, current or voltage, selectable	4	—	DRT2-AD04
	High resolution analog input, current or voltage, selectable			DRT2-AD04H
	Analog output, current or voltage, selectable	—		2
Temperature input slave devices	Thermocouple inputs	4	—	DRT2-TS04T
	Platinum resistance thermometer inputs			DRT2-TS04P
IP67 rated, environment resistant slave devices	Digital inputs	8, NPN	—	DRT2-ID08C
		8, PNP		DRT2-ID08C-1
		16, NPN		DRT2-HD16C
		16, PNP		DRT2-HD16C-1
	Digital outputs	—	8, NPN	DRT2-OD08C
			8, PNP	DRT2-OD08C-1
Screwless clamp terminal with transistors	Input units without detection	32, NPN	—	DRT2-ID32SL
		32, PNP		DRT2-ID32SL-1
	Output units without detection	—	32, NPN	DRT2-OD32SL
			32, PNP	DRT2-OD32SL-1
	Mixed inputs and outputs without detection	16, NPN	16, NPN	DRT2-MD32SL
		16, PNP	16, PNP	DRT2-MD32SL-1
	Input units with detection	32, NPN	—	DRT2-ID32SLH
		32, PNP		DRT2-ID32SLH-1
	Output units with detection	—	32, NPN	DRT2-OD32SLH
			32, PNP	DRT2-OD32SLH-1
	Mixed inputs and outputs with detection	16, NPN	16, NPN	DRT2-MD32SLH
		16, PNP	16, PNP	DRT2-MD32SLH-1

# Networking Solutions

# CompoNet

Quick Link

K227

## CS/CJ-Series CompoNet Master Units with the Industry's Top-Class Performance and Functions

- Control up to 2,560 points and 384 nodes with one Master Unit
- Settings are easy. Slave Units automatically detect and use the baud rate set on the Master Unit
- Intuitive memory mapping with separate areas for Word Slave Units and Bit Slave Units
- Seven-segment display helps with startup and enables prompt detection of problems
- Remote I/O communications and message communications are both supported



## Ordering Information

Applicable PLC	Maximum control points	Specifications	Model
CS Series	2,560	Master function	CS1W-CRM21
CJ Series			CJ1W-CRM21

## Master Unit Specifications

Item	Model	CS1W-CRM21	CJ1W-CRM21
Applicable PLC		All CS-series PLCs	All CJ-series PLCs
Unit classification		CS-series Special I/O Unit	CJ-series Special I/O Unit
Current consumption (Power supplied from PLC's Power Supply Unit)		400 mA max. at 5 VDC	
Weight		190 g max. (Master Unit only)	130 g max. (Master Unit only)
Communications power supply connector		One communications power supply connector for Slave Units and Repeater Units on the trunk line when using Flat Cable <b>Note:</b> The Master Unit does not required communications power.	
Communications power supply connector allowable current capacity		5 A max.	
Maximum number of mountable Master Units		One word number assigned: 80 Units Two word numbers assigned: 48 Units Four word numbers assigned: 24 Units Eight word numbers assigned: 12 Units	One word number assigned: 40 Units Two word numbers assigned: 40 Units Four word numbers assigned: 24 Units Eight word numbers assigned: 12 Units
Mounting location		According to CS/CJ-series Special I/O Unit specifications.	
Communications power ON/OFF monitoring		The ON/OFF status of the communications power supply can be detected at the communications power supply connector.	
Noise immunity		Conforms to IEC 61000-4-4 2kV (applied to PLC power supply)	
Vibration resistance		10 to 150 Hz	
Shock resistance		150 m/s <sup>2</sup>	
Dielectric strength		500 VAC (between isolated circuits)	
Insulation resistance		20 MΩ min. (between isolated circuits)	
Ambient operating temperature		0 to 55° C	
Ambient operating humidity		10 to 90% (no condensation)	
Ambient operating atmosphere		No corrosive gases	
Storage temperature		-20 to 75° C	

## CompoNet Network Specifications

Communications method	ODVA-standard CompoNet protocol
<b>Types of communications</b>	Remote I/O communications (programless, constant sharing of data with Slave Units) and message communications (explicit message communications as required with Slave Units and FINS message communications as required with PLCs)
<b>Baud rate</b>	4 Mbits/s (See note.), 3 Mbits/s, 1.5 Mbits/s, 93.75 kbits/s <b>Note:</b> A baud rate of 4 Mbits/s is not supported for branch lines and thus cannot be used for Slave Units with cables (i.e., Bit Slave Units).
<b>Error control</b>	Manchester code rules, CRC
<b>Communications media</b>	The following media can be used. <ul style="list-style-type: none"> <li>• VCTF 2-conductor cable (JIS C 3306, 2-conductor)</li> <li>• Standard flat cable (DCA4-4F10)</li> <li>• Sheathed flat cable (DCA5-4F10)</li> </ul> <b>Note:</b> VCTF 2-conductor cable, Standard Flat Cable, and Sheathed Flat Cable are all different types of cable. To use more than one type of cable, they must be separated on the trunk line and a sub-trunk line or on different sub-trunk lines.
<b>Maximum I/O capacity</b>	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total) CompoNet Communication Cable, Belden (800-235-3361, <a href="http://www.belden.com">www.belden.com</a> )
<b>Maximum number of nodes</b>	Word Slave Units: 64 input nodes and 64 output nodes Bit Slave Units: 128 input nodes and 128 output nodes
<b>Bits allocated per node address</b>	Word Slave Units: 16 bits Bit Slave Units: 2 bits
<b>Maximum number of nodes without Repeater Units (One trunk line or sub-trunk line)</b>	32 nodes 384 nodes with repeater units
<b>Repeater Unit application conditions</b>	Up to 64 repeater units can be connected per network (i.e., per Master Unit). Up to 32 repeater units can be connected per trunk line or per sub-trunk line. When repeater units are connected in series from the Master Unit, up to two extra segment layers can be created (i.e., up to 2 repeater units are allowed between a Slave Unit and the Master Unit).
<b>Communications power supply voltage</b>	24 VDC $\pm$ 10%

# Digital I/O Slave Units CRT1-□D16(-1)

## Simple and Intelligent Expandable I/O Slave Units

- Simplify startup with the communications power supply monitor (Smart function)
- Collect various preventive maintenance data required to improve productivity, such as information on equipment deterioration due to aging and equipment operating time data (Smart function)
- The communications baud rate is set without using switches and addresses are set using rotary switches, so setting errors are reduced
- Communications connector and removable I/O terminal block enable maintenance without disconnecting wiring



## Ordering Information

### Basic Units

Name	Appearance	Specifications			Communications cables			Model
					VCTF 2-conductor cables	Standard flat cable I	Sheathed flat cable II	
Two-tier screw terminal block		Inputs	16 inputs	NPN	Yes	Yes	Yes	CRT1-ID16
				PNP				CRT1-ID16-1
		Outputs	16 outputs	NPN				CRT1-OD16
				PNP				CRT1-OD16-1
Screw terminal block with relay outputs		Outputs	16 outputs	Contacts				CRT1-ROS16 <i>NEW</i>
Three-tier screw terminal block		Inputs	16 inputs	NPN	Yes	Yes	Yes	CRT1-ID16TA <i>NEW</i>
				PNP				CRT1-ID16TA-1 <i>NEW</i>
		Outputs	16 outputs	NPN				CRT1-OD16TA <i>NEW</i>
				PNP				CRT1-OD16TA-1 <i>NEW</i>
		Inputs/outputs	8 inputs and 8 outputs	NPN				CRT1-MD16TA <i>NEW</i>
				PNP				CRT1-MD16TA-1 <i>NEW</i>
Digital I/O slave units with connectors		Inputs	16 inputs	NPN	Yes	Yes	Yes	CRT1-ID16S <i>NEW</i>
Outputs	16 outputs			NPN				CRT1-ID16S-1 <i>NEW</i>
				PNP				CRT1-OD16S <i>NEW</i>
CompoNet Digital I/O slaves with clamp terminals		Inputs	16 inputs	NPN	Yes	Yes	Yes	CRT1-OD16S-1 <i>NEW</i>
				PNP				CRT1-ID16SL <i>NEW</i>
		Outputs	16 outputs	NPN				CRT1-ID16SL-1 <i>NEW</i>
PNP	CRT1-OD16SL <i>NEW</i>							
								CRT1-OD16SL-1 <i>NEW</i>

**Note:** Check with factory for UL status

## Analog I/O Slave Units

Name	Appearance	Specifications		Communications cables			Model
				VCTF 2-conductor cables	Standard flat cable I	Sheathed flat cable II	
Analog I/O slave units		Analog inputs	4 inputs	Yes	Yes	Yes	CRT1-AD04
		Analog outputs	2 outputs				CRT1-DA02

**Note:** Check with factory for UL status

## Expansion Units

Name	Appearance	Specifications				Model
Expansion units		Inputs	8 inputs	NPN	One expansion unit can be mounted to each Digital I/O slave with a 2-tier screw terminal block	XWT-ID08
				PNP		XWT-ID08-1
		Outputs	8 outputs	NPN		XWT-OD08
				PNP		XWT-OD08-1
		Inputs	16 inputs	NPN		XWT-ID16
				PNP		XWT-ID16-1
		Outputs	16 outputs	NPN		XWT-OD16
				PNP		XWT-OD16-1

**Note:** Check with factory for UL status

# IP20 Bit Slave Units with e-CON Connectors

## CRT1B-□D02S(-1)

### Simple and Intelligent Slave Units for Bit-Level Distribution

- Industry-standard e-CON connectors
- Mount the Unit on the guide rail vertically or horizontally using a special bracket
- Short-circuit protection safeguards the network from I/O short circuits
- The communications baud rate is set without using switches and addresses are set using rotary switches, so setting errors are reduced
- Smart functions provide support for effective maintenance and monitoring device operation status



## Ordering Information

I/O classification	Internal I/O common	I/O capacity	I/O terminals	Internal circuit power supply	Rated I/O power supply voltage	Model
Input	NPN (⊕ common)	2 points	Industry Standard e-CON Connectors	Supplied along with communications power	Supplied along with communications power (24 VDC)	CRT1B-ID02S
	PNP (⊖ common)					CRT1B-ID02S-1
Output	NPN (⊖ common)					CRT1B-OD02S
	PNP (⊕ common)					CRT1B-OD02S-1

# IP54 Bit Slave Units w/e-CON Connector or Screwless-clamp Terminal Block

## CRT1B-□D0□SP(-1)/MD04SLP(-1)

### Simple and Intelligent Bit Slave Units that Resist Dust and Splashing

- IEC 60529 protection enables bit-level distributed installation without control boxes
- Lineup of models with industry-standard e-CON connectors or clamps simplifies wiring
- Short-circuit protection safeguards the network from I/O short circuits
- The communications baud rate is set without using switches and addresses are set with rotary switches, so setting errors are reduced
- Smart functions provide support for effective maintenance and monitoring device operation status



## Ordering Information

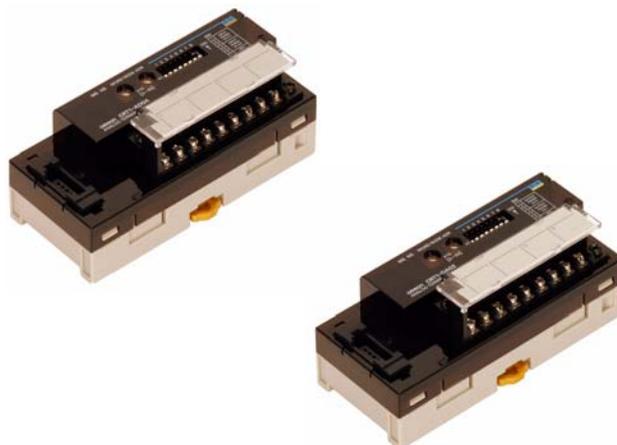
I/O classification	Internal I/O common	I/O capacity	I/O terminals	Internal circuit power supply	Rated I/O power supply voltage	Model			
Input	NPN (⊕ common)	2 points	Industry Standard e-CON Connectors	Supplied along with communications power	Supplied along with communications power (24 VDC)	CRT1B-ID02SP			
	PNP (⊖ common)					CRT1B-ID02SP-1			
Output	NPN (⊖ common)	4 points				Screw-less clamp terminal block	Supplied along with communications power	Supplied along with communications power (24 VDC)	CRT1B-OD02SP
	PNP (⊕ common)								CRT1B-OD02SP-1
Input	NPN (⊕ common)	2 inputs and 2 outputs				Screw-less clamp terminal block	Supplied along with communications power	Supplied along with communications power (24 VDC)	CRT1B-ID04SP
	PNP (⊖ common)								CRT1B-ID04SP-1
Input and output	NPN (input: ⊕ common/ output: ⊖ common)	2 inputs and 2 outputs	Screw-less clamp terminal block	Supplied along with communications power	Supplied along with communications power (24 VDC)	CRT1B-MD04SLP			
	PNP (input: ⊖ common/ output: ⊕ common)					CRT1B-MD04SLP-1			

## Analog I/O Slave Units

# CRT1-AD04/DA02

### Simple and Intelligent Analog Slave Units Perform a Variety of Analog Processing Internally

- Smart functions provide support for effective maintenance and monitoring device operation status
- Analog processing equivalent to digital panel meters is supported, such as with scaling, peak/bottom hold, top/valley hold, and comparator functions
- Use deviation and cumulative counter functions for analog calculations, such as for equipment error prediction and flowrate
- Communications connector and removable I/O terminal block enable maintenance without disconnecting wiring



## Ordering Information

I/O classification	I/O capacity	Model
Analog input	4 inputs	<b>CRT1-AD04</b>
Analog output	2 outputs	<b>CRT1-DA02</b>

## Repeater Unit

# CRS1-RPT01

- Expand the network by branching lines or extending the trunk line
- Expand the network to up to 1,500 m using two segment layers of Repeater Units (baud rate: 93.75 kbits/s)
- Increase the number of connected nodes



## Ordering Information

Specification	Model
Repeater Unit	<b>CRS1-RPT01</b>

## Manuals

Cat. No.	Products	Model	Name	Type
W456	Master Units	CS1W-CRM21, CJ1W-CRM21	CS1W-CRM21/CJ1W-CRM21 CompoNet Master Units	Operation Manual
W457	Slave Units	CRT1 Series	CompoNet CRT1 Series CRT1-ID16(-1)/OD16(-1), CRT1B-ID/OD/MD□□□(-1), CRT1-AD04/DA02 Slave Units and CRS1-RPT01 Repeater Unit	Operation Manual

# Networking Solutions Profibus-DP



## High-Speed Open Network for Plant Floor Automation

Profibus-DP (PROcess Field BUS — Decentralized Periphery) is a vendor-independent, open fieldbus standard for a wide range of applications in manufacturing, process and building automation. Vendor independence and transparency of operation are guaranteed by the Profibus standard EN50170. With Profibus, devices of different manufacturers can communicate without special interface adjustments.



## Ordering Information

### Profibus-DP Master and Slave Modules

Item	Description	Specifications	Model
Profibus-DP Master for CJ1	Master unit provides data exchange, diagnostics and message communications	40 nodes max. per PLC; 12 Mbps; 1200 m distance; shielded twisted pair cable	CJ1W-PRM21
Profibus-DP Master for CS1		125 nodes max. per PLC; 12 Mbps; 1200 m distance; shielded twisted pair cable; allows 7,168 words of I/O data per PLL; one RS-485 port	CS1W-PRM21
Profibus-DP intelligent slave for CJ1	Data link to any PLC data area; shows status information overview in host PLC, plus extensive diagnostics via Profibus	Max. 180 words data exchanged; up to 100 words each of input and output; one RS-485 port	CJ1W-PRT21
Profibus-DP intelligent slave for CS1			C200HW-PRT21
Profibus-DP I/O Link module for CPM1A and CPM2A	Exchanges I/O status	Max. 16 inputs and 16 outputs	CPM1A-PRT21
Profibus-DP Communications unit for Multiple I/O	Connects to a maximum of 8 GT1 Multiple I/O Units	Use GT1 Multiple I/O below	PRT1-COM
I/O Unit connecting cable	Connects Multiple I/O modules together and to Communications unit (PRT1-COM)	1 m	GCN1-100
Configuration Software	Set up Omron Profibus-DP nodes and monitor system	—	CX-One Software

## Multiple I/O Units for PRT1-COM

Unit	Type	Inputs	Outputs	I/O connection type	Model	
					NPN	PNP
Basic I/O	Transistor inputs	16	—	M3 terminal block	GT1-ID16	GT1-ID16-1
				Molex connector; GCN1-MX25B	GT1-ID16MX	GT1-ID16MX-1
				Fujitsu ribbon style	GT1-ID16ML	GT1-ID16ML-1
				D-Sub 25 pin connectors	GT1-ID16DS	GT1-ID16DS-1
				High density Fujitsu	GT1-ID32ML	GT1-ID32ML-1
	Transistor outputs	—	16	M3 terminal block	GT1-OD16	GT1-OD16-1
				Molex connector; GCN1-MX25B	GT1-OD16MX	GT1-OD16MX-1
				Fujitsu ribbon style	GT1-OD16ML	GT1-OD16ML-1
				D-Sub 25 pin connectors	GT1-OD16DS	GT1-OD16DS-1
				High density Fujitsu	GT1-OD32ML	GT1-OD32ML-1

Unit	Type	Inputs	Outputs	I/O connection type	Model
Basic I/O	Relay outputs	—	8	M3 terminal block	GT1-ROP08
			16		GT1-ROS16
Special I/O	Analog inputs	4	—	Molex connector, GCN1-MX25B	GT1-AD04
		8			GT1-AD08MX
	Analog outputs	—	4	M3 terminal block	GT1-DA04
				Molex connector, GCN1-MX25B	GT1-DA04MX
	Counter unit	1	—	M3 terminal block	GT1-CT01
	Temperature inputs	4 RTD	—	M3 terminal block	GTTS04P
		4 T/C			GT1-TS04T

## Technical Documentation

Description	Model
CS1/CJ1 Profibus-DP Master Unit operation manual	W409
CJ1W-PRT21 Profibus-DP Slave Unit operation manual	W408
C200H Profibus-DP Master Unit operation manual	W349
C200HW-PRT21 Profibus-DP Slave Unit operation manual	W901
Profibus-DP Multiple I/O Terminal operation manuals	W900

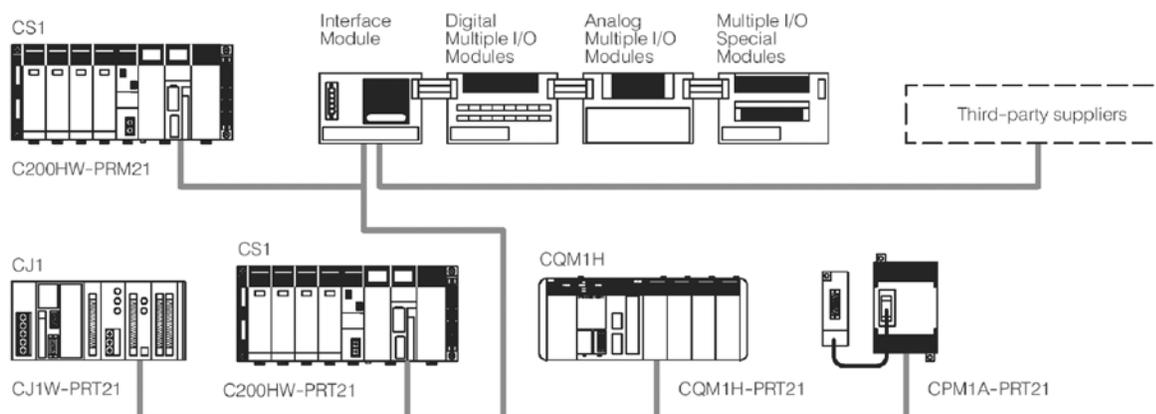
## Profibus Communication Cable

Belden (800-235-3361, www.belden.com)

Part #

- 3079A 22 AWG 300V Twinax
- 3079E 22 AWG 300V Twinax, Flex Version

## Profibus-DP System Configuration



## Networking Solutions

## Controller Link

Quick Link  
K228**Omron Deterministic Peer-to-Peer Network**

Omron's low-cost Controller Link peer-to-peer network complements Ethernet by providing access to mission critical information while not disturbing the timing or execution of the main control system. It was designed specifically to handle large data transfers in applications with these requirements:

- Large amounts of information can be transferred from controller to controller automatically, and/or by using specific commands
- You will utilize a supervisory system that will be constantly updated as it coordinates the output from one manufacturing cell to the next
- Timing will be deterministic so that performance is repeatable



Controller Link options (left to right): PCI bus personal computer boards (3G8F7-CLK-□3-E), wired link unit for CS1 PLC (CS1W-CLK23), fiber-optic link unit for CS1 PLC (CS1W-CLK53) and wired link unit for CJ1 PLC (CJ1W-CLK23)

**Features****Basic Functionality**

- Data Link service — large, user defined amounts of shared memory is instantaneously updated in all the other connected controllers
- Messaging service that can transmit data between specific nodes on specified events using simple ladder instructions
- Connect CJ1 series, CS1 series, CVM1, CV, CQM1H, C200HX/HG/HE PLCs, and NS and NSJ HMI's simultaneously (32 nodes max.) to a max. distance of 1 km @ 500 Kbps baud rate
- Shielded twisted-pair (STP) or optical fiber units available (Optical fiber connections have a high tolerance for noisy environments)
- Complete error correction and troubleshooting functions.
- Set communications parameters using CX-Programmer software (part of CX-One)
- Total number of data link words in one network: 32,000 words (64,000 bytes) max.

**CS1-□3 Controller Link Models**

- Connect up to 62 nodes total utilizing repeater units
- Transmit up to 1.5 km at 2 Mbps baud rate using STP cables and STP repeater units
- Complete error correction and troubleshooting functions
- 1:N unequal allocation of data link possible using CX-Programmer v3.2 or greater
- Data link allocation can be changed while data link is running
- Number of data link words per module: 12,000 words (24,000 bytes) max.

**PCI Controller Link Support Board**

- Number of data link words in one PCI module: 32,000 words (64,000 bytes) max.
- Direct communication to controller link layer using CX-Programmer software

## Ordering Information

### Controller Link PLC Modules

Type	Protocols	Rating	Ports/media	Unit class	Connection type	Current consumption	Model
Controller Link	Omron proprietary; data links and message communications between PLCs and computers; includes support software	2 Mbps max. speed; 1 km distance; 62 nodes (using repeater units); up to 4 units can be mounted to a CPU rack or expansion	Shielded twisted pair cable	CPU bus unit	2-wire screw + ground	0.33 A, 5 VDC	<b>CS1W-CLK23</b>
			Optical HPCF fiber cable		2 x HPCF connector	0.52 A, 5 VDC	<b>CS1W-CLK13</b>
			Optical graded-index (GI) fiber cable		4 x ST connectors	0.65 A, 5 VDC	<b>CS1W-CLK53</b>
			Shielded twisted pair cable		2-wire screw + ground	0.35 A, 5 VDC	<b>CJ1W-CLK23</b>

### Controller Link Computer Network Service Boards (NSBs)

Type	Protocols	Rating	Ports/media	Connection type	Model
Controller Link PCI board	Personal computer board using Omron propriety network; includes support software	2 Mbps max. speed; 1 km distance; 62 nodes (using repeater units)	Special twisted pair	PCI plus 2-wire screw + ground	<b>3G8F7-CLK23-E</b>
			Optical HPCF fiber cable	PCI and HPCF connectors	<b>3G8F7-CLK13-E</b>
			Optical graded-index (GI) fiber cable	PCI and ST connectors	<b>3G8F7-CLK53-E</b>
Controller Link Repeater unit	Repeats signal to expand network and extend distance	—	Special twisted pair	Screw-Screw	<b>CS1W-RPT01</b>
			Optical HPCF fiber cable	Screw-HPCF connector	<b>CS1W-RPT02</b>
			Optical graded-index (GI) fiber cable	Screw-ST connector	<b>CS1W-RPT03</b>

### Controller Link Interface Units for HMIs

Applicable model	Description	Specifications	Connection	Model
NS HMIs	Establishes HMI as a node for Controller Link communications Attaches to port on back of HMI	2 Mbps max. speed; 1.5 km distance; 62 nodes (using 2 repeater units)	Shielded twisted pair cable	<b>NS-CLK21</b>
NSJ HMIs with integrated logic and I/O network controller				<b>NSJW-CLK21-V1</b>

### Controller Link Communication Cable

Belden (800-235-3361, [www.belden.com](http://www.belden.com))

Part #

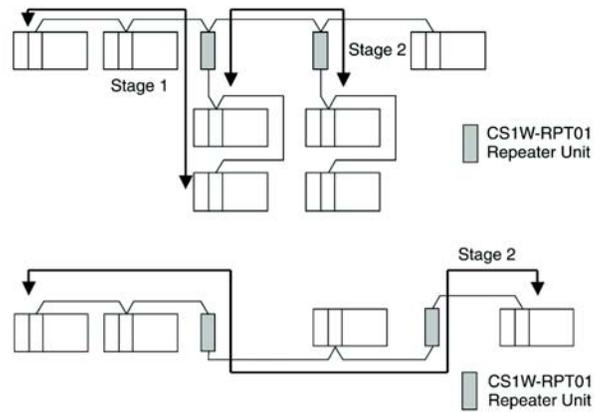
- 9207 Twinax
- 89207 Twinax, 200°C, Plenum
- 9815 Twinax, 100 Ohm, Direct Burial
- 3073F 600V Tray Cable, Twinax

### Technical Documentation

Description	Model
Controller Link Units CS1W-CLK/CJ1W-CLK/C200HW-CLK/CVM1-CLK Operation Manual	<b>W309</b>
CS1W-CLK1□ (H-PCF Cable) Optical Ring Controller Link Units Operation Manual	<b>W370</b>
Controller Link Support Board for PCI Bus (Twisted pair) Operation Manual	<b>W383</b>
Controller Link Support Board for PCI Bus (Optical Ring, H-PCF Cable) Installation Guide	<b>W388</b>
3G8F7-CLK12-EV1, 3G8F7-CLK21-EV1, 3G8F7-CLK52-EV1 Controller Link Support Board for PCI Bus Installation Guide	<b>W422</b>

## Controller Link System Configuration

Utilizing repeater units with Controller Link units, the number of network nodes can increase to a maximum of 62. Based on design needs, there are multiple network layouts possible. In order for all nodes to be active in the network, no more than 2 repeater units must be passed for any node to reach any other node.



# Networking Solutions Serial

## Simple-to-Use, PLC Interfaces for Control Device Communications

- Add or expand serial communications capabilities on PLCs
- Simplify communication setup for serial devices using Protocol Macro application in CX-One software
- Wireless serial communications up to 100 m between a PC and PLC available
- No ladder programming needed with CompoWay/F simple serial interface



## Ordering Information

### Serial Communications Modules for Programmable Controllers

- Mount up to 16 modules to increase the number of serial ports (RS-232C or RS-422A/485) two at a time on CPU or Expansion Racks
- Up to 32 additional serial port connections with protocol setting for each port; specify Protocol Macros, Host Link Communications, or 1:N NT Links for HMIs
- CS1 serial communications inner boards can be mounted in the CPU to maximize use of available I/O module capacity
- Block style CPM1A and CPM2A and modular CPM2C use a peripheral port adapter to enable serial communications

Ports	Protocols	Connection type	Installation	Model
RS-232C x 2	CompoWay-F, Host Link, NT Link 1:N, Modbus master (ASCII and RTU), Modbus-RTU slave, user-defined	9-pin D-sub	CPU bus unit for rack	CJ1W-SCU21-V1
RS-422/RS-485 x 2				CJ1W-SCU31-V1
RS-232C x 1 and RS-422/RS-485 x 1				CJ1W-SCU41-V1
RS-232C x 2	CompoWay-F, Host Link, NT Link 1:N, Modbus master (ASCII and RTU), Modbus-RTU slave, user-defined		Option board for CPU	CS1W-SCB21-V1
RS-232C x 1 and RS-422/RS-485 x 1				CS1W-SCB41-V1
RS-232C x 2				CS1W-SCU21-V1
RS-422/RS-485 x 2			CPU bus unit for rack	CS1W-SCU31-V1

### Protocol Macros Software

- Protocol Macros lets you easily create protocols for data exchange with external devices and execute with one instruction
- Standard protocols for Omron temperature/process controllers, panel meters, bar code readers, encoders, etc. are built into Protocol Macros
- Use CX-Protocols Windows®-based software to create protocols for any non-Omron device

Software name	Description	Quantity	Model
CX-Protocol	Performs data transfers with OMRON components using standard system protocols with serial communications modules. Creates data transfers with non-Omron components by defining parameters in CX-Protocol using a serial communications module	1 license	CXONE-AL01C-EV□

**Note:** The box next to EV indicates the current version of software (2, 3, 4, etc.)

## Simple Serial Interface Between Omron PLCs and Temperature and Process Controllers

Eliminate the need for ladder programming to transfer data between Omron temperature controllers, digital panel meters and programmable controllers. These interface units automatically handle present value inputs to the PLC and settings output to the discrete controller via the Data Memory area of the PLC's CPU.

Item	Features	Compatible PLCs	Model
CompoWay/F serial interface modules	RS-232C x 1 and RS-422/485 x 1 ports connect up to 32 units to one PLC	CS1, CJ1, CQM1H, CPM2A	CJ1W-CIF21
		CPM2C	CPM2C-CIF21

## Wireless Bluetooth Serial Communications for PLCs

- Program and monitor your CJ1/CS1 series PLCs at 115kbps over a wireless Bluetooth connection, with no cable between your PC and PLC
- The PROMI-SD205-OA serial to wireless Bluetooth adapter connects directly to a CJ1/CS1 PLC 9-pin RS-232 port
- With the USB to Bluetooth adapter for your PC, the transmission range is up to 100m as standard

Description	Model
Serial to wireless Bluetooth converter, for CJ1/CS1 PLC 9-pin RS-232 serial port, 100 m range	PROMI-SD205-OA
USB to Bluetooth adapter, 100 m range	MITSUMI-USB-BT

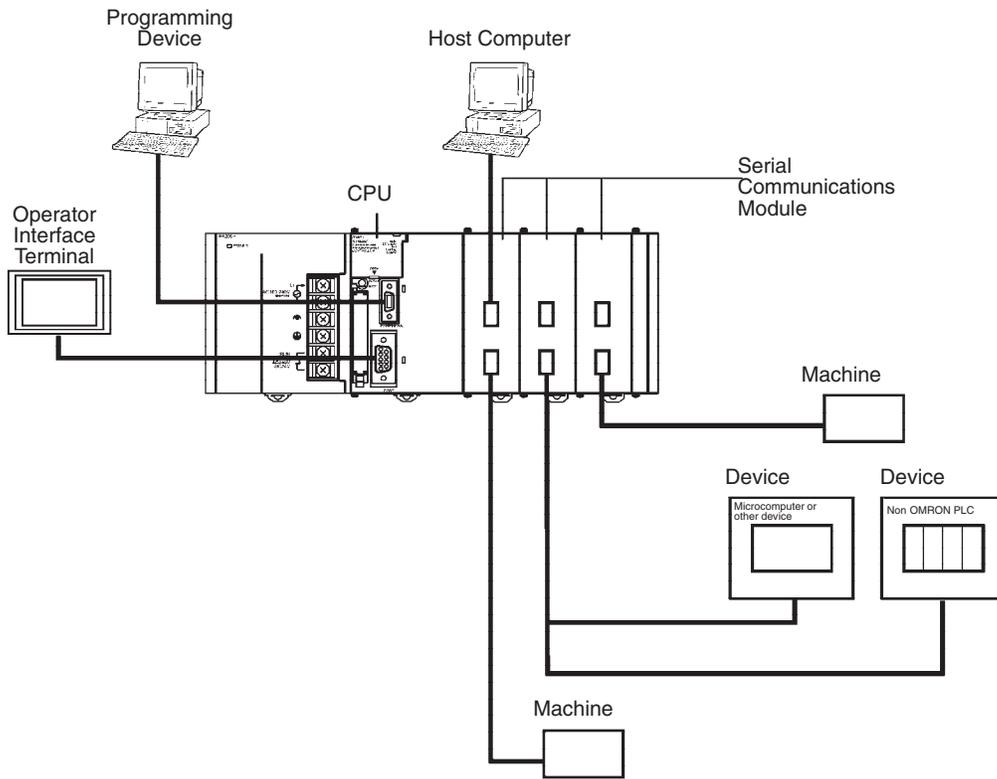
## Adding Serial Ports to PLCs and HMIs

Item	Features	Compatible devices	Model
Adapters for serial communications	Converts peripheral port to RS-232C serial port	CPM1A, CPM2A PLCs	CPM1-CIF01
	Converts peripheral port to RS-422 serial port	CPM1A, CPM2A PLCs	CPM1-CIF11
	Converts mini-peripheral port to RS-232C serial port	CPM2B, CPM2C PLCs	CPM2C-CIF01-V1
	Converts mini-peripheral port to RS-422/485 and RS-232C serial ports	CPM2C PLCs	CPM2C-CIF11
	Converts mini-peripheral port to RS-422 serial port	CPM2C PLCs	CPM2C-CIF21
	RS-232C to RS-422 adapter	HMIs and PLCs	NT-AL001
	RS-422/485 adapter enables monitoring of multiple PLCs; 500 m total transmission distance	NS, NSJ and NT21 HMIs	NS-AL002
	RS-422A adapter enables monitoring of multiple PLCs; 50 m total transmission distance	NS and NSJ HMIs	CJ1W-CIF11
	Converts USB to RS-232 C; 0.5 m cable length	NS HMIs	CS1W-CIF31
	Converts DeviceNet to RS-232C	PLCs and HMIs	DRT1-232C2
RS-232C serial cable, 2 m cable length	PLCs and HMIs	C200H-CN229-EU CBL-202 in Canada	

## Technical Documentation

Description	Model
CS/CJ Series CS1W-SCB21/SCB41 serial communications boards CS1W-SCU21, CJ1W-SCU21, CJ1W-SCU31 and CJ1W-SCU41 serial communications units operation manual	W336
CJ Series CJ1W-CIF21 simple communications unit operation manual	W400

# System Configuration



# WT30

Quick Link  
K243

## Wireless Serial I/O Transmitter

- WT30 Serial Master Station collects ON/OFF data using wireless communications and is connected to I/O Slave Stations
- Serial Master Station provides an RS-232C interface to a personal computer or PLC
- I/O Slave Stations can be used with WD30 DeviceNet wireless master
- Easily check wireless communications status from indicator display
- Height of 90 mm and DIN Rail mounting enables installation in control panels
- Conforms to FCC part 15.247 (USA) and international standards
- Use a Class 2 power supply to conform to UL standards: Omron's S8VS or S82K



## Ordering Information

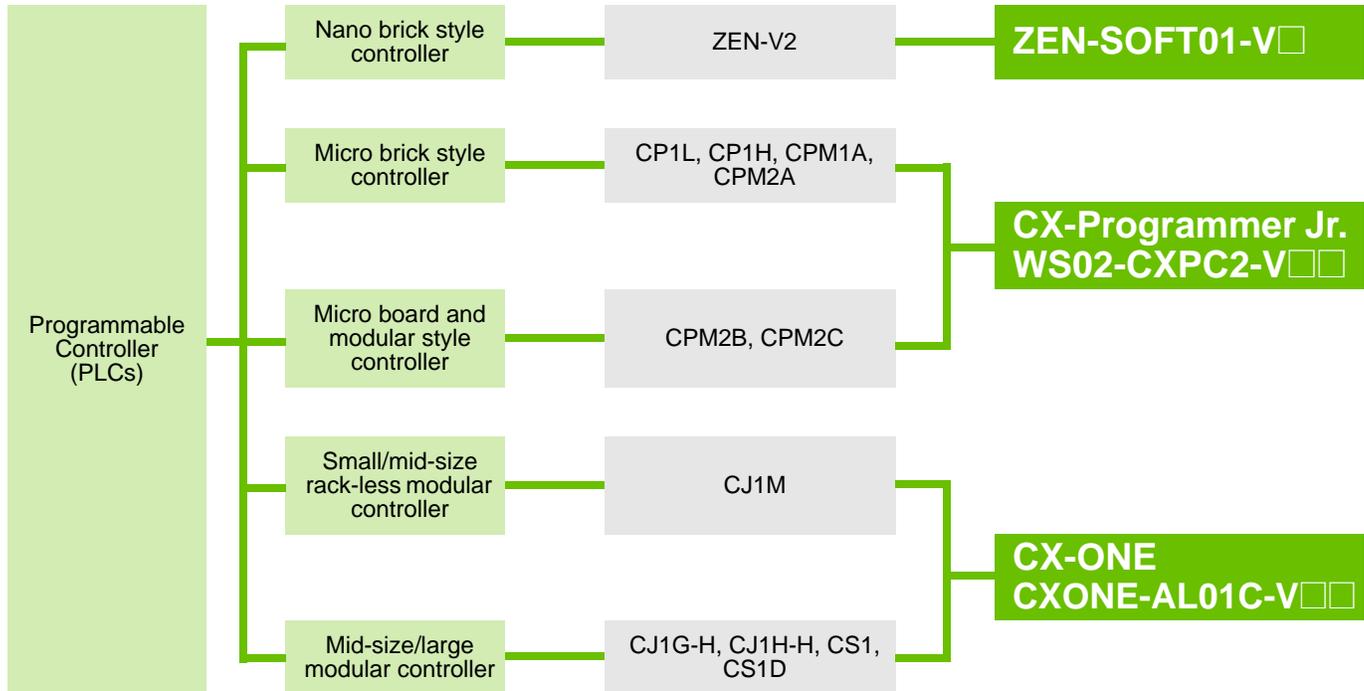
Description	Model
Serial Master, RS-232C (antennas not included)	WT30-M01-FLK
16 pt DC input slave (antennas not included)	WT30-SID16
8 pt DC input and 8 pt NPN output slave (antennas not included)	WT30-SMD16
8 pt DC input and 8 pt PNP output slave (antennas not included)	WT30-SMD16-1
Magnet-based antennas (2 per set)	WT30-AT001
Flat diversity antenna (1 per set)	WT30-AT002
Pencil antenna (2 per set)	WT30-AT003
Antenna extension cable (2 m)	WT30-CA2M

## Contents

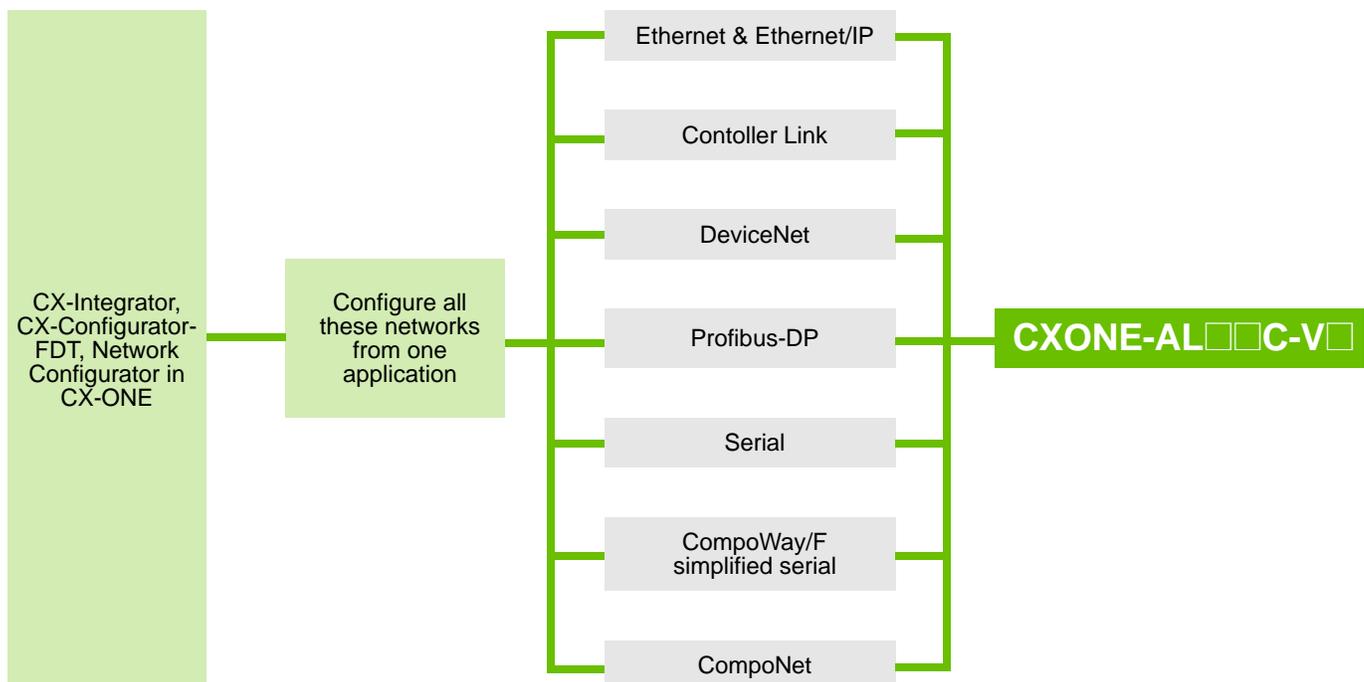
<b>Selection Guide</b>		D-ii
<b>Programming/Setup Software</b>		
<b>CX-ONE</b>	One software for whole machine setup, operation, monitoring and resetting	D-1
<b>CX-Programmer Jr.</b>	Setup and monitoring for Micro and Small PLCs	D-19
<b>CX-Configurator-FDT</b>	Configure Profibus-DP networks	D-21
<b>CX-Thermo</b>	Set-up and monitoring for temperature controllers	D-24
<b>NTST Software</b>	HMI project design, monitoring and operation for NT-Series terminals	D-26
<b>CX-ServerOPC</b>	OPC client/server HMI development tool	D-27
<b>SCADA</b>	Process monitoring HMI development tool	D-29

## Selection Guide

### PLC Programming, Monitoring Software

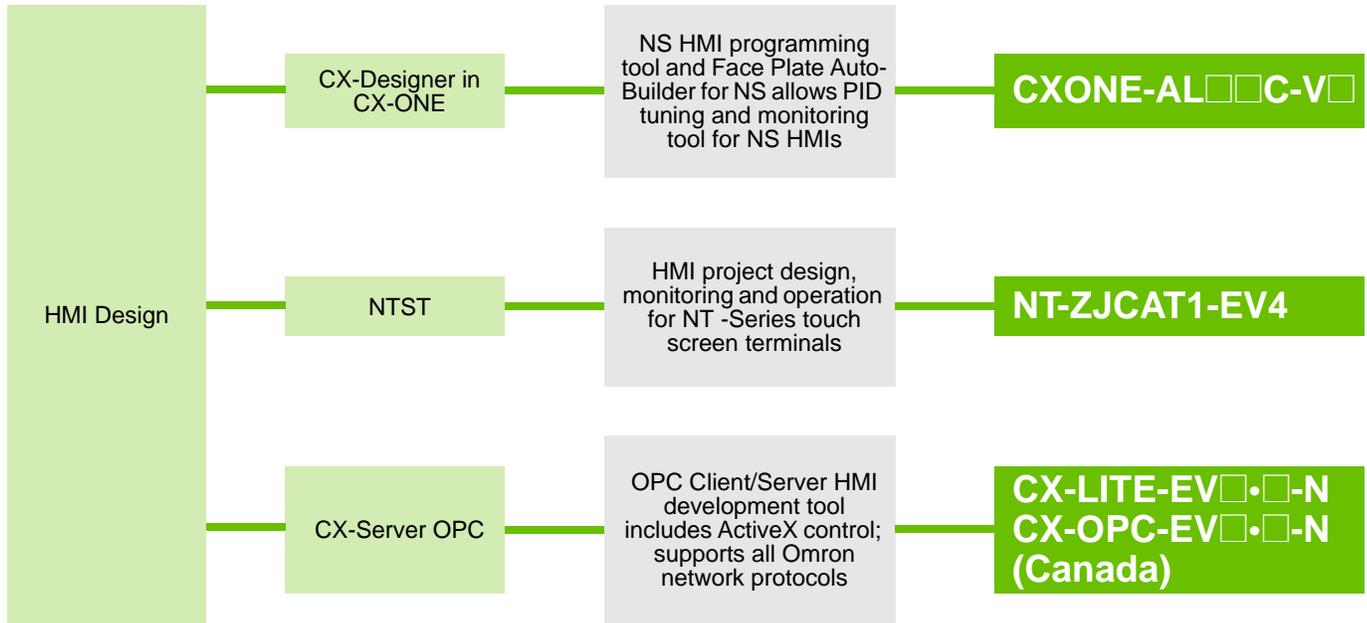


### Network Configuration Software



## Selection Guide

### HMI Design, Monitoring, and Control Software



## Selection Guide

# Software CX-ONE

Quick Link  
L422

One Software for Your Complete Machine



## Simplify Automation Tasks to Achieve Continuous Improvement

Designed to make total machine integration a reality, Omron's Smart Platform approach enables complete machine and plant automation from one single platform. Complex machines can be developed, commissioned, and maintained, without worrying about integration of various software, communications, and fieldbuses. It enables users to mix and match their preferred solutions. Driven by the need to make connectivity as simple and flexible as possible, Omron's Smart Platform provides seamless connectivity of sensing, control, motion, and temperature devices. The Smart Platform is built around CX-One software that offers three major advantages:

### One Software

CX-One provides a single programming and configuration environment that enables the user to build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors. This fully integrated software package reduces the complexity of configuration so automation systems can be programmed or configured with minimal training.

## One Connection

One connection point — direct serial, Ethernet, or modem connection — lets you fully access settings, programs and configurations from all the “Smart Platform” devices used on your machine. You can upload and download all programs, settings, comments, fieldbus configurations, HMI and intelligent device configurations in a matter of minutes. This allows remote access or servicing of your complete machine.

## One Minute

Accomplish more in less time! One-minute “Plug & Work” functionality simplifies programming and configuration to drag-and-drop object selection and adding application-specific parameters. CX-One’s pre-tested Function Block libraries and Smart Active Parts encapsulate hours of expert programming. It allows you to create and store new objects and function blocks, too. Control system and HMI programming, configuration, and testing that previously took hours or days can be accomplished in minutes!

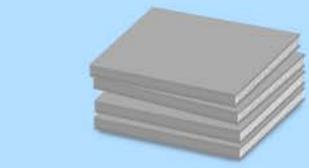
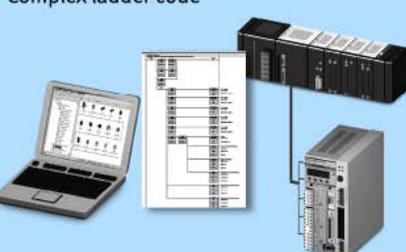
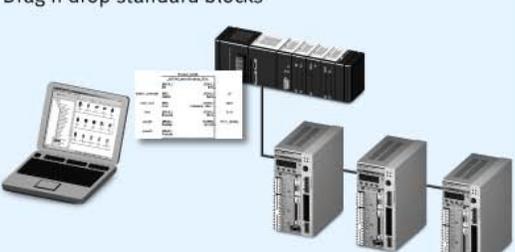
## What’s in CX-One?

How many software packages do you need? With Omron, it’s only one. Omron’s CX-One software includes all these tools:

Software tool	Description
CX-Programmer	PLC programming tool
CX-Integrator	Network configuration tool for Serial, CompoWay/F, Controller Link, DeviceNet and Ethernet
CX-Simulator	PLC & HMI simulation tool for testing, debugging programs and projects
CX-Designer	NS HMI programming tool
CX-Motion	PLC-based “-MC” series motion control programming tool
CX-Motion-NCF	Position programming tool for MechatroLink II communications
CX-Motion-MCH	Motion programming tool for MechatroLink II communications
CX-Position	PLC-based “-NC” position control module programming tool
CX-Protocol	Serial device protocol programming tool
CX-Process Tool	Process PLC programming and monitoring tool
Face Plate Auto-Builder for NS	PID tuning and monitoring tool for NS HMIs
CX-Thermo	Temperature controller programming tool
Switch Box	Utility for setting and monitoring PLC I/O
CX-Server	Communications Middleware tool
CX-Drive	Drive Configuration and Monitoring tool
CX-FLnet	FL-Net Configuration and Monitoring tool
CX-ConfigurationFDT	Profibus DP and DP-V1 Configuration and Monitoring tool
CX-Trajexia	Trajexia software to configure the Trajexia controller
Network Configuration for Ethernet/IP	Ethernet/IP configuration tool

## Continuously Improving Your Results

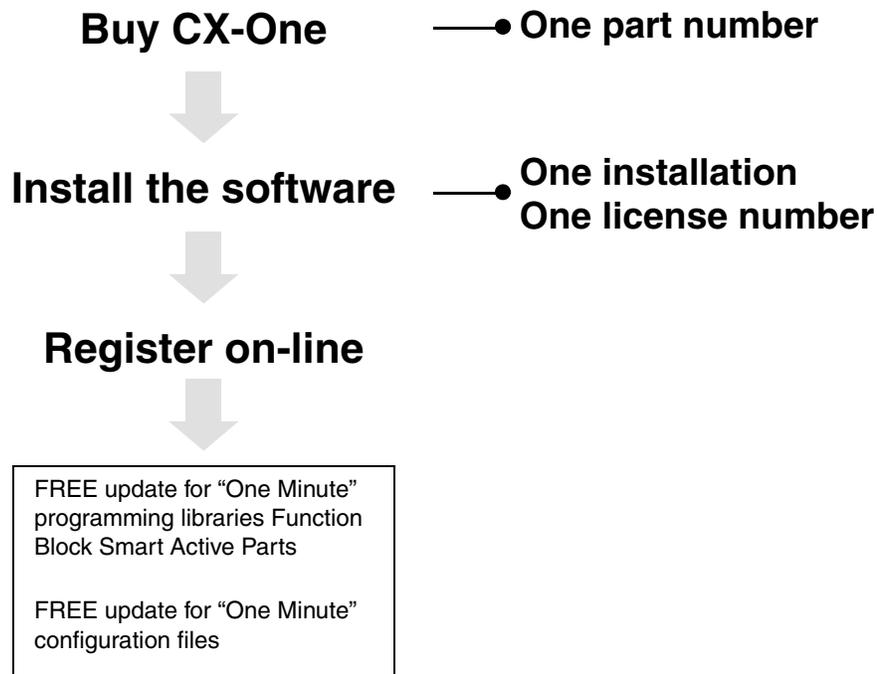
CX-One software and Smart Platform devices help reduce engineering costs for automation projects and shortens start-up and recovery time compared to traditional approaches to installation and maintenance.

	Traditional approach	With Smart Platform
1 Wire up	<p>10 core cable for each axis</p>  <p>2 hours</p>	<p>Simple co-ax connection</p>  <p>1 minute</p>
2 Configure	<p>Different software, cables and connections</p>  <p>20 minutes</p>	<p>Integrated software</p>  <p>1 minute</p>
3 Test	<p>Detailed studying required before operation</p>  <p>3 hours</p>	<p>Pre-made objects to test motion</p>  <p>1 minute</p>
4 Program	<p>Complex ladder code</p>  <p>Xx? hours</p>	<p>Drag n drop standard blocks</p>  <p>1 minute</p>

## Simplified Software Installation and Registration

With CX-One, all the applications can be purchased, installed and registered together saving you administrative time that cuts operational overhead.

- Eliminates buying support software applications separately for each different PLC, Special I/O modules, HMI or network board and installing each one at a time in your computer
- Eliminates registration of each application software separately for support



## System Requirements

Operating System (OS) Japanese or English version (See note 1)	Microsoft Vista® (except 64-bit edition)	Microsoft Windows® NT (Service Pack 6a)	Microsoft Windows® 2000 (Service Pack 3 or higher)	Microsoft Windows® XP
<b>Main unit</b>	IBM AT compatible machine Pentium-class CPU 333 MHz or higher. Pentium III 1 GHz or higher is recommended			
<b>Memory</b>	Memory 256 MB or higher required, 512 MB recommended (See note 2)			
<b>Hard drive</b>	To install entire CX-One, about 2.2 GB or more free space is required			
<b>Display</b>	High quality display with SVGA (800 x 600) or higher and 256 colors or more			
<b>Optical drive</b>	CD-ROM drive			
<b>Communication port</b>	At least 1 RS-232C port (See note 3)			
<b>Others</b>	For on-line user registration via the Internet, you need appropriate hardware such as modem and access right for the Internet			

**Note: 1.** About operating System for CX-One: This product **does not run on Microsoft Windows 95** or other OS version than the specified System requirement. If you have such an operating System on a client computer, you must upgrade the operating System before installing this product. **Note that required System and capacity of hard drive depend on your System environment.**

**2.** The required memory depends on the Support Software consisting CX-One. For details, see user's manuals.

**3.** RS-232C port is required for connection with a PLC using CX-One Support Software. If you have only USB port on your Personal computer, use USB-RS-232C conversion cable (CS1W-CIF31).

## Ordering Information

Software name	Description	Quantity	Model
CX-One	Programming and configuration management software that lets you build, configure and program networks, PLCs, HMIs, motion control systems, temperature controllers and sensors	1 license	CXONE-AL01C-V□
		3 licenses	CXONE-AL03C-V□
		10 licenses	CXONE-AL10C-V□
		30 licenses	CXONE-AL30C-V□
		50 licenses	CXONE-AL50C-V□
		Site license	CXONE-ALXXC-V□
CX-One upgrade	For registered users of CX-One previous versions, Syswin, CPT, LSS CX-Programmer, SSS, CVSS Software. Excludes CX Programmer Jr.	1 license	CXONE-AL01C-V□-UP
		3 licenses	CXONE-AL03C-V□-UP
		10 licenses	CXONE-AL10C-V□-UP
		30 licenses	CXONE-AL30C-V□-UP
		50 licenses	CXONE-AL50C-V□-UP
		Site license	CXONE-ALXXC-V□-UP

**Note:** The box next to V indicates the current version of software (2, 3, 4, etc.).

# CX-Programmer

## Applications

Omron's CX-Programmer makes working with an Omron PLC so easy.

### With CX-Programmer, You Can Do All This and More

- Develop, write, modify and debug programs on-line/off-line
- Import and upgrade existing legacy programs (used in older Omron programming packages) using the file conversion utility
- Set up hardware
- Set up and perform communications
- Set up PLC networks
- Perform diagnostics, testing and debugging
- Monitor data and networks
- Generate reports
- Share tag data with other CX-One software products
- One software tool for ALL Omron PLCs, CX-Programmer is the only software program needed

CX-Programmer structure offers flexibility in managing programs. It's Windows Explorer® style interface makes the task of creating logic programs easy. Multiple window

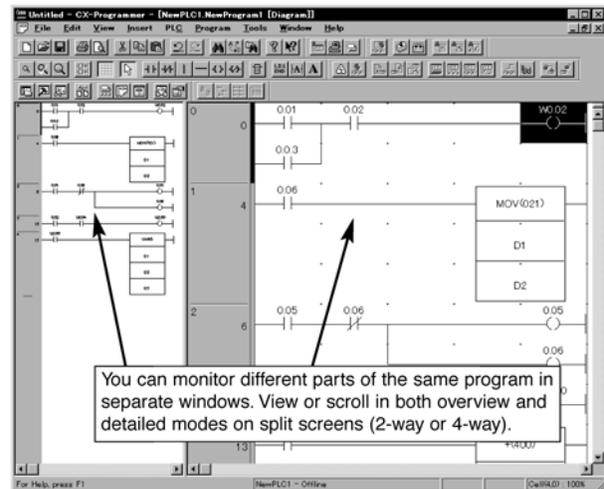
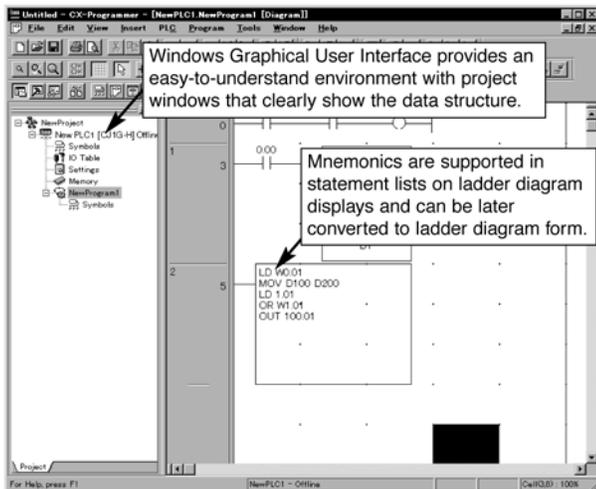
displays, tree style overviews, "watch and output" windows, and standard Windows® menus all help to make it simple and intuitive to use.

It's packed with powerful features like support for legacy Omron programming software – you can import PLC programs created in SYSWIN, CPT, SSS, CVSS, and LSS directly; perform advanced diagnostics; you can *trace data* and run *timing charts* or set up network routing tables and much more.

### Key Features

- Program all Omron Controllers and support network setup in one package
- Programming software is compatible with Windows® 98/NT4.0 Systems 2000/XP/Vista
- Built-in CX-Net and CX-Server network configuration utilities simplify communications between PLCs and PCs
- Uses Structured Text language, Function Blocks and Sequential Function Chart in conformance with the IEC 61131-3 standard

## Provides a Wealth of Functionality in an Efficient and Intuitive Environment



### Easy Operation

- Operations with mouse or function keys
- Windows Explorer® style interface
- Advanced Find/Replace functions
- Display operand input ranges

- Convert text inputs to ladder diagrams. Either enter mnemonics into ladder diagram displays or convert text from text editors
- Copy/paste I/O data to and from MS Excel® for creation/editing

## Numerous Display and Monitoring Options

- Monitor present values of specified addresses
- Watch Windows enable monitoring of specific address locations
- Output Windows can display: errors, search results, file read errors, and program comparison results

## Data Compatibility with Windows Applications

- Import I/O table data such as name, address, and I/O comments from Microsoft® Excel spreadsheets

## Flexible Maintenance Functions

- Force-setting/resetting
- Differential monitoring
- Timer/Counter set value changes
- Cross-references
- Data trace and time chart monitoring
- On-line editing of multiple locations and controllers
- On-line editing of different tasks from different computers

## Remote Programming and Monitoring

- Access any PLC located on a network from a single location (single port multiple access)
- Access remote PLCs via modem connections
- Store/read CPU data (programs, parameters, memory contents, or comments) in memory files optional Flash memory cards or built-in data file (EM) file memory
- Display time-stamped error histories (including user-generated error logs) from the CPU
- Protect programs for access using passwords

## Import/Export I/O Allocations, Comments and Symbol Names Using Microsoft® Excel

Reduce costs of program development with Microsoft® Excel.

I/O tables, including symbols, address and I/O comments can be copied and pasted directly from CX-Programmer to MS Excel® or from MS Excel® to CX-Programmer.

**Microsoft® Excel Spreadsheet**

I/C Symbol	Address	I/O comment
X Seq Valid NC1 n0	2000.0C	Sequence_NO_Valid(Memory_Opr)(Xaxis)(Unit No.0)
X Act NC1 n0	2000.01	Activation(Memory_Opr)(Xaxis)(Unit No.0)
X Alone Act NC1 n0	2000.02	Standalone_Activation(Memory_Opr)(Xaxis)(Unit No.0)
X Abs Cmd Direct NC1 n0	2000.04	Abs_Command(Direct_Opr)(Xaxis)(Unit No.0)
X Inc Cmd Direct NC1 n0	2000.04	Inc_Command(Direct_Opr)(Xaxis)(Unit No.0)
X Int Fix Feed NC1 n0	2000.0E	IntErrpt_Fixed_Length_Feed(Direct_Opr)(Xaxis)(Unit No.0)
X Org Srch NC1 n0	2000.0E	Origin_Search(Xaxis)(Unit No.0)
X Org Ret NC1 n0	2000.07	Origin_Return(Xaxis)(Unit No.0)
X Preset NC1 n0	2000.0E	Present_Position_Preset(Xaxis)(Unit No.0)
X Jog NC1 n0	2000.0E	Jog_Feed(Xaxis)(Unit No.0)
X J Dir NC1 n0	2000.1C	Jog_Direction_setting(Xaxis)(Unit No.0)
X Teaching NC1 n0	2000.11	Teaching(Xaxis)(Unit No.0)
X Puls Inh Rel NC1 n0	2000.12	Pulse_Out_Inhibit_Release(Xaxis)(Unit No.0)
X Err Reset NC1 n0	2000.13	ErrCounter_ResetOutput_Origin_adjust_Output(Xaxis)(Unit No.0)
X Override NC1 n0	2000.14	Override_Valid(Xaxis)(Unit No.0)
X Decel Stop NC1 n0	2000.15	Decel_Stop(Xaxis)(Unit No.0)
X Compul Act NC1 n0	2001.0E	Compulsory_Activation(Xaxis)(Unit No.0)
X Data Write NC1 n0	2001.12	Data_Write(Xaxis)(Unit No.0)

**1. Copy I/O allocation tables and other data with MS-Excel.**

**2. Paste the data into a numeric table.**

**3. Select from the numeric table when entering instruction operands. Use the presearch function to make program development even easier.**

## Use Automatic Address Allocations for Increased Flexibility

- CX-Programmer can automatically allocate I/O addresses. Assign a memory block size to any of the available data types, and CX-Programmer will auto allocate and increment addresses with the block.

**Local or Global Variable Table**

Name	Type	Address / Value	Block Locati...	Usage	Comment
module1	BOOL	W0.00 [Auto]		Work	execution module1
module2	BOOL	W0.01 [Auto]		Work	execution module2
LS1	BOOL	0.00		Work	limit SW1
LS2	BOOL	0.01		Work	limit SW2

**Automatic Address Allocation Dialog Box**

PLC Automatic Memory Allocation

Automatic allocation allows work symbols to be automatically assigned an address. The address range from which to assign these can be set below.

Use automatic allocation

Start address: W0

Length (channels): 100

**Diagram**

NewPLC2.NewProgram2 [Diagram]

1. Enter symbols into the variable table, omitting specific addresses.

2. Specify allocation word ranges in the automatic address allocation dialog box.

3. Addresses will be automatically allocated to local or global variables memory areas.

## Network Configurations Made Easy

Configuring a network of PLCs couldn't be easier, with the CX-NET network configuration tool, setup PLC network routing tables, I/O tables, and data link tables.

Quickly connect to any PLC on the network.

From any single location along the network using Omron's single-port multiple-access (SPMA) technology, you can:

- See devices present on the network
- Run network diagnostics
- Create and transfer network routing and data link tables

CX-Programmer can be ordered separately from CX-One.

**Tool 1: Simple Connection**

nice.odm - CX-NET: PLC Network Configuration Tool

Project: nice.odm

Devices: Gateway, New PLC 1

Diagram: Toolbus connected to CJ1G-CPU68H. Node: 0, Network: 0.

Connected Successfully. Status: Op Line. Mode: Monitor.

Easily connect to local PLCs.

**Tool 2: Complex Network Connection**

nice.odm - CX-NET: PLC Network Configuration Tool

Project: nice.odm

Devices: Gateway, New PLC 1

Diagram: Toolbus connected to [Gateway] CJ1H-CPU68H, which is connected via Controller Link to CJ1G-CPU42H. Node: 07, Network: 0.

Connected Successfully. Status: Op Line. Mode: Monitor.

Or, connect just as easily to PLCs on complex networks using PLC names.

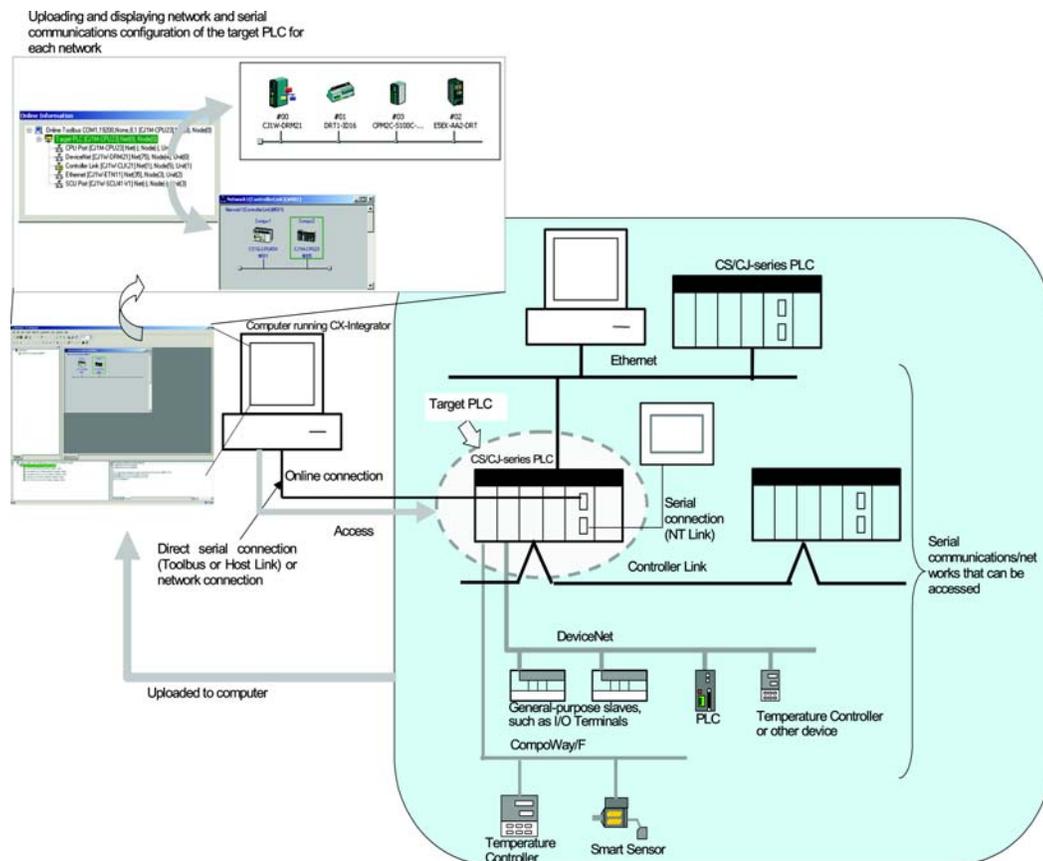
# CX-Integrator

CX-Integrator — the graphical interface and system configuration tool — is the heart of CX-One. It enables easy performance of many operations, such as monitoring the connection status of various networks, setting parameters, and diagnosing networks.

- Easy operation
- Integrated file saving within CX-One
- Allows graphical parameterization of peer-peer and fieldbus networks
- CP1H, CJ and CS programmable controllers and NSJ HMIs can manually or automatically initiate CX-Integrator uploads of parameters and network monitoring
- Expanded network diagnostics
- Multiple language support — English, Spanish French, German, Chinese and Japanese — makes it easier for local engineers to operate the software

## Flexibility in Connection

- Direction connection to serial communications using the CompoWay/F protocol is possible without going through a PLC
- The CompoWay/F network configuration can be uploaded or automatic connection is possible using the NT Link protocol for NS-series PTs and CS/CJ-series PLCs
- Parameters in slaves on the networks can be set, edited, uploaded, and downloaded



## Network Diagnostics

- Ethernet network “ping” test and broadcast node searches
- Measure response time with echoback test between nodes on Ethernet, Controller link, SYSMAC LINK and DeviceNet
- Branching information can be displayed by Repeater Units for Controller Link network diagnosis
- Routing tables can be set offline and then transferred on-line to PLCs for Ethernet, Controller Link, SYSMAC LINK, and DeviceNet networks

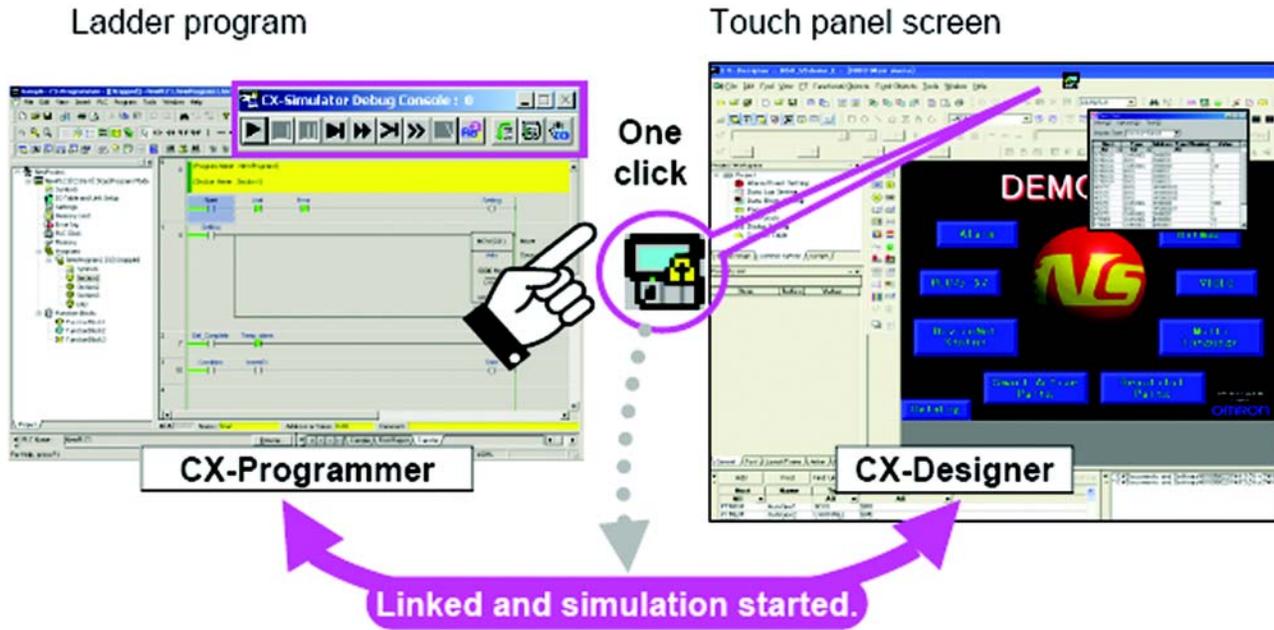
## Start Other Applications from CX-Integrator

- Start Special Application pop-up menu in the Network Configuration Window can start CX-Programmer for CS/CJ PLCs, CX-Designer for NS series HMIs, CX-Thermo for Omron temperature controllers, CX-Drive for DeviceNet connected inverters and servo drivers, and more
- Start a Data Link for a Controller Link network unit
- Start a Routing Table to identify communication unit and port for reporting devices

# CX-Simulator – Integrated Simulation

Create I/O expressions, or a debugging ladder logic program to simulate virtual external inputs. It's even possible to input an actual PLC "Data Trace" or collect "Time Chart Monitor" data from CX-Programmer for input simulation.

**Simulation of the PLC – PT (touch panel) system can be started easily, with one click of an icon.**



## Integrated Simulation Overview:

- Integrated Simulation is a function of CX-One (version 2.0 or higher) that simultaneously tests inter-operability between the ladder program and PT (touch panel) and checks screen operation on the computer.

## Using Integrated Simulation:

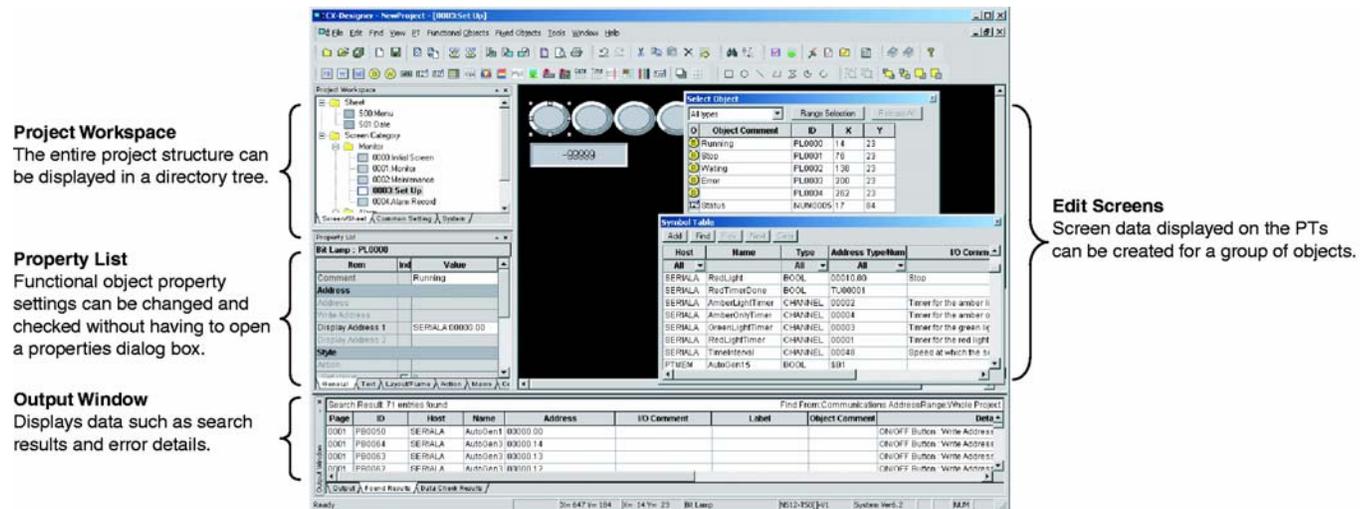
- Provides an inter-operability check between the ladder program and touch panel screens.
- Operation can be verified before actual devices such as the PLC and PT (touch panel) are installed and wired, so software quality can be improved in the design stage. Time can be saved by eliminating the tasks up to downloading the screen data from the computer to the NS. The operation of both the PLC and PT (touch panel) can be verified simultaneously in the computer, which greatly reduces the time required for debugging and equipment downtime during improvements.

# CX-Designer

CX-Designer data visualization tool for Omron HMIs in the NS- and NSJ-series efficiently creates screens and aids in project debugging. It runs on Windows® 98 SE, NT, Me, 2000, XP, or Vista (except 64-bit edition).

## Share Tag Information with CX-Programmer

Shorten development time and provide valuable information in testing and troubleshooting from tag information shared with CX-Programmer.



## Project Management Using Project Workspace

Projects are easy to manage because the entire project structure can be checked at a glance. Screens, alarms, and other common settings can be displayed in a directory tree in the CX-Designer project workspace. Screens and settings can be copied between multiple CX-Designer project workspaces. Screens can also be copied within the same project workspace, and can be classified into any category, e.g., by application, and displayed in a directory tree. When screens are created, consecutive screen numbers are automatically applied to screens in the same category. These numbers can also be changed. The common settings accessed by screens are also copied automatically. If symbols are used, it also becomes easy to change addresses after screens have been copied. This makes screen management even easier.

## CX-Designer Can Be Started From CX-Integrator

This capability makes it easy to launch HMI projects while working in other development and monitoring applications in CX-One.

## Smart Active Parts

Omron's patented Smart Active Parts are pre-designed screens and components that drag-and-drop from a library and communicate directly with control-system components, for example temperature controllers, inverters and motion controllers. They all feature commonly required customer functionality as standard, and they bring powerful functionality

to your machine without programming. This saves time and money, and enables you to add complex features that were previously not available.

## Screens Can Be Created Using Symbols

Symbols can be used with the CX-Designer. Symbols are address to which names have been assigned. In addition to the existing method of directly inputting addresses to be browsed by functional objects, the addresses can also be set by using symbols (names). When the address allocated for a symbol is changed, the address is changed for all objects that access that symbol.

This makes it easy to change address allocations and reuse screens. Symbols can also be shared by the CX-Designer and CX-Programmer by copying the symbols from CX-Programmer symbol tables to the CX-Designer.

## Functional Object Property Settings Using Property Lists

Functional object settings can be changed and checked without having to open a dialog box allowing easy creation and editing of objects. When more than one object is selected, common settings for those objects can be changed in one operation from the property list.

## Test Mode for Created Screens

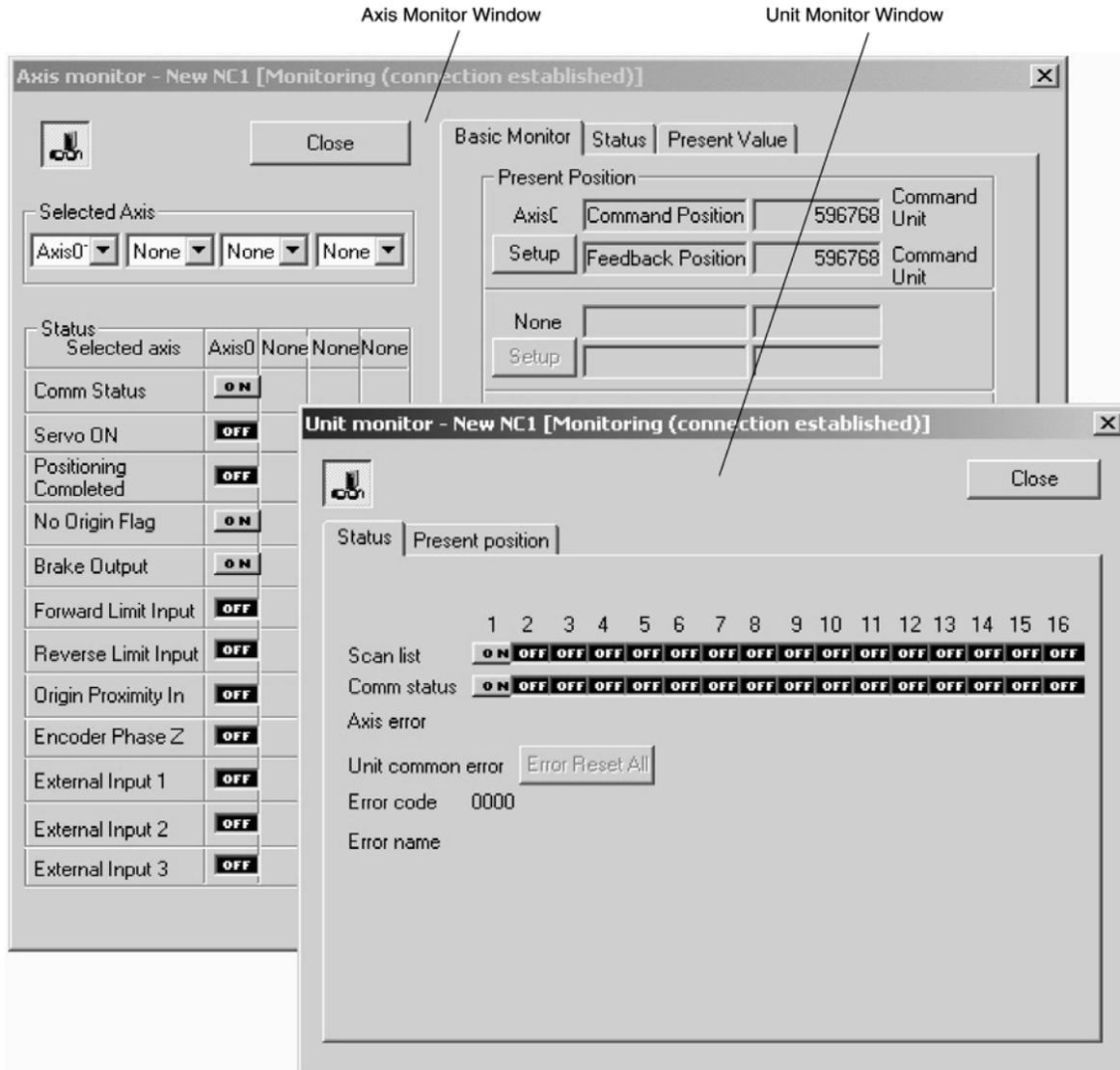
Prevent problems in commissioning and shorten time to productivity by using the test mode before uploading the project to the HMI. CX-Designer can perform an operating test on the computer without connecting to a PLC. Operation can be checked using screen data on the CX-Designer, if required.

## Quick transfers to HMI

Only edited data is automatically transferred to the HMI, shortening transfer times. Objects on the screen can be listed and specified as objects selected. The screen display can also be limited to specified objects. This makes it easy to check and change the property settings for overlapping objects.

# CX-Motion-NCF and CX-Motion-MCH

Set parameters, monitor and troubleshoot drives connected to position and motion controller PLC modules that use MECHATROLINK-II communications. MECHATROLINK-II high-speed Firewire bus provides instant communications between Omron's W-Series servo drives and CS1/CJ1 PLC-based motion and position controllers to simplify multi-axis coordination. These programs can be launched through CX-Integrator.

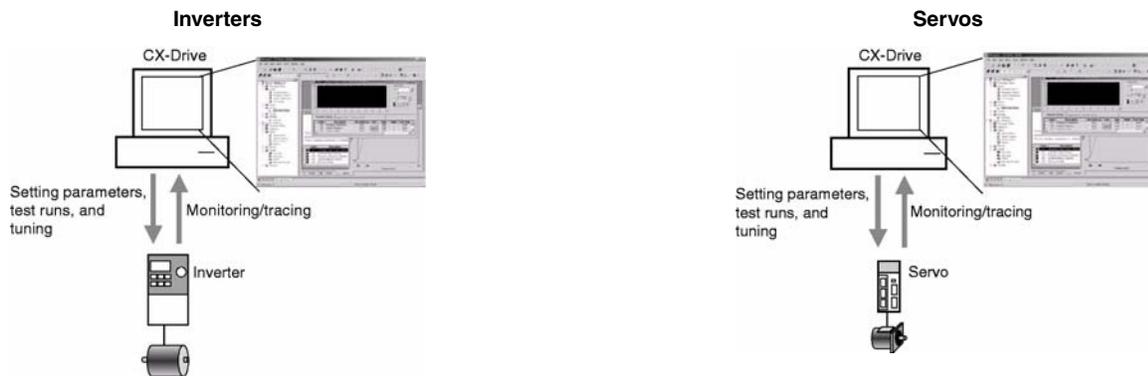


- Configure all drives connected to the MECHATROLINK-II motion link
- Access to all system programming, configuration and monitoring from one connecting point
- Complete configuration of the MCH and NCF modules and the servo drives
- Programming in Basic type Motion Control language
- On-line Monitoring
- Imports CAM tables

<b>Compatible Position Control Units</b>	CJ Series: CJ1W-NCF71 CS Series: CS1W-NCF71	16 axes max.
<b>Compatible Motion Control Units</b>	CJ Series: CJ1W-MCH71 CS Series: CJ1W-MCH71	30 axes max.

# CX-Drive

The CX-Drive software application enables 1) setting, downloading, uploading, and comparing parameters, 2) test runs and tuning, and 3) monitoring and data tracing for Omron Inverters and Servos. CX-Drive can be launched from CX-Integrator for efficient design and operation.



## Easy and Dependable Parameter Editing for Inverters and Servos

Inverter and Servo parameters can be edited using parameter numbers or by category. Parameter editing tables show parameter ID numbers, descriptions, units, default values, and ranges in the same way as in the Servo manuals.

Parameters can be set using pull-down menus or by typing in settings. Parameter settings can be easily reviewed because setting status (e.g., modified, warning, default, or disabled) is shown for each parameter to avoid setting mistakes.

## Check Drive Parameters and Load Selected Ones

When connected on-line, you can easily display drive parameters by using a comparison function. Also, the selected parameters can be downloaded to or uploaded from the drive as required.

## Edit Parameters in Graphic Form

Inverter parameters, such as V/F profiles and jump frequencies, can be displayed in graphic charts.

## Display Parameters in Diagrams

Drive parameters can be displayed in diagrams, such as PID diagrams or position/speed/torque block diagrams.

## Automatically Detect Drives

The connected drives can be detected automatically and displayed in a list without setting model numbers or connection types. Just select a drive to add it to the Workspace.

## Auto-tuning and Test Runs

Save time and eliminate start-up delays by having CX-Drive automatically calculate and set key operating parameters and test performance before commissioning.

## Real Time Tracing

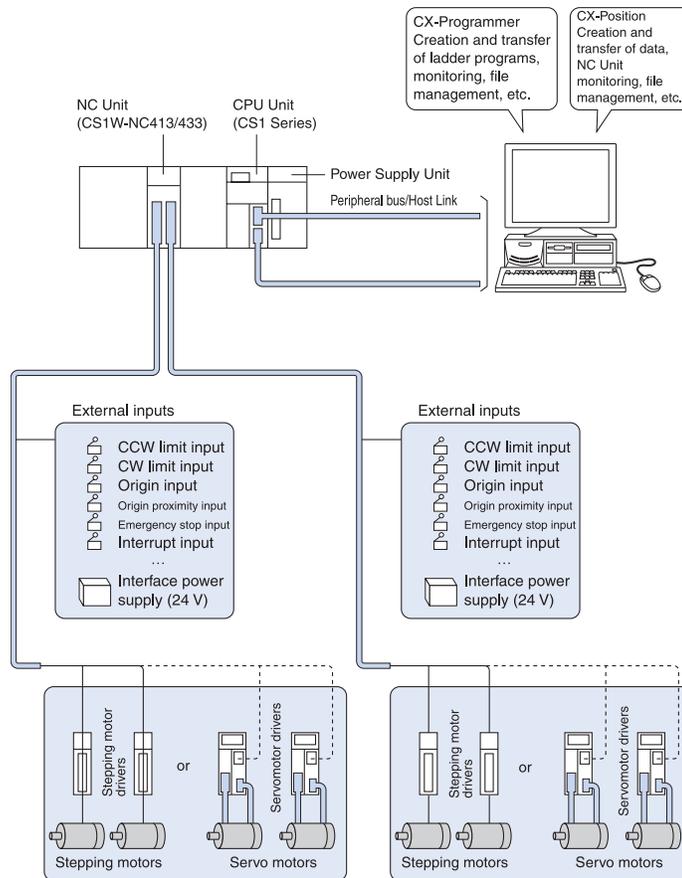
The Real Time Monitor Window enables monitoring a specific set of parameters. The parameter values are displayed simultaneously in graphic and digital forms. The graphic display shows the parameter values per unit time.

<b>Basic functions</b>	Setting, downloading, uploading, and comparing parameters; test runs and tuning; monitoring and data tracing
<b>File extensions</b>	Workspace files: .sdw Drive files: .sdd Monitor review files: .sdm Text file for drive: .csv or .txt

# CX-Position

## Set, transfer, store, and print position control unit data and monitor operation on-line

The CX-Position software simplifies every aspect of position control, from creating/editing the data used in Position Control Units (NC Units) to communicating on-line and monitoring operation. The software is equipped with functions that can improve productivity, such as automatically generating project data and reusing existing data.



## Data Can Be Created for Various Applications

The CX-Position enables data for multiple NC Units on up to 1,000 PLCs to be handled as 1 project. Data is displayed in tree format and the data for an NC Unit can be moved or copied (overwritten) between PLCs in the project tree. This feature allows data to be edited and re-used in other PLCs or NC Units.

- The CX-Position can read information from NC Units connected on-line and automatically generate project data
- Data created for a C200HW-NC□□□□ using the SYSMAC-NCT can be imported and used as data for the CS1W-NC□□□□ or CJS1W-NC□□□□

## NC Monitor

Display the NC units' present positions, error codes, sequence numbers, and I/O status.

The sequence numbers and present positions can be displayed for up to 4 Units. In addition, the contents of the operating memory area and operating data area can be monitored and the error log can be displayed.

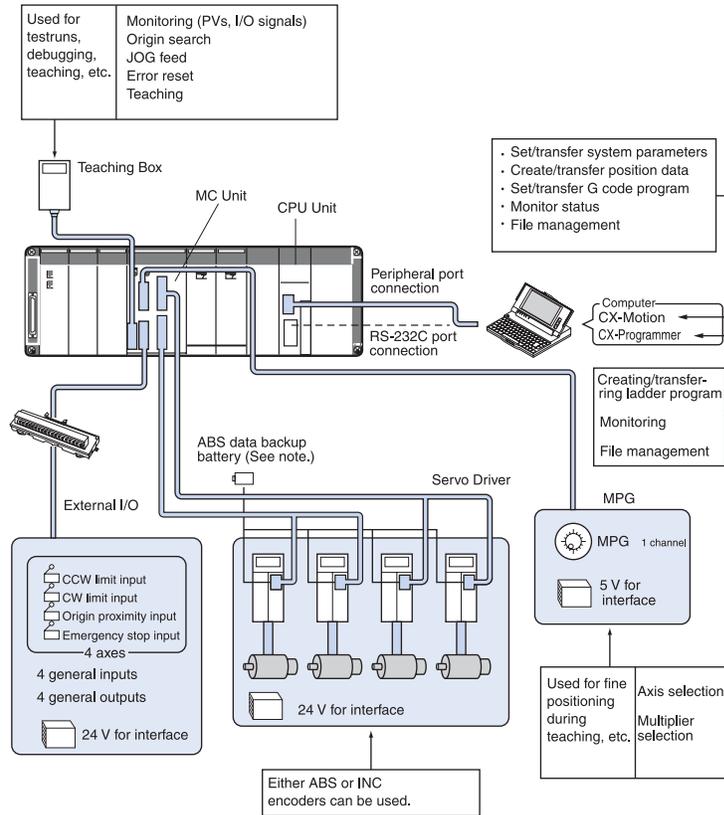
## Communicate with NC Units Through the Network

It is possible to communicate with NC Units through via HostLink or Ethernet to perform on-line operations (monitoring operation or transferring/verifying parameters, sequences, etc.) with the NC Unit.

<b>Compatible position control units</b>	CS Series: CS1W-NC113/NC133/NC213/NC413/NC433 CJ Series: CJ1W-NC113/NC133/NC213/NC413/NC433
<b>Basic functions</b>	Create, edit, and print the Position Control Unit's parameter data, sequence data, speed data, acceleration/deceleration data, dwell times, and zone data. Monitor the Position Control Unit's operating status.
<b>Created files</b>	CX-Position project files (*.nci) Contents: Parameter data, sequence data, speed data, acceleration/deceleration data, dwell times, and zone data

# CX-Motion

The CX-Motion software can be used to create, edit, and print the various parameters, position data, and motion control programs (G code) required to operate Motion Controllers, transfer the data to the Motion Control Units, and monitor operation of the Motion Control Units. Increase productivity in every step of the motion control process, from development of the motion control program to system operation.



Note: A data backup battery is required when an ABS encoder is used.

## Key Features

- Full 32-bit Windows® application with familiar interface
- Powerful editing features maximize design and programming efficiency
- Advanced monitoring, display, and debugging functions reduce engineering time and implementation costs
- Extensive, context sensitive help system
- Import program files, parameters, and position data created in previous versions of Omron's MC Support Software
- Create projects containing one or more MC unit
- Data is displayed in a tree format in the project workspace
- User defined mnemonics or G codes for programming
- An automatic loading function enables easy downloading of MC programs and position data stored on a personal computer, providing support for systems requiring more programs or position data than the MC module can store on its own
- A Servo Trace function simplifies system tuning and setup. This function enables the user to trace speed reference, present speed, and error counter with a specified starting condition and specified sampling period of 2-100 ms up to 500 samples

## Motion Control Programs

Easily create motion control G Code programs and parameters.

CX-Motion can create all of the data needed in the Motion Control Unit, such as parameters, position data, and the program. The program can be input in either G code or mnemonics.

- When the Unit is connected on-line, data can be transferred, verified, and saved
- Data for different Units can be registered and managed as separate projects

## Operation Monitor

Powerful support during startup and operation

The MC Unit Monitoring function can display vital information at the computer, such as the present position, task being executed, I/O status, error displays, and servo system trace data.

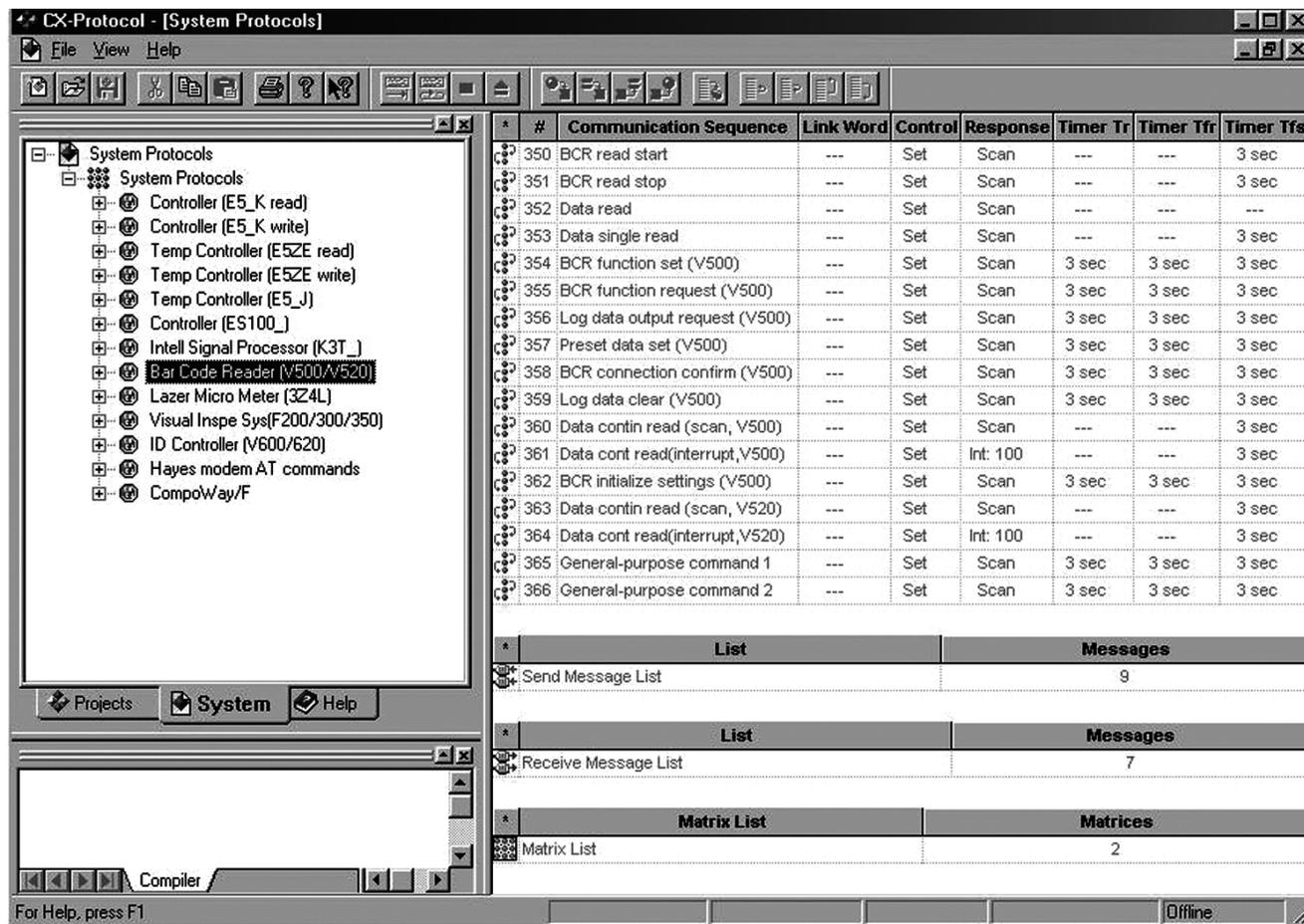
- Up to 20 errors that have occurred in the Motion Control Unit can be stored and displayed (CS1W-MC421/221 and CV500-MC421/221 Motion Control Units only)

## Automatic Loading Function

Various programs and position data can be stored on disks for the computer running the CX-motion software and the required program/position data can be substituted into the Motion Control Unit when necessary. More than 100 different application programs can be used in this way. A wide variety of programs can be available for execution if the computer is used to store data for the PLC-based MC Unit.

<b>Compatible motion controllers</b>	CS1W-MC221, CS1W-MC421
<b>Basic functions</b>	Create/transfer/print various parameters, position data, and the MC program, transfer data to the MC Unit, and monitor MC Unit's operating status.
<b>Other functions</b>	Automatic loading, Servo data tracing
<b>Created files</b>	CX-Motion project files (*.mci) Contents: System parameters, position data, program, scripts, etc.

# CX-Protocol



## Key Features

- Communicate with serial RS-232 and RS-422/485 devices
- Supports half-duplex or full-duplex modes
- Assignable error-check code to send/receive commands
- Conversions for ASCII and Hex numerical data
- Pre-built functions for inserting into command strings
- Programmable flow control
- Includes protocols for Omron temperature controllers, panel meters, bar code readers, vision sensors, and Hayes compatible modems
- "Live" monitoring of transmissions for testing/debugging command strings
- Combine with Serial communications modules for CJ, CS, CP1H, NSJ and C200H Alpha PLC series

When it is time to connect a serial device to our PLCs and exchange data, use CX-Protocol to make the job simple and easy. It doesn't matter if it's an Omron or non-Omron product; communicate to any serial device through a CJ, CS, CP1H, NSJ and C200H Alpha PLC series Serial Communications modules with both RS-232 and RS-422/485 ports.

With CX-Protocol, develop the communication protocol for any serial device and transfer it to a series serial module's processor just like a logic program.

All the serial command processing is executed from within the module, not from the CPU. To call a created protocol for use in a program, select the CX-Programmer Protocol Macro (PMCR) command to exchange data between the serial device and logic program running on the PLC CPU.

# Software CX-Programmer Jr.



## Setup and Monitoring for Micro and Small PLCs

**Microsoft Excel Spreadsheet**

I/O Symbol	Address	I/O comment
X Seq Valid NC1 n0	2000.0C	Sequence_NO_Valid(Memory_Opr)(Xaxis)
X Act NC1 n0	2000.01	Activation(Memory_Opr )(Xaxis)(Unit No.0)
X Alone_Act NC1 n0	2000.02	Standalone_Activation(Memory_Opr )(Xaxis)(Unit No.0)
X Ahs_Cmnd NC1 n0	2000.03	Ahs_Command_Direct_Opr(Xaxis)(Unit No.0)
X Inc_Cmnd NC1 n0	2000.04	Inc_Command(Direct_Opr)(Xaxis)(Unit No.0)
X Int_Fix_Feed NC1 n0	2000.05	IntErrupt_Fixed_Length_Feed(Direct_Opr)(Xaxis)(Unit No.0)
X Org_Srch NC1 n0	2000.0E	Origin_Search(Xaxis)(Unit No.0)
X Org_Ret NC1 n0	2000.07	Origin_Return(Xaxis)(Unit No.0)
X Preset NC1 n0	2000.0E	Present_Position_Preset(Xaxis)(Unit No.0)
X Jog NC1 n0	2000.0E	Jog_Feed(Xaxis)(Unit No.0)
X J_Dir NC1 n0	2000.1C	Jog_Direction_setting(Xaxis)(Unit No.0)
X Teaching NC1 n0	2000.11	Teaching(Xaxis)(Unit No.0)
X Puls_Inh_Rel NC1 n0	2000.12	Pulse_Out_Inhibit_Release(Xaxis)(Unit No.0)
X Err_Reset NC1 n0	2000.15	ErrCounter_ResetOutput_Origin_adjust_Output
X Ovende NC1 n0	2000.14	Overice_Valid(Xaxis)(Unit No.0)
X Decel_Stop NC1 n0	2000.15	Decel_Stop(Xaxis)(Unit No.0)
X Compul_Act NC1 n0	2001.0E	Compulsory_Activation(Xaxis)(Unit No.0)
X Data_Write NC1 n0	2001.12	Data_Write(Xaxis)(Unit No.0)

**1. Copy I/O allocation tables and other data with MS-Excel.**

**2. Paste the data into a numeric table.**

**3. Select from the numeric table when entering instruction operands. Use the presearch function to make program development even easier.**

- Cost-effective software for Micro and Small PLCs (CPM, SRM, CP1H, CP1L)
- Reduced instruction set for programming and monitoring PLCs and networking commands
- Supports multiple languages
- Reduce costs of program development with Microsoft® Excel: I/O tables, including symbols, address and I/O comments can be copied and pasted directly from CX-Programmer to MS Excel® or from MS Excel® to CX-Programmer

- Automatically allocate I/O addresses. Assign a memory block size to any of the available data types, and CX-Programmer will auto allocate and increment addresses with the block

## Functions

- Creating, transferring, monitoring, and printing the program
- Creating and editing the I/O table
- Creating and transferring the PLC Setup
- Setting, transferring, and monitoring I/O memory data
- On-line editing
- Differentiation monitoring
- Data tracing
- Time chart monitoring
- Transferring files to Memory Card

## Specifications

- Operating system: Windows® XP/2000/Vista
- Languages: English, French, German, Italian, Spanish, Japanese and Chinese (PRC)
- PLC models supported: CP1, CPM, SRM

## Ordering Information

Item	Description	Quantity	Model
CX-Programmer Jr. support software	Windows®-based programming software; reduced instruction set and net-working commands, matched to CPM-series controller needs, full version	1 license	WS02-CXPC2-V□

**Note:** The box next to V indicates the current version of software (7.2, 7.3, 8.0, etc.).

Software

# CX-ConfiguratorFDT



## Configure Profibus-DP Networks

- Advanced configuration tool that uses FDT/DTM (Field Device Tool and Device Type Manager) technology
- The Profibus-DP network topology and system characteristics are defined and then downloaded in the Omron Profibus Master Unit
- Configuration can be done remotely, via other networks as Ethernet or Controller Link
- Can be used with all OMRON masters: CQM1, CJ and CS series



## Function

**The configuration software package for the Omron Profibus-DP master is used to define:**

- The configuration of the bus system connected
- Configuration- and parameter data of all connected slave stations
- Overall bus communication settings
- All configuration data can be prepared off-line and downloaded remotely

**After the initial configuration has been downloaded, the software package can be used for:**

- Addition / deletion of slave units or modules
- Connection to many devices from various automation suppliers to intercommunicate without having to make any special interface adaptations
- Monitoring the Profibus system status
- Troubleshooting communication problems

It is not possible to use other (general-purpose) Profibus-DP Configurator software packages for this purpose.

### More about FDT/DTM and Omron CX-Profibus

FDT is a frame application that provides a standard communication interface between software components that support the field devices and systems. These so-called DTMs can be used in all configuration tools that follow the FDT specification.

The DTM is the management component for a field device or system. It provides all configuration, diagnostics and maintenance information and even graphical user dialogs of the specific device. Omron's CX-Profibus configuration package is a FDT frame application that includes all DTMs for Omron Profibus masters and slaves. DTMs of other vendors' devices can be added. Also, a Generic slave DTM for field devices that only provide a GSD-file for configuration is available.

## Ordering Information

Software name	Description	Quantity	Model
CX-One	CX-Profibus included in CX-One bundle	1 license	CXONE-AL01C-V□

**Note:** The box next to V indicates the current version of software (2, 3, 4, etc.).

## Specifications

Item	Specification
	<b>Hardware platform</b> <ul style="list-style-type: none"> <li>• Personal computer: IBM PC/AT or compatible</li> <li>• Processor: Pentium 500 MHz or higher</li> <li>• Memory: 256 Mbytes</li> <li>• Hard disk: A minimum of 256 Mbytes CD-ROM drive</li> <li>• Graphics resolution: 800 x 600 pixels minimum</li> <li>• Serial port: RS-232C</li> </ul>
	<b>Operating System</b> <ul style="list-style-type: none"> <li>• MS Windows NT4.0, SP6</li> <li>• MS Windows 2000, SP2</li> <li>• MS Windows XP</li> <li>• MS Windows Vista (except 64-bit edition)</li> </ul>
<b>Operating environment</b>	<b>Connection to CS1/CJ1W-PRM21</b> Peripheral or RS-232C port of PC with PLC CPU. Serial communications mode: Peripheral bus, Host Link, Toolbus, supported by CX-Server. Communication cable: Cable CS1W-CN226 to connect to the peripheral port on the CPU (Not included in package).
	<b>Connection to C200HW-PRM21</b> RS-232C port of PC with Configuration port on the Unit.
<b>CX-Profibus</b>	<b>General Project functions</b> File handling: CX-Profibus supports overall handling of project files as well as network data. <ul style="list-style-type: none"> <li>• New: Start a new project.</li> <li>• Open: Open an existing project file.</li> <li>• Save (As): Save a project file.</li> <li>• Export: Export project data to HTML.</li> <li>• Properties: Edit project property information.</li> </ul> User management: Functionality of CX-Profibus can be defined by several limited as password protected access levels: <ul style="list-style-type: none"> <li>• Administrator</li> <li>• Planning engineer</li> <li>• Maintenance</li> <li>• Operator</li> <li>• Observer</li> </ul>
	<b>Network setup functions</b> CX-Profibus provides network tree view, from which hierarchy between Master and slave devices can clearly be distinguished. The following network functions are available: <ul style="list-style-type: none"> <li>• Network DTMs (i.e. devices) can be added or deleted, using drag and drop from the Device Catalog.</li> <li>• Network DTMs can be copied and moved from one location to another in the network view.</li> <li>• DTM names can be edited by the user.</li> <li>• Any change to the parameters of a DTM is clearly marked in the tree view, until the project is downloaded to the Master Unit.</li> </ul>
	<b>Device Catalog functions</b> The Device Catalog maintains the installed device DTMs. After installation of a new DTM, the user must refresh the database. The Device Catalog provides the following functions: <ul style="list-style-type: none"> <li>• Update Device Catalog.</li> <li>• Add device DTMs to the network directly.</li> <li>• Install a GSD file. This function allows copying of GSD files to a specific directory, after which they are available for the Generic Slave DTM.</li> </ul>
	<b>Support functions</b> CX-Profibus provides the following additional support functions: <ul style="list-style-type: none"> <li>• Context sensitive help functions.</li> <li>• Error logging.</li> <li>• Monitoring of FDT communication between DTMs.</li> <li>• Multi-language support.</li> </ul>

## Specifications (Continued)

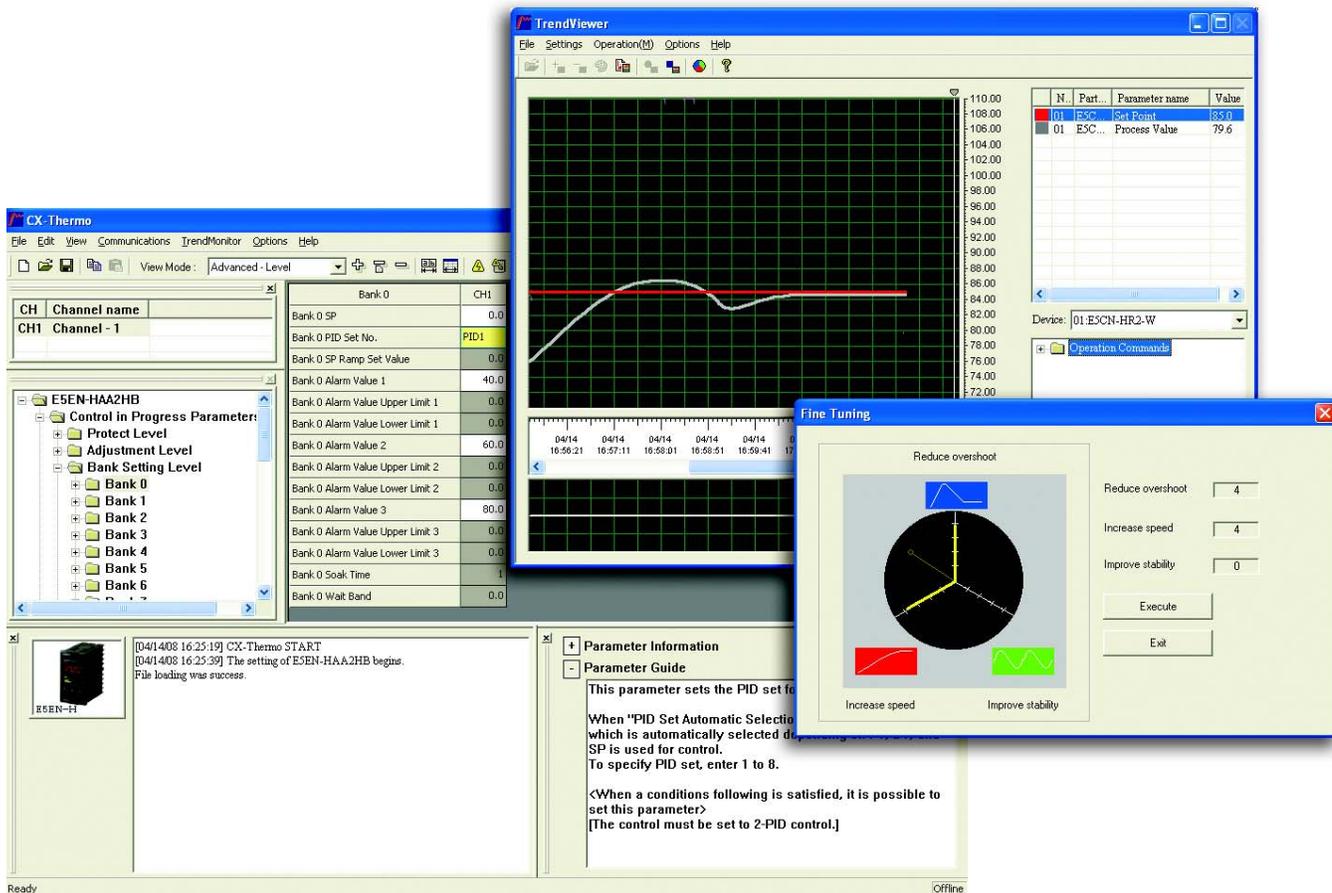
Item		Specification
CS1/CJ1W-PRM21 DTM	<b>Device setup</b>	Device setup allows the user to: <ul style="list-style-type: none"> <li>• Select the PROFIBUS Master Unit's unit number.</li> <li>• Configure the communication link between the PC and the Unit. This function invokes the user interface of CX-Server.</li> <li>• Test the Units communication link and read out the Unit's information.</li> </ul>
	<b>Master setup</b>	It allows enabling of Auto Addressing, to facilitate I/O data mapping, as well as defining the Unit's behavior in case of <ul style="list-style-type: none"> <li>• a network malfunction.</li> <li>• a PLC mode change between PROGRAM and RUN/MONITOR mode.</li> </ul>
	<b>Bus parameter setup</b>	The bus parameter setup allows the selection of baud rate and calculation and editing of specific bus parameters.
	<b>Slave area setup</b>	The Slave area setup allows the user to define the I/O Data mapping of the I/O Data from each of the slave devices on to the PLC memory areas.
	<b>Monitoring functions</b>	<ul style="list-style-type: none"> <li>• Master status read out.</li> <li>• Slave status and slave diagnostics read-out.</li> <li>• Read out of the Unit's error log.</li> </ul>
	<b>Additional Master functions</b>	<ul style="list-style-type: none"> <li>• Set remote slave address.</li> <li>• Provide communication channels for PROFIBUS DP-V1 MSAC1 messages.</li> </ul> <b>Note:</b> These functions are implemented as of Unit version 2.0.
	<b>Support functions</b>	<ul style="list-style-type: none"> <li>• Context sensitive help functions.</li> <li>• Multi-language support.</li> </ul>
C200HW-PRM21 DTM	<b>Bus parameter setup</b>	The bus parameter setup allows the selection of baud rate and calculation and editing of specific bus parameters.
	<b>Address mapping setup</b>	The address mapping setup shows an overview of the mapping of the I/O data of each Slave on to the Unit's memory. The mapping can be accomplished automatically, but the function also allows editing of individual address mappings.
	<b>Monitoring functions</b>	Master status read out. Slave status read-out.
	<b>Support functions</b>	<ul style="list-style-type: none"> <li>• Context sensitive help functions.</li> <li>• Multi-language support.</li> </ul>
Generic Slave DTM	<b>General functions</b>	The Generic Slave DTM reads the contents of a specific GSD file located in a special sub-directory, and displays the setup options to the user. It supports <ul style="list-style-type: none"> <li>• GSD file revisions 1 and 2 (PROFIBUS DP functionality).</li> <li>• GSD file revisions 3 (PROFIBUS DP-V1 functionality).</li> </ul>
	<b>I/O configuration setup</b>	The I/O configuration setup function allows: <ul style="list-style-type: none"> <li>• Selection of device address.</li> <li>• Enable/disable watchdog.</li> <li>• Overview of available I/O modules.</li> <li>• Selection of I/O modules, including Addition, Insertion and Removal of multiple modules.</li> </ul>
	<b>Parameter setup</b>	The Parameter setup function: <ul style="list-style-type: none"> <li>• Setting of common as well as module dependent parameters.</li> <li>• Setting of PROFIBUS DP Extension parameters.</li> <li>• Setting of PROFIBUS DP-V1 dependent parameters.</li> </ul>
	<b>Group setting</b>	The Group setup function allows definition of the group to which the associated slave device will belong.
	<b>Monitoring functions</b>	The Monitoring functions provides a display of <ul style="list-style-type: none"> <li>• Standard Slave diagnostics flags.</li> <li>• Extended diagnostics messages.</li> </ul>
	<b>Support functions</b>	<ul style="list-style-type: none"> <li>• Context sensitive help functions.</li> <li>• Multi-language support.</li> </ul>

# Software CX-Thermo



## Set, Monitor, and Troubleshoot Omron Temperature and Process Controllers

- Simplify parameter set-up for the latest E5CN/CN-H, E5AN/AN-H, E5EN/EN-H, E5ZN, E5□R/□R-T, and EJ1.
- Enables editing and batch-downloading parameters from a personal computer, reducing the work required to set parameters, device adjustment, and maintenance.
- Easily make fine-tuning adjustments to enhance control performance.
- Supports Trend Monitoring: monitor data (PV, SP, MV, PID parameter, Alarm ON/OFF, etc.) for up to 31 E5□N/□N-H Temperature Controllers. Connect up to 64 EJ1N, 17 EJ1G, or 16 E5ZN Temperature Controllers. (The Temperature Controllers must be from the same series.)
- Supports parameter masks to hide parameters unnecessary to display. (Supported only by the E5□N/□N-H and E5□R/□R-T).
- Access logic operations to enable setting inputs from external inputs (event inputs) or temperature status, outputs to external outputs (control or auxiliary outputs), and changing operating status with ON/OFF delays. (Supported only by the E5□N/□N-H).



## Specifications

Compatible devices	Temperature controllers	E5CN (available after April 2004) E5AN, E5EN (available from Feb. 2005), E5CN-H, E5AN-H, E5EN-H E5AR, E5ER E5AR-T, E5ER-T E5ZN EJ1N-TC4, EJ1N-TC2, EJ1N-HFU EJ1G-TC4, EJ1G-TC2, EJ1G-HFU G3ZA (only when connected to EJ1N-TC4, EJ1N-TC2, EJ1G-TC4, EJ1G-TC2) Note: Models with DeviceNet communications are not supported.
PC requirements	Operating system	Windows 2000 (service pack 3 or higher), XP, or Vista (Japanese or English version)
	CPU	300 MHz min.
	Memory	128 MB min.
	Hard disk	300 MB min. available space
	CD-ROM	One CD-ROM drive
	Monitor	SVGA (800 × 600) min.
	Comms. ports	RS-232C port, or USB port, 1 port min.
Connection method		<ul style="list-style-type: none"> <li>• An E58-CIFQ1 USB-Serial Conversion Cable is required to connect a computer to the setup tool port the E5_N, E5_N-H, or EJ1.</li> <li>• A K3SC Interface Converter is used to connect a computer to models with RS-422/RS-485 communications.</li> <li>• An E58-CIFIR USB-Infrared Conversion Cable is required to wirelessly connect a computer to models with infrared communications (E5AN-H or E5EN-H).</li> </ul>

## Ordering Information

Name	Model
CX-Thermo Support Software (CX-Thermo is also available as part of the CX-One Software Suite)	EST2-2C-MV <input type="checkbox"/>

**Note:** The box next to MV indicates the current version of software (4, etc.).

# Software NTST

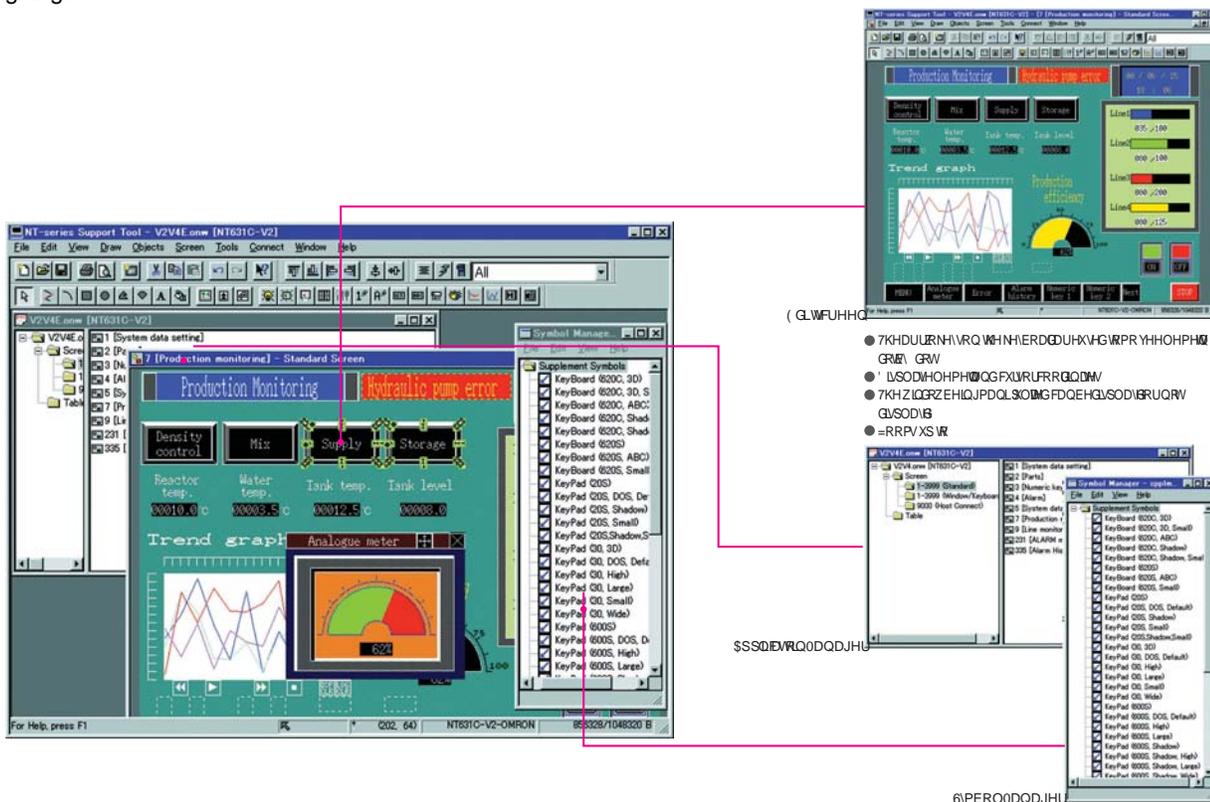


## HMI Project Design, Monitoring and Operation for NT-Series

- For NT11, NT21, NT631 and NT31 Operator Interface Terminals
- NT31 and NT631 support multi-vendor PLCs
- Included with CX-One Software

## Greatly Improved Support Software: Better Data Reusability for Even Greater Design Efficiency

Windows® look and feel environment ensures easy operation, allowing anyone to create screens quickly and easily. The enhanced ON/OFF simulation function of the NT631/NT31 and easy application of existing screen data accelerate product development and designing.



## System Requirements

### Memory

CPU: Pentium 100 MHz min.  
RAM: 32 MB min.

### Hard disk

Software capacity: 17 MB  
Installer: 3 MB  
Sample elements: 32 MB

### Operating System

Windows® 95, 98, 2000, NT 4.0, Me, or XP  
Media: CD-ROM

## Ordering Information

Item	Language	Operating Systems	Model
NTST Support Software	English	Windows® 95, 98, NT, 2000, Me, or XP	NT-ZJCAT1-EV□

**Note:** The box next to EV indicates the current version of software (4, etc.)

# SCADA Development Software CX-ServerOPC



## OPC Client/Server HMI Development Tool

- **Omron OPC Server** — Easily connect OPC client applications to Omron hardware through use of standard OPC technologies. The CX-ServerOPC Omron OPC Server supports all Omron communication protocols and PLC memory locations in one software package
- **OPC Client ActiveX Control** — Turn Microsoft® Excel and Visual Basic into a powerful OPC client application that can access data from one or many OPC Servers at the same time, supporting multiple vendor platforms and bridging of OPC Server to OPC Server. This means that through using the Omron OPC Client ActiveX control a single Excel or Visual Basic application can be developed to interface to Omron PLCs and someone else's at the same time. When you have customers with multiple PLC vendors in their manufacturing environment who need a simple way to exchange and share data, this is the answer
- **I/O Point Database** — Reuse I/O data from CX-Programmer. This allows direct importing of CX-Programmer CDM file to a CX-ServerOPC project, saving valuable engineering development time
- **Omron Network Service Boards (NSB)**— FINS Gateway drivers for all Omron Network Service boards included
- **Third-Party ActiveX Controls** — Use your favorite Microsoft® compliant ActiveX control. Connect it to a CX-ServerOPC OPC client application using the Omron ActiveX Linker control. Configure it through the Linker control properties menu; there is no code to write



- **Script Command Set** — For more advanced users, the OPC Client ActiveX control can be accessed through Visual Basic Script. Powerful commands are available for such things as reading and writing OPC items as arrays of data. The command set is available in the included manual and on-line help. Microsoft® Excel and Visual Basic sample applications are also included demonstrating use of all the commands

## Functions

<b>Program integration</b>	Integration in VBA and Visual Basic via ActiveX® components Supports the use of ActiveX® components of other suppliers The interoperability of CX-Server OPC has been tested with numerous commercially available OPC clients
<b>Application</b>	Application-based display of PLC and OPC Server data with the features of MS Office products as well as VBA and Visual Basic
<b>OPC functions</b>	Synchronous or Asynchronous communication Reading from cache or device Subscription update rates starting from 100 milliseconds
<b>Standard controls</b>	7 Segment- and Display control to display data in multiple formats Toggle button, Rotary Knob, Thumbwheel control and LED Indicator to write a value with a single click and to visualize the value at the same time Linear- and Rotational Gauge that can display data in a graphical way Data Logging, Timer and Linker controls to log data, trigger actions and connect third party ActiveX® controls

## System Requirements

<b>CPU</b>	Minimum: Pentium 200 MHz; Pentium II 400 MHz or higher recommended
<b>Operating system</b>	Windows® 2000, XP, XP Embedded and Vista (except 64-bit edition)
<b>Memory</b>	64 MB minimum
<b>Hard disk</b>	30 MB free memory space
<b>CD-ROM</b>	One CD-ROM drive
<b>Monitor</b>	SVGA graphic, 800 x 600 or higher
<b>Communications ports</b>	COMx or network card for Ethernet or Controller Link, depending on the network used; combinations are possible.

## Ordering Information

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Product description	Version type	Languages supported	Model
CX-Server Lite Designed for use in Microsoft Excel, Visual Basic or .NET environments to Omron PLC's single license	Serial & Network Version	English, French, German, Italian, Spanish	<b>CX-LITE-EV</b> □•□
CX-ServerOPC Omron OPC Server, single license, supports all Omron network protocols	Serial & Network Version	English, French, German, Italian, Spanish	<b>CX-OPC-EV</b> □•□

**Note:** The boxes next to V□•□ indicates the current version of software (1.0, 2.0, 3.0, etc.).

# SCADA Development Software

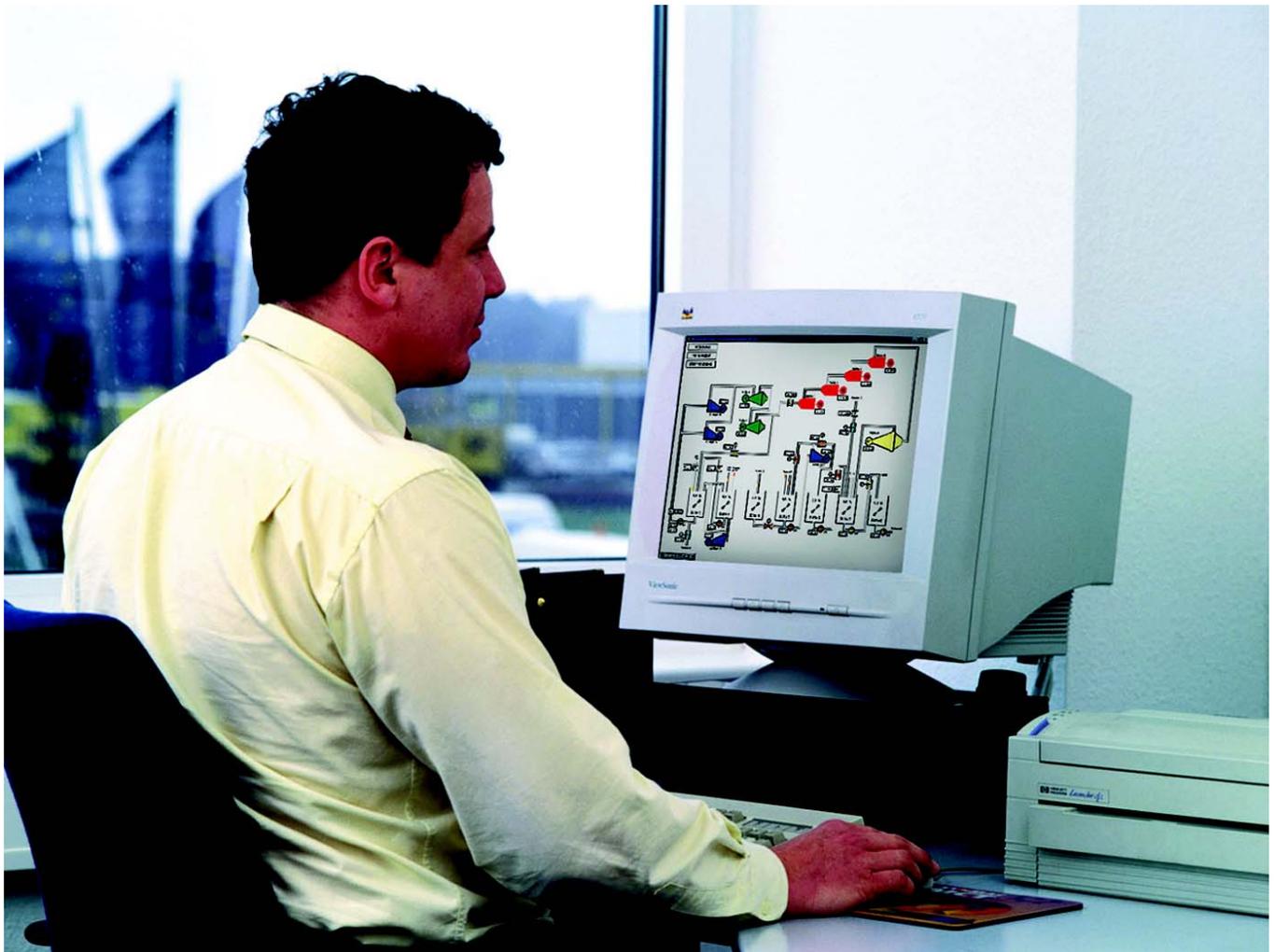
# SCADA

Quick Link  
L428

## SCADA and Process Monitoring Solutions

Develop modern Human Machine Interfaces (HMI) and Supervisory Control and Data Acquisition System (SCADA) applications that run native on Windows NT, 2000, XP, Vista or in an Internet and Intranet environment.

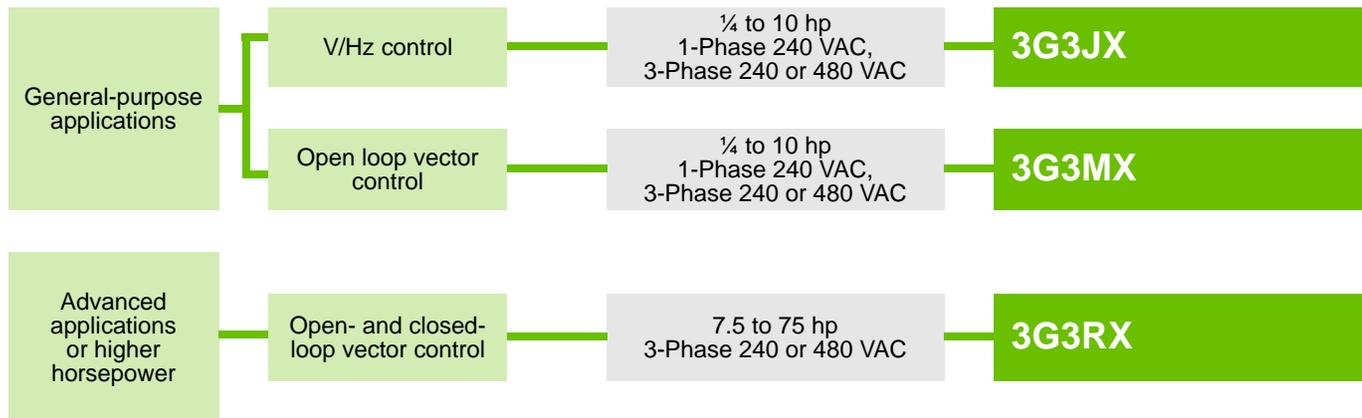
- SCADA applications include control room monitoring, tank farms, petrochemical, pharmaceutical, and detention
- HMI software designed to interface enterprise-wide
- Serve the process screens up to any PC with built-in Web Servers
- Includes tools to configure applications in conformance with the FDA 21 CFR Part 11 regulation
- Provides multi-level security for applications, including use over Intranets and Internet



## Contents

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<b>3G3MX</b> Compact open loop vector control AC Drive	E-4
<b>3G3RX</b> Advanced open or closed loop vector control AC Drive	E-7

## Selection Guide



# AC Drives 3G3JX

Quick Link  
D222

## V/Hz AC Drive with Energy Saving Function

- V/Hz control
- Top and bottom wiring enables simple contactor replacement
- Side by side mounting contributes to space savings
- Microsurge voltage suppression reduces motor burn out, allows use of most general purpose induction motors
- Automatic energy saving function significantly reduces energy usage on fan and pump applications
- Overcurrent and overvoltage trip suppression reduces nuisance tripping
- Re-start function allows automatic recovery from momentary power loss
- Built-in PID function eliminates the need for external controller



## Specifications

Power supply	
Rated input voltage & frequency	1-phase: 200 V -15% to 240 V +10%, 50/60 Hz $\pm$ 5% 3-phase: 200 V -15% to 240 V +10%, 50/60 Hz $\pm$ 5% 3-phase: 380 V -15% to 480 V +10%, 50/60 Hz $\pm$ 5%
Control characteristics	
Control method	Sine Wave PWM (V/f control), possible to program any V/f pattern
Output frequency range	0.5 to 400 Hz
Frequency accuracy (temperature change)	Digital command: $\pm$ 0.01% of the maximum frequency Analog command: $\pm$ 0.4% of the maximum frequency (25°C $\pm$ 10°C)
Frequency setting resolution	Digital setting: 0.1 Hz Analog setting: maximum frequency/1000
Overload capacity	150% rated output current for one minute
Frequency setting signal	Operator: Up and Down Keys or frequency setting potentiometer Potentiometer: Analog setting 1 K to 2 K Ohms RS-485 port Modbus Communications External signal 0 to 10 VDC (20 k Ohms), 4 to 20 mA (250 Ohms)
Acceleration/deceleration time	0.01 to 3000 seconds, linear and S-curve acceleration/deceleration, second acceleration/deceleration setting available
Protective functions	
Motor overload protection	Solid state motor overload protection at 115% of motor FLA
Overcurrent trip suppression	When the Over-current Trip Suppression feature is enabled, the drive stops the acceleration ramp in each case until the motor current level is less than the threshold value, which is approximately 150% of the rated current.
Overload operation	The drive monitors the motor current during acceleration or constant speed operation. If it reaches the overload limit level, the output frequency is lowered automatically according to the overload limit parameter.
Overvoltage protection level setting during deceleration	This function automatically keeps DC voltage at the set level during deceleration. 240-V class: 330 to 395 480-V class: 660 to 790
Momentary power loss	The amount of time a power input undervoltage can occur without tripping the power failure alarm. Range is 0.3 to 25 seconds. If under-voltage exists longer than this time, the drive trips.
Cooling method	Cooling fan is provided for: 240 V and 460 V, 2 HP or larger drives (3-phase and Single-phase); other models are self-cooling

Protective functions (continued)	
Cooling fin overheat	Protected by electronic circuit
Cooling fan control	ON/OFF selection to provide longer life for cooling fan and additional energy savings
Stall prevention	Overload Limit/Overload Warning helps prevent an overcurrent trip due to rapid load fluctuation in acceleration or deceleration
Ground fault	Protected by electronic circuit (rated output current level)
Power charge indication	Power LED indicator stays ON
Environmental conditions	
Enclosure rating	IP20 (NEMA 1)
Location	Indoor (free from corrosive gases and dust)
Ambient temperature	-14°F to 122°F (-10°C to 50°C) Both the carrier frequency and output current need to be reduced at over 40°C
Storage temperature	-4°F to 149°F (-20°C to 65°C) Short-time temperature during transport
Humidity	20% to 90% RH (Non condensing)
Elevation	3,281 ft (1,000 m) or below
Wiring distance	328 ft (100 m) or less between AC Drive and motor
Vibration	5.9 m/s <sup>2</sup> (0.6 G), 10 to 55 Hz
Other functions	
Multi-function inputs	Multi-function input terminals S1 to S5 Select 5 functions among the 31 functions available and allocate them as required
Multi-function outputs	Multi-function output terminal P1 Select 1 functions among the 12 functions available and allocate them as required
Standard functions	AVR function, V/f characteristic selection, upper/lower limit, 16-step speeds, starting frequency adjustment, jogging operation, carrier frequency adjustment, PID control, frequency jump, analog gain/bias adjustment, S-shape acceleration/deceleration, electronic thermal characteristics/level adjustment, retry function, torque boost, trip monitor, soft lock function, frequency conversion display, Re-start function, overcurrent suppression function

## 3G3JX AC Drive Ordering Information

Input Voltage	Phase	Rated output current (A)	kW	Nominal HP <sup>1</sup>	Model Number
240	1	1.4	0.2	1/4	3G3JX-AE002
240	1	2.6	0.4	1/2	3G3JX-AE004
240	1	4.0	0.75	1	3G3JX-AE007
240	1	7.1	1.5	2	3G3JX-AE015
240	1	10.0	2.2	3	3G3JX-AE022
240	3	1.4	0.2	1/4	3G3JX-A2002
240	3	2.6	0.4	1/2	3G3JX-A2004
240	3	4.0	0.75	1	3G3JX-A2007
240	3	7.1	1.5	2	3G3JX-A2015
240	3	10.0	2.2	3	3G3JX-A2022
240	3	15.9	3.7	5	3G3JX-A2037
240	3	24	5.5	7.5	3G3JX-A2055
240	3	32	7.5	10	3G3JX-A2075
480	3	1.5	0.4	1/2	3G3JX-A4004
480	3	2.5	0.75	1	3G3JX-A4007
480	3	3.8	1.5	2	3G3JX-A4015
480	3	5.5	2.2	3	3G3JX-A4022
480	3	8.6	3.7	5	3G3JX-A4037
480	3	13	5.5	7.5	3G3JX-A4055
480	3	16	7.5	10	3G3JX-A4075

**Note:** Controls should be sized based upon motor FLA (Full Load Amps), not on horsepower.  
Constant Torque overload set at 150% for 60 seconds.

<sup>1</sup> Nominal HP rating based on standard 1800 RPM motor amperage. Use of high efficiency motors and motors of different base speeds may increase or decrease applicable motor HP.

## Support Software and Programming Devices

Item	Description	Model
Software	CX-Drive	CX-Drive

## Accessories

Item	Description	Model
DIN rail mounting bracket	DIN rail mounting bracket for 3G3JX-A2002, -A2004, -A2007 -AE002, -AE004	3G3AX-DIN11
DIN rail mounting bracket	DIN rail mounting bracket for 3G3JX-A2015 -A2022, -A2037, -A4004, -A4007, -A4015, -A4022, -A4037, -AE007, -AE015, -AE022	3G3AX-DIN12
Digital operator	Optional external digital operator. 3G3JX operator can not be removed	3G3AX-OP01
Digital operator cable	Digital operator cable, 1 m	3G3AX-OPCN1
Digital operator cable	Digital operator cable, 3 m	3G3AX-OPCN3

Please refer to Page E-9 for additional information on AC Drive accessories.

## Manuals

Item	Description	Model
User's Manual	3G3JX User's Manual	I558-E1
Brochure	AC Drives JX, MX, RX	I201-E-01
Catalog	AC Drives Catalog	I914-E3

# AC Drives

# 3G3MX

Quick Link  
D223

## 3G3MX Compact Open Loop Vector Control AC Drive

- Open loop vector control
- High starting torque: 200% at 1 Hz allows start of high inertia loads
- Side by side mounting saves panel space
- Microsurge voltage suppression reduces motor burn out, allows use of most general purpose induction motors
- Overcurrent and overvoltage trip suppression reduces nuisance tripping
- Built-in PID function eliminates the need for external controller
- Re-start function allows automatic recovery from momentary power loss
- Removable control circuit terminal block saves wiring time



## Specifications

Power Supply	
Rated input voltage & frequency	1-phase: 200 V -10% to 240 V +10%, 50/60 Hz $\pm$ 5% 3-phase: 200 V -10% to 240 V +10%, 50/60 Hz $\pm$ 5% 3-phase: 380 to 480 V $\pm$ 10%, 50/60 Hz $\pm$ 5%
Control characteristics	
Control method	Sine Wave PWM (V/f control), possible to program any V/f pattern, Open loop vector control (Advanced Sensorless Vector Control)
Output frequency range	0.5 to 400 Hz
Frequency accuracy (temperature change)	Digital command: $\pm$ 0.01% of the maximum frequency Analog command: $\pm$ 0.2% of the maximum frequency (25°C $\pm$ 10°C)
Frequency setting resolution	Digital setting: 0.1 Hz Analog setting: maximum frequency/1000
Overload capacity	150% rated output current for one minute
Frequency setting signal	Operator: Up and Down Keys or frequency setting potentiometer Potentiometer: Analog setting 1 K to 2 K Ohms (2W) RS-485 port Modbus Communications External signal 0 to 10 VDC (10 k Ohms), 4 to 20 mA (250 Ohms)
Acceleration/deceleration time	0.01 to 3000 seconds, linear and S-curve acceleration/deceleration, second acceleration/deceleration setting available
Protective functions	
Motor overload protection	Solid state motor overload protection at 115% of motor FLA
Overcurrent trip suppression	When the Over-current Trip Suppression feature is enabled, the drive stops the acceleration ramp in each case until the motor current level is less than the threshold value, which is approximately 150% of the rated current.
Overload operation	The drive monitors the motor current during acceleration or constant speed operation. If it reaches the overload limit level, the output frequency is lowered automatically according to the overload limit parameter.
Overvoltage protection level setting during deceleration	This function automatically keeps DC voltage at the set level during deceleration. 200-V class: 330 to 395 400-V class: 660 to 790
Momentary power loss	The amount of time a power input undervoltage can occur without tripping the power failure alarm. Range is 0.3 to 25 seconds. If under-voltage exists longer than this time, the drive trips.
Cooling method	Cooling fan is provided for: 240 V and 460 V, 2 HP or larger drives (3-phase and Single-phase); other models are self-cooling
Cooling fin overheat	Protected by electronic circuit

Protective functions (continued)	
Cooling fan control	ON/OFF selection to provide longer life for cooling fan and additional energy savings
Stall prevention	Overload limit/overload warning helps prevent an overcurrent trip due to rapid load fluctuation in acceleration or deceleration
Ground fault	Protected by electronic circuit (rated output current level)
Power charge indication	Power LED indicator stays ON
Environmental conditions	
Enclosure rating	IP20 (NEMA 1)
Location	Indoor (free from corrosive gases and dust)
Ambient temperature	-14°F to 122°F (-10°C to 50°C) Both the carrier frequency and output current need to be reduced at over 40°C
Storage temperature	-4°F to 149°F (-20°C to 65°C) Short-time temperature during transport
Humidity	20% to 90% RH (Non condensing)
Elevation	3,281 ft (1,000 m) or below
Wiring distance	328 ft (100 m) or less between AC Drive and motor
Vibration	5.9 m/s <sup>2</sup> (0.6 G), 10 to 55 Hz
Other functions	
Multi-function inputs	Multi-function input terminals S1 to S6 Select six functions among the 27 functions available and allocate them as required
Multi-function outputs	Multi-function output terminals P1 and P2 Select 2 functions among the 10 functions available and allocate them as required
Standard functions	AVR function, V/f characteristic selection, upper/lower limit, 16-step speeds, starting frequency adjustment, jogging operation, carrier frequency adjustment, PID control, frequency jump, analog gain/bias adjustment, S-shape acceleration/deceleration, electronic thermal characteristics/level adjustment, retry function, torque boost, trip monitor, soft lock function, frequency conversion display, re-start prevention, overcurrent suppression function, microsurge voltage suppression

## 3G3MX AC Drive Ordering Information

Input Voltage (V)	Phase	Rated output current (A)	kW	Nominal HP <sup>1</sup>	Model Number
240	1	1.6	0.2	1/4	3G3MX-AE002
240	1	2.6	0.4	1/2	3G3MX-AE004
240	1	4.0	0.75	1	3G3MX-AE007
240	1	8.0	1.5	2	3G3MX-AE015
240	1	11.0	2.2	3	3G3MX-AE022
240	3	1.6	0.2	1/4	3G3MX-A2002
240	3	3.0	0.4	1/2	3G3MX-A2004
240	3	5.0	0.75	1	3G3MX-A2007
240	3	8.0	1.5	2	3G3MX-A2015
240	3	11.0	2.2	3	3G3MX-A2022
240	3	17.5	3.7	5	3G3MX-A2037
240	3	24.0	5.5	7.5	3G3MX-A2055
240	3	32.0	7.5	10	3G3MX-A2075
480	3	1.5	0.4	1/2	3G3MX-A4004
480	3	2.5	0.75	1	3G3MX-A4007
480	3	3.8	1.5	2	3G3MX-A4015
480	3	5.5	2.2	3	3G3MX-A4022
480	3	8.6	3.7	5	3G3MX-A4037
480	3	13.0	5.5	7.5	3G3MX-A4055
480	3	16.0	7.5	10.0	3G3MX-A4075

**Note:** Controls should be sized based upon motor FLA (Full Load Amps), not on horsepower.  
Constant Torque overload set at 150% for 60 seconds.

<sup>1</sup> Nominal HP rating based on standard 1800 RPM motor amperage. Use of high efficiency motors and motors of different base speeds may increase or decrease applicable motor HP.

## Support Software and Programming Devices

Item	Description	Model
Software	CX-Drive	CX-Drive

## Accessories

Item	Description	Model
DIN rail mounting bracket	DIN rail mounting bracket for 3G3MX-A2002, -A2004, -A2007, -AE002, -AE004	<b>3G3AX-DIN21</b>
DIN rail mounting bracket	DIN rail mounting bracket for 3G3MX-A2015, -A2022,-A2037, -A2055, -A2075, -A4004, -A4007, -A4015, -A4022, -A4037, -A4055, -A4075, -AE007, -AE015, -AE022	<b>3G3AX-DIN22</b>
Digital operator	Optional external digital operator	<b>3G3AX-OP01</b>
Digital operator cable	Digital operator cable 1 m	<b>3G3AX-OPCN1</b>
Digital operator cable	Digital operator cable 3 m	<b>3G3AX-OPCN3</b>

Please refer to Page E-9 for additional information on AC Drive accessories.

## Manuals

Item	Description	Model
User's Manual	3G3MX User's Manual	<b>I559-E1</b>
Brochure	AC Drives JX, MX, RX	<b>I20I-E-01</b>
Catalog	AC Drives Catalog	<b>I914-E3</b>

# AC Drives 3G3RX

Quick Link  
D224

## 3G3RX Advanced Closed Loop Vector Control AC Drive

- Open and closed loop vector control
- High starting torque 200% at 0.3 Hz (Closed loop) allows zero speed load holding
- With encoder feedback, can be used for low precision positioning
- Automatic energy saving function significantly reduces energy usage on constant speed fan and pump applications
- Microsurge voltage suppression reduces motor burn out, allows use of most general purpose induction motors
- Overcurrent and overvoltage trip suppression reduces nuisance tripping
- Re-start function allows automatic recovery from momentary power loss
- Built-in radio noise filter lowers noise impact on other drives and equipment



## Specifications

Power supply	
Rated input voltage & frequency	3-phase: 200 V-15% to 240 V +10%, 50/60 Hz $\pm$ 5% 3-phase: 380 V to 480 V +10%, 50/60 Hz $\pm$ 5%
Control characteristics	
Control method	Sine Wave PWM (V/f control), possible to program any V/f pattern, Open loop vector control (advanced sensorless vector control), closed loop vector control with encoder feedback
Output frequency range	0.1 to 400 Hz
Frequency accuracy (temperature change)	Digital command: $\pm$ 0.01% of the maximum frequency Analog command: $\pm$ 0.2% of the maximum frequency (25°C $\pm$ 10°C)
Frequency setting resolution	Digital setting: 0.01 Hz Analog setting: Max. frequency/4000 (Terminal FV: 12 bits/0 to +10 V), (Terminal FE: 12 bits/-10 to +10 V), (Terminal FI: 12 bits/0 to +20 mA)
Overload capacity	150% rated output current for 1 minute 200% for 3 s
Frequency setting signal	Operator: Up and Down Keys RS-485 port Modbus Communications External signal 0 to 10 VDC, -10 to + 10 VDC (Input Impedance 10 k Ohms), 4 to 20 mA (Input impedance 100 Ohms)
Acceleration/deceleration time	0.01 to 3600 seconds, linear and S-curve acceleration/deceleration, second acceleration/deceleration setting available
Protective functions	
Motor overload protection	Solid state motor overload protection
Overcurrent trip suppression	When the over-current trip suppression feature is enabled, the drive stops the acceleration ramp in each case until the motor current level is less than the threshold value, which is approximately 150% of the rated current.
Overload operation	The drive monitors the motor current during acceleration or constant speed operation. If it reaches the overload limit level, the output frequency is lowered automatically according to the overload limit parameter.
Overvoltage protection level setting during deceleration	This function automatically keeps DC voltage at the set level during deceleration. 200-V class: 330 to 395 400-V class: 660 to 790

Protective functions (continued)	
Momentary power loss	The amount of time a power input undervoltage can occur without tripping the power failure alarm. Range is 0.3 to 25 seconds. If under-voltage exists longer than this time, the drive trips.
Cooling method	Cooling fan is provided for: 240 V and 480 V
Cooling fin overheat	Protected by electronic circuit
Cooling fan fault	ON/OFF selection to provide longer life for cooling fan and additional energy savings
Stall prevention	Overload limit/overload warning helps prevent an overcurrent trip due to rapid load fluctuation in acceleration or deceleration
Ground fault	Protected by electronic circuit (rated output current level)
Power charge indication	Power LED indicator stays ON
Environmental conditions	
Enclosure rating	Open chassis: IP20
Location	Indoor (free from corrosive gases and dust)
Ambient temperature	-14°F to 122°F (-10°C to 50°C) Both the carrier frequency and output current need to be reduced at over 40°C
Storage temperature	-4°F to 149°F (-20°C to 65°C) Short-time temperature during transport
Humidity	20% to 90% RH (Non condensing)
Elevation	3,281 ft (1,000 m) or below
Wiring distance	328 ft (100 m) or less between AC Drive and motor
Vibration	5.9 m/s <sup>2</sup> (0.6 G), 10 to 55 Hz (3G3RX-A□055/-A□075/-A□110/-A□150/-A□185/-A□220) 2.94 m/s <sup>2</sup> (0.3 G), 10 to 55 Hz (3G3RX-A□300/-A□370/-A□450/-A□550) <b>Note:</b> "□" = E, 2, 4
Other functions	
Multi-function inputs	Select 8 functions of the 61 functions and allocate them to terminals S1 to S8 sink/source logic selection
Multi-function outputs	Select among 45 functions available and allocate them to terminals P1 through P5 sink/source logic selection
Standard functions	Upper/lower frequency limit, frequency jump, curve acceleration/deceleration, manual torque boost level/break, energy-saving operation, analog meter adjustment, starting frequency, carrier frequency adjustment, electronic thermal function, external start/end (frequency/rate), analog input selection, trip retry, restart during momentary power interruption, various signal outputs, reduced voltage startup, overload limit, initialization value setting, automatic deceleration at power-off, AVR function, automatic acceleration/deceleration, auto tuning (Online/Offline), high-torque multi-motor operation control (sensor-less vector control of two motors with one AC Drive)

## 3G3RX AC Drive Ordering Information

Input Voltage	Phase	Rated output current (A)	kW	Nominal HP <sup>1</sup>	Model Number
240V	3	24	5.5	7.5	3G3RX-A2055
240V	3	32	7.5	10	3G3RX-A2075
240V	3	46	11	15	3G3RX-A2110
240V	3	64	15	20	3G3RX-A2150
240V	3	76	18.5	25	3G3RX-A2185
240V	3	95	22	30	3G3RX-A2220
240V	3	121	30	40	3G3RX-A2300
240V	3	145	37	50	3G3RX-A2370
240V	3	182	45	60	3G3RX-A2450
240V	3	220	55	75	3G3RX-A2550
480V	3	14	5.5	7.5	3G3RX-A4055
480V	3	19	7.5	10	3G3RX-A4075
480V	3	25	11	15	3G3RX-A4110
480V	3	32	15	20	3G3RX-A4150
480V	3	38	18.5	25	3G3RX-A4185
480V	3	48	22	30	3G3RX-A4220
480V	3	58	30	40	3G3RX-A4300
480V	3	75	37	50	3G3RX-A4370
480V	3	91	45	60	3G3RX-A4450
480V	3	112	55	75	3G3RX-A4550

**Note:** Controls should be sized based upon motor FLA (Full Load Amps), not on horsepower.  
Constant Torque overload set at 150% for 60 seconds.

<sup>1</sup> Nominal HP rating based on standard 1800 RP motor amperage. Use of high efficiency motors and motors of different base speeds may increase or decrease applicable motor HP.

## Accessories for JX, MX, and RX AC Drives

Item	Description	Model	
Digital operator	For setting parameters on the AC Drive	3G3AX-OP01	
Digital operator cable	Digital operator cable 1 m	3G3AX-OPCN1	
Digital operator cable	Digital operator cable 3 m	3G3AX-OPCN3	
RX Encoder Feedback Board	Option card for encoder feedback	3G3AX-PG01	
RX Interface Board	PLC I/O interface	3G3AX-DIO1	
Regenerative braking unit	240 V class	120 W, 180 $\Omega$	3G3AX-RBU21
		120 W, 20 $\Omega$	3G3AX-RBU22
		6 $\Omega$	3G3AX-RBU23
		4 $\Omega$	3G3AX-RBU24
	480 V class	120 W, 180 $\Omega$	3G3AX-RBU41
		24 $\Omega$	3G3AX-RBU42
		12 $\Omega$	3G3AX-RBU43
Braking resistor	Compact type	120 W, 100 $\Omega$ , 5% ED	3G3AX-RBA1201
		120 W, 100 $\Omega$ , 2.5% ED	3G3AX-RBA1202
		120 W, 50 $\Omega$ , 15% ED	3G3AX-RBA1203
		120 W, 35 $\Omega$ , 10% ED	3G3AX-RBA1204
	Standard type	200 W, 100 $\Omega$ , 10% ED	3G3AX-RBB2001
		200 W, 100 $\Omega$ , 75% ED	3G3AX-RBB2002
		300 W, 50 $\Omega$ , 7.5% ED	3G3AX-RBB3001
		400 W, 35 $\Omega$ , 7% ED	3G3AX-RBB4001
	Medium capacity type	400 W, 50 $\Omega$ , 10% ED	3G3AX-RBC4001
		600 W, 35 $\Omega$ , 10% ED	3G3AX-RBC6001
		1200 W, 17 $\Omega$ , 10% ED	3G3AX-RBC12001
DC reactor	For 3-phase 240 V AC Drives	5.5 kW	3G3AX-DL2055
		7.5 kW	3G3AX-DL2075
		11 kW	3G3AX-DL2110
		15 kW	3G3AX-DL2150
		18.5 kW / 22 kW	3G3AX-DL2220
		30 kW	3G3AX-DL2300
		37 kW	3G3AX-DL2370
		45 kW	3G3AX-DL2450
		55 kW	3G3AX-DL2550
		For 3-phase 480 V AC Drives	5.5 kW
	7.5 kW		3G3AX-DL4075
	11 kW		3G3AX-DL4110
	15 kW		3G3AX-DL4150
	18.5 kW / 22 kW		3G3AX-DL4220
	30 kW		3G3AX-DL4300
	37 kW		3G3AX-DL4370
	45 kW		3G3AX-DL4450
	55 kW		3G3AX-DL4550

## Accessories for JX, MX, and RX AC Drives (continued)

Item	Description	Model			
Input noise filter	For 3-phase 240 V AC Drive	5.5 kW	3G3AX-NFI24		
		7.5 kW	3G3AX-NFI25		
		11 kW	3G3AX-NFI26		
		15 kW	3G3AX-NFI27		
		18.5 kW	3G3AX-NFI28		
		22 kW / 30 kW	3G3AX-NFI29		
		37 kW	3G3AX-NFI2A		
		45 kW	3G3AX-NFI2B		
		55 kW	3G3AX-NFI2C		
		For 3-phase 480 V AC Drives	5.5 kW / 7.5 kW	3G3AX-NFI43	
	11 kW		3G3AX-NFI44		
	15 kW		3G3AX-NFI45		
	18.5 kW		3G3AX-NFI46		
	22 kW		3G3AX-NFI47		
	30 kW		3G3AX-NFI48		
	37 kW		3G3AX-NFI49		
	45 kW / 55 kW		3G3AX-NFI4A		
	Output noise filter		All voltages up to 500 VAC	25 A	3G3AX-NFO03
				50 A	3G3AX-NFO04
		75 A		3G3AX-NFO05	
100 A		3G3AX-NFO06			
150 A		3G3AX-NFO07			
AC reactor		For 3-phase 240 V AC Drives		5.5 kW / 7.5 kW	3G3AX-AL2110
	11 kW / 15 kW		3G3AX-AL2220		
	18.5 kW / 22 kW		3G3AX-AL2330		
	30 kW / 37 kW		3G3AX-AL2500		
	45 kW / 55 kW		3G3AX-AL2750		
	For 3-phase 480 V AC Drives	5.5 kW / 7.5 kW	3G3AX-AL4110		
		11 kW / 15 kW	3G3AX-AL4220		
		18.5 kW / 22 kW	3G3AX-AL4330		
		30 kW / 37 kW	3G3AX-AL4500		
		45 kW / 55 kW	3G3AX-AL4750		

## Manuals

Item	Description	Model
Manual	3G3RX USER'S MANUAL	I560-E1
Brochure	AC Drives JX, MX, RX	I20I-E-01
Catalog	AC Drives Catalog	I914-E3

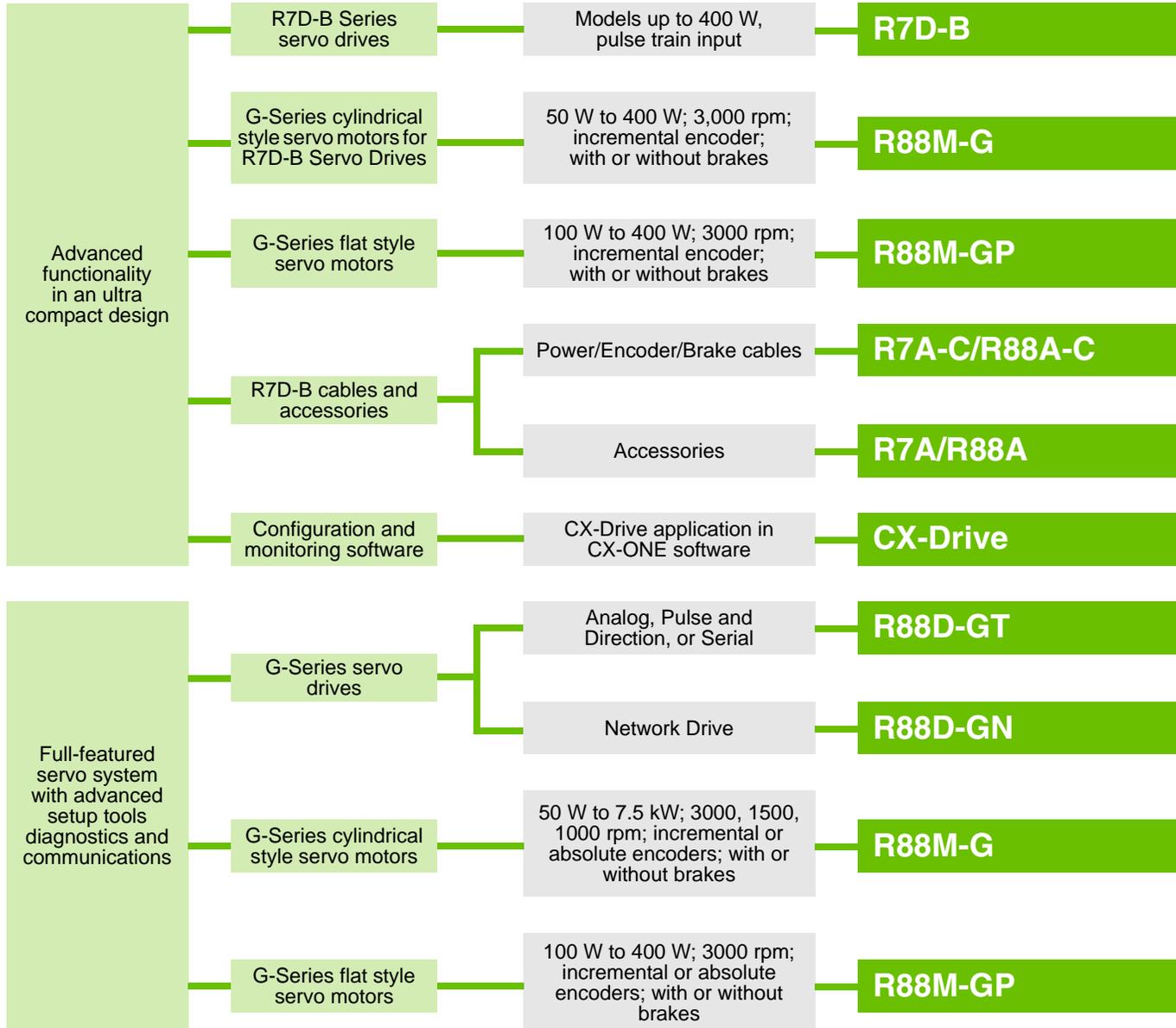
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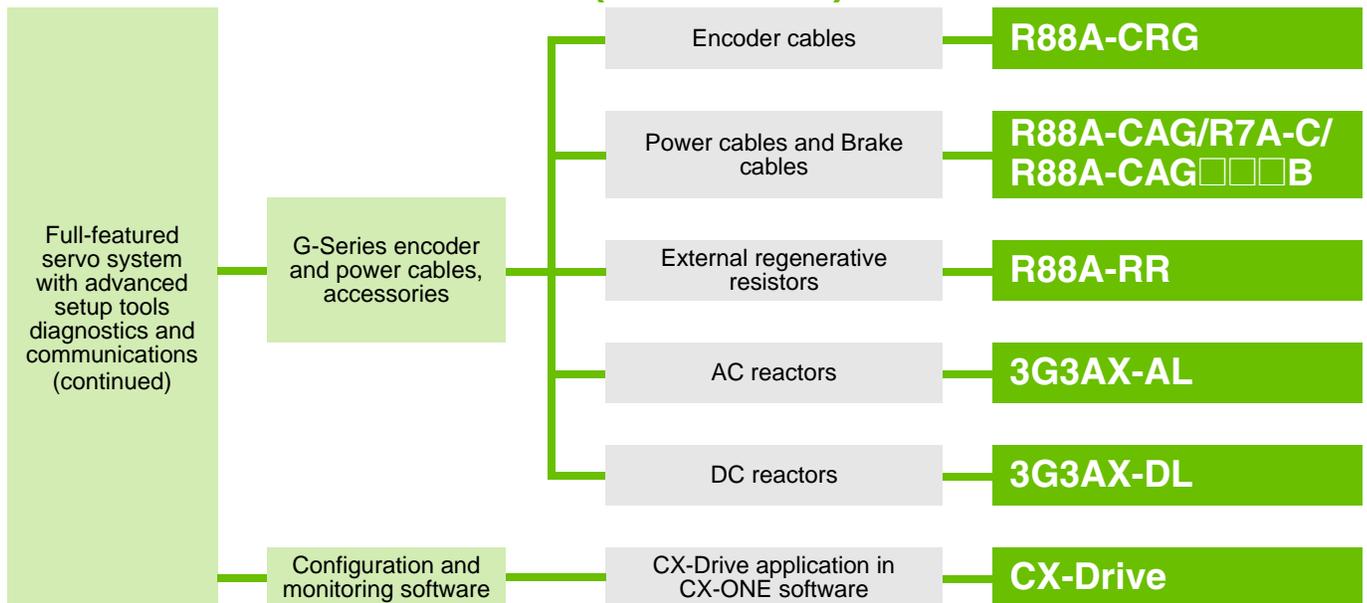
## Selection Guide

### Servo Drives and Motors

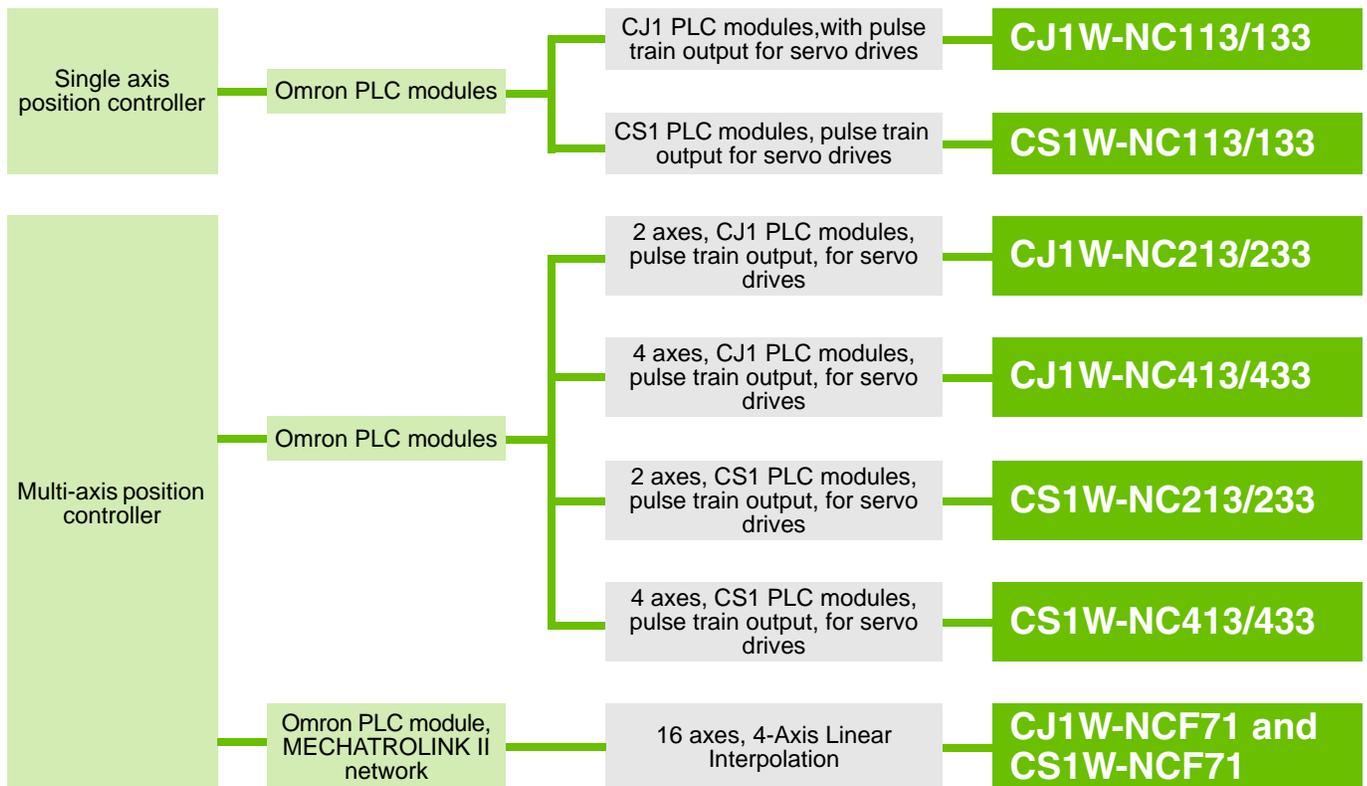


## Selection Guide

### Servo Drives and Motors (continued)

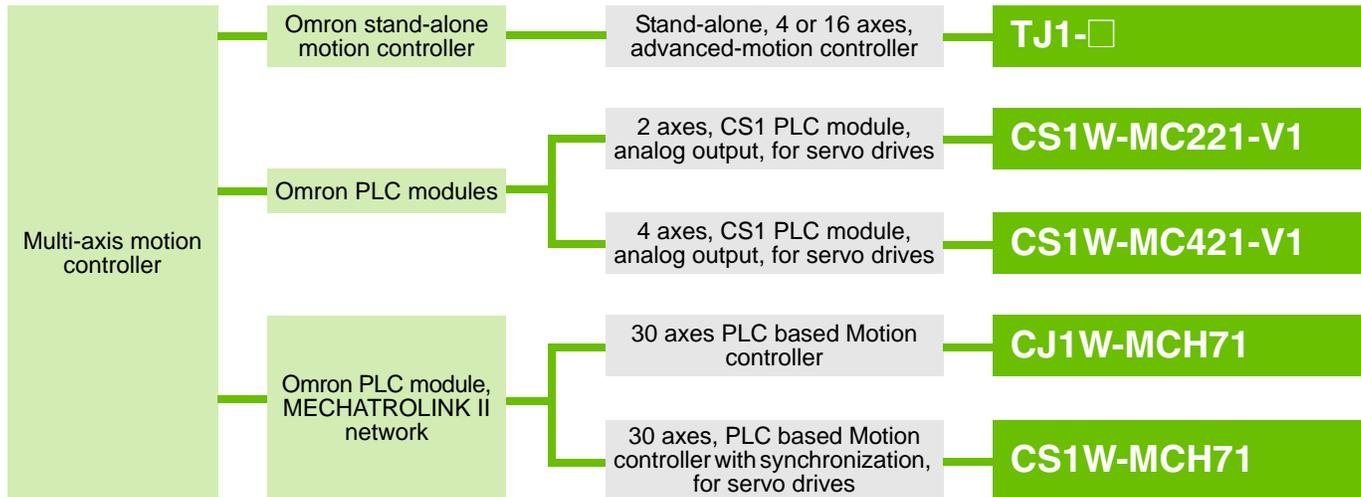


### Position and Motion Controllers

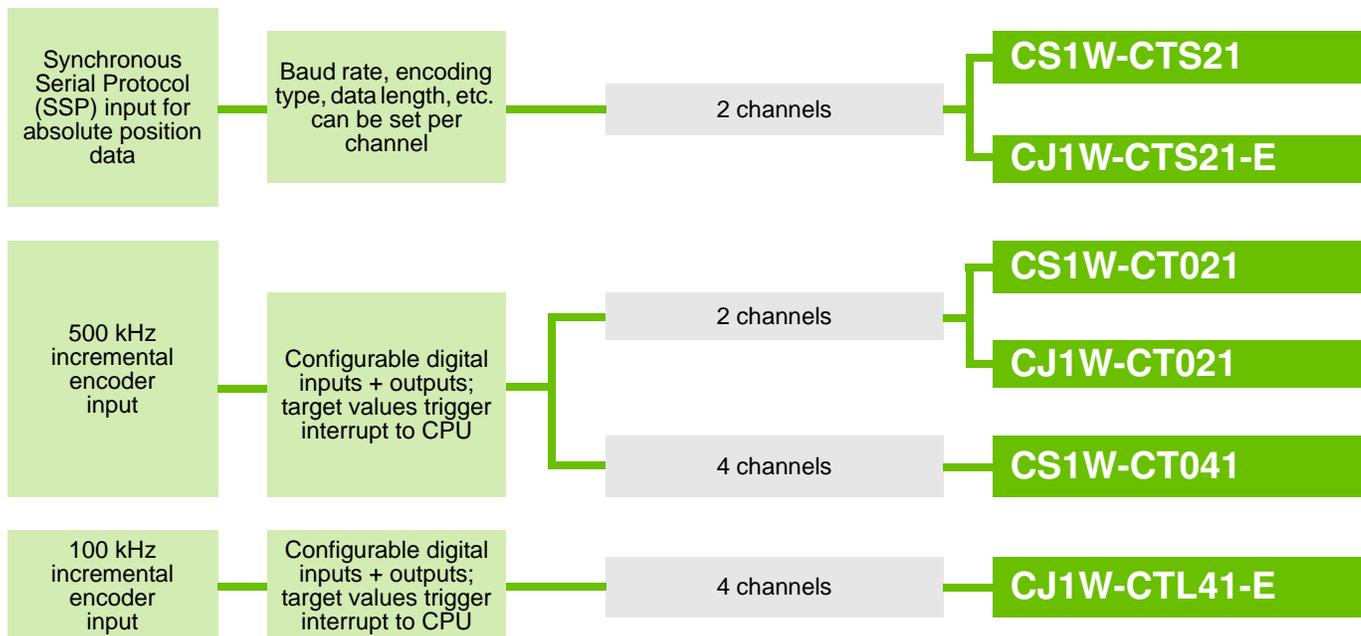


## Selection Guide

### Position and Motion Controllers (continued)



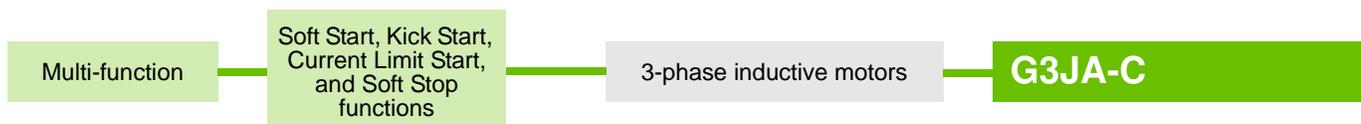
### High-Speed Counter PLC Modules



### Cam Positioners Emulate Mechanical Cam Switches

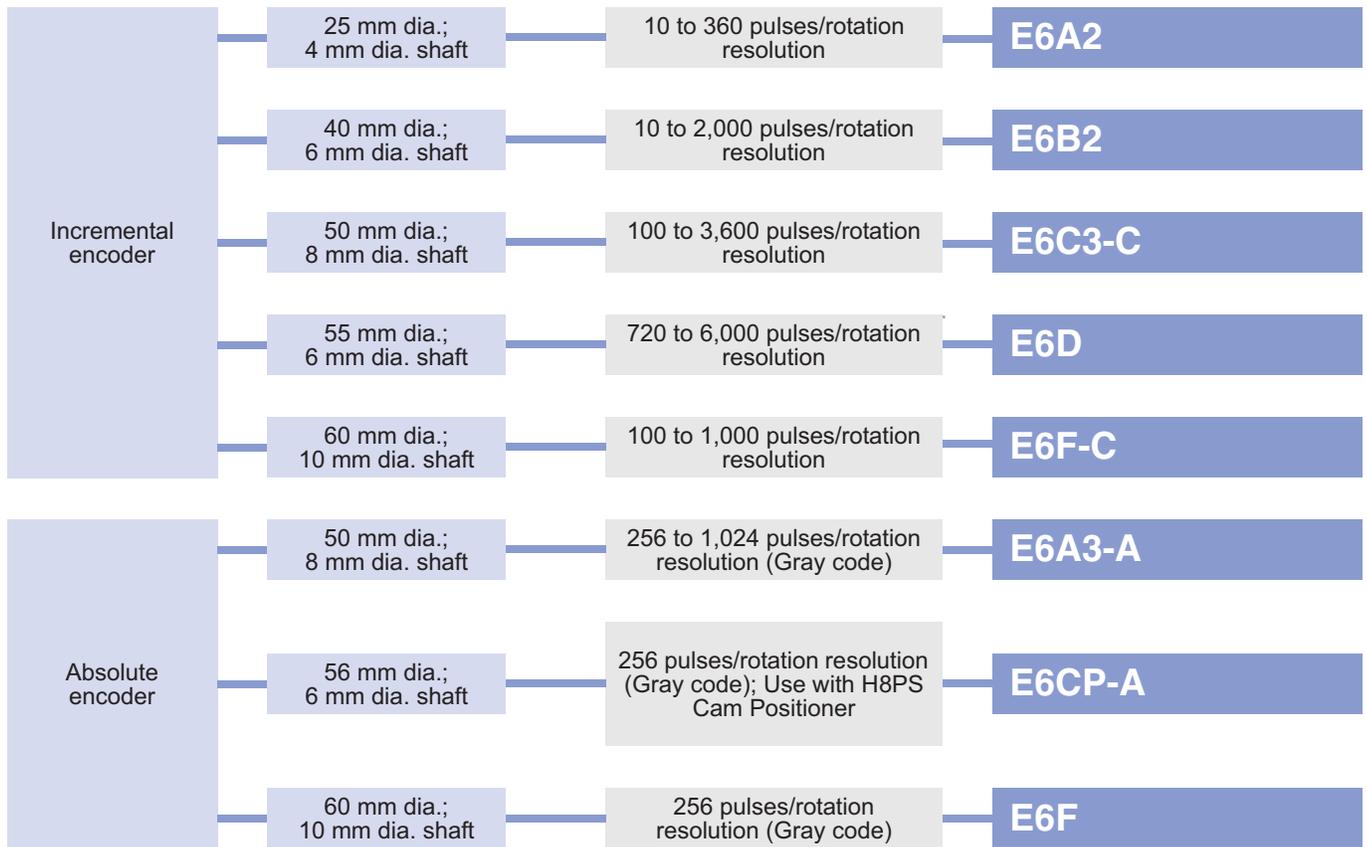


### Soft Starters



## Selection Guide

### Rotary Encoders



## Selection Guide

# R7-Series Servo Drives R7D-B



## Advanced Functionality in an Ultra Compact Design

- Small footprint, reduces the control panel space requirements
- Simple real-time autotuning, eliminates the need for complicated adjustments, reducing start up time
- Adaptive vibration suppression, reducing the amount of vibration improves positioning time and accuracy
- Command pulse frequencies up to 500 kpps enabling high-speed positioning and high-precision control
- Torque limiting function, set two torque limits, and switch between them; great for application, such as pressing or part insertion
- Copy function: Parameters can be easily set for many servo drives using the copy function in the programming unit or the configuration software, reducing start up time



## Ordering Information

### Servo Drive Model Numbers

The model number provides information such as the Servo Drive type, the applicable Servomotor capacity, and the power supply voltage.

R7D-BP01H

SMARTSTEP 2  
Servo Drive

Drive Type  
P: Pulse Train input

Applicable Servomotor  
Capacity

- A5: 50 W
- 01: 100 W
- 02: 200 W
- 04: 400 W

Power Supply Voltage

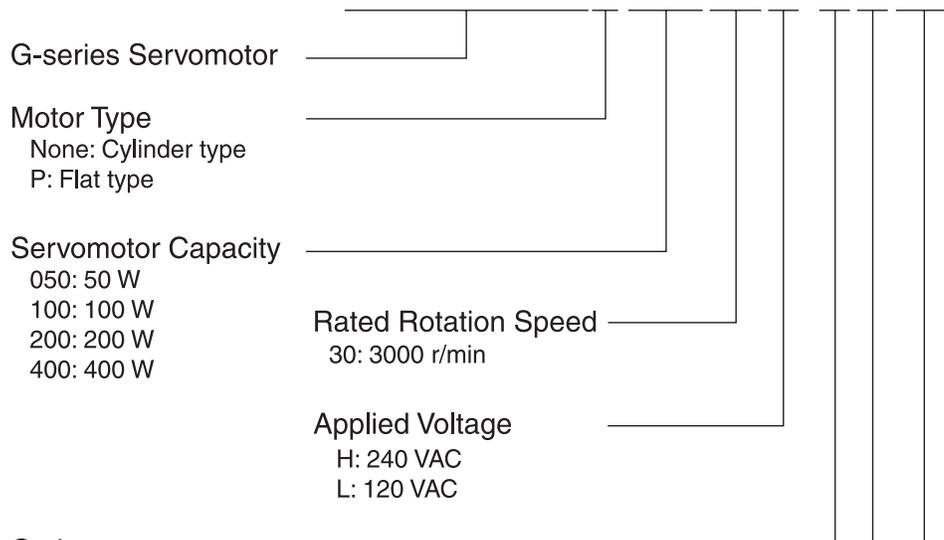
- L: 120 VAC
- H: Single-phase/Three-phase 240 VAC
- HH: Single-phase 240 VAC



## Servomotor Model Numbers

The model number provides information such as the Servomotor type, Servomotor capacity, rated speed, and options.

### R88M-GP10030H-BOS2



- Options
- None: Straight shaft
  - B: Brake
  - O: With Oil seal
  - S2: With Key tap

## Servo Motor and Drive Combinations

Only the Servomotor and Servo Drive combinations listed here can be used. Do not use other combinations.

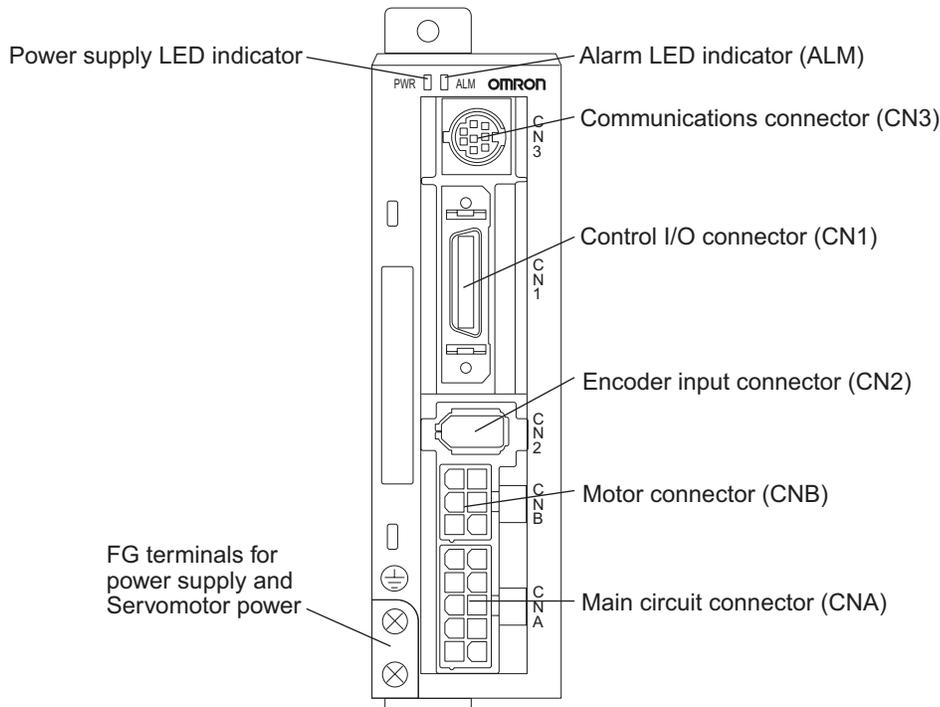
### Cylindrical Servomotors Combinations

Voltage	Servo Drive	Rated output	Servomotor	
	Pulse-string input		Without brake	With brake
Single-phase 120 VAC	R7D-BPA5L	50W	R88M-G05030H-S2	R88M-G05030H-BS2
	R7D-BP01L	100 W	R88M-G10030L-S2	R88M-G10030L-BS2
	R7D-BP02L	200 W	R88M-G20030L-S2	R88M-G20030L-BS2
Single-phase 240 VAC	R7D-BP01H	50 W	R88M-G05030H-S2	R88M-G05030H-BS2
		100 W	R88M-G10030H-S2	R88M-G10030H-BS2
	R7D-BP02HH	200 W	R88M-G20030H-S2	R88M-G20030H-BS2
	R7D-BP04H	400 W	R88M-G40030H-S2	R88M-G40030H-BS2
Three-phase 240 VAC	R7D-BP01H	50 W	R88M-G05030H-S2	R88M-G05030H-BS2
		100 W	R88M-G10030H-S2	R88M-G10030H-BS2
	R7D-BP02H	200 W	R88M-G20030H-S2	R88M-G20030H-BS2
	R7D-BP04H	400 W	R88M-G40030H-S2	R88M-G40030H-BS2

### Flat Servomotors Combinations

Voltage	Servo Drive	Rated output	Servomotor	
	Pulse-string input		Without brake	With brake
Single-phase 120 VAC	R7D-BP01L	100 W	R88M-GP10030L-S2	R88M-GP10030L-BS2
	R7D-BP02L	200 W	R88M-GP20030L-S2	R88M-GP20030L-BS2
Single-phase 240 VAC	R7D-BP01H	100 W	R88M-GP10030H-S2	R88M-GP10030H-BS2
	R7D-BP02HH	200 W	R88M-GP20030H-S2	R88M-GP20030H-BS2
	R7D-BP04H	400 W	R88M-GP40030H-S2	R88M-GP40030H-BS2
Three-phase 240 VAC	R7D-BP01H	100 W	R88M-GP10030H-S2	R88M-GP10030H-BS2
	R7D-BP02H	200 W	R88M-GP20030H-S2	R88M-GP20030H-BS2
	R7D-BP04H	400 W	R88M-GP40030H-S2	R88M-GP40030H-BS2

## Ordering Information



### Power Supply Cables (for CNA)

Specifications		Model
Power supply input cable for single-phase power (connectors attached)	2 m	R7A-CLB002S2
Power supply input cable for three-phase power (connectors attached)		R7A-CLB002S3
External regenerative resistor connection cable		R7A-CLB002RG

### Servo Motor Power Cable (for CNB)

Specifications		Model
Standard cables (connectors attached)	3 m	R7A-CAB003S
	5 m	R7A-CAB005S
	10 m	R7A-CAB010S
	15 m	R7A-CAB015S
	20 m	R7A-CAB020S

### Control Cables (for CN1)

Specifications		Model
Connector-terminal block cables	1 m	XW2Z-100J-B28
	2 m	XW2Z-200J-B28
General-purpose control cables	1 m	R7A-CPB001S
	2 m	R7A-CPB002S

### Motor Brake Cables

Specifications		Model
Standard cables	3 m	R88A-CAGA003B
	5 m	R88A-CAGA005B
	10 m	R88A-CAGA010B
	15 m	R88A-CAGA015B
	20 m	R88A-CAGA020B

### Control Terminal Block

Specifications	Model
With M3 screws	XW2B-34G4
With M3.5 screws	XW2B-34G5
With M3 screw	XW2D-34G6

### Connectors

Specifications	Model
Main circuit connector (CNA)	R7A-CNB01P
Servomotor connector (CNB)	R7A-CNB01A
Control input connector (CN1)	R88A-CNW01C
Encoder input connector (CN2)	R88A-CNW01R
Servomotor connector for encoder cable	R88A-CNG02R
Servomotor connector for servomotor power cable	R88A-CNG01A

### Encoder Cables (for CN2)

Specifications		Model
Standard cables (connectors attached)	3 m	R88A-CRGB003C
	5 m	R88A-CRGB005C
	10 m	R88A-CRGB010C
	15 m	R88A-CRGB015C
	20 m	R88A-CRGB020C

## DIN Rail Mounting Unit

Specifications	Model
DIN Rail mounting unit	R7A-DIN01B

## Parameter Unit

Specifications	Model
Parameter unit	R88A-PR02G

## Personal Computer Monitor Cable

Specifications	Model
Personal computer monitor cable    2 m	R88A-CCG002P2

## Reactors

Specifications	Applicable Servo Drive	Model
Single-phase 120 V AC	R7D-BPA5L	3G3AX-DL2002
	R7D-BP01L	3G3AX-DL2004
	R7D-BP02L	3G3AX-DL2007
Single-phase 240 V AC	R7D-BP01H	3G3AX-DL2004
	R7D-BP02HH	3G3AX-DL2004
	R7D-BP04H	3G3AX-DL2007
Three-phase 240 V AC	R7D-BP01H	3G3AX-AL2025
	R7D-BP02H	3G3AX-AL2025
	R7D-BP04H	3G3AX-AL2025

## External Regeneration Resistors

Specifications	Model
220 W, 47 Ω	R88A-RR22047S
80 W, 100 Ω	R88A-RR080100S
80 W, 50 Ω	R88A-RR08050S

## Servo Control Cable Options

Select the Servo relay unit and cable according to the model number of the position control unit being used.

Position control unit	Position control unit cable (See note 1)	Servo relay unit	Servo drive cable (See note 2)
CJ1W-NC133	XW2Z-□□□J-A18	XW2B-20J6-1B	XW2Z-□□□J-B29
CJ1W-NC233	XW2Z-□□□J-A19	XW2B-40J6-2B	
CJ1W-NC433			
CS1W-NC133	XW2Z-□□□J-A10	XW2B-20J6-1B	
CS1W-NC233	XW2Z-□□□J-A11	XW2B-40J6-2B	
CS1W-NC433			
CJ1W-NC113	XW2Z-□□□J-A14	XW2B-20J6-1B	
CJ1W-NC213	XW2Z-□□□J-A15	XW2B-40J6-2B	
CJ1W-NC413			
CS1W-NC113	XW2Z-□□□J-A6	XW2B-20J6-1B	
C200HW-NC113			
CS1W-NC213	XW2Z-□□□J-A7	XW2B-40J6-2B	
CS1W-NC413			
C200HW-NC213			
C200HW-NC413			
CJ1M-CPU21	XW2Z-□□□J-A33	XW2B-20J6-8A	XW2Z-□□□J-B32
CJ1M-CPU22		XW2B-40J6-9A (for 2 axes)	
CJ1M-CPU23			
CQM1H-PLB21	XW2Z-□□□J-A3	XW2B-20J6-3B (See note 1)	XW2Z-□□□J-B29

**Note:** 1. Insert the cable length into the boxes in the model number (0.5 m □□□ = 0.50; 1 m □□□ = 100; 2 m □□□ = 200).

**Position control unit cables** come in two lengths: 0.5 m and 1 m (some are also available in lengths of 2 m).

**Servo drive cables** available in two lengths: 1 m and 2 m.

2. Two servo drive cables are required if 2-axis control is performed using one position control unit.

## Specifications

### Servo Drives General Specifications

Item		Specifications
Ambient operating temperature, ambient operating humidity		0 to 55°C, 90% max. (with no condensation)
Ambient storage temperature, ambient storage humidity		-20 to 65°C, 90% max. (with no condensation)
Storage and operating atmosphere		No corrosive gasses, no dust, no iron dust, no exposure to moisture or cutting oil
Vibration resistance		10 to 60 Hz; acceleration: 5.9 m/s <sup>2</sup> (0.6 G) max.
Impact resistance		Acceleration of 19.6 m/s <sup>2</sup> max. 3 times each in X, Y, and Z directions
Insulation resistance		Between power supply/power line terminals and frame ground: 0.5 MΩ min. (at 500 VDC)
Dielectric strength		Between power supply/power line terminals and frame ground: 1,500 VAC for 1 min. at 50/60 Hz and between each control signal and frame ground: 500 VAC for 1 min.
Altitude		1,000 m above sea level max. (860 hp min.)
Degree of protection		Built into panel (IP10)
International standards	EC Directives	EMC Directive EN 55011 class A group 1 EN 61000-6-2
		Low Voltage Directive EN 50178
	UL standards	UL 508C
	cUL standards	cUL C22.2 No.14

## Characteristics

### 120 V AC Specification

Item	Servo Drive model		
	R7D-BPA5L	R7D-BP01L	R7D-BP02L
Continuous output current (rms)	1.0 A	1.6 A	2.5 A
Momentary maximum output current (rms)	3.3 A	5.1 A	7.5 A
Power supply capacity	0.16 KVA	0.25 KVA	0.42 KVA
Input power supply voltage (main circuit)	Single-phase 120 VAC (85 to 127 V), 50/60 Hz		
Input power supply current (rms) (main circuit)	1.4 A	2.2 A	3.7 A
Heat generated (main circuit)	12 W	16 W	22 W
Control method	All-digital servo		
Inverter method	IGBT-driven PWM method		
PWM frequency	12 kHz		6 kHz
Maximum response frequency (command pulses)	Line drive: 500 kpps, Open collector: 200 kpps		
Weight	0.35 kg		0.42 kg
Applicable motor capacity	50 W	100 W	200 W

## 240 V AC Specification

Item	Servo Drive model			
	R7D-BP01H	R7D-BP02HH	R7D-BP02H	R7D-BP04H
Continuous output current (rms)	1.0 A	1.6 A	1.6 A	2.5 A
Momentary maximum output current (rms)	3.3 A	4.9 A	4.9 A	7.8 A
Power supply capacity	0.27 KVA (0.30 KVA) (See note)	(0.35 KVA) (See note)	0.42 KVA	0.69 KVA (0.77 KVA) (See note)
Input power supply voltage (main circuit)	Both single-phase and three-phase 200 to 240 VAC (170 to 264 V), 50/60 Hz			
Input power supply current (rms) (main circuit)	0.7 A (1.5 A) (See note)	(1.6 A) (See note)	1.1 A	1.8 A (3.5 A) (See note)
Heat generated (main circuit)	14 W	16 W	20 W	26W
Control method	All-digital servo			
Inverter method	IGBT-driven PWM method			
PWM frequency	12 kHz			6 kHz
Maximum response frequency (command pulses)	Line drive: 500 kpps, Open collector: 200 kpps			
Weight	0.35 kg		0.42 kg	
Applicable motor capacity	100 W	200 W	200 W	400 W

Note: Value inside parentheses ( ) are for single-phase 240-V use.

## Servomotor Specifications (R88M-G)

### 3,000-r/min Cylindrical Servomotors

#### 120 V AC Specification

Item	Unit	R88M-G05030H	R88M-G10030L	R88M-G20030L
Rated output (See note 1)	W	50	100	200
Rated torque (See note 1)	N·m	0.16	0.32	0.64
Rated rotation speed	r/min	3000		
Max. rotation speed	r/min	5000		
Max. momentary torque (See note 1)	N·m	0.48	0.95	1.78
Rated current (See note 1)	A (rms)	1.1	1.7	2.5
Max. momentary current (See note 1)	A (rms)	3.4	5.1	7.6
Rotor inertia	kg·m <sup>2</sup>	2.5 x 10 <sup>-6</sup>	5.1 x 10 <sup>-6</sup>	1.4 x 10 <sup>-5</sup>
Applicable load inertia	—	30 times rotor inertia max.		

Note: 1. These are the values when the Servomotor is combined with a Servo Drive at room temperature.  
The momentary maximum torque shown above indicates the standard value.

### 3,000-r/min Cylindrical Servomotors

#### 240 V AC Specification

Item	Unit	R88M-G05030H	R88M-G10030L	R88M-G20030L	R88M-G40030H
Rated output (See note 1)	W	50	100	200	400
Rated torque (See note 1)	N·m	0.16	0.32	0.64	1.3
Rated rotation speed	r/min	3000			
Max. rotation speed	r/min	5000			
Max. momentary torque (See note 1)	N·m	0.48	0.95	1.78	3.60
Rated current (See note 1)	A (rms)	1.1	1.1	1.6	2.6
Max. momentary current (See note 1)	A (rms)	3.4	3.4	4.9	7.9
Rotor inertia	kg·m <sup>2</sup>	2.5 x 10 <sup>-6</sup>	5.1 x 10 <sup>-6</sup>	1.4 x 10 <sup>-5</sup>	2.6 x 10 <sup>-5</sup>
Applicable load inertia	—	30 times rotor inertia max.			

Note: 1. These are the values when the Servomotor is combined with a Servo Drive at room temperature.  
The momentary maximum torque shown above indicates the standard value.

## 3,000-r/min Flat Servomotors

### 120 V AC Specification

Item	Unit	R88M-GP10030L	R88M-GP20030L
Rated output (See note 1)	W	100	200
Rated torque (See note 1)	N·m	0.32	0.64
Rated rotation speed	r/min	3000	
Max. rotation speed	r/min	5000	
Max. momentary torque (See note 1)	N·m	0.85	1.86
Rated current (See note 1)	A (rms)	1.6	2.5
Max. momentary current (See note 1)	A (0-p)	6.9	10.5
Rotor inertia	kg·m <sup>2</sup>	9.0 x 10 <sup>-6</sup>	3.4 x 10 <sup>-5</sup>
Applicable load inertia	—	20 times rotor inertia max.	

**Note: 1.** These are the values when the Servomotor is combined with a Servo Drive at room temperature.  
The momentary maximum torque shown above indicates the standard value.

## 3,000-r/min Flat Servomotors

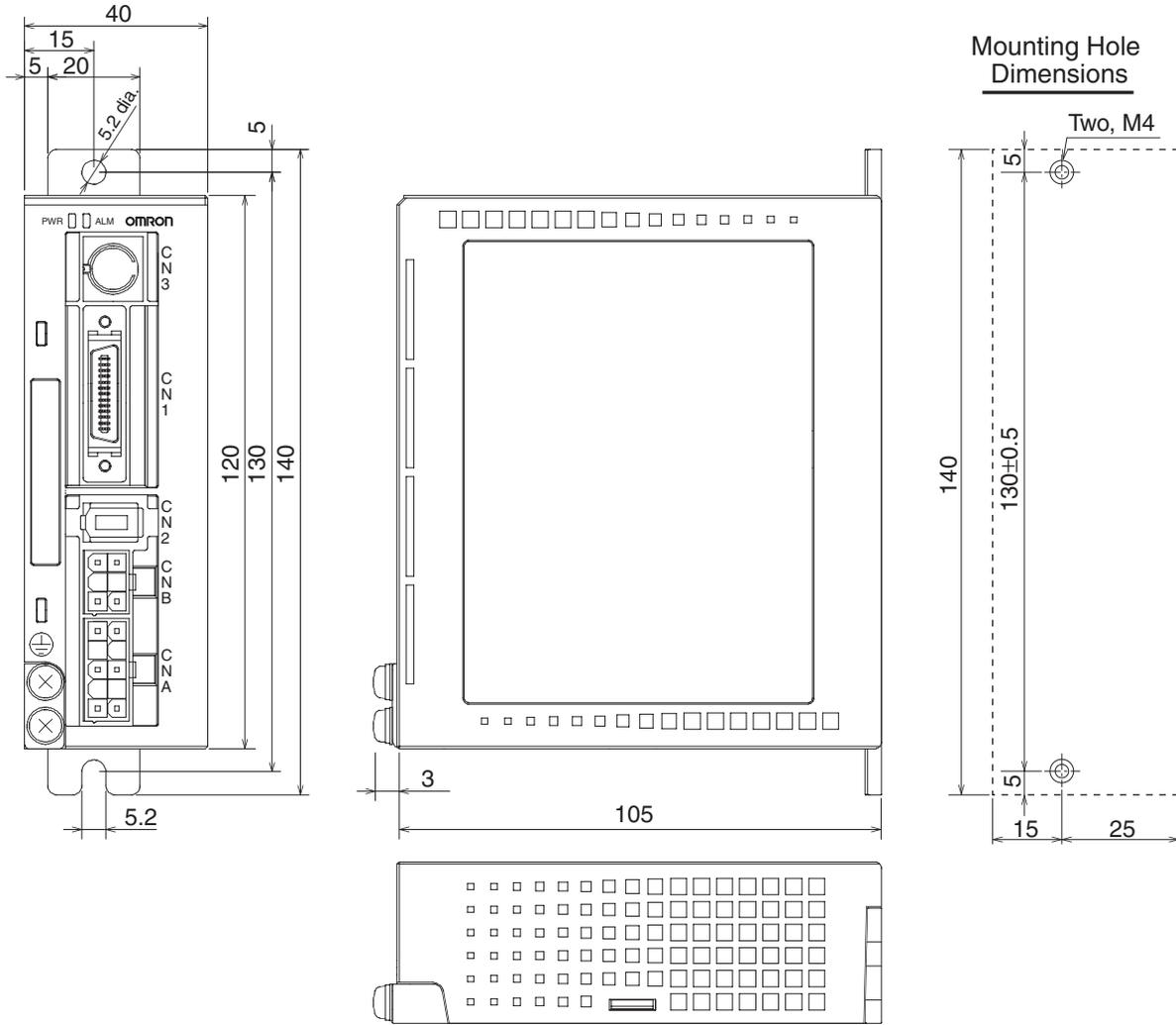
### 240 V AC Specification

Item	Unit	R88M-GP10030H	R88M-GP20030L	R88M-GP40030L
Rated output (See note 1)	W	100	200	400
Rated torque (See note 1)	N·m	0.32	0.64	1.3
Rated rotation speed	r/min	3000		
Max. rotation speed	r/min	5000		
Max. momentary torque (See note 1)	N·m	0.90	1.82	3.60
Rated current (See note 1)	A (rms)	1.0	1.6	4.4
Max. momentary current (See note 1)	A (0-p)	4.3	6.8	18.6
Rotor inertia	kg·m <sup>2</sup>	9.0 x 10 <sup>-6</sup>	3.4 x 10 <sup>-5</sup>	6.4 x 10 <sup>-5</sup>
Applicable load inertia	—	20 times rotor inertia max.		

**Note: 1.** These are the values when the Servomotor is combined with a Servo Drive at room temperature.  
The momentary maximum torque shown above indicates the standard value.



**R7-BP02L/-BP02HH/-BP04H (200 W/400 W)**



# G-Series Servo Drives and Servo Motors R88D-G and R88M-G



## A Wide Selection of Models with High-Level Functions and Performance Demanded in Today's Servo System

The G-Series Servo drives and Servo motors provide high-precision positioning with improved response and vibration control.

### Servo Drive Features

- Improved real-time auto tuning simplifies the startup procedure
- Small footprint reduces control panel space required
- Better frequency response improves machine performance
- Adaptive vibration suppression filter automatically reduces the effect of vibration

### Servo Motor Features

- Wide selection of speeds, available in 1000, 1500, 2000 and 3000 RPM
- All Servomotors with absolute encoder have 17 bit resolution for increased accuracy
- Models from 50 W up to 7.5 kW (additional models up to 15 kW available soon)

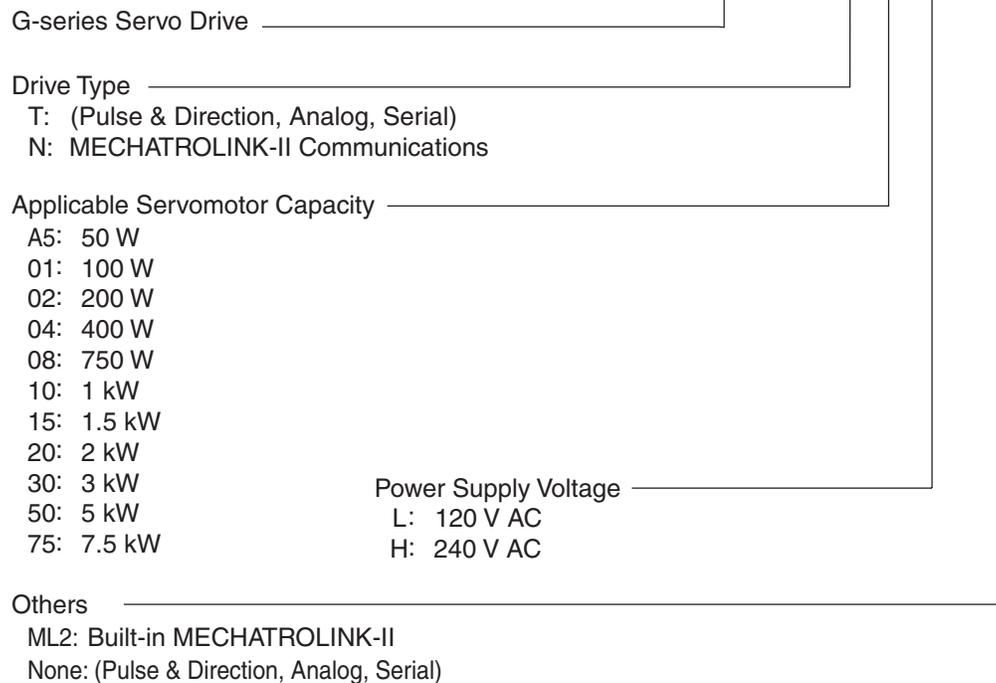


## Ordering Information

### Drive and Motor Selection

The model number provides information such as the Servo Drive type, the applicable Servomotor capacity, and the power supply voltage.

**R88D-GT01H-ML2**



**Servomotor Model Numbers**

**R88M-GP10030H-BOS2**

G-series Servomotor

Motor Type

- Blank: Cylinder type
- P: Flat type

Servomotor Capacity

- 050: 50 W
- 100: 100 W
- 200: 200 W
- 400: 400 W
- 750: 750 W
- 900: 900 W
- 1K0: 1 kW
- 1K5: 1.5 kW
- 2K0: 2 kW
- 3K0: 3 kW
- 4K0: 4 kW
- 4K5: 4.5 kW
- 5K0: 5 kW
- 6K0: 6 kW
- 7K5: 7.5 kW

Rated Rotation Speed

- 10: 1,000 r/min
- 15: 1,500 r/min
- 20: 2,000 r/min
- 30: 3,000 r/min

Applied Voltage

- H: 240 V AC with incremental encoder specifications
- L: 120 V AC with incremental encoder specifications
- T: 240 V AC with absolute encoder specifications
- S: 120 V AC with absolute encoder specifications

Others

- Blank: Straight shaft
- B: With brake
- O: With oil seal
- S2: With key and tap

**Servo Motor and Drive Combination Overview**

Only the Servomotor and Servo Drive combinations listed here can be used. Do not use other combinations.

**3,000-r/min. Cylindrical Servomotors and Servo Drives**

Voltage	Analog, Pulse, Serial Servo Drive	Network Servo Drive	Servomotor		
			Rated output	With incremental encoder	With absolute encoder
120 V AC	R88D-GTA5L	R88D-GNA5L-ML2	50 W	R88M-G05030H-□	R88M-G05030T-□
	R88D-GT01L	R88D-GN01L-ML2	100 W	R88M-G10030L-□	R88M-G10030S-□
	R88D-GT02L	R88D-GN02L-ML2	200 W	R88M-G20030L-□	R88M-G20030S-□
	R88D-GT04L	R88D-GN04L-ML2	400 W	R88M-G40030L-□	R88M-G40030S-□
Single-phase 240 V AC	R88D-GT01H	R88D-GN01H-ML2	50 W	R88M-G05030H-□	R88M-G05030T-□
	R88D-GT01H	R88D-GN01H-ML2	100 W	R88M-G10030H-□	R88M-G10030T-□
	R88D-GT02H	R88D-GN02H-ML2	200 W	R88M-G20030H-□	R88M-G20030T-□
	R88D-GT04H	R88D-GN04H-ML2	400 W	R88M-G40030H-□	R88M-G40030T-□
Single-phase/ three-phase 240 V AC	R88D-GT08H	R88D-GN08H-ML2	750 W	R88M-G75030H-□	R88M-G75030T-□
	R88D-GT15H	R88D-GN15H-ML2	1 kW	—	R88M-G1K030T-□
	R88D-GT15H	R88D-GN15H-ML2	1.5 kW	—	R88M-G1K530T-□
Three-phase 240 V AC	R88D-GT20H	R88D-GN20H-ML2	2 kW	—	R88M-G2K030T-□
	R88D-GT30H	R88D-GN30H-ML2	3 kW	—	R88M-G3K030T-□
	R88D-GT50H	R88D-GN50H-ML2	4 kW	—	R88M-G4K030T-□
	R88D-GT50H	R88D-GN50H-ML2	5 kW	—	R88M-G5K030T-□

## 2,000-r/min. Cylindrical Servomotors and Servo Drives

Voltage	Analog, Pulse, Serial Servo Drive	Network Servo Drive	Servomotor	
			Rated output	With absolute encoder
Single-phase/ three-phase 240 V AC	R88D-GT10H	R88D-GN10H-ML2	1 kW	R88M-G1K020T-□
	R88D-GT15H	R88D-GN15H-ML2	1.5 kW	R88M-G1K520T-□
Three-phase 240 V AC	R88D-GT20H	R88D-GN20H-ML2	2 kW	R88M-G2K020T-□
	R88D-GT30H	R88D-GN30H-ML2	3 kW	R88M-G3K020T-□
	R88D-GT50H	R88D-GN50H-ML2	4 kW	R88M-G4K020T-□
	R88D-GT50H	R88D-GN50H-ML2	5 kW	R88M-G5K020T-□
	R88D-GT75H	R88D-GN75H-ML2	7.5 kW	R88M-G7K515T-□

## 1,000-r/min. Cylindrical Servomotors and Servo Drives

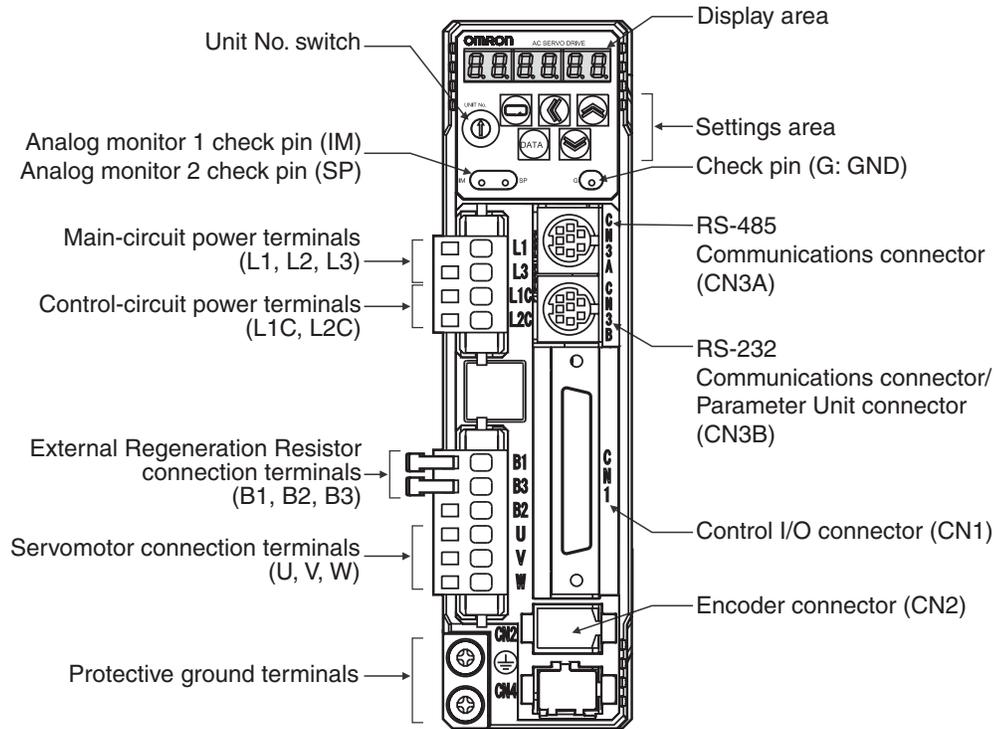
Voltage	Analog, Pulse, Serial Servo Drive	Network Servo Drive	Servomotor	
			Rated output	With absolute encoder
Single-phase/ three-phase 240 V AC	R88D-GT15H	R88D-GN15H-ML2	900 W	R88M-G90010T-□
Three-phase 240 V AC	R88D-GT30H	R88D-GN30H-ML2	2 kW	R88M-G2K010T-□
	R88D-GT50H	R88D-GN50H-ML2	3 kW	R88M-G3K010T-□
	R88D-GT50H	R88D-GN50H-ML2	4.5 kW	R88M-G4K510T-□
	R88D-GT75H	R88D-GN75H-ML2	6 kW	R88M-G6K010T-□

## 3,000-r/min. Flat Servomotors and Servo Drives

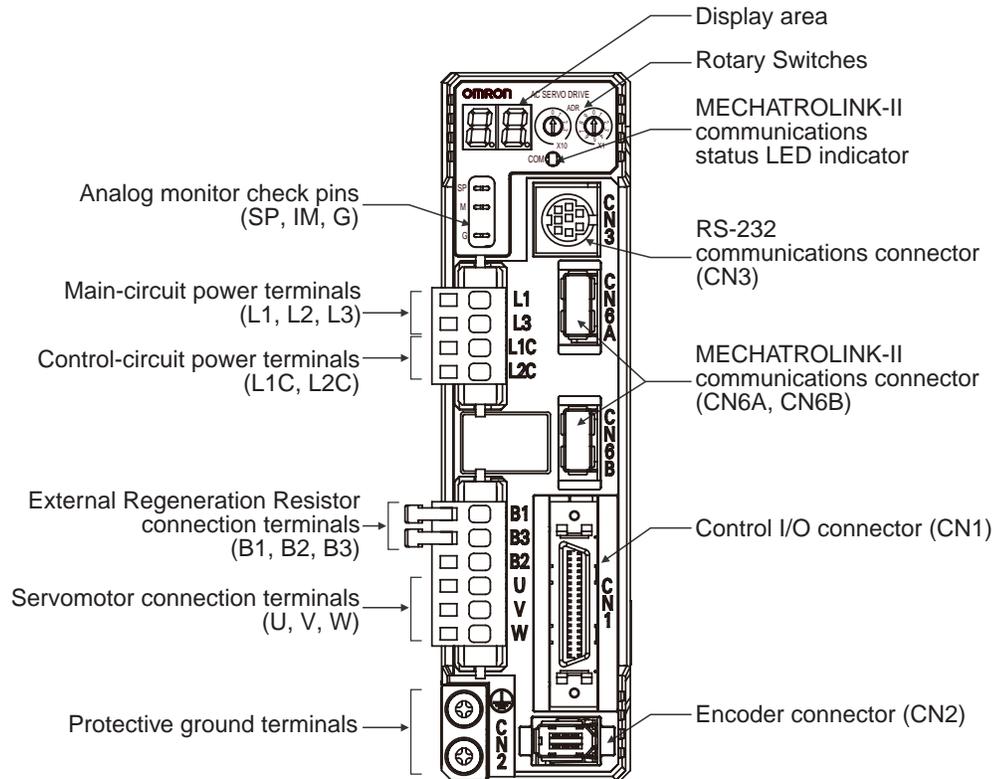
Voltage	Analog, Pulse, Serial Servo Drive	MLII Servo Drive	Servomotor		
			Rated output	With incremental encoder	With absolute encoder
120 V AC	R88D-GT01L	R88D-GN01L-ML2	100 W	R88M-GP10030L-□	R88M-GP10030S-□
	R88D-GT02L	R88D-GN02L-ML2	200 W	R88M-GP20030L-□	R88M-GP20030S-□
	R88D-GT04L	R88D-GN04L-ML2	400 W	R88M-GP40030L-□	R88M-GP40030S-□
Single-phase 240 V AC	R88D-GT01H	R88D-GN01H-ML2	100 W	R88M-GP10030H-□	R88M-GP10030T-□
	R88D-GT02H	R88D-GN02H-ML2	200 W	R88M-GP20030H-□	R88M-GP20030T-□
	R88D-GT04H	R88D-GN04H-ML2	400 W	R88M-GP40030H-□	R88M-GP40030T-□

## Ordering Information

### R88D-GT



### R88D-GN



## Servo Drives

Phase	Watts	Voltage	Analog, Pulse, Serial Servo Drive	Network Servo Drive with MECHATROLINK II
Single-phase	50	120 V AC	R88D-GTA5L	R88D-GNA5L-ML2
	100		R88D-GT01L	R88D-GN01L-ML2
	200		R88D-GT02L	R88D-GN02L-ML2
	400		R88D-GT04L	R88D-GN04L-ML2
Single-phase	50	240 V AC	R88D-GT01H	R88D-GN01H-ML2
	100		R88D-GT01H	R88D-GN01H-ML2
	200		R88D-GT02H	R88D-GN02H-ML2
	400		R88D-GT04H	R88D-GN04H-ML2
	750		R88D-GT08H	R88D-GN08H-ML2
	1 kW		R88D-GT10H	R88D-GN10H-ML2
Single-phase/three-phase	900	240 V AC	R88D-GT15H	R88D-GN15H-ML2
	1 kW			
	1.5 kW			
	2 kW		R88D-GT20H	R88D-GN20H-ML2
	3 kW		R88D-GT30H	R88D-GN30H-ML2
	5 kW		R88D-GT50H	R88D-GN50H-ML2
	7.5 kW		R88D-GT75H	R88D-GN75H-ML2

## Cylindrical Style Servo Motors

### Incremental Encoder, 3000 rpm

Specifications			Model	
			Straight shaft	Straight shaft with key and tap
Without brake	120 V AC	50 W	R88M-G05030H	R88M-G05030H-S2
		100 W	R88M-G10030L	R88M-G10030L-S2
		200 W	R88M-G20030L	R88M-G20030L-S2
		400 W	R88M-G40030L	R88M-G40030L-S2
	240 V AC	50 W	R88M-G05030H	R88M-G05030H-S2
		100 W	R88M-G10030H	R88M-G10030H-S2
		200 W	R88M-G20030H	R88M-G20030H-S2
		400 W	R88M-G40030H	R88M-G40030H-S2
With brake	120 V AC	50 W	R88M-G05030H-B	R88M-G05030H-BS2
		100 W	R88M-G10030L-B	R88M-G10030L-BS2
		200 W	R88M-G20030L-B	R88M-G20030L-BS2
		400 W	R88M-G40030L-B	R88M-G40030L-BS2
	240 V AC	50 W	R88M-G05030H-B	R88M-G05030H-BS2
		100 W	R88M-G10030H-B	R88M-G10030H-BS2
		200 W	R88M-G20030H-B	R88M-G20030H-BS2
		400 W	R88M-G40030H-B	R88M-G40030H-BS2
		750 W	R88M-G75030H-B	R88M-G75030H-BS2

### Servomotors with Incremental or Absolute Encoder, 3000 rpm

Specifications			Model	
			Straight shaft	Straight shaft with key and tap
Without brake	120 V AC	50 W	R88M-G05030T	R88M-G05030T-S2
		100 W	R88M-G10030S	R88M-G10030S-S2
		200 W	R88M-G20030S	R88M-G20030S-S2
		400 W	R88M-G40030S	R88M-G40030S-S2
	240 V AC	50 W	R88M-G05030T	R88M-G05030T-S2
		100 W	R88M-G10030T	R88M-G10030T-S2
		200 W	R88M-G20030T	R88M-G20030T-S2
		400 W	R88M-G40030T	R88M-G40030T-S2
		750 W	R88M-G75030T	R88M-G75030T-S2
		1 kW	R88M-G1K030T	R88M-G1K030T-S2
		1.5 kW	R88M-G1K530T	R88M-G1K530T-S2
		2 kW	R88M-G2K030T	R88M-G2K030T-S2
		3 kW	R88M-G3K030T	R88M-G3K030T-S2
		4 kW	R88M-G4K030T	R88M-G4K030T-S2
		5 kW	R88M-G5K030T	R88M-G5K030T-S2
		With brake	120 V AC	50 W
100 W	R88M-G10030S-B			R88M-G10030S-BS2
200 W	R88M-G20030S-B			R88M-G20030S-BS2
400 W	R88M-G40030S-B			R88M-G40030S-BS2
240 V AC	50 W		R88M-G05030T-B	R88M-G05030T-BS2
	100 W		R88M-G10030T-B	R88M-G10030T-BS2
	200 W		R88M-G20030T-B	R88M-G20030T-BS2
	400 W		R88M-G40030T-B	R88M-G40030T-BS2
	750 W		R88M-G75030T-B	R88M-G75030T-BS2
	1 kW		R88M-G1K030T-B	R88M-G1K030T-BS2
	1.5 kW		R88M-G1K530T-B	R88M-G1K530T-BS2
	2 kW		R88M-G2K030T-B	R88M-G2K030T-BS2
	3 kW		R88M-G3K030T-B	R88M-G3K030T-BS2
	4 kW		R88M-G4K030T-B	R88M-G4K030T-BS2
	5 kW		R88M-G5K030T-B	R88M-G5K030T-BS2

### Servomotors with Incremental Encoder, 2000 rpm

Specifications			Model	
			Straight shaft	Straight shaft with key and tap
Without brake	240 V AC	1 kW	R88M-G1K020T	R88M-G1K020T-S2
		1.5 kW	R88M-G1K520T	R88M-G1K520T-S2
		2 kW	R88M-G2K020T	R88M-G2K020T-S2
		3 kW	R88M-G3K020T	R88M-G3K020T-S2
		4 kW	R88M-G4K020T	R88M-G4K020T-S2
		5 kW	R88M-G5K020T	R88M-G5K020T-S2
		7.5 kW	R88M-G7K515T	R88M-G7K515T-S2
With brake	240 V AC	1 kW	R88M-G1K020T-B	R88M-G1K020T-BS2
		1.5 kW	R88M-G1K520T-B	R88M-G1K520T-BS2
		2 kW	R88M-G2K020T-B	R88M-G2K020T-BS2
		3 kW	R88M-G3K020T-B	R88M-G3K020T-BS2
		4 kW	R88M-G4K020T-B	R88M-G4K020T-BS2
		5 kW	R88M-G5K020T-B	R88M-G5K020T-BS2
		7.5 kW	R88M-G7K515T-B	R88M-G7K515T-BS2

**Servomotors with Incremental or Absolute Encoder, 1000 rpm**

Specifications			Model	
			Straight shaft	Straight shaft with key and tap
Without brake	240 V AC	900 W	R88M-G90010T	R88M-G90010T-S2
		2 kW	R88M-G2K010T	R88M-G2K010T-S2
		3 kW	R88M-G3K010T	R88M-G3K010T-S2
		4.5 kW	R88M-G4K510T	R88M-G4K510T-S2
		6 kW	R88M-G6K010T	R88M-G6K010T-S2
With brake	240 V AC	900 W	R88M-G90010T-B	R88M-G90010T-BS2
		2 kW	R88M-G2K010T-B	R88M-G2K010T-BS2
		3 kW	R88M-G3K010T-B	R88M-G3K010T-BS2
		4.5 kW	R88M-G4K510T-B	R88M-G4K510T-BS2
		6 kW	R88M-G6K010T-B	R88M-G6K010T-BS2

**Flat Style Servo Motors**

**Servomotors with Incremental Encoder, 3000 rpm**

Specifications			Model	
			Straight shaft	Straight shaft with key and tap
Without brake	120 V AC	100 W	R88M-GP10030L	R88M-GP10030L-S2
		200 W	R88M-GP20030L	R88M-GP20030L-S2
		400 W	R88M-GP40030L	R88M-GP40030L-S2
	240 V AC	100 W	R88M-GP10030H	R88M-GP10030H-S2
		200 W	R88M-GP20030H	R88M-GP20030H-S2
		400 W	R88M-GP40030H	R88M-GP40030H-S2
With brake	120 V AC	100 W	R88M-GP10030L-B	R88M-GP10030L-BS2
		200 W	R88M-GP20030L-B	R88M-GP20030L-BS2
		400 W	R88M-GP40030L-B	R88M-GP40030L-BS2
	240 V AC	100 W	R88M-GP10030H-B	R88M-GP10030H-BS2
		200 W	R88M-GP20030H-B	R88M-GP20030H-BS2
		400 W	R88M-GP40030H-B	R88M-GP40030H-BS2

**Servomotors with Incremental or Absolute Encoder, 3000 rpm**

Specifications			Model	
			Straight shaft	Straight shaft with key and tap
Without brake	120 V AC	100 W	R88M-GP10030S	R88M-GP10030S-S2
		200 W	R88M-GP20030S	R88M-GP20030S-S2
		400 W	R88M-GP40030S	R88M-GP40030S-S2
	240 V AC	100 W	R88M-GP10030T	R88M-GP10030T-S2
		200 W	R88M-GP20030T	R88M-GP20030T-S2
		400 W	R88M-GP40030T	R88M-GP40030T-S2
With brake	120 V AC	100 W	R88M-GP10030S-B	R88M-GP10030S-BS2
		200 W	R88M-GP20030S-B	R88M-GP20030S-BS2
		400 W	R88M-GP40030S-B	R88M-GP40030S-BS2
	240 V AC	100 W	R88M-GP10030T-B	R88M-GP10030T-BS2
		200 W	R88M-GP20030T-B	R88M-GP20030T-BS2
		400 W	R88M-GP40030T-B	R88M-GP40030T-BS2

## Servo Motor Power Cables

### For Servomotors without Brake

Specifications		Model
Cylindrical Servomotors of 50 to 750 W, 3,000-r/min. Flat Servomotors of 100 to 400 W, 3,000-r/min.	3 m	R88A-CAGA003S
	5 m	R88A-CAGA005S
	10 m	R88A-CAGA010S
	15 m	R88A-CAGA015S
	20 m	R88A-CAGA020S
	30 m	R88A-CAGA030S
	40 m	R88A-CAGA040S
	50 m	R88A-CAGA050S
Cylindrical Servomotors of 1 to 1.5 kW, 3,000-r/min. Cylindrical Servomotors of 1 to 1.5 kW, 2,000-r/min. Cylindrical Servomotors of 900 W, 1,000-r/min.	3 m	R88A-CAGB003S
	5 m	R88A-CAGB005S
	10 m	R88A-CAGB010S
	15 m	R88A-CAGB015S
	20 m	R88A-CAGB020S
	30 m	R88A-CAGB030S
	40 m	R88A-CAGB040S
	50 m	R88A-CAGB050S
Cylindrical Servomotors of 2 kW, 3,000-r/min. Cylindrical Servomotors of 2 kW, 2,000-r/min.	3 m	R88A-CAGC003S
	5 m	R88A-CAGC005S
	10 m	R88A-CAGC010S
	15 m	R88A-CAGC015S
	20 m	R88A-CAGC020S
	30 m	R88A-CAGC030S
	40 m	R88A-CAGC040S
	50 m	R88A-CAGC050S
Cylindrical Servomotors of 3 to 5 kW, 3,000-r/min. Cylindrical Servomotors of 3 to 5 kW, 2,000-r/min. Cylindrical Servomotors of 2 to 4.5 kW, 1,000-r/min.	3 m	R88A-CAGD003S
	5 m	R88A-CAGD005S
	10 m	R88A-CAGD010S
	15 m	R88A-CAGD015S
	20 m	R88A-CAGD020S
	30 m	R88A-CAGD030S
	40 m	R88A-CAGD040S
	50 m	R88A-CAGD050S
Cylindrical Servomotors of 7.5 kW, 1,500-r/min. Cylindrical Servomotors of 6 kW, 1,000-r/min.	3 m	R88A-CAGE003S
	5 m	R88A-CAGE005S
	10 m	R88A-CAGE010S
	15 m	R88A-CAGE015S
	20 m	R88A-CAGE020S
	30 m	R88A-CAGE030S
	40 m	R88A-CAGE040S
	50 m	R88A-CAGE050S

**For Servomotors with Brake**

Specifications		Model
Cylindrical Servomotors of 1 to 1.5 kW, 3,000-r/min. Cylindrical Servomotors of 1 to 1.5 kW, 2,000-r/min. Cylindrical Servomotors of 900 W, 1,000-r/min.	3 m	R88A-CAGB003B
	5 m	R88A-CAGB005B
	10 m	R88A-CAGB010B
	15 m	R88A-CAGB015B
	20 m	R88A-CAGB020B
	30 m	R88A-CAGB030B
	40 m	R88A-CAGB040B
	50 m	R88A-CAGB050B
	Cylindrical Servomotors of 2 kW, 3,000-r/min. Cylindrical Servomotors of 2 kW, 2,000-r/min.	3 m
5 m		R88A-CAGC005B
10 m		R88A-CAGC010B
15 m		R88A-CAGC015B
20 m		R88A-CAGC020B
30 m		R88A-CAGC030B
40 m		R88A-CAGC040B
50 m		R88A-CAGC050B
Cylindrical Servomotors of 3 to 5 kW, 3,000-r/min. Cylindrical Servomotors of 3 to 5 kW, 2,000-r/min. Cylindrical Servomotors of 2 to 4.5 kW, 1,000-r/min.		3 m
	5 m	R88A-CAGD005B
	10 m	R88A-CAGD010B
	15 m	R88A-CAGD015B
	20 m	R88A-CAGD020B
	30 m	R88A-CAGD030B
	40 m	R88A-CAGD040B
	50 m	R88A-CAGD050B

**Brake Cables (Standard Cables)**

Specifications		Model
Cylindrical Servomotors of 50 to 750 W, 3,000-r/min. Flat Servomotors of 100 to 400 W, 3,000-r/min.	3 m	R88A-CAGA003B
	5 m	R88A-CAGA005B
	10 m	R88A-CAGA010B
	15 m	R88A-CAGA015B
	20 m	R88A-CAGA020B
	30 m	R88A-CAGA030B
	40 m	R88A-CAGA040B
	50 m	R88A-CAGA050B
	Cylindrical Servomotors of 7.5 kW, 1,500-r/min. Cylindrical Servomotors of 6 kW, 1,000-r/min.	3 m
5 m		R88A-CAGE005B
10 m		R88A-CAGE010B
15 m		R88A-CAGE015B
20 m		R88A-CAGE020B
30 m		R88A-CAGE030B
40 m		R88A-CAGE040B
50 m		R88A-CAGE050B

## Encoder Cables

Specifications		Model
Cylindrical Servomotors of 50 to 750 W with an absolute encoder, 3,000-r/min. Flat Servomotors of 100 to 400 W with an absolute encoder, 3,000-r/min.	3 m	R88A-CRGA003C
	5 m	R88A-CRGA005C
	10 m	R88A-CRGA010C
	15 m	R88A-CRGA015C
	20 m	R88A-CRGA020C
	30 m	R88A-CRGA030C
	40 m	R88A-CRGA040C
	50 m	R88A-CRGA050C
Cylindrical Servomotors of 50 to 750 W with an incremental encoder, 3,000-r/min. Flat Servomotors of 100 to 400 W with an incremental encoder, 3,000-r/min.	3 m	R88A-CRGB003C
	5 m	R88A-CRGB005C
	10 m	R88A-CRGB010C
	15 m	R88A-CRGB015C
	20 m	R88A-CRGB020C
	30 m	R88A-CRGB030C
	40 m	R88A-CRGB040C
	50 m	R88A-CRGB050C
Cylindrical Servomotors of 1 to 5 kW, 3,000-r/min. Cylindrical Servomotors of 1 to 5 kW, 2,000-r/min. Cylindrical Servomotors of 7.5 kW, 1,500-r/min. Cylindrical Servomotors of 900 W to 6 kW, 1,000-r/min.	3 m	R88A-CRGC003N
	5 m	R88A-CRGC005N
	10 m	R88A-CRGC010N
	15 m	R88A-CRGC015N
	20 m	R88A-CRGC020N
	30 m	R88A-CRGC030N
	40 m	R88A-CRGC040N
	50 m	R88A-CRGC050N

## Cables and Accessories

Servo terminal blocks and cables according to the model number of the position control unit being used.

Position control unit	Position control unit cable (See note 1)	Terminal block	Servo drive cable for CN1 (See note 2)	
CQM1H-PLB21	XW2Z-□□□J-A3	XW2B-20J6-3B	XW2Z-□□□J-B25	
CS1W-NC113	XW2Z-□□□J-A6	XW2B-20J6-1B		
C200HW-NC113				
CS1W-NC213	XW2Z-□□□J-A7	XW2B-40J6-2B		
CS1W-NC413				
C200HW-NC213				
C200HW-NC413				
CS1W-NC133	XW2Z-□□□J-A10	XW2B-20J6-1B		
CS1W-NC233	XW2Z-□□□J-A11	XW2B-40J6-2B		
CS1W-NC433				
CJ1W-NC113	XW2Z-□□□J-A14	XW2B-20J6-1B		
CJ1W-NC213	XW2Z-□□□J-A15	XW2B-40J6-2B		
CJ1W-NC413				
CJ1W-NC133	XW2Z-□□□J-A18	XW2B-20J6-1B		
CJ1W-NC233	XW2Z-□□□J-A19	XW2B-40J6-2B		
CJ1W-NC433				
CJ1M-CPU21	XW2Z-□□□J-A33	XW2B-20J6-8A (for 1 axis)		XW2Z-□□□J-B31
CJ1M-CPU22		XW2B-40J6-9A (for 2 axes)		
CJ1M-CPU23				

**Note: 1.** Insert the cable length into the boxes in the model number (0.5 m □□□ = 050; 1 m □□□ = 100; 2 m □□□ = 200).

**Position control unit cables** come in two lengths: 0.5 m and 1 m (some are also available in lengths of 2 m).

**Servo drive cables** also come in two lengths: 1 m and 2 m.

**2.** Two servo drive cables are required if 2-axis control is performed.

## GT Control Cables (for CN1)

Specifications		Model
General-purpose control cables with connector on one end	1 m	R88A-CPG001S
	2 m	R88A-CPG002S
Connector-terminal block cables	1 m	XW2Z-100J-B24
	2 m	XW2Z-200J-B24
Connector terminal block	M3 screw type	XW2B-50G4
	M3.5 screw type	XW2B-50G5
	M3 screw type	XW2D-50G6

## GN Control Cables (for CN1)

Specifications		Model
Connector-Terminal Block Cables	1 m	XW2Z-100J-B33
	2 m	XW2Z-200J-B33
Connector Terminal Block	M3 screw type	XW2B-20G4
	M3.5 screw type	XW2B-20G5
	M3 screw type	XW2D-20G6

## Motion Control Unit Cables

There are special cables for 1-axis and 2-axis motion control unit operation. Select the appropriate cable for the number of axes to be connected.

Motion Control Unit	Cable		Remarks
CS1W-MC221-V1/421-V1	For 1 axis	R88A-CPG□□□M1	The □□□ digits in the model number indicate the cable length. Motion control unit cables come in four lengths: 1 m, 2 m, 3 m, and 5 m. Example model number for 2-m 1-axis cable: R88A-CPG002M1
	For 2 axes	R88A-CPG□□□M2	

## Mechatrolink Cables

Name		Model
MECHATROLINK-II Cables (with ring core and USB connector on both ends)	0.5 m	FNY-W6003-A5
	1.0 m	FNY-W6003-01
	3.0 m	FNY-W6003-03
	5.0 m	FNY-W6003-05
	10.0 m	FNY-W6003-10
	20.0 m	FNY-W6003-20
	30.0 m	FNY-W6003-30
MECHATROLINK-II terminating resistor	Terminating resistance	FNY-W6022
MECHATROLINK-II repeater	Communications repeater	FNY-REP2000

## CN3 Option Cables

Specifications		Model
RS-232 Communications cable	2 m	R88A-CCG002P2
RS-485 Communications cable	0.5 m	R88A-CCG0R5P4
	1 m	R88A-CCG001P4

## Parameter Unit

Specifications	Model
Parameter unit	R88A-PR02G

## Connectors

Specifications		Model
Servomotor connector for encoder cable	Absolute encoder	R88A-CNG01R
	Incremental encoder	R88A-CNG02R
Control I/O connector (CN1)		R88A-CNU11C
Encoder connector (CN2)		R88A-CNW01R

## External Regenerative Resistor

Specifications	Model
80 W 50 $\Omega$	R88A-RR08050S
80 W 100 $\Omega$	R88A-RR080100S
220 W 47 $\Omega$	R88A-RR22047S

## Reactors

Specifications	Model
R88D-GT or -GNA5L/01H	3G3AX-DL2002
R88D-GT or -GN01L/02H	3G3AX-DL2004
R88D-GT or -GN02L/04H	3G3AX-DL2007
R88D-GT or -GN04L/08H/10H	3G3AX-DL2015
R88D-GT or -GN15H	3G3AX-DL2022
R88D-GT or -GN08L/10H/15H	3G3AX-AL2025
R88D-GT or -GN20H/30H	3G3AX-AL2055
R88D-GT or -GN50H	3G3AX-AL2110
R88D-GT or -GN75H	3G3AX-AL2220

## Mounting Brackets

Specifications	Model
R88D-GT or -GNA5L/01L/01H/02H	R88A-TK01G
R88D-GT or -GN02L/04H	R88A-TK02G
R88D-GT or -GN04L/08H	R88A-TK03G
R88D-GT or -GN10H/15H	R88A-TK04G

## Absolute Encoder Backup Battery

Specifications	Model
2,000 mA·h 3.6 V	R88A-BAT01G

## Absolute Encoder Battery Cable

Specifications		Model
Absolute encoder battery cable	0.3 m	R88A-CRGD0R3C

## Position Controllers

## For CJ1 and CS1 PLC's

## PLC-Based Accurate Positioning Control

From simple axis position measurement to multi-axis synchronized control, Omron offers a full range of PLC-based solutions:

- High-speed counter modules gather position information from SSI or incremental encoders. Actual positions are compared with internally started target values.
- Position control modules are used for point-to-point positioning with servo drives or stepper motors. Target position and acceleration/deceleration curves can be adjusted on-the-fly.
- Position control modules equipped with MECHATROLINK-II interface can control multiple drives through a single, high-speed data link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.



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## Ordering Information

## CS1 Series

Modules are counted as Special I/O and occupy one rack slot.

Channels /axes	Type	Signal type	Current consumption	Remarks	Connection type	Model
2	SSI inputs (absolute position data)	Synchronous Serial Protocol	320 mA	Baud rate, encoding type, data length, etc. can be set per channel	M3 screw	CS1W-CTS21
2	500 kHz counter	Line driver, 24 V	360 mA	Configurable digital inputs + outputs; target values trigger interrupt to CPU	1 x 40 pt (Fujitsu)	CS1W-CT021
4			450 mA		2 x 40 (MIL-spec)	CS1W-CT041
1	Position controller	Open collector, 24 V	250 mA	500 kpps pulse outputs; inputs for origin, limit switches, stop, interrupt Use CX-Position software	1 x 40 pt (Fujitsu)	CS1W-NC113
2			360 mA		CS1W-NC213	
4					2 x 40 pt (Fujitsu)	CS1W-NC413
1		Line driver	250 mA		1 x 40 pt (Fujitsu)	CS1W-NC133
2					CS1W-NC233	
4					2 x 40 pt (Fujitsu)	CS1W-NC433
16		MECHATROLINK-II			360 mA	Position, speed and torque control; access to all drive parameters Use CX-Motion NCF

## CJ1 Series

Modules are counted as Special I/O, except 16-point CJ1W-NCF71, which is a CPU bus module.

Channels /axes	Type	Signal type	Current consumption	Remarks	Connection type	Model
2	SSI inputs (absolute position data)	Synchronous serial protocol	300 mA	Baud rate, encoding type, data length, etc. can be set per channel	M3 screw	CJ1W-CTS21-E
	500 kHz counter	Line driver, 24 V	280 mA	Configurable digital inputs + outputs; Target values trigger interrupt to CPU	1 x 40 pt (Fujitsu)	CJ1W-CT021
4	100 kHz counter	Line driver, 24 V via terminal block	320 mA		1 x 40 (MIL-spec)	CJ1W-CTL41-E
1	Position controller	Open collector, 24 V	250 mA	500 kpps pulse outputs; inputs for origin, limit switches, stop, interrupt Use CX-Position software	1 x 40 pt (Fujitsu)	CJ1W-NC113
2			360 mA			CJ1W-NC213
4			360 mA		2 x 40 pt (Fujitsu)	CJ1W-NC413
1		Line driver	250 mA		1 x 40 pt (Fujitsu)	CJ1W-NC133
2			360 mA			CJ1W-NC233
4			360 mA		2 x 40 pt (Fujitsu)	CJ1W-NC433
16			Mechatrolink-II			Position, speed and torque control; access to all drive parameters Use CX-Motion NCF

# Motion Controllers For CJ1 & CS1 PLC's

## High-Speed PLC-Based Motion Controllers

**MCH71** Motion control modules for CJ1 and CS1 PLC series are equipped with MECHATROLINK-II interface that can control multiple drives through a single, high-speed data link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.

- PLC-based motion controller eliminates integration of motion controllers from other suppliers
- Controls a total of 32 axes (30 physical max.)
- Simplified wiring saves design time and installation and maintenance costs
- Real multi-tasking and parallel programming
- Simple to develop and modify motion programs using BASIC
- Access to the complete system from one point allows quick troubleshooting and effective time management
- Linear, circular, and helical interpolation for accurate positioning
- Electronic axes synchronization produces smooth motion
- Electronic cam profiles simulates popular mechanical ones to shorten setup
- Dedicated inputs/outputs on the controller



### MECHATROLINK-II High-Speed Motion Link

This high-speed interface replaces the costly discrete wiring required with traditional systems. Just one MECHATROLINK-II cable eliminates the need for about 15 to 18 wires for each axis, simplifying wiring, and reducing installation costs and time. It also means that maintenance and troubleshooting are minimized. With a baud rate of up to 10 MHz, the MECHATROLINK-II link provides communication cycle times of 0.5 ms for 4 axes, to 4 ms for 30 axes, ensuring fast, precise motion control.

## Ordering Information

### CJ1/CS1 Motion Controllers

Type	Axes	Output type	Rating	PLC series	Current consumption	Model
Motion control module	2 axes	Analog	Uses G language Uses CX-Motion software	CS1	0.60 A (w/ Teaching Box: 0.80)	CS1W-MC221-V1
	4 axes				0.70 A (w/ Teaching Box: 1.00)	CS1W-MC421-V1
	30 axes	MECHATROLINK-II	Uses CX-Motion MCH software; MECHATROLINK-II high-speed bus provides instant communications between the motion controller and Omron servo drives Functions: Electronic cam profiles and axis synchronization; Registration inputs; accesses all drive parameters; gear functions	CJ1-H/ CJ1M	0.8 A, 5 VDC (counts as CPU bus unit)	CS1W-MCH71
					0.6 A, 5 VDC (counts as CPU bus unit)	CJ1W-MCH71

# Trajexia Stand-Alone Motion Controller

## TJ1-□

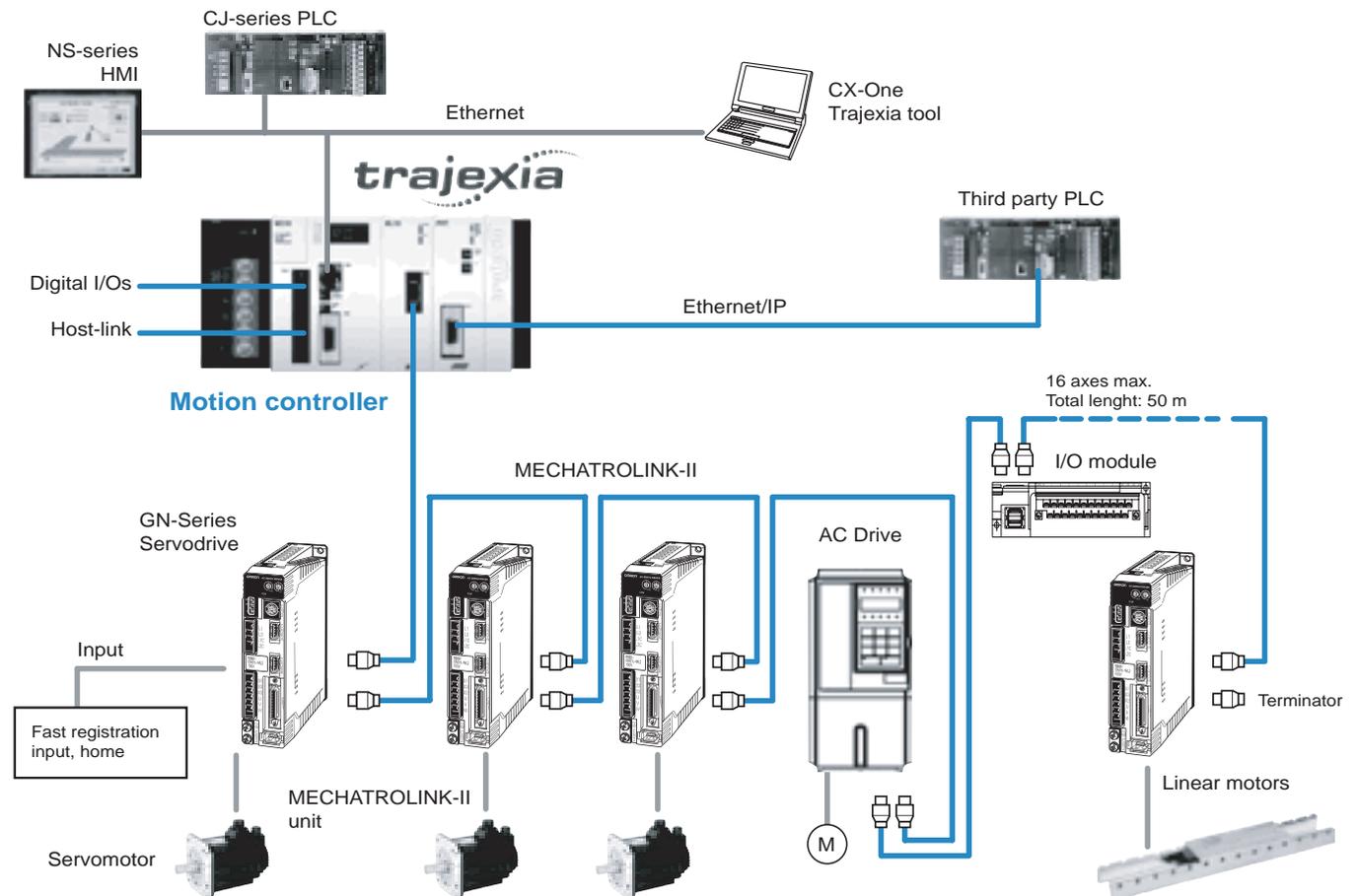


### Stand-Alone Advanced Motion Controller Using Mechatrolink-II Motion Bus

- 16 axes advanced motion coordination over a robust and fast motion link MECHATROLINK-II
- Supports position, speed and torque control
- Each axis can run complex interpolation moves, e-cams and e-gearboxes
- Advanced debugging tools including trace and oscilloscope functions
- Hardware registration input for each servo axis
- Control of servos, inverters and I/Os over a single motion network
- Multi-tasking controller capable of running up to 14 tasks simultaneously
- Open communication - Ethernet built-in, PROFIBUS-DP and DeviceNet as options



### System Configuration



## Specifications

### General Specifications

Item	Details
Model	TJ1-□
Ambient operating temperature	0 to 55 C
Ambient operating humidity	10 to 90% RH
Ambient storage temperature	-20 to 70 C
Ambient storage humidity	90% max. (with no condensation)
Atmosphere	No corrosive gases
Vibration resistance	10 to 57 Hz: (0.075 mm amplitude) 57 to 100 Hz Acceleration: 9.8 m/s <sup>2</sup> , in X, Y and Z directions for 80 minutes
Shock resistance	143 m/s <sup>2</sup> , 3 times each X, Y and Z directions
Insulation resistance	20 MOhm
Dielectric strength	500 Volt
Protective structure	IP20
International standards	cULus, CE, EN 61131-2 and RoHS

### Motion Control Unit

Item	Details		
Model	TJ1-MC16		
Number of axes	16		
Number of inverters and I/O modules	8 maximum		
Number of Mechatrolink-II master units	Up to 4 Mechatrolink-II master units (TJ1-ML16, see below) can be connected		
Cycle time	Selectable 0.5 ms, 1 ms or 2 ms		
Programming language	BASIC-like Motion language		
Multi-tasking	Up to 14 tasks running simultaneously		
Digital I/O	16 Inputs and 8 Outputs freely configurable		
Measurement units	User definable		
Available memory for user programs	500 kb		
Data storage capacity	Up to 2 MB flash data storage		
Saving program data, motion controller	SRAM with battery backup and Flash-ROM		
Saving program data, personal computer	Trajexia Motion Perfect software manages a backup on the hard disk of the personal computer		
Communication ports	1 Ethernet port and 2 serial ports		
Firmware update	Via Trajexia software tool		
Ethernet port	Electrical characteristics	Conform to IEEE 802.3 (100BaseT)	
	Connector	RJ45 Ethernet connector	
Serial port	Electrical characteristics	Conform 1 port to RS-232C and 1 port to RS-485/RS-422A (selectable by switch)	
	Connector	SUB-D9 connector (Counterpart included in the package)	
	Synchronization	Start-stop synchronization (asynchronous)	
	Baud rate	1200 / 2400 / 4800 / 9600 / 19200 / 38400 bps	
	Transmission format	Databit Length	7 or 8 bit
		Stop bit	1 or 3 bit
		Parity Bit	Even/Odd/None
	Transmission mode	Point-to-multipoint (1:N)	
	Transmission protocol	RS-232C (1:1)	Host Link master protocol, Host Link slave protocol, ASCII general-purpose
		RS-422A (1:N)	Host Link master protocol, Host Link slave protocol, ASCII general-purpose
		RS-485 (1:N)	ASCII general-purpose
	Galvanic isolation	RS-422A port	
	Communication buffers	254 bytes	
Flow control	None		
Terminator	Yes, selectable by switch		
Cable length	15 m for RS-232 and 500 m for RS-422/RS-485		

## Mechatrolink-II Master Unit

Item	Specifications
Model	TJ1-ML16
Controlled devices with Mechatrolink-II interface	Servo drives, various I/O units and Frequency inverters
Electrical characteristics	Conform to MECHATROLINK standard
Communication ports	1 MECHATROLINK-II master
Transmission speed	10 Mbps
Communication cycle	0.5 ms, 1 ms or 2 ms
Stations slave types	Axes or Servo drives Frequency inverters I/O Modules
Number of stations per master / Cycle time	Max. 16 Stations / 2 ms Max. 8 Stations / 1 ms Max. 4 Stations / 0.5 ms
Transmission distance	Max. 50 meters without using repeater

## Profibus Slave Unit

Items	Specifications
Model	TJ1-PRT
PROFIBUS standard	Conform to PROFIBUS-DP standard EN50170 (DP-V0)
Communication ports	1 PROFIBUS-DP slave
Transmission speed	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 and 12000 kbits/s
Node numbers	0 to 99
I/O size	For both directions a configurable size of 0 to 122 words (16-bit)
Galvanic isolation	Yes

## DeviceNet Slave Unit

Items	Specifications
Model	TJ1-DRT
DeviceNet standard	Conforms to DeviceNet standard of CIP edition 1
Communication ports	1 DeviceNet slave connector
Transmission speed	125, 250 and 500 Kbps, auto-detected
Node numbers	0 to 63
I/O size	0 to 32 words (16-bit), configurable, for both directions
Galvanic isolation	Yes

## Flexible Axis Unit

Items	Specifications	
Model	TJ1-FL02	
Number of axes	2	
Control method	±10 V Analog Output in closed loop or pulse train output in open loop	
Encoder	Position/speed feedback	2 Incremental and Absolute encoders
	Absolute encoder standards supported	SSI, EnDat and Tamagawa
	Encoder Input maximum frequency	6 MHz
	Encoder/Pulse Output max. frequency	2 MHz
Auxiliary I/Os	2 Fast registration inputs, 2 definable inputs, 2 Enable output, 4 position switch outputs or axes reset	
Galvanic isolation	Yes	

## Ordering Information

### Trajexia Motion Controller

Name	Model
Trajexia Motion Controller Unit, 16 axes (Trajexia end cover unit TJ1-TER is included)	TJ1-MC16
Trajexia Motion Controller Unit, 4 axes (Trajexia end cover unit TJ1-TER is included)	TJ1-MC04
Power Supply for Trajexia system, 100-240V AC	CJ1W-PA202
Power Supply for Trajexia system, 24V DC	CJ1W-PD022

### Trajexia — Axes Control Modules

Name	Model
Trajexia MECHATROLINK-II Master Unit (up to 16 axes)	TJ1-ML16
Trajexia MECHATROLINK-II Master Unit (up to 4 axes)	TJ1-ML04
Trajexia Flexible Axis Unit (for 2 axes)	TJ1-FL02

### Trajexia — Communication Modules

Name	Model
Trajexia DeviceNet Slave Unit	TJ1-DRT
Trajexia PROFIBUS-DP Slave Unit	TJ1-PRT

### Mechatrolink-II — Related Devices

Name	Remarks	Model
Distributed I/O modules	64-point digital input and 64-point digital output (24 VDC)	FNY-IO2310
	Analog input: -10 V to +10 V, 4 channels	FNY-AN2900
	Analog output: -10 V to +10 V, 2 channels	FNY-AN2910
Mechatrolink-II cables	0.5 meter	FNY-W6003-A5
	1 meter	FNY-W6003-01
	3 meters	FNY-W6003-03
	5 meters	FNY-W6003-05
	10 meters	FNY-W6003-10
	20 meters	FNY-W6003-20
	30 meters	FNY-W6003-30
Mechatrolink-II terminator	Terminating resistor	FNY-W6022

### I/O Cables

Name	Remarks	Length	Model
I/O Cable for FNY-IO2310	With connector on the Distributed I/O module side (FNY-IO2310)	0.5 m	FNY-W5410-05
		1.0 m	FNY-W5410-10
		3.0 m	FNY-W5410-30

### Servo System and Inverters

**Note:** Contact your Omron sales office for detailed specs and ordering information.

### Software

Specifications	Model
Trajexia Motion Perfect and CX-Drive	TJ1-Tools

# Soft Starters G3JA



## 3-Phase Hybrid Soft Starters Extend Motor Life

- G3JA-C Soft Start, Kick Start, Current Limit Start, and Soft Stop functions for 3-phase inductive motors satisfy motor performance needs for a wide range of applications. Internal protections include protection against overload and phase loss
- Smooth motor starts and stops can reduce mechanical shock, leading to longer motor life, less frequent servicing and lower maintenance costs
- Reduced power loss through hybrid control: Power supplied through a thyristor during starting or stopping and through a bypass relay during stable operation
- Slim 45-mm body saves installation space; all models have the same shape
- Electronic Thermal Overload Relay built in protects the motor from problems such as burning due to motor overload or locking. The overload class can be set to OFF, 10, 15, or 20



- Optional Auxiliary Contact Block enhances operation monitoring by providing an output of operating status
- Meets UL508; cULus listed; complies with IEC standards, etc.

## Soft Starters Ordering Information

### Multi-Function Soft Starters

Supply voltage	Main circuit operating current (A)		KW at 350% of load			HP at 350% of load			Model
	Current rating	Adjustable range	200 VAC 50/60 Hz	230 VAC 50 Hz	380/400/415 VAC 50 Hz	200 VAC 60 Hz	230 VAC 60 Hz	460 VAC 60 Hz	
100 to 240 VAC, 50/60 Hz	3	1 to 3	0.2 to 0.4	0.55	1.1	0.5	0.5	0.5 to 1.5	G3JA-C403B AC100-240
	9	3 to 9	0.55 to 1.5	2.2	4	0.75 to 2	0.75 to 2	1.5 to 5	G3JA-C409B AC100-240
	16	5.3 to 16	1.1 to 2.2	4	7.5	1.5 to 3	1.5 to 5	5 to 10	G3JA-C416B AC100-240
	19	6.3 to 19	1.5 to 3.7			1.5 to 5	2 to 5		
	25	8.3 to 25	2.2 to 5.5	5.5	11	3 to 7.5	3 to 7.5	7.5 to 15	G3JA-C425B AC100-240
	30	10 to 30							
	37	12.3 to 37	3.7 to 7.5	7.5	18.5	5 to 10	5 to 10	10 to 25	G3JA-C437B AC100-240
24 VAC/ VDC	3	1 to 3	0.2 to 0.4	0.55	1.1	0.5	0.5	0.5 to 1.5	G3JA-C403B AC/DC24
	9	3 to 9	0.55 to 1.5	2.2	4	0.75 to 2	0.75 to 2	1.5 to 5	G3JA-C409B AC/DC24
	16	5.3 to 16	1.1 to 2.2	4	7.5	1.5 to 3	1.5 to 5	5 to 10	G3JA-C416B AC/DC24
	19	6.3 to 19	1.5 to 3.7			1.5 to 5	2 to 5		
	25	8.3 to 25	2.2 to 5.5	5.5	11	3 to 7.5	3 to 7.5	7.5 to 15	G3JA-C425B AC/DC24
	30	10 to 30							
	37	12.3 to 37	3.7 to 7.5	7.5	18.5	5 to 10	5 to 10	10 to 25	G3JA-C437B AC/DC24

## Accessories

Description	Specification	Model
Fan	Allows increased switching frequency from 4/hr to 10/hr	G32J-CF64
Auxiliary contact	1 NO contact	G32J-CA10
Auxiliary contacts	2 NO contacts	G32J-CA20
Auxiliary contact	1 NC contact	G32J-CA01
Auxiliary contacts	1 NO + 1 NC contacts	G32J-CA11
Terminal block adapters	Set of 2	G32J-TA10

# Cam Positioner H8PS



## Easy-to-Use Stand-Alone Cam Positioner Uses Encoder Input

- High-speed operation at 1600 r/min. and high precision settings to 0.5°
- Advanced angle compensation function compensates for output delays
- Highly visible display with reverse-lit LCD for long-distance legibility
- Fits a 1/4 DIN panel cutout
- Front panel and surface/DIN rail mounting models (track mounting adapter optional)
- 8, 16 and 32 outputs models
- Bank function for multi-product production (8 banks)
- Use Omron absolute encoders for cam input; available with easy-to-install connector
  - E6CP-AG5C-C 256 2M for 256 pulse/rev resolution
  - E6C3-AG5C-C 360 2M for 360 pulse/rev resolution
  - E6F-AG5C-C 720 2M for 720 pulse/rev resolution
- IP40 front panel rating; waterproof and protective covers available



## Specifications

- Supply voltage: 24 VDC
- Inputs: Encoder input: Connection to a dedicated absolute encoder
  - External inputs: bank inputs 1/2/4, origin input, start input (16-/32-output models)
- Control output:
  - 8-output Models: 8 cam outputs, 1 RUN output, 1 pulse output
  - 16-output Models: 16 cam outputs, 1 RUN output, 1 pulse output
  - 32-output Models: 32 cam outputs, 1 RUN output, 1 pulse output
- Output ratings:
  - Cam outputs, RUN output: NPN or PNP open collector, 100 mA at 30 VDC
  - Pulse outputs: NPN or PNP open collector, 30 mA at 30 VDC
- Dimensions: 96 H x 96 W x 65 D mm

## Ordering Information

### Cam Positioners

Number of outputs	Mounting method	Dimensions L x W x H mm	Output type	Bank function	Model
8 outputs	Panel mounting	96 x 96 x 67.5	NPN open collector PNP open collector	None	H8PS-8B H8PS-8BP
	DIN rail or surface mounting	96 x 96 x 60.6	NPN open collector PNP open collector		H8PS-8BF H8PS-8BFP
16 outputs	Panel mounting	96 x 96 x 67.5	NPN open collector PNP open collector		H8PS-16B H8PS-16BP
	DIN rail or surface mounting	96 x 96 x 60.6	NPN open collector PNP open collector		H8PS-16BF H8PS-16BFP
32 outputs	Panel mounting	96 x 96 x 67.5	NPN open collector PNP open collector		H8PS-32B H8PS-32BP
	DIN rail or surface mounting	96 x 96 x 60.6	NPN open collector PNP open collector		H8PS-32BF H8PS-32BFP

## Absolute Encoders and Couplers

Full descriptions are listed under Rotary Encoders elsewhere in this catalog.

Type	Resolution	Shaft diameter	Cable length	Encoder Model
Economy	256	6 mm	2 m	E6CP-AG5C-C 256 2M
Standard	256	8 mm	1 m	E6C3-AG5C-C 256 1M
			2 m	E6C3-AG5C-C 256 2M
				E6C3-AG5C-C 360 2M
	360			E6C3-AG5C-C 360 2M
	720			E6C3-AG5C-C 720 2M
Rugged	256	10 mm		E6F-AG5C-C 256 2M
	360			E6F-AG5C-C 360 2M
	720			E6F-AG5C-C 720 2M

## Accessories

Description	Specification	Model
Discrete wire output cable	2 m length	Y92S-41-200
Connector type output cable		E5ZE-CBL200
Support software	CD-ROM	H8PS-SOFT-V1
Parallel input adapter	Two units can operate in parallel	Y92C-30
Protective cover	Hard plastic, fits H8PS	Y92A-96B
Watertight cover	NEMA 4 protection for H8PS front panel	Y92A-96N
DIN-rail mounting adapter	Use with H8PS-□BF□ models	Y92F-91
Encoder extension cable	5 m length (for E5CP, E6C3-A, E6F-A)	E69-DF5

# Rotary Encoders—Absolute E6C3-A



## Water Resistant Encoder for Tough Environments

- IP65 drip-proof, oil-proof construction with sealed bearing
- 8 mm stainless steel shaft provides superior shaft loading performance: Radial: 8 kg-f; Axial: 5.1 kg-f
- NPN, or PNP open collector or voltage outputs
- Optimum angle control when combined with cam positioner (stand-alone H8PS or PLC-based) or encoder-input PLC position control modules
- Response frequency: 20 kHz max., 5,000 rpm max.
- Pre-wired with 1 meter cable; 2 meter cable available, connector version available for direct connection to an H8PS Cam Positioning unit



## Absolute Rotary Encoders

When ordering, specify the resolution in addition to the model number (example: E6C3-AG5C 360P/R 1M).

Size	Shaft	Supply voltage	Output configuration	Output code	Resolution (pulses/rotation)	Connection method	Model
50 dia. x 43 D mm	8 dia. x 15 L mm, stainless steel	12 to 24 VDC	NPN open-collector output	Gray	256, 360, 720	2 m connector for H8PS Cam Positioner	<b>E6C3-AG5C-C</b>
					256, 360, 720, 1,024	Pre-wired, 1 m cable	<b>E6C3-AG5C</b>
				Binary	32, 40		<b>E6C3-AN5C</b>
			BCD	6, 8, 12	<b>E6C3-AB5C</b>		
			PNP open-collector output	Gray	256, 360, 720, 1,024	<b>E6C3-AG5B</b>	
				Binary	32, 40	<b>E6C3-AN5B</b>	
		BCD		6, 8, 12	<b>E6C3-AB5B</b>		
		5 VDC 12 VDC	Voltage output	Binary	256	<b>E6C3-AN1E</b>	
						<b>E6C3-AN2E</b>	

# Rotary Encoders—Absolute

## E6CP

Quick Link

F523

### Low-Cost Absolute Encoder, 50 mm Diameter

- High-precision detection of automatic machine timing, also ideal for robot limit signals
- Absolute encoder performance at the cost of an incremental encoder
- Gray code output eliminates reading mistakes
- Lightweight, plastic body construction, IP50 enclosure rating
- Shaft loading: Radial: 3 kg-f; Axial: 2 kg-f
- Open collector output
- Response frequency: 5 kHz max., 1,000 rpm max.
- Pre-wired with 2-meter cable, connector version available for direct connection to an H8PS Cam Positioning unit



## Absolute Rotary Encoders

Size	Shaft	Power supply voltage	Output configuration	Output code	Resolution (pulses/rotation)	Connection method	Model
50 dia. x 55 D mm	6 dia. x 10 L mm	5 to 12 VDC	Open-collector output	Gray	256 (8-bit)	Pre-wired, 2 m cable	<b>E6CP-AG3C</b>
		12 to 24 VDC					<b>E6CP-AG5C</b>
						2 m cable with connector for H8PS Cam Positioner	<b>E6CP-AG5C-C</b>

# Rotary Encoders—Absolute

## E6F-A

Quick Link  
F524

### Rugged Encoder for High-Precision Detection

- 10 mm stainless steel shaft and rugged construction provide the highest shaft loading among Omron encoders: Radial: 12 kg-f, Thrust: 5 kg-f
- IP65f water and oil-proof construction
- High response speed for faster control: Gray code: 20 kHz; BCD: 10 kHz, 5,000 rpm max.
- Combine with H8PS Cam Positioner or PLC encoder input module for optimum angle control
- Pre-wired with 2-meter cable, connector version available for direct connection to an H8PS Cam Positioning unit



## Absolute Rotary Encoders

When ordering, specify the resolution in addition to the model number (example: E6F-AG5C 256 P/R).

Size	Shaft	Power supply voltage	Output configuration	Output code	Resolution (pulses/ rotation)	Connection method	Model	
60 mm dia. x 65 D mm	10 dia. x 20 L mm	5 to 12 VDC	NPN open collector	BCD	360	Pre-wired 2 m cable	E6F-AB3C	
			PNP open collector				E6F-AB5C	
		12 to 24 VDC	NPN open collector	Gray code	256, 360, 720	2 m cable with connector for H8PS Cam Positioner	E6F-AG5C-C	
			PNP open collector				E6F-AG5C	
			12 to 24 VDC	NPN open collector	Gray code	256, 360, 720, 1,024	Pre-wired 2 m cable	E6F-AG5C
				PNP open collector				E6F-AG5B

# Rotary Encoders—Incremental

## E6A2-C

Quick Link

F525

### Miniature Positioning Solution for Tight Spaces

- High response frequency and noise immunity make encoders ideal for factory automation applications with 10 to 500 pulses/revolution
- Space saving enclosure: 25 mm dia.
- 4 mm shaft with load rating of: Radial: 1 kg-f; Axial: 0.5 kg-f
- Open collector output, other output types available
- Output phases: A/A, B and A, B, Z (reversible) are available
- Response frequency: 20 kHz max., 5,000 rpm max.
- Enclosure rating: IP50
- Pre-wired with 0.5 meter cable



## Incremental Rotary Encoders

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/revolution)	Model
25 dia. x 31 D mm	4 dia. x 10 L mm	12 to 24 VDC	NPN open collector, 30 mA max.	100	E6A2-CW5C 100P/R 05M
				200	E6A2-CW5C 200P/R 05M

# Rotary Encoders—Incremental

## E6B2-C

Quick Link

F526

### General-Purpose Compact Encoders

- High resolution models (up to 2000 pulses per revolution available) substantially improve measuring accuracy
- Rugged construction: 6 mm shaft with load rating of: Radial: 3 kg-f; Axial: 2 kg-f
- Output phases: A, B, Z (reversible)
- Response frequency: up to 100 kHz max., 6,000 rpm max.
- Protected against short-circuit and reversed connections for highly reliable operation
- Available with NPN and PNP open collector, voltage and line driver outputs
- Enclosure rating: IP50
- Pre-wired with 0.5- or 2-meter cables



## Incremental Rotary Encoders

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/revolution)	Cable length	Model
40 mm dia. x 44 D mm	6 dia. x 15 L mm	12 to 24 VDC	NPN open collector, 35 mA max.	100	2 m	E6B2-CWZ6C 100P/R 2M
				200		E6B2-CWZ6C 200P/R 2M
				360	0.5 m	E6B2-CWZ6C 360P/R 05M
				360	2 m	E6B2-CWZ6C 360P/R 2M
				500		E6B2-CWZ6C 500P/R 2M
				600		E6B2-CWZ6C 600P/R 2M
				1000	0.5 m	E6B2-CWZ6C 1000P/R 05M
					2 m	E6B2-CWZ6C 1000P/R 2M
					0.5 m	E6B2-CWZ1X 1000P/R 05M
			5 VDC	Line driver: High: -20 mA or 2.5 V min. Low: +20 mA or 0.5 V max.		

# Rotary Encoders—Incremental

## E6C3-C



### Water Resistant Incremental Encoder for Tough Environments

- High resolution solutions from 100 to 3600 pulses/revolution
- IP65f drip-proof, oil-proof construction with sealed bearing
- 8 mm stainless steel shaft provides a load rating of: Radial: 88 kg-f; Axial: 5 kg-f
- Complementary outputs simplify interfacing to NPN or PNP input devices
- Output phases: A, B and Z (reversible)
- Response frequency: 125 kHz max. (65 kHz for Z-phase), 5,000 rpm max.
- Surge protection built-in
- Voltage and line driver output versions available
- Pre-wired with 1 meter cable, 2 meter cable is available



## Incremental Rotary Encoders-Complementary NPN and PNP Outputs

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/revolution)	Model
50 dia. x 43 D mm	8 dia. x 15 L mm, stainless steel	12 to 24 VDC	<p>Complementary output (NPN and PNP), 35 mA max.</p>	100	E6C3-CWZ5GH 100P/R 1M
				200	E6C3-CWZ5GH 200P/R 1M
				360	E6C3-CWZ5GH 360P/R 1M
				500	E6C3-CWZ5GH 500P/R 1M
				720	E6C3-CWZ5GH 720P/R 1M
				800	E6C3-CWZ5GH 800P/R 1M
				1000	E6C3-CWZ5GH 1000P/R 1M
				2048	E6C3-CWZ5GH 2048P/R 1M
				2500	E6C3-CWZ5GH 2500P/R 1M
				3600	E6C3-CWZ5GH 3600P/R 1M

## Rotary Encoders—Incremental

# E6D

Quick Link  
F528

### Rugged, High-Resolution Encoder

- Resolution as high as 6,000 pulses/revolution in a rugged construction
- Outputs: A, B (reversible) and Z (zero)
- 55 mm diameter housing
- Superb reliability and accuracy: phase error as small as 1/4T ±0.07T
- High response frequency of 200 kHz, 12,000 rpm max.
- 6 mm shaft with load rating of: radial: 5 kg-f; axial: 3 kg-f



## Incremental Rotary Encoders

Add resolution (pulses/revolution) before P/R in the model number.

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/revolution)	Cable length	Model
40 mm dia. x 44 D mm	6 dia. x 15 L mm	12 VDC	NPN open collector, 35 mA max.	720, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3200, 3600, 4096, 5000, 6000	0.5 m	E6D-CWZ2C□□□□P/R 05M
		5 VDC				E6D-CWZ1E□□□□P/R 05M

## Rotary Encoders—Incremental

# E6F-C

Quick Link  
F529

### Rugged Encoder with Strongest Shaft

- 10 mm stainless steel shaft and rugged construction provides the highest shaft loading among Omron encoders: Radial: 12 kg-f, Thrust: 5 kg-f
- IP65f water- and oil-proof construction
- 60 mm diameter housing
- Complementary output for longer cable length extension
- High response frequency of 83 kHz, 5,000 rpm max.
- Output load short-circuit protection to reduce risks from incorrect wiring
- Pre-wired 2 meter cable



## Incremental Rotary Encoders

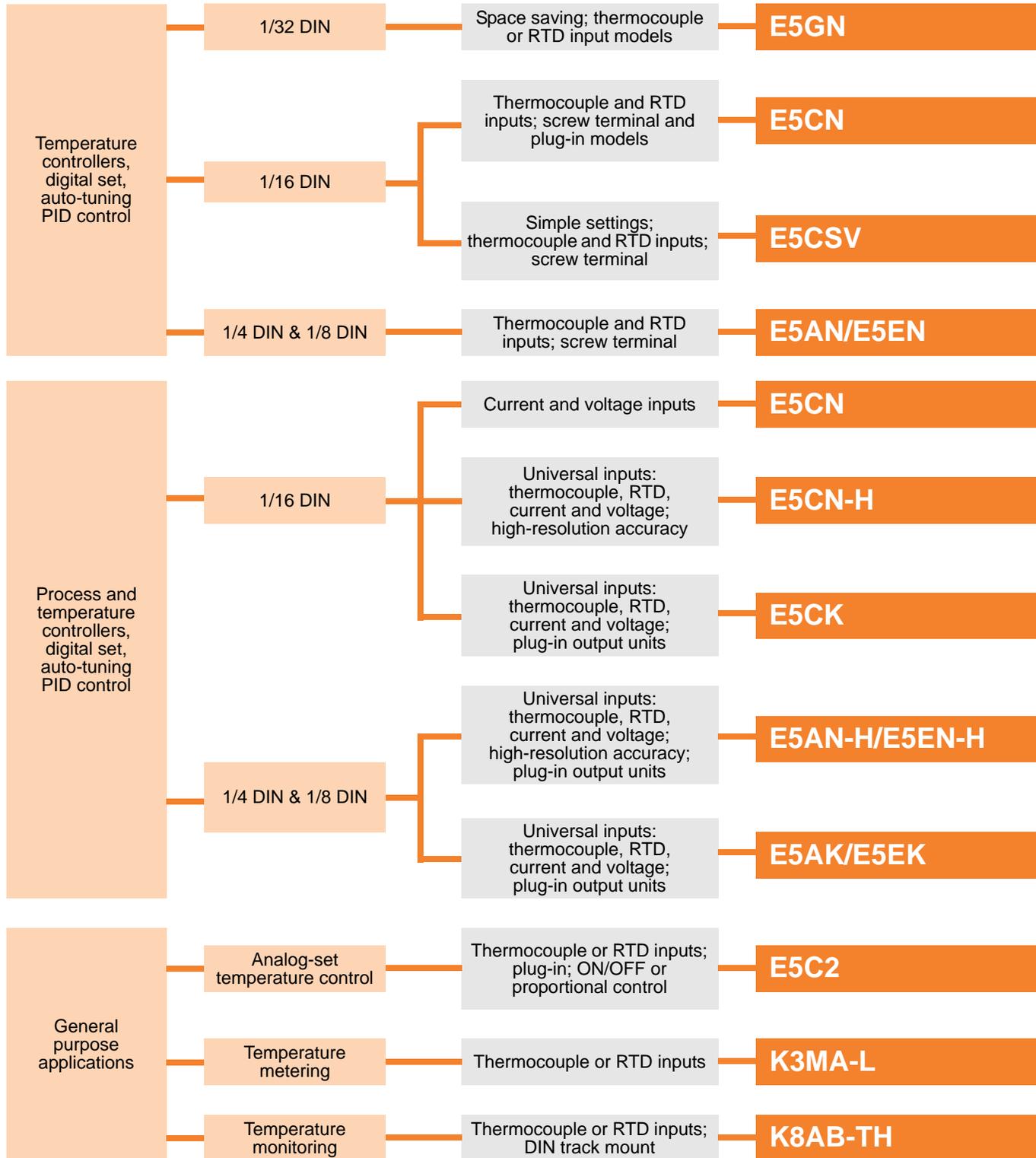
Add resolution (pulses/revolution) before P/R in the model number.

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/revolution)	Cable length	Model
60 mm dia. x 65 D mm	10 dia. x 20 L mm	12 to 24 VDC	Complementary NPN and PNP, ±30 mA	100, 200, 360, 500, 600, 1000	2 m	E6F-CWZ5GP/R 2M

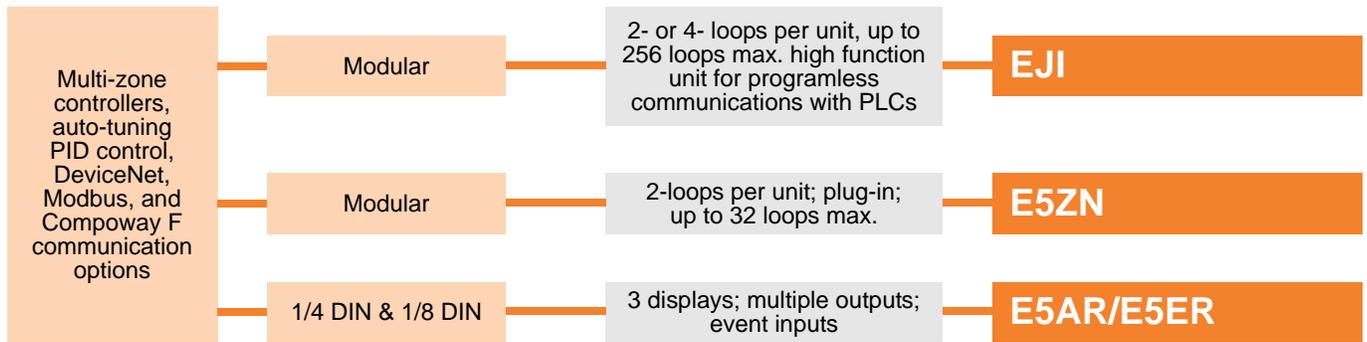
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## Selection Guide



## Selection Guide



## Selection Guide

# Temperature & Process Controllers

# E5CN

Quick Link  
M222

## 1/16 DIN Size Temperature & Process Controllers with 3-Color Display

- Fast sampling rate (250 ms) and short control period (0.5 s minimum) improves response
- Password protected settings limit access
- Easy setting and monitoring using 11-segment, 4 digit display
- 3-color display indicates changes in PV status to make monitoring more informative
- User-settable counter indicating number of operations of control output relay, gives warning to maintenance personnel of impending 'end of specified life'
- ON/OFF control or 2-PID with auto-tuning for superior performance
- Optional software enables fast and easy controller setup and monitoring via PC
- Software also offers "cloning" capability and enhanced security features through "parameter lockout" feature
- Built-in PC communication port reduces costs and simplifies installation
- Option units include event input, communications, 1-phase and 3-phase heater burnout, and a second control output
- Water-resistant front panel rated NEMA 4X/IP66
- Relay, long-life hybrid relay, voltage and current outputs
- Compact: measures 48 H x 48 W x 78 D mm (panel mount)
- 3-year warranty



## Specifications

- Models with temperature inputs:
  - Thermocouple input: Types K, J, T, L, E, U, N, R, S, B, W, or PL II
  - Platinum RTD input: Pt100 and JPt100
  - Omron infrared temperature sensor input: 10°-70° C, 60°-120°C, 115°-165°C, 160°-260°C
  - Voltage input: 0 to 50 mV
- Models with analog inputs:
  - Current input: 4-20 mA, 0 to 20 mA
  - Voltage input: 1 to 5 V, 0 to 5 V, 0 to 10 V
- Relay output: SPST-NO, 3 A at 250 VAC (SPDT– plug-in models)
  - 100,000 electrical operations (standard)
  - 1 million operations (long-life hybrid relay)
- Voltage output: 12 VDC ±15% for SSR, 21 mA max. load with short-circuit protection
  - Voltage pulse output is for driving an external SSR
- Current output: 4-20 mA DC/0-20 mA DC, load: 600 Ω max., approx. 10,000 resolution

## Panel Mount, Screw Terminal Temperature & Process Controllers

Inputs	Accuracy	Supply voltage	Auxiliary outputs	Control outputs	Model (only black models listed)
Temperature - Thermocouple, Platinum RTD, Omron infrared temperature sensor, voltage	Thermocouple: ±0.3% of indicated value or ±1°C (whichever is greater), ±1 digit max.  Platinum RTD: ±0.2% of indicated value or ±0.8°C (whichever is greater), ±1 digit max.	100-240 VAC, 50/60 Hz	0 (See note)	Relay	E5CN-RMT-500 AC100-240
				Voltage	E5CN-QMT-500 AC100-240
				Current	E5CN-CMT-500 AC100-240
			2 (See note)	Relay	E5CN-R2MT-500 AC100-240
				Voltage	E5CN-Q2MT-500 AC100-240
				Current	E5CN-C2MT-500 AC100-240
	24 VAC, 50/60 Hz, 24 VDC	0	Relay	E5CN-RMTD-500 ACDC24	
			Voltage	E5CN-QMTD-500 ACDC24	
			Current	E5CN-CMTD-500 ACDC24	
		2 (See note)	Relay	E5CN-R2MTD-500 ACDC24	
			Voltage	E5CN-Q2MTD-500 ACDC24	
			Current	E5CN-C2MTD-500 ACDC24	
Analog (current/voltage)	Analog input: ±0.2% FS ±1 digit max.	100-240 VAC, 50/60 Hz	0	Relay	E5CN-RML-500 AC100-240
				Voltage	E5CN-QML-500 AC100-240
				Current	E5CN-CML-500 AC100-240
			2	Relay	E5CN-R2ML-500 AC100-240
				Voltage	E5CN-Q2ML-500 AC100-240
				Current	E5CN-C2ML-500 AC100-240
		24 VAC, 50/60 Hz, 24 VDC	0	Relay	E5CN-RMLD-500 ACDC24
				Voltage	E5CN-QMLD-500 ACDC24
				Current	E5CN-CMLD-500 ACDC24
			2	Relay	E5CN-R2MLD-500 ACDC24
				Voltage	E5CN-Q2MLD-500 ACDC24
				Current	E5CN-C2MLD-500 ACDC24

**Note:** To order these specific models in silver add "W" to the part number (e.g. E5CN-R2MT-W-500 AC100-240); other models listed only available in black.

### Option Units (for Panel Mount Models Only)

One of the following Option Units can be mounted to provide the E5CN with additional functions.

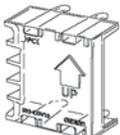
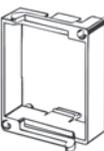
Functions	Recommended additional parts	Model
RS-485 Communications + 3-phase heater burnout/SSR failure/heater overcurrent detection	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNHH03N2
Heater burnout/SSR failure/heater overcurrent detection + Event inputs	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3)	E53-CNHB2
RS-485 Communications + Control output 2 (Voltage for driving SSR)	Please refer to Relay section for Omron's offering of Solid State Relays	E53-CNQ03N2
Event inputs + External power supply for ES1B	—	E53-CNPBN2
Heater burnout/SSR failure/heater overcurrent detection + External power supply for ES1B	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNPHN2
RS-485 Communications + External power supply for ES1B	—	E53-CNP03N2
RS-485 Communications + Heater burnout/SSR failure/heater overcurrent detection	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNH03N2
RS-485 Communications	—	E53-CN03N2
Event inputs	—	E53-CNBN2
Heater burnout/SSR failure/heater overcurrent detection + Control output 2 (Voltage for driving SSR)	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNQH2
3-phase heater burnout/SSR failure/heater overcurrent detection + Control output 2 (Voltage for driving SSR)	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNQH2N2
Event inputs + Control output 2 (Voltage for driving SSR)	—	E53-CNQB2

## Plug-In, 11-Pin Socket Mount Temperature Controllers

Temperature inputs	Accuracy	Voltage	Alarm outputs	Control outputs	Model
Thermocouple, Platinum RTD, Omron infrared temperature sensor, voltage	Thermocouple: ±1% of indicated value or ±2 C (whichever is greater), ±1 digit max.  Platinum RTD: ±0.2% of indicated value or ±0.8 C (whichever is greater), ±1 digit max.	100-240 VAC, 50/60 Hz	0	Relay	E5CN-RTU AC100-240
				Voltage	E5CN-QTU AC100-240
			1	Relay	E5CN-R1TU AC100-240
				Voltage	E5CN-Q1TU AC100-240
			2	Relay	E5CN-R2TU AC100-240
				Voltage	E5CN-Q2TU AC100-240
	24 VAC, 50/60 Hz, 24 VDC		0	Relay	E5CN-RTDU AC/DC24
				Voltage	E5CN-QTDU AC/DC24
			1	Relay	E5CN-R1TDU AC/DC24
				Voltage	E5CN-Q1TDU AC/DC24
2	Relay	E5CN-R2TDU AC/DC24			
	Voltage	E5CN-Q2TDU AC/DC24			

**Note:** Additional models available: analog input; current output. All plug-in models only available in black.

## Accessories

Functions	Appearance	Dimensions H x W x D mm	Specification	Model
Current transformers (CT)		32.5 x 40 x 10	50 A current load, 5.8 mm dia. hole	E54-CT1
		49 x 40 x 10	50 A current load, 12 mm dia. hole	E54-CT3
Finger protection terminal cover		48.8 x 48 x 31.1	Replacement part  <b>Note:</b> The terminal cover comes with controllers with "-500" in the part number	E53-COV17
Panel mounting conversion adapter		72 x 72 x 76	Converts 72 x 72 mm panel cutout to 48 x 48 mm cutout	Y92F-45
USB-Serial conversion cable		2.1 m length	Connects to programming port under controller	E58-CIFQ1
CX-Thermo software		CD-ROM	Simplify parameter set-up and monitoring. Enables editing and batch-downloading of parameters from a PC.	EST2-2C-MV□
Panel mounting adapter		58 x 48 x 25	Fits behind panel, ideal for side-by-side installation. Use P3G□-□□ sockets.  Order separately for panel mounting.	Y92F-30
Track mounting, front-connecting socket		74 x 50 x 31.2	11-pin socket	P2CF-11
			11-pin socket with finger-safe terminals	P2CF-11-E
Back-connecting socket for panel mounting		45 x 45 x 27	11-pin socket	P3GA-11
Finger protection terminal cover		48 x 48 x 37.5 installed	Finger-safe terminal cover for 11-pin socket	Y92A-48G

Please refer to Relay section for Omron's offering of Solid State Relays

# Temperature & Process Controllers

## E5CN-H

Quick Link

M223

### Advanced, High-Performance 1/16 DIN Size Temperature & Process Controllers

- Easy-to-read, high-resolution, 11-segment display with 5 digits/0.01°C or F
- Achieve high-speed disturbance recovery from 60 ms sampling rate and short control period (0.5 s minimum)
- Universal inputs on all models (thermocouple, RTD, or analog input) to handle various sensors with high accuracy:
  - Thermocouple/Pt input:  $\pm 0.1\%$  of PV
  - Analog input:  $\pm 0.1\%$  FS
- Flexible logic operations (AND, OR, and delays) with contact outputs set from CX-Thermo software
- User-settable counter indicating number of operations of control output relay, gives warning to maintenance personnel of impending 'end of specified life'
- ON/OFF control or 2-PID with auto-tuning for superior performance
- Optional software enables fast and easy controller setup and monitoring via PC
- Software also offers "cloning" capability and enhanced security features through "parameter lockout" feature
- Built-in PC communication port simplifies setup
- Option units include event inputs, communications, 1-phase and 3-phase heater burnout, transfer output, and a second control output
- Water-resistant front panel rated NEMA 4X/IP66
- Relay, voltage (for driving SSR), current, and linear voltage outputs
- Compact: measures 48 H x 48 W x 78 D mm
- 3-year warranty



## Specifications

- Universal inputs:
  - Thermocouple input: Types K, J, T, L, E, U, N, R, S, B, W, or PL II
  - Platinum RTD input: Pt100 and JPt100
  - Current input: 4-20 mA, 0 to 20 mA
  - Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
- Relay output: SPST-NO, 3 A at 250 VAC
  - 100,000 electrical operations (standard)
- Voltage output: 12 VDC  $\pm 15\%$  for SSR, 21 mA max. load with short-circuit protection
  - Voltage pulse output is for driving an external SSR
- Current output: 4-20 mA DC/0 to 20 mA DC, 600  $\Omega$  max., approx. 10,000 resolution
- Linear voltage output: 0 to 10 VDC (load: 1 k $\Omega$  min.), approx. 10,000 resolution

## Panel Mount, Screw Terminal Temperature & Process Controllers

Inputs	Accuracy	Supply voltage	Auxiliary outputs	Control outputs	Model (only black models listed)
Universal - Thermocouple, Platinum RTD, current, voltage	Thermocouple: ( $\pm 0.1\%$ of indicated value or $\pm 1^\circ\text{C}$ , whichever is greater) $\pm 1$ digit max.	100-240 VAC, 50/60 Hz	2	Relay (See note)	E5CN-HR2M-500 AC100-240
				Voltage (See note)	E5CN-HQ2M-500 AC100-240
				Current (See note)	E5CN-HC2M-500 AC100-240
	Platinum RTD: ( $\pm 0.1\%$ of indicated value or $\pm 0.5^\circ\text{C}$ , whichever is greater) $\pm 1$ digit max.	24 VAC, 50/60 Hz, 24 VDC		Linear voltage	E5CN-HV2M-500 AC100-240
				Relay (See note)	E5CN-HR2MD-500 ACDC24
				Voltage (See note)	E5CN-HQ2MD-500 ACDC24
				Current (See note)	E5CN-HC2MD-500 ACDC24
Analog input: $\pm 0.1\%$ FS $\pm 1$ digit max.			Linear voltage	E5CN-HV2MD-500 ACDC24	
CT input: $\pm 5\%$ FS $\pm 1$ digit max.					

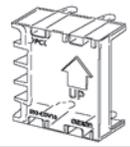
**Note:** To order these specific models in silver add "W" to the part number (e.g. E5CN-HR2M-W-500 AC100-240); models with linear voltage output only available in black

### Option Units

One of the following Option Units can be mounted to provide the E5CN-H with additional functions.

Functions	Recommended additional parts	Model
RS-485 Communications + 3-phase heater burnout/SSR failure/heater overcurrent detection	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNHH03N2
Heater burnout/SSR failure/heater overcurrent detection + Event inputs	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNHB2
RS-485 Communications + Control output 2 (Voltage for driving SSR)	Please refer to Relay section for Omron's offering of Solid State Relays	E53-CNQ03N2
RS-485 Communications + Heater burnout/SSR failure/heater overcurrent detection	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CN03N2
RS-485 Communications	—	E53-CN03N2
Event inputs	—	E53-CNBN2
Heater burnout/SSR failure/heater overcurrent detection + Control output 2 (Voltage for driving SSR)	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNQHN2
3-phase heater burnout/SSR failure/heater overcurrent detection + Control output 2 (Voltage for driving SSR)	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CNQHHN2
Event inputs + Control output 2 (Voltage for driving SSR)	Please refer to Relay section for Omron's offering of Solid State Relays	E53-CNQBN2
Control output 2 (Voltage for driving SSR) + Transfer output	Please refer to Relay section for Omron's offering of Solid State Relays	E53CNQFN2
Event inputs + Transfer output	—	E53-CNBFN2
RS-232C Communications + Control output 2 (Voltage for driving SSR)	Please refer to Relay section for Omron's offering of Solid State Relays	E53CNQ01N2
RS-232C Communications	—	E53-CN01N2
RS-232C Communications + Heater burnout/SSR failure/heater overcurrent detection	Current transformer for heater burnout detection: 50 A load (E54-CT1 or E54-CT3); SSRs	E53-CN01N2

## Accessories

Functions	Appearance	Dimensions H x W x D mm	Specification	Model
Current transformers (CT)		32.5 x 40 x 10	50 A current load, 5.8 mm dia. hole	<b>E54-CT1</b>
		49 x 40 x 10	50 A current load, 12 mm dia. hole	<b>E54-CT3</b>
Finger protection terminal cover		48.8 x 48 x 31.1	Replacement part  <b>Note:</b> The terminal cover comes with controllers with "-500" in the part number	<b>E53-COV17</b>
Panel mounting conversion adapter		72 x 72 x 76	Converts 72 x 72 mm panel cutout to 48 x 48 mm cutout	<b>Y92F-45</b>
USB-Serial Conversion Cable		2.1 m length	Connects to programming port under controller	<b>E58-CIFQ1</b>
CX-Thermo Software		CD-ROM	Simplify parameter set-up and monitoring. Enables editing and batch-downloading of parameters from a PC.	<b>EST2-2C-MV□</b>
Panel mounting adapter		58 x 48 x 25	Fits behind panel, ideal for side-by-side installation. Use P3G□-□□ sockets.  Order separately for panel mounting.	<b>Y92F-30</b>

Please refer to Relay section for Omron's offering of Solid State Relays

# Temperature & Process Controllers

# E5AN/E5EN

Quick Link  
M224

## 1/4 and 1/8 DIN Size Temperature & Process Controllers with 3-Color/3-Level Display

- Fast sampling rate (250 ms) and short control period (0.5 s minimum) improves response
- Password protected settings limit access
- Easy setting and monitoring using 11-segment, 4 digit display
- 3-color/3-level display that simultaneously displays the PV, SV, and MV status to make monitoring more informative
- One-touch operation with Programmable Function Key (PF) that can be assigned to auto/manual, RUN/STOP, or other functions
- Option units include event input, communications, 1-phase and 3-phase heater burnout, and a second control output
- ON/OFF control or 2-PID with auto-tuning for superior performance
- Optional software enables fast and easy controller setup and monitoring via PC
- Software also offers "cloning" capability and enhanced security features through "parameter lockout" feature
- Built-in PC communication port reduces installation time and simplifies setup
- Water-resistant front panel rated NEMA 4X/IP66
- Relay, voltage and current outputs
- Standard panel cutouts: 1/8 DIN 48 x 96 E5EN; 1/4 DIN 96 x 96 E5AN
- 3-year warranty



## Specifications

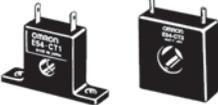
- Models with temperature inputs:
  - Thermocouple input: Types K, J, T, L, E, U, N, R, S, B, W, or PL II
  - Platinum RTD input: Pt100 and JPt100
  - Omron infrared temperature sensor input: 10°-70° C, 60°-120°C, 115°-165°C, 160°-260°C
  - Voltage input: 0 to 50 mV
- Models with analog inputs:
  - Current input: 4-20 mA, 0 to 20 mA
  - Voltage input: 1 to 5 V, 0 to 5 V, 0 to 10 V
- Relay output: SPST-NO, 5 A at 250 VAC
  - 100,000 electrical operations (standard)
  - 1 million operations (long-life relay)
- Voltage output: 12 VDC ±15% for SSR, 21 mA max. load with short-circuit protection
  - Voltage pulse output is for driving an external SSR
- Current output: 4-20 mA DC/0-20 mA DC, load: 600 Ω max., approx. 10,000 resolution

## Panel Mount, Screw Terminal Temperature Controllers

Input type	Accuracy	Aux. outputs	Control output 1	Functions			Model Insert "A" for 1/4 DIN E5AN models Insert "E" for 1/8 DIN E5EN models			
				Heater burn-out	Sensor power supply	Control output 2				
Temperature - Thermocouple, Platinum RTD, Omron infrared temperature sensor, voltage	Thermocouple: (±0.3% of indicated value or ±1°C, whichever is greater) ±1 digit max.  Platinum RTD: (±0.2% of indicated value or ±0.8°C, whichever is greater) ±1 digit max.	3	Relay	—	—	—	E5□N-R3MT-500-N AC100-240			
			Voltage (for SSR)				E5□N-Q3MT-500-N AC100-240			
			Current				E5□N-C3MT-500-N AC100-240			
			Relay				1	E5□N-R3HMT-500-N AC100-240		
			Voltage (for SSR)					E5□N-Q3HMT-500-N AC100-240		
			Relay				2	E5□N-R3HHMT-500-N AC100-240		
			Voltage (for SSR)					E5□N-Q3HHMT-500-N AC100-240		
			Relay				—	Voltage	E5□N-R3QMT-500-N AC100-240	
			Voltage (for SSR)						E5□N-Q3QMT-500-N AC100-240	
			Current						E5□N-C3QMT-500-N AC100-240	
			Relay						Long-life relay	E5□N-R3YMT-500-N AC100-240
			Voltage (for SSR)							E5□N-Q3YMT-500-N AC100-240
			Current							E5□N-C3YMT-500-N AC100-240
			Relay				Yes	—	E5□N-R3PMT-500-N AC100-240	
			Voltage (for SSR)						E5□N-Q3PMT-500-N AC100-240	
			Current						E5□N-R3ML-500-N AC100-240	
Relay	E5□N-Q3ML-500-N AC100-240									
Analog (current/voltage)	Analog input: ±0.2% FS ±1 digit max.  CT input: ±5% FS ±1 digit max.	3	Relay	—	—	—	E5□N-R3ML-500-N AC100-240			
			Voltage (for SSR)				E5□N-Q3ML-500-N AC100-240			
			Current				E5□N-C3ML-500-N AC100-240			
			Relay				1	E5□N-R3HML-500-N AC100-240		
			Voltage (for SSR)					E5□N-Q3HML-500-N AC100-240		
			Voltage (for SSR)				—	Long-life relay	E5□N-Q3YML-500-N AC100-240	

**Note:** Models with 24 VAC/VDC supply voltage, also silver models available, please see complete datasheet.

## Accessories

Description	Appearance	Specification	Model
Communications board	—	RS-485	E53-EN03
		RS-232C	E53-EN01
Event input board		For remote set point and Run/Stop functionality	E53-AKB
Current transformers (CT) for heater burnout detection		50 A current load, 5.8 mm dia. hole	E54-CT1
		50 A current load, 12 mm dia. hole	E54-CT3
Terminal cover (supplied with controller)	—	Provides finger protection from terminals	E53-COV16
USB-Serial conversion cable		Connects to programming port under controller (2.1 m length)	E58-CIFQ1
CX-Thermo software		Simplify parameter set-up and monitoring. Enables editing and batch-downloading of parameters from a PC.	EST2-2C-MV□

Please refer to Relay section for Omron's offering of Solid State Relays

# Temperature & Process Controllers

# E5AN-H/E5EN-H

Quick Link  
M225

## Advanced, High-Performance 1/4 and 1/8 DIN Size Temperature & Process Controllers with 3-Color/3-Level Display

- Easy-to-read, high-resolution, 11-segment display with 5 digits/0.01°C or F
- Achieve high-speed disturbance recovery from 60 ms sampling rate and short control period (0.5 s minimum)
- Configure the controller from a variety of output units to match application requirements
- Universal inputs on all models (thermocouple, RTD, or analog input) to handle various sensors with high accuracy:
  - Thermocouple/Pt input:  $\pm 0.1\%$  of PV
  - Analog input:  $\pm 0.1\%$  FS
- Flexible contact outputs with logic operations (AND, OR, and delays) set-up from CX-Thermo Software (Ver. 4.0+)
- ON/OFF control or 2-PID with auto-tuning for superior performance
- 3-color/3-level display that simultaneously displays the PV, SV, and MV status to make monitoring more informative
- One-touch operation with Programmable Function Key (PF) that can be assigned to auto/manual, RUN/STOP, or other functions
- Flexible logic operations (AND, OR, and delays) with contact outputs set from CX-Thermo Software
- Save up to 8 banks of control recipes and ramp/soak parameters
- User-settable counter indicating number of operations of control output relay, gives warning to maintenance personnel of impending 'end of specified life'
- Optional software enables fast and easy controller setup and monitoring via PC
- Simplify setup and parameter adjustment time through infrared communications port or built-in PC comm. port



- Controller options include: heater burnout alarms, event inputs, remote setpoint input, transfer outputs, and communications
- All models feature remote setpoint input (4 to 20 mA) and 2 event inputs
- Water-resistant front panel rated NEMA 4X/IP66
- User-selectable/-replaceable relay, voltage, current, and linear voltage output units
- Standard panel cutouts: 1/4 DIN 96 x 96 E5AN; 1/8 DIN 48 x 96 E5EN
- 3-year warranty

## Specifications

- Universal inputs:
  - Thermocouple input: Types K, J, T, L, E, U, N, R, S, B, W, or PL II
  - Platinum RTD input: Pt100 and JPt100
  - Current input: 4-20 mA, 0 to 20 mA
  - Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
- Optional output units – relay, voltage, current, and linear voltage; specifications provided below
- Built-in solid state relay output: 3 A at 75 to 250 VAC (resistive load)
- Relay output for position-proportional: Open and close: SPST-NO, 250 VAC, 1 A (including in-rush current), electrical life: 100,000 operations min.
  - Potentiometer input: Must be between 100  $\Omega$  and 2.5 k $\Omega$  for maximum open position.
- Auxiliary relay outputs: SPST-NO, 3 A at 250 VAC
  - 100,000 electrical operations

## Panel Mount, Screw Terminal Temperature & Process Controllers

Control method: Standard - heat, cool, heating/cooling Output: user defined; order Control Output Units separately below.

Input type/accuracy	Aux. outputs	Control outputs 1/2	Additional functions		Model 1/4 DIN - E5AN models 1/8 DIN - E5EN models
			Heater burnout	Transfer output	
Thermocouple: (±0.1% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum RTD: (±0.1% of indicated value or ±0.5°C, whichever is greater) ±1 digit max. Current input (analog): ±0.1% FS ±1 digit max. CT input (voltage): ±5% FS ±1 digit max.	2	Optional Output Unit × 2	1	—	E5AN-HAA2HBM-500 AC100240
			2	4 to 20 mA output	E5EN-HAA2HBM-500 AC100240
	3		—	E5AN-HAA2HHBFM-500 AC100240	
			—	E5EN-HAA2HHBFM-500 AC100240	
Select 2 Control Output Units from chart below: Relay, SSR, Voltage pulse (NPN or PNP), Current or Linear voltage					

Note: 24 VAC/VDC supply voltage and silver models also available please see complete datasheet.

### Control Output Units

Output unit	Specifications	Model
Relay output	SPST-NO, 250 VAC, 5 A (resistive load), electrical life: 100,000 operations	E53-RN
Voltage output (for driving SSR)	12 VDC (PNP), max. load current: 40 mA, with short-circuit protection	E53-QN
	24 VDC (NPN), max. load current: 20 mA, with short-circuit protection	E53-Q3
	24 VDC (PNP), max. load current: 20 mA, with short-circuit protection	E53-Q4
Current output	4 to 20 mA DC, load: 600 Ω max., resolution: approx. 10,000	E53-C3N
	0 to 20 mA DC, load: 600 Ω max., resolution: approx. 10,000	E53-C3DN
Linear voltage output	0 to 10 VDC, load: 1 kΩ min., resolution: approx. 10,000	E53-V34N
	0 to 5 VDC, load: 1 kΩ min., resolution: approx. 10,000	E53-V35N

## Panel Mount Screw Terminal Temperature & Process Controllers

Control method: Standard - heat, cool, heating/cooling Output: built-in Solid State Relay

Input type/accuracy	Aux. outputs	Control outputs 1/2	Additional functions		Model 1/4 DIN - E5AN models 1/8 DIN - E5EN models
			Heater burnout	Transfer output	
Thermocouple: (±0.1% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum RTD: (±0.1% of indicated value or ±0.5°C, whichever is greater) ±1 digit max. Current input (analog): ±0.1% FS ±1 digit max. CT input (voltage): ±5% FS ±1 digit max.	2	SSR Outputs × 2	1	—	E5AN-HSS2HBM-500 AC100240
			2	4 to 20 mA output	E5EN-HSS2HBM-500 AC100240
	3		—	E5AN-HSS2HHBFM-500 AC100240	
			—	E5EN-HSS2HHBFM-500 AC100240	
Select 2 Control Output Units from chart below: Relay, SSR, Voltage pulse (NPN or PNP), Current or Linear voltage					

Note: 24 VAC/VDC supply voltage models also available please see complete datasheet.

Control method: Standard - Position-proportional valve, heat, cool, heating/cooling Output: built-in Solid State Relay

Input type/accuracy	Aux. outputs	Control outputs 1/2	Additional functions		Model 1/4 DIN - E5AN models 1/8 DIN - E5EN models
			Heater burnout	Transfer output	
Thermocouple: (±0.1% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum RTD: (±0.1% of indicated value or ±0.5°C, whichever is greater) ±1 digit max. Current input (analog): ±0.1% FS ±1 digit max. CT input (voltage): ±5% FS ±1 digit max.	2	Relay outputs × 2	—	—	E5AN-HPRR2BM-500 AC100240
					E5EN-HPRR2BM-500 AC100240
				4 to 20 mA output	E5AN-HPRR2BFM-500 AC100240
					E5EN-HPRR2BFM-500 AC100240

- Note:** 1. Position-proportional models are intended for motorized valves (not 4-20 mA modulating valves). These use two relays ("open" and "close") which will turn a motor clockwise or counter-clockwise, thus opening or closing the valve.  
 2. 24 VAC/VDC supply voltage models also available please see complete datasheet.

## Accessories

Functions	Appearance	Specification	Model
Communications board	—	RS-485	E53-EN03
		RS-232C	E53-EN01
Event input board		For remote set point and Run/Stop functionality	E53-AKB
Current transformers (CT) for heater burnout detection		50 A current load, 5.8 mm dia. hole	E54-CT1
		50 A current load, 12 mm dia. hole	E54-CT3
Terminal cover (supplied with controller)	—	Provides finger protection from terminals	E53-COV16
USB-Serial conversion cable		Connects to programming port under controller (2.1 m length)	E58-CIFQ1
USB-infrared conversion cable		Cable and mounting bracket provides simple connection to infrared programming port on front of controller (2 m length)	E58-CIFIR
CX-Thermo software	—	Simplify parameter set-up and monitoring. Enables editing and batch-downloading of parameters from a PC.	EST2-2C-MV <input type="checkbox"/>

Please refer to Relay section for Omron's offering of Solid State Relays

# Temperature Controllers E5GN



## Space-Saving, Intelligent Digital Temperature Controllers

- 1/32 DIN sized controller saves panel space, measures just 100 mm deep
- Thermocouple/non-contact temperature sensors/voltage or platinum RTD input models
- Serial RS-485 communication models available
- Auto-tuning and self-tuning available: functions can be used simultaneously
- Heating or heat/cool control
- Water-resistant construction (NEMA 4X/IP66) rated front panel
- Dimensions: 24 H x 48 W x 100 D mm
- 3-year warranty



## Specifications

- Thermocouple input: K, J, T, E, L, U, N, R, S, B
- Omron infrared temperature sensor input: 10°-70°C, 60°-120°C, 115°-165°C, 160°-260°C
- Voltage input: 0 to 50 mV
- Platinum RTD: Pt100, JPt100
- Relay output: SPST-NO, 2 A at 250 VAC resistive load, 100,000 operations
- Voltage output: 12 VDC +15%/-20% for SSR (PNP), 21 mA max. load
- Control method: PID or ON/OFF control with auto-tuning and self-tuning functions that can be used simultaneously

## 1/32 DIN Temperature Controllers

Temperature inputs	Accuracy	Voltage	Alarm outputs	Control outputs	Model
Thermocouple	±0.5% of indicated value or ±1 C (whichever is greater), ±1 digit max.	100-240 VAC, 50/60 Hz	0	Relay	<b>E5GN-RTC AC100-240</b>
Thermocouple				Voltage	<b>E5GN-QTC AC100-240</b>
Thermocouple			1	Relay	<b>E5GN-R1TC AC100-240</b>
Platinum RTD				Voltage	<b>E5GN-R1P AC100-240</b>
Thermocouple		24 VAC, 50/60 Hz, 24 VDC	0	Relay	<b>E5GN-R1TC AC/DC24</b>
Thermocouple				Voltage	<b>E5GN-Q1TC AC/DC24</b>

# Digital Temperature Controllers E5CSV



## Simple to Set and Operate 1/16 DIN Size Controllers

- Easy setting using internal DIP and rotary switches
- ON/OFF or PID control (with on-demand auto-tuning) selectable
- Clearly visible digital display with character height of 13.5 mm
- Deviation indicator makes monitoring more effective
- Multiple temperature sensor input (thermocouple/platinum resistance thermometer) models stocked; thermocouple input only and platinum RTD input only models available
- Models with two alarms are ideal for temperature alarm applications
- Setting change protection prohibits tampering
- Sampling rate (500 ms) and selectable control period (2 and 20 s) improves response
- 8-mode alarm output and sensor error detection
- Input shift adjusts display to reflect known sensor offsets



- Accuracy  $\pm 0.5\%$  of value
- $^{\circ}\text{C}$  or  $^{\circ}\text{F}$  field selectable
- RoHS compliant
- Water-resistant front panel rated NEMA 4X/IP66
- Compact: measures 48 H x 48 W x 78 D mm

## Specifications

- Multi-input (thermocouple/platinum resistance thermometer) type: K, J, L, T, U, N, R, Pt100, JPt100
- Relay output: SPST-NO, 3 A at 250 VAC; 100,000 electrical operations
- Voltage output: 12 VDC for SSR, 21 mA max. load with short-circuit protection

## Temperature Controllers

Size	Power supply voltage	Number of alarm points	Control output	TC/Pt multi-input Case color: Black Scale marked in $^{\circ}\text{C}$	TC input Case color: Light gray Scale marked in $^{\circ}\text{C}$	Pt input Case color: Light gray Scale marked in $^{\circ}\text{C}$	TC/Pt multi-input Case color: Black Scale marked in $^{\circ}\text{F}$
1/16 DIN 48 x 48 x 78 mm (W x H x D)	100 to 240 VAC, 50/60 Hz	0	Relay	E5CSV-RT AC100-240	—	—	E5CSV-RT-F AC100-240
			Voltage (for driving SSR)	E5CSV-QT AC100-240			E5CSV-QT-F AC100-240
		1	Relay	E5CSV-R1T AC100-240	E5CSV-R1KJ-W	E5CSV-R1P-W	E5CSV-R1T-F AC100-240
			Voltage (for driving SSR)	E5CSV-Q1T AC100-240	E5CSV-Q1KJ-W	E5CSV-Q1P-W	E5CSV-Q1T-F AC100-240
		2 (See note)	Relay	E5CSV-R2T AC100-240	—	—	E5CSV-R2T-F AC100-240
			Voltage (for driving SSR)	E5CSV-Q2T AC100-240			E5CSV-Q2T-F AC100-240
	24 VAC/ VDC	0	Relay	E5CSV-RTD AC/DC24	—	—	—
			Voltage (for driving SSR)	E5CSV-QTD AC/DC24			
		1	Relay	E5CSV-R1TD AC/DC24			E5CSV-R1T-DF AC/DC24
			Voltage (for driving SSR)	E5CSV-Q1TD AC/DC24			E5CSV-Q1T-DF AC/DC24
		2 (See note)	Relay	E5CSV-R2TD AC/DC24			—
			Voltage (for driving SSR)	E5CSV-Q2TD AC/DC24			

**Note:** Models with two alarm outputs always use the upper limit alarm mode for the alarm 2 output.

# Process Controllers

# E5□K Series

Quick Link

M228

## Advanced Process Controllers with Fuzzy Logic Tuning

- Field configurable outputs, options
- 100 ms sampling (analog input)
- Advanced PID or fuzzy self-tuning
- Water-resistant front panel meets NEMA 4X/IP66
- Remote set-point with optional event input board
- Set-point ramp
- Serial communications available
- Front panel programming
- Heat only or heat/cool control
- Auxiliary outputs (SPST) standard
- 3-year warranty
- Three sizes to match your panel:
  - 1/4 DIN (E5AK): 96 H x 96 W x 100 D mm
  - 1/8 DIN (E5EK): 96 H x 48 W x 100 D mm
  - 1/16 DIN (E5CK): 53 H x 53 W x 100 D mm



## Specifications

- Thermocouple inputs: Types K, J, T, E, L, U, N, R, S, B, W, PLII
- Platinum RTD inputs: Pt100 and JPt100
- Current input: 4 to 20 mA DC, 0 to 20 mA DC
- Voltage input: 1 to 5 VDC, 0 to 5 VDC, 0 to 10 VDC
- Relay output: SPST-NO, 3 A at 250 VAC (resistive load); 100,000 operations min.
  - SSR, 1 A, 75 to 250 VAC
- Voltage (pulse) output: 12/24 VDC (NPN) or 24 VDC (PNP) 20 mA max. with short-circuit protection circuit
- Linear voltage output: 0 to 10 VDC; Permissible load impedance 1 k  $\Omega$  max.; Resolution: Approx. 2600 steps
- Linear current output: 4 to 20 mA, 0 to 20 mA; Permissible load impedance 500  $\Omega$  max.; Resolution: Approx. 2600 steps
- Control method: ON/OFF, Advanced PID Control (with auto-tuning) or Self-tuning
- Auxiliary output: Relay, SPST-NO, 3 A at 250 VAC

## 1/4 and 1/8 DIN Process Controllers

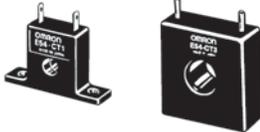
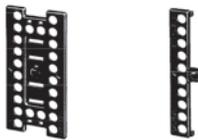
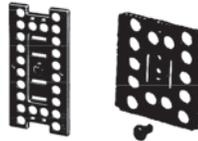
Description	Size	Supply voltage	Control output	Auxiliary output	Model
Standard	1/4 DIN	100-240VAC, 50/60 Hz	Choose 2 output units: Relay, SSR, Voltage pulse (NPN or PNP), Linear voltage, Linear current	2, Relay	<b>E5AK-AA2-500</b>
Positional-proportional model for motorized valves			2 Relays		<b>E5AK-PRR2-500</b>
Standard	1/8 DIN	100-240VAC, 50/60 Hz	Choose 2 output units: Relay, SSR, Voltage for SSR (NPN or PNP), Linear voltage, Linear current	2, Relay	<b>E5EK-AA2-500</b>
Positional-proportional model for motorized valves			2 Relays		<b>E5EK-PRR2-500</b>

- Note:**
1. All control outputs are insulated from the input circuit.
  2. When using the heater burnout alarm function with a standard model, the Linear Output Module cannot be used for the control outputs (heat). The Digital Controller provides transfer outputs at 4 to 20 mA for the PV and other values and control outputs at 4 to 20 mA for the current outputs.
  3. Part numbers ending in -500 include a Finger Safe cover.

## Output and Option Units for E5AK/E5EK

Description	Specifications	Compatible controller	Max. quantity	Model
Relay	SPST, 3 A 250 VAC	E5AK/E5EK	2	E53-R
SSR (solid-state relay)	1 A, 75 to 250 VAC			E53-S
Voltage pulse	NPN, 12 VDC			E53-Q
	NPN, 24 VDC			E53-Q3
	PNP, 24 VDC			E53-Q4
Linear current	4 to 20 mA			E53-C3
Linear voltage	0-10 VDC			E53-V34
	0-5 VDC	E53-V35		
Communications	RS-485	3 (E5AK)/1 (E5EK)	E53-EN03	
Event input	For remote set-point		E53-AKB	

## Accessories

Functions	Appearance	Specification	Model
Current transformers (CT)		50 A current load, 5.8 mm dia. hole	E54-CT1
		50 A current load, 12 mm dia. hole	E54-CT3
Terminal cover for E5AK		Finger protection terminal cover (2 pieces)	E53-COV0809
Terminal cover for E5EK		Finger protection terminal cover	E53-COV08
			E53-COV07

## 1/16 DIN Process Controllers

Description	DIN Size	Supply voltage	Control output	Auxiliary output	Model
Standard	1/16 DIN	100-240 VAC, 50/60 Hz	Output unit combinations of two: Relay, Voltage pulse (NPN or PNP), Linear voltage, Linear current	1, Relay	E5CK-AA1-500
Non-standard model with built-in quick auto-tune button					E5AK-AA1-302

**Note:** 1. All control outputs are insulated from the input circuit.

2. When using the heater burnout alarm function with a standard model, the Linear Output Module cannot be used for the control outputs (heat). The Digital Controller provides transfer outputs at 4 to 20 mA for the PV and other values and control outputs at 4 to 20 mA for the current outputs.

3. Part numbers ending in -500 include a Finger Safe cover.

## Output and Option Units for E5CK

Description	Specifications	Compatible controller	Max. quantity	Model
Relay/Relay	SPST/SPST, 5A 250 VAC	E5CK	1	E53-R4R4
Relay/Pulse	SPST, 5A/NPN, 24 VDC			E53-Q4R4
Relay/Linear current	SPST, 5A/4 to 20 mA			E53-C4R4
	SPST, 5A/0 to 20 mA			E53-C4DR4
	SPST, 5A/0 to 10 VDC			E53-V44R4
Communications	RS-485	E53-CK03		
Event input	For multiple set-points	E53-CKB		
Transfer output	4 to 20 mA	E53-CKF		

# Temperature Controllers

## E5C2

Quick Link

M229

### 1/16 DIN Sized, Analog-Set Temperature Controller

- Fits standard 8-pin round sockets
- ON/OFF control models and proportional control (P) models available
- Front panel offset adjustment on "P" controllers
- Dual scale models available
- Contact or voltage output models
- Type J or K thermocouples, platinum RTD and thermistor input models
- Panel mount hardware included
- Sockets, protective cover, and other accessories available separately



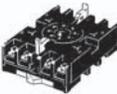
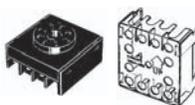
### Specifications

- Thermocouple input: Type K or J models
- Platinum RTD input: Pt100
- Relay output: SPDT, 3 A at 250 VAC resistive load
- Voltage (pulse) output: 5 VDC, 10 mA max. with short-circuit protection circuit

### Analog-Set Temperature Controllers

Input type	Temperature range	Setting accuracy	Voltage	Control type	Control output	Model
Thermocouple (K)	32 F - 1112 F	±2% max. of full scale	100/120 VAC, 50/60 Hz	ON/OFF	Relay	E5C2-R20K-32/1112F-AC120
Thermocouple (J)	0 C - 200 C and 32 F - 392 F					E5C2-R20J-0200C/32392F-AC120
	0 C - 400 C and 32 F - 752 F					E5C2-R20J-0400C/32752F-AC120
	0 C - 200 C and 32 F - 392 F					E5C2-R40J-0200C/32392F-AC120
	0 C - 400 C and 32 F - 752 F			Proportional		E5C2-R40J-0400C/32752F-AC120

## Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Panel mounting adapter		58 L x 48 H x 15.5 D	Fits behind panel, ideal for side-by-side installation. Use P3G□-□ sockets.	Y92F-30
Track mounting/front connecting socket		70 L x 50 H x 20.3 D	8-pin socket	P2CF-08
		70 L x 50 H x 21.5 D	8 pin, finger-safe socket	P2CF-08-E
Back connecting socket for panel mounting		45 L x 45 H x 17 D	8-pin socket	P3G-08
		47.7 L x 47.7 H x 27.6 D	8-pin socket, finger-safe terminal cover	P3G-08 with Y92A-48G
Hard cover		50.5 L x 50.5 H x 16 D	—	Y92A-48B
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	PFP-50N
		1000 L x 35 H x 7.3 D	1 m length	PFP-100N
		1000 L x 35 H x 16.0 D	1 m length	PFP-100N2
End plate		50 L x 11.5 H x 10 D	Holds track-mounted devices in place	PFP-M

# Digital Panel Meters K3MA-L



## Temperature Meter with 2-Color Display

- Wide range of inputs: 10 types of thermocouple, 2 types of platinum RTD
- High visibility 2-color display with 14.2 mm high characters
- Easy confirmation of max./min. display
- Front-panel key operation for easy setting
- Average processing function suppresses display flickering
- Sampling period: 500 ms
- Max./min. hold, temperature input shift and temperature unit selection functions built-in
- Water- and dust-proof NEMA 4X (IP66 equivalent) front panel



## Specifications

- Input types:
  - Thermocouple types: K, J, T, E, L, U, N, R, S, B
  - Platinum resistance thermometer: Pt100, JPt100
- Measuring accuracy:  $\pm 0.5\%$  indication value,  $\pm 1$  digit max.
- Relay output: Rating: One SPDT relay, 5 A at 250 VAC/30 VDC
- Electrical operations: 100,000 operation
- Memory protection: EEPROM, 100,000 rewrite capacity
- Dimensions: 97 L x 96 W x 48 H mm; 80 mm mounting depth

## Temperature Meters

Range	Additional features	Display	Output	Supply voltage	Model
-200 to 1800 C, -300 to 3200 F; 1 or 0.1 resolution by range	N/A	4-digits (-1999 to 9999)	None	100 to 240 VAC	<b>K3MA-L 100-240 VAC</b>
			One 5 A relay		<b>K3MA-L-C 100-240 VAC</b>
			None	24 VAC/VDC	<b>K3MA-L 24 VAC/VDC</b>
			One 5 A relay		<b>K3MA-L-C 24 VAC/VDC</b>

## Accessories

Description	Appearance	Function	Model
Splash-proof soft cover		Allows settings changes without removal	<b>K32-49SC</b>
Hard cover		Prevents accidental setting changes	<b>K32-49HC</b>

# Temperature Monitoring Relays K8AB-TH



## Ultra-Slim 22 mm Temperature Monitoring Relays

- Protect equipment against excessive temperature increase by monitoring temperature
- High temperature models available, up to 1800°C (3200°F)
- Wide range of functions: upper limit/lower limit alarm mode; output normally ON/OFF selection; output latch; setting protection, temperature unit °C/°F
- Temperature sensor inputs:
  - Thermocouple types K, J, T, E; Platinum RTD Pt100 (K8AB-TH11S)
  - Thermocouple types K, J, T, E, B, R, S, PLII (K8AB-TH12S)
- Monitor output status from LED indicator
- Track-mount or surface mount with M4 screws
- Dimensions: 90 H x 22.5 W x 100 D mm



## Temperature Monitoring Relays

Description	Features	Input voltage	Output	Model
Temperature range 0 to 399 C/F	Thermocouple/RTD inputs; 1 C/F setting unit	100 to 240 VAC	SPDT relay, 3 A at 250 VAC	<b>K8AB-TH11S 100-240 VAC</b>
		24 VAC/VDC		<b>K8AB-TH11S 24VAC/VDC</b>
Temperature range 0 to 1800 C, 0 to 3200 F	Thermocouple inputs; 10 C/F setting unit	100 to 240 VAC		<b>K8AB-TH12S 100-240 VAC</b>
		24 VAC/VDC		<b>K8AB-TH12S 24VAC/VDC</b>

# Multi-Loop Temperature Controller EJ1

Quick Link

M422

## In-Panel Temperature Controller with Flexible Modular Design for Greater Integration with Host Devices

- Improved setup through high-speed, program-less communications with PLCs, HMIs and Power Controllers
- System expandable up to 256 loops for large-area control
- Easy installation with side-by-side connectors and removable terminals
- Available with screw terminals or screw-less clamp terminals
- Powerful software supported by Smart Active Parts and Smart Function Block Libraries
- Multi-input units (2 or 4 loops): RTD, Thermocouple, Current and Voltage inputs
- RS-232C/RS-485 with Modbus RTU and CompoWay/F communications, and dedicated port for G3ZA power controller
- USB connectivity possible for programming with Omron cable (E58-CIFQ1)
- Up to 16 temperature controllers can be connected to a single DeviceNet communication unit
- All of the parameters for the temperature controllers connected to the DeviceNet communication units can be uploaded or downloaded in one operation



## Specifications

Item	Type	EJ1N-TC4	EJ1N-TC2
Power supply voltage		24 VDC	—
Input		Thermocouple: K, J, T, E, L, U, N, R, S, B, W, PLII ES1B Infrared Thermosensor: 10 to 70 C, 60 to 120 C, 115 to 165 C, 140 to 260 C Analog input: 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V Platinum resistance thermometer: Pt100, JPt100	
Input impedance		Current input: 150 Ω max., voltage input: 1 MΩ min.	
Control outputs	Voltage output	Output voltage: 12 VDC ±15%, max. load current: 21 mA (PNP models with short-circuit protection circuit)	
	Transistor output	—	Max. operating voltage: 30 V, max. load current: 100 mA
	Current output	—	Current output range: 4 to 20 mA or 0 to 20 mA DC Load: 500 Ω max. (including transfer output) (Resolution: Approx. 2,800 for 4 to 20 mA DC, approx. 3,500 for 0 to 20 mA DC)
Event inputs	Input points	—	2
	Contact input	—	ON: 1 kΩ max., OFF: 100 kΩ min.
	Non-contact input	—	ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.
		—	Outflow current: Approx. 4 mA per point
Number of input and control points		Input points: 4, Control points: 4	Input points: 2, Control points: 2
Setting method		Via communications	
Control method		ON/OFF control or 2-PID (with autotuning)	
Other functions		Two-point input shift, digital input filter, remote SP, SP ramp, manual manipulated variable, manipulated variable limiter, interference overshoot adjustment, loop burnout alarm, RUN/STOP, banks, I/O allocations, etc.	
Indication accuracy		Thermocouple input/platinum resistance thermometer input: (±0.5% of indication value (PV) or ±1 C, whichever is greater) ±1 digit max. Analog input: ±0.5% FS ±1 digit max. CT input: ±5% FS ±1 digit max.	
Hysteresis		0.1 to 999.9 EU (in units of 0.1 EU)	
Proportional band (P)		0.1 to 999.9 EU (in units of 0.1 EU)	

## Specifications (Continued)

Item	Type	EJ1N-TC4	EJ1N-TC2
Integral time (I)		0 to 3,999 s (in units of 1 s)	
Derivative time (D)		0.0 to 999.9 s (in units of 0.1 s)	
Control period		0.5 s, 1 to 99 s (in units of 1 s)	
Manual reset value		0.0% to 100.0% (in units of 0.1%)	
Alarm output setting range		-1,999 to 9,999 (decimal point position depends on input type)	
Sampling period		250 ms	
Influence of signal source resistance		Thermocouple: 0.1 C (0.2 F)/ $\Omega$ max. (100 $\Omega$ max. per line) Platinum resistance thermometer: 0.4 C (0.8 F)/ $\Omega$ max. (10 $\Omega$ max. per line)	
Standards	Approved standards	UL61010C-1, CSA C22.2 No.1010-1	
	Conformed standards	EN61010-1 (IEC61010-1): Pollution level 2, overvoltage category II	

## Standard Control Models

Name	Power supply voltage	No. of control points	Control outputs 1 and 2	Control outputs 3 and 4	Auxiliary output	Functions		Communications functions	Input type	Terminal	Model					
						Heater burnout alarm	Event inputs									
Basic Unit (temperature control) (See note 1)	24 VDC supplied from the End Unit	2	Voltage output: 2 points (for SSR drive) (See note 2)	Transistor output: 2 points (sinking)	None	2 (See note 3)	2	G3ZA connection port: RS-485 From End Unit: Port A or port B: RS-485	Thermocouple, platinum resistance thermometer, analog voltage, and analog current selectable for each channel	M3 terminal	EJ1N-TC2A-QNHB					
				Screw-less clamp						EJ1N-TC2B-QNHB						
		4	Voltage output: 2 points (for SSR drive) (See note 2)	None	None	None	None			None	None	M3 terminal	EJ1N-TC4A-QQ			
			Screw-less clamp									EJ1N-TC4B-QQ				
2	Current output: 2 points	Transistor output: 2 points (sinking)	None	None	None	None	None	None	M3 terminal	EJ1N-TC2A-CNB						
									Screw-less clamp	EJ1N-TC2B-CNB						
HFU (See note 1)	None	None	None	None	Transistor output: 4 points (sinking)	None	4	From End Unit: Port A: RS-485 Port C: RS-485 or RS-232C selectable  From End Unit: Port A: RS-485 Port C: RS-422	No input	M3 terminal	EJ1N-HFUA-NFLK					
										Screw-less clamp	EJ1N-HFUB-NFLK					
					None	None	None			None	None	None	None	None	M3 terminal	EJ1N-HFUA-NFL2
															Screw-less clamp	EJ1N-HFUB-NFL2
End Unit (See note 1)	24 VDC	None	None	None	Transistor output: 2 points (sinking)	None	None	DeviceNet communications	None	M3 terminal	EJ1N-HFUB-DRT					
										Screw-less clamp	<b>NEW</b>					
End Unit (See note 1)	24 VDC	None	None	None	Transistor output: 2 points (sinking)	None	None	Port A or B: RS-485 Connector: Port A	None	M3 terminal	EJ1C-EDUA-NFLK					
										Detachable connector	EJ1C-EDUC-NFLK					
											<b>NEW</b>					

- Note: 1.** An End Unit is always required for connection to a Basic Unit or an HFU. An HFU cannot operate without a Basic Unit. External communications cannot be performed when using a basic unit only.
- 2.** For heating/cooling control applications, control outputs 3 and 4 on the 2-point models are used for the cooling or heating control outputs. On the 4-point models, heating/cooling control is performed for the two input points.
- 3.** When using the heater burnout alarm, purchase a Current Transformer (E54-CT1 or E54-CT3) separately.

## Accessories

Description	Appearance	Specification	Model
Current transformers (CT) for heater burnout detection		50 A current load, 5.8 mm dia. hole	<b>E54-CT1</b>
		50 A current load, 12 mm dia. hole	<b>E54-CT3</b>
Mounting track	 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1 m length	<b>PFP-100N</b>
G3ZA connecting cable	—	5 m length	<b>EJ1C-CBLA050</b>
USB-Serial conversion cable	—	Thermo Mini, CX-Thermo software, USB (type A plug), Windows 2000/XP	<b>E58-CIFQ1</b>
CX-Thermo software	—	Software supports easy setup, monitoring and data logging	<b>EST2-2C-MV</b> <input type="checkbox"/>

# Multi-channel Power Controller for EJ1

# G3ZA



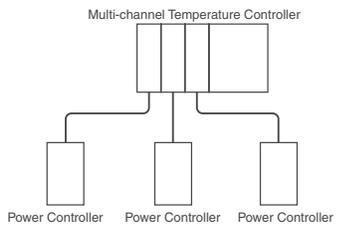
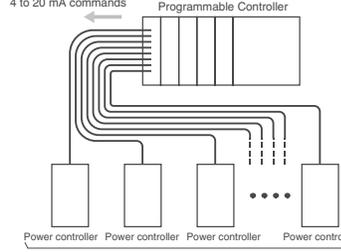
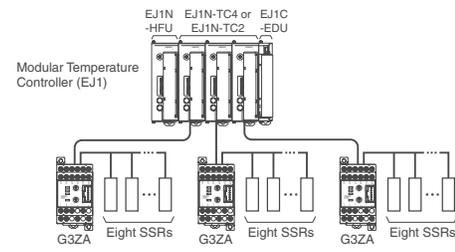
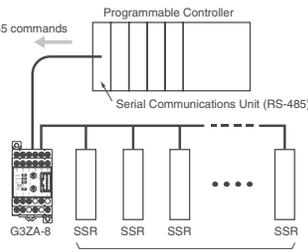
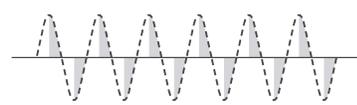
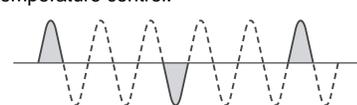
## Optimum Cycle Control for High-Precision Control with Low Noise

- Optimize cycle control for high accuracy regulation to improve heating performance.
- Control up to 8 SSRs with one unit. Lower peak current when using offset control.
- Low noise, harmonics-free control reduces heater stress.
- Accurate power control (within half cycle) with zero-switching control.
- Dedicated communications port built into EJ1 Temperature Controllers acts as a “Smart Interface” with the G3ZA.
- RS-485 communications to set manipulated variables and heater burnout detection. The Smart Function Block Library for the G3ZA can also be used.
- Soft-start function for lamp heaters (G3ZA must be used in combination with an SSR **without** the zero cross function).
- Three-phase optimum cycle control for three-phase heaters.
- Combining with special CT for 150-A current detection.
- Compact size is smaller than a standard power controller.



## Features

## Comparison between the G3ZA and Standard Power Controllers

Item	Standard power controllers	G3ZA
Connections	<p>Power Controllers Controlled Using Current Output of 4 to 20 mA</p>  <p>Multi-channel Temperature Controller</p> <p>Power Controller Power Controller Power Controller</p> <p>4 to 20 mA commands Programmable Controller</p>  <p>Power controller Power controller Power controller ... Power controller</p> <p>8 total</p>	<p>Control Using Communications from a Host Device</p> <ul style="list-style-type: none"> <li>• Direct connection is possible using an EJ1 Modular Temperature Controller</li> </ul>  <p>EJ1N -HFU EJ1N-TC4 or EJ1C EJ1N-TC2 -EDU</p> <p>Modular Temperature Controller (EJ1)</p> <p>G3ZA Eight SSRs G3ZA Eight SSRs G3ZA Eight SSRs</p> <p>RS-485 commands Programmable Controller</p>  <p>Serial Communications Unit (RS-485)</p> <p>G3ZA-8 SSR SSR SSR ... SSR</p> <p>8 total</p>
Control method	<p>Phase Control</p> <ul style="list-style-type: none"> <li>• Response is fast and high-precision temperature control is possible.</li> <li>• Harmonics and noise are problems.</li> </ul> 	<p>Optimum Cycle Control (High-precision Zero Cross Control)</p> <ul style="list-style-type: none"> <li>• Outputs are turned ON and OFF each half cycle.</li> <li>• Zero-cross control is performed.</li> <li>• Noise is suppressed while achieving high-speed response with high-precision temperature control.</li> </ul> 

## Ordering Information

### List of Models

Name	Number of control channels	Heater burnout detection	Load power supply voltage	Model
Multi-channel power controller	4	Supported	100 to 240 VAC	G3ZA-4H203-FLK-UTU
			400 to 480 VAC	G3ZA-4H403-FLK-UTU
	8	Not supported	100 to 240 VAC	G3ZA-8A203-FLK-UTU
			400 to 480 VAC	G3ZA-8A403-FLK-UTU

**Note:** When using the heater burnout detection function, CTs must be ordered separately.

### Accessories (Order Separately)

Name	Hole diameter	Detection current	Model
Current transformer (CT)	5.8 dia.	0 to 50 A	E54-CT1
	12.0 dia.	0 to 50 A	E54-CT3
	30.0 dia.	0 to 150 A	G3ZA-CT150L

Name	Model
DIN Track	PFP-100N
	PFP-50N
End Plates (stoppers)	PFP-M

## Specifications

### Ratings

Item	Load power supply voltage range	100 to 240 VAC	400 to 480 VAC
Power supply voltage		100 to 240 VAC (50/60 Hz)	
Operating voltage range		85 to 264 VAC	
Power consumption		16 VA max.	
Load power supply voltage		100 to 240 VAC	400 to 480 VAC
Load power supply voltage range		75 to 264 VAC	340 to 528 VAC
Manipulated variable input		0.0% to 100.0% (via RS-485 communications)	
Current transformer input (See note 1)		Single-phase AC, 0 to 50 A (primary current of CT) Single-phase AC, 0 to 150 A (primary current of CT) <span style="background-color: #cccccc;">V2</span>	
Trigger output		One voltage output for each channel, 12 VDC $\pm$ 15%, Max. load current: 21 mA (with built-in short-circuit protection circuit)	
Alarm output		NPN open collector, one output Max. applicable voltage: 30 VDC, Max. load current: 50 mA Residual voltage: 1.5 V max., Leakage current: 0.4 mA max.	
Indications		LED indicators	
Control method		Optimum cycle control Soft-start optimum cycle control (See note 2) <span style="background-color: #cccccc;">V2</span> Three-phase optimum cycle control <span style="background-color: #cccccc;">V2</span>	
Ambient operating temperature		-10 to 55 C (with no icing or condensation)	
Ambient operating humidity		25% to 85%	
Storage temperature		-25 to 65 C (with no icing or condensation)	
Elevation		2,000 m max.	
Accessories		Instruction Sheet	

**Note:** 1. CT inputs are provided only on Models with heater burnout detection.

2. Use an SSR without the zero-cross function (G3PA-□BL-VD) for soft-start optimum cycle control.

## Performance

<b>Current indication accuracy</b>	Current Range 0 to 50 A, ±3 A 0 to 150 A, ±9 A 0 to 100%, ±6% (See note) (for models with heater burnout detection)
<b>Insulation resistance</b>	100 MΩ min. (at 500 VDC) between primary and secondary
<b>Dielectric strength</b>	2,000 VAC, 50/60 Hz for 1 min between primary and secondary
<b>Vibration resistance</b>	Vibration frequency: 10 to 55 Hz, acceleration: 50 m/s <sup>2</sup> in X, Y, and Z directions
<b>Shock resistance</b>	300 m/s <sup>2</sup> three times each in six directions along three axes
<b>Weight</b>	Approx. 200 g (including terminal cover)
<b>Degree of protection</b>	IP20
<b>Memory protection</b>	EEPROM (non-volatile memory) (number of writes: 100,000)
<b>Installation environment</b>	Overvoltage category III, pollution degree 2 (according to IEC 60664-1)
<b>Approved standards</b>	UL508 (Listing), CSA22.2 No. 14 EN50178 EN61000-6-4 (EN55011: 1998, A1: 1999 Class A, Group 1) EN61000-6-2: 2001

**Note:** When measured with percentage selected for the current monitor parameter and the maximum current measurable with the CT at 100%.

## Communications Specifications

<b>Transmission line connections</b>	Multipoint
<b>Communications method</b>	RS-485
<b>Max. transmission distance</b>	500 m
<b>No. of nodes</b>	31 (via multidrop connections)
<b>Synchronization method</b>	Stop-start synchronization
<b>Communications baud rate</b>	9.6, 19.2, 38.4 or 57.6 kbps, Default: 9.6 kbps
<b>Transmission code</b>	ASCII
<b>Communications data length</b>	7 or 8 bits, Default: 7
<b>Communications stop bits</b>	1 or 2 bits, Default: 2
<b>Communications parity</b>	Vertical parity: None, even, or odd, Default: Even
<b>Flow control</b>	None

## Current Transformer Specifications (Order Separately)

Item	Specification		
	E54-CT1	E54-CT3	G3ZA-CT150L
<b>Model number</b>	E54-CT1	E54-CT3	G3ZA-CT150L
<b>Max. continuous heater current</b>	50 A	120 A (See note)	150 A
<b>Detection current with G3ZA connected</b>	50 A		150 A
<b>Dielectric strength</b>	1,000 VAC for 1 min.		2,000 VAC for 1 min.
<b>Vibration resistance</b>	98 m/s <sup>2</sup> , 50 Hz		
<b>Weight</b>	Approx. 11.5 g	Approx. 50 g	Approx. 130 g
<b>Accessories</b>	None	Connection terminals (2) Plugs (2)	None

**Note:** The maximum continuous current is 50 A for the G3ZA in combination with the E54-CT3.

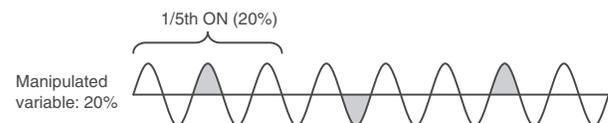
## Applicable SSR and Control Methods V2

The G3ZA can be used for a variety of applications by selecting the SSR drive. For example, inrush current can be reduced at startup by selecting soft-start optimum cycle control if a single-phase halogen heater is used.

SSR	Control method	CT (4-channel models only)	Example of supported heater
Single-phase heater SSR with zero-cross function	Optimum cycle control	0 to 50 A or 0 to 150 A: 4 Units	Single-phase heater
Single-phase heater SSR without zero-cross function	Soft-start optimum cycle control	0 to 50 A or 0 to 150 A: 4 Units	Single-phase halogen heater <span style="border: 1px solid black; padding: 0 2px;">V2</span>
Three-phase heater SSR with zero-cross function	Three-phase optimum cycle control	0 to 50 A or 0 to 150 A: up to 2 Units	Three-phase heater <span style="border: 1px solid black; padding: 0 2px;">V2</span>

## Optimum Cycle Control

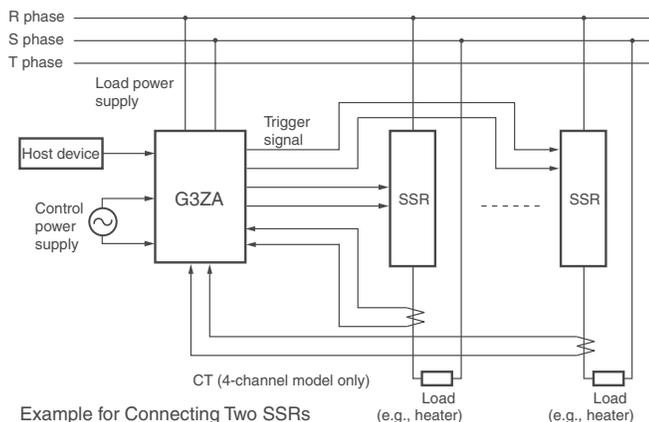
- Optimum cycle control is performed by driving SSRs according to load power detection and trigger signals. (Zero-cross SSRs are used.)
- Noise is suppressed while ensure high-speed response by turning outputs ON and OFF each half cycle to achieve high-precision temperature control.



**Note:** Refer to "Connection Configuration" for connecting to an SSR.

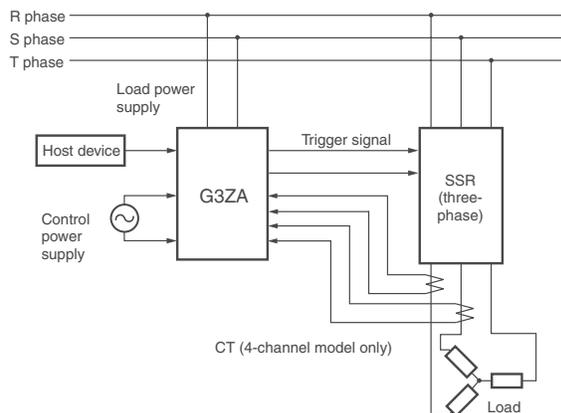
## Connection Configuration

### Single-phase SSR



**Note:** Connect a power supply with the same phase as the SSRs to the load power supply terminals on the G3ZA.

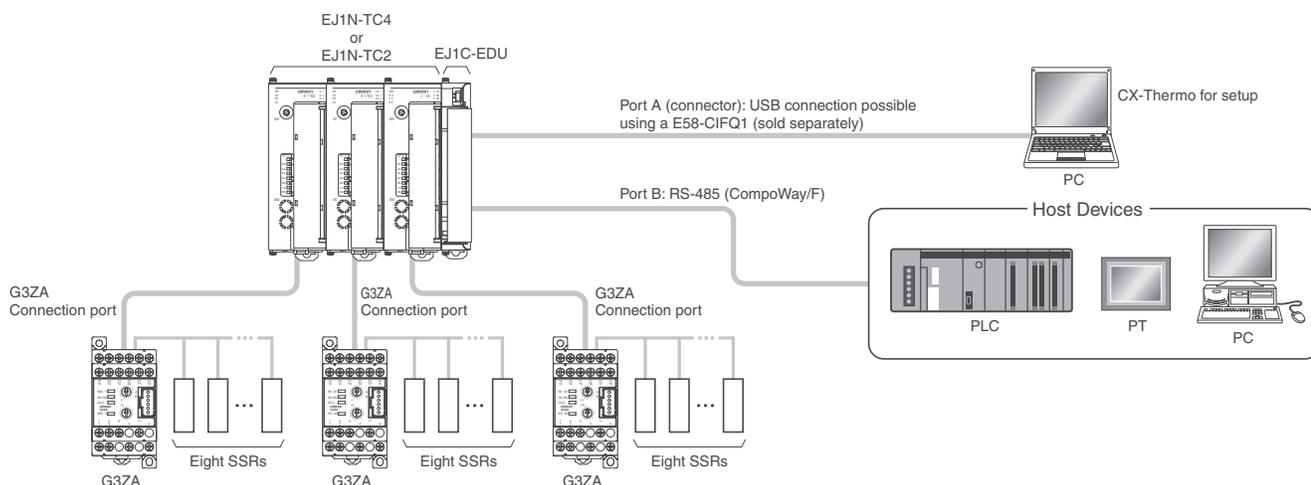
### Three-phase SSR V2



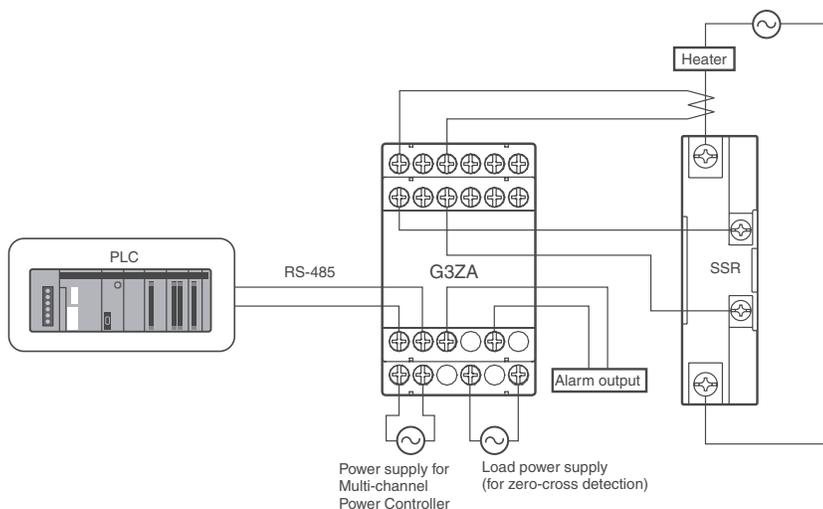
**Note:** Connect to one of the three phases on the load power supply input terminals of the G3ZA.

## Host Device Connection Example

### Example of Connection to EJ1 Modular Temperature Controller



### Example of Connection to PLC

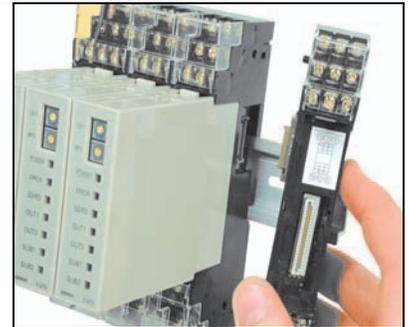


# Multi-Loop Temperature Controllers E5ZN



## DIN Track Mounting Modular Temperature Controller

- Two temperature control loops per unit occupy just 30 mm rack space
- Easily expands to 32 control loops with up to 16 E5ZN units
- Plug-in temperature controllers can be replaced without changing terminal wiring
- No power supply and communications wiring required between units when multiple units are mounted side-by-side
- Thermocouple/non-contact temperature sensors/voltage or platinum RTD input models
- CX-Thermo support software simplifies setup and monitoring via PC
- Optional 1/16 DIN Setting Display Unit helps reduce communications programming requirements
- Field selectable heating or heat/cool control operation
- One event input per unit
- Serial RS-485 communications built in
- Optional DeviceNet communications unit available
- 3-year warranty
- Dimensions: 134.7 H x 30 W x 112 D mm (socket mounted first unit); 22.5 W for additional units



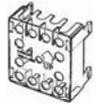
## Specifications

- Thermocouple input: Thermocouple: K, J, T, E, L, U, N, R, S, B
- Omron's ES1B infrared temperature sensor: 10° to 70°C, 60° to 120°C, 115° to 165°C, 140° to 260°C
- Voltage input: 0 to 50 mV
- Platinum RTD input: Pt100, JPt100
- Voltage output for SSR: 12 VDC ±15% (PNP); 21 mA max.; short-circuit protection
- Transistor output: 100 mA at 30 VDC
- Analog current output: 4 to 20/0 to 20 mA DC; 350 Ω max. load
- Transfer output accuracy: ±0.5% FS +0.7 mA or ±0.5% FS +0.175 V

## Modular Temperature Controllers

Input type	Accuracy	Supply voltage	Control output	Auxiliary output	Additional functions	Model	
Thermocouple	±0.5% or ±1 C, (whichever is greater) ±1 digit max.	24 VDC	Voltage for SSR	Transistor output: 2 pts (sinking)	Heater burnout alarm (Use E54-CT1 or E54-CT3 current transformer as detector)	E5ZN-2QNH03TC-FLK	
Platinum RTD				Transistor output: 2 pts (sourcing)		E5ZN-2QNH03P-FLK	
Thermocouple				Transistor		Transistor output: 2 pts (sinking)	E5ZN-2QPH03TC-FLK
Platinum RTD						Transistor output: 2 pts (sourcing)	E5ZN-2QPH03P-FLK
Thermocouple						Transistor output: 2 pts (sinking)	E5ZN-2TNH03TC-FLK
Platinum RTD						Transistor output: 2 pts (sourcing)	E5ZN-2TNH03P-FLK
Thermocouple			Analog current output		Transistor output: 2 pts (sinking)	Transfer output (linear voltage output)	E5ZN-2TPH03TC-FLK
Platinum RTD					Transistor output: 2 pts (sourcing)	E5ZN-2TPH03P-FLK	
Thermocouple				Transfer output (linear voltage output)	Transistor output: 2 pts (sinking)	E5ZN-2CNF03TC-FLK	
Platinum RTD					Transistor output: 2 pts (sourcing)	E5ZN-2CNF03P-FLK	
Thermocouple						E5ZN-2CPF03TC-FLK	
Platinum RTD						E5ZN-2CPF03P-FLK	

## Accessories

Functions	Appearance/ Dimensions	Specification	Model
Terminal units (include bus system without backplane)	 134.7 H x 30 W x 46 D mm	For first E5ZN unit or DeviceNet unit. 24 terminals. Equipped with terminals for power supply, communications and setting devices.	<b>E5ZN-SCT24S-500</b>
	 134.7 H x 22.5 W x 46 D mm	For second and additional E5ZN units. 18 terminals. Not equipped with terminals for power supply, communications and setting devices.	<b>E5ZN-SCT18S-500</b>
DeviceNet communications unit	 134.7 H x 30 W x 46 D mm	Mounts to the E5ZN-SCT24S Terminal Unit External input power supply voltage 24 VDC	<b>E5ZN-DRT</b>
Setting display unit	 48 H x 48 W x 84 D mm	Requires 24 VDC power supply	<b>E5ZN-SDL</b>
Sockets for setting display unit	 70 L x 50 H x 31.2 D mm	11-pin track mounting/front connecting socket	<b>P2CF-11</b>
	 70 L x 50 H x 31.2 D mm	11-pin track mounting/front connecting socket with finger protection	<b>P2CF-11-E</b>
	 45 L x 45 H x 27 D mm	11-pin back connecting socket for panel mounting	<b>P3GA-11</b>
	 47.7 L x 47.7 H x 27.6 D mm	Terminal cover for finger protection	<b>Y92A-48G</b>
Mounting track	 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1 m length	<b>PFP-100N</b>
	 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate	 50 x 10 x 10	Holds track-mounted devices in place	<b>PFP-M</b>

# Temperature Controllers E5AR/E5ER



## 1/4 and 1/8 DIN Digital Controllers Offer 5-Digit, 3-Row Display

- A short 50 ms sampling period provides high-speed response
- Single-loop PID control or Single-loop heating and cooling control; multi-loop control models available
- Displays PV, SP, and MV data simultaneously in a 3-row, reverse LCD display with backlight
- Bar graph displays MV (manipulated variable), valve opening or deviation
- Multi-loop control models offer cascade control and proportional control all in one controller
- Download settings and report data using CX-Thermo software with communication models
- Equipped with calculation functions as a standard (e.g., square root calculation and broken-line approximation)
- Position proportional relay output models available
- DeviceNet communication models available
- 3-year warranty
- Dimensions:
  - 1/4 DIN (E5AR): 96 H x 96 W x 95 D mm
  - 1/8 DIN (E5ER): 96 H x 48 W x 95 D mm



## Specifications

- Thermocouple inputs: Types K, J, T, E, L, U, N, R, S, B, W
- Platinum RTD inputs: Pt100
- Current input: 4 to 20 mA DC, 0 to 20 mA DC (including remote SP input)
- Voltage input: 1 to 5 VDC, 0 to 5 VDC, 0 to 10 VDC (including remote SP input)  
(Input impedance: 150 Ω for current input, approx. 1 MΩ for voltage input)
- Voltage (pulse) output: 12 VDC, 40 mA max. with short-circuit protection circuit
- Current output: 0 to 20 mA DC, 4 to 20 mA DC; load: 500 Ω max. (including transfer output)  
(Resolution: Approx. 54,000 for 0 to 20 mA DC; Approx. 43,000 for 4 to 20 mA DC)
- Control method: PID or ON/OFF control

## Temperature Controllers

### 1/4 DIN Size

Input	Accuracy	Voltage	Control outputs	Additional features			Model
				Auxiliary outputs	Event inputs	Serial communications	
Thermocouple, Platinum RTD, Current, Voltage	Temperature: ±0.1% of PV, ±1 digit  Analog input: ±0.1% FS ±1 digit max.	100-240 VAC, 50/60 Hz	2 points: Pulse voltage and Pulse voltage/current	4	2	No	E5AR-Q4B AC100-240  E5AR-QC43DB-FLK AC100-240
			4 points: Pulse voltage and Pulse voltage/current and Current (2 points)		6	RS-485	

## 1/8 DIN Size

Input	Accuracy	Voltage	Control outputs	Additional features			Model
				Auxiliary outputs	Event inputs	Serial communications	
Thermocouple, Platinum RTD, Current, Voltage	Temperature: $\pm 0.1\%$ of PV, $\pm 1$ digit	100-240 VAC, 50/60 Hz	2 points: Pulse voltage and Pulse voltage/current	4	2	No	E5ER-Q4B AC100-240
	Analog input: $\pm 0.1\%$ FS $\pm 1$ digit max.		4 points: Pulse voltage and Pulse voltage/current and Current (2 points)		6	RS-485	E5ER-QC43DB-FLK AC100-240

## Accessories

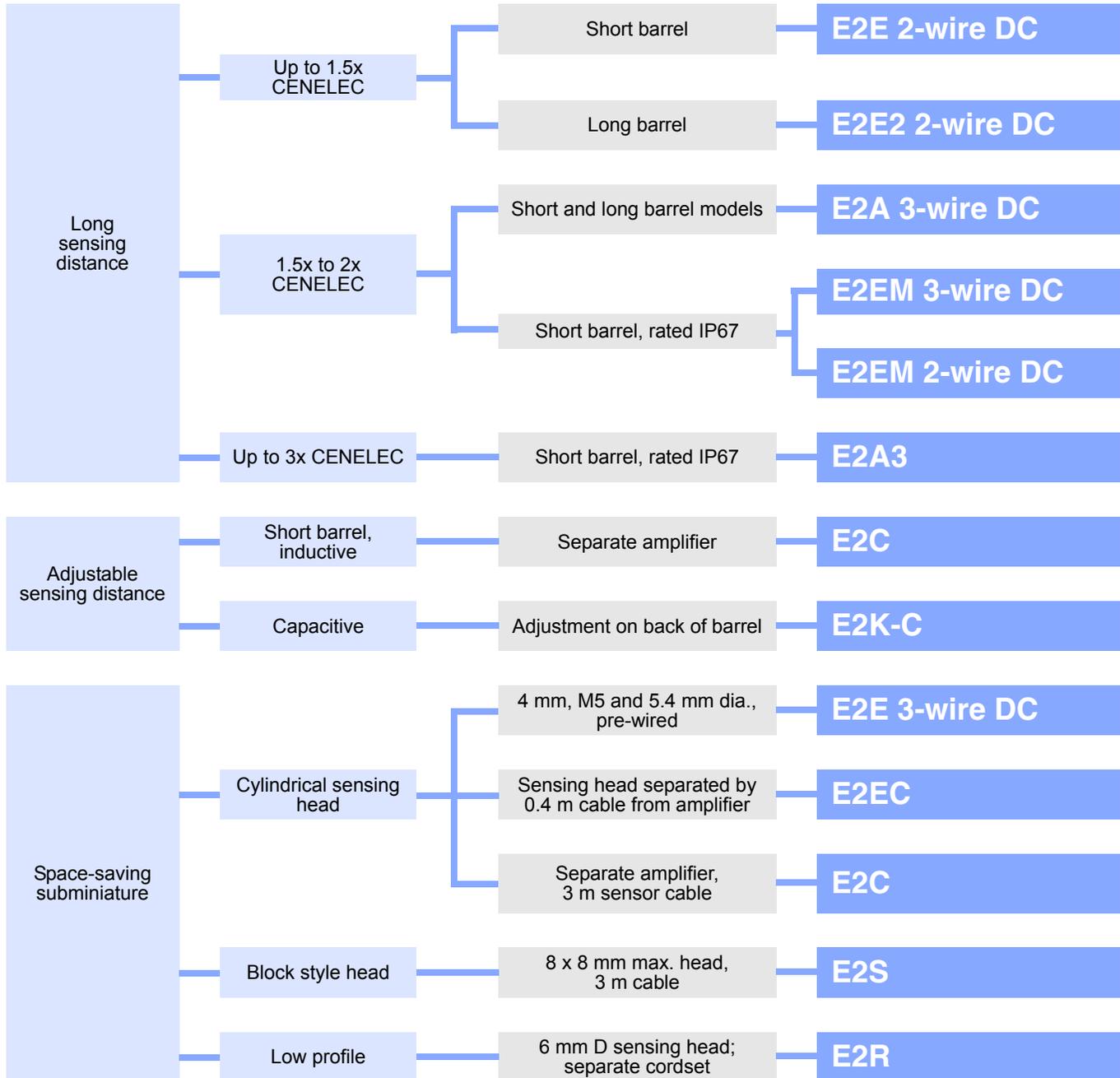
Description	Specification	Model
CX-Thermo Software	Software supports easy setup, monitoring and data logging	EST2-2C-MV <input type="checkbox"/>
Terminal cover for E5AR	Provides finger protection from terminals	E53-COV14
		E53-COV15

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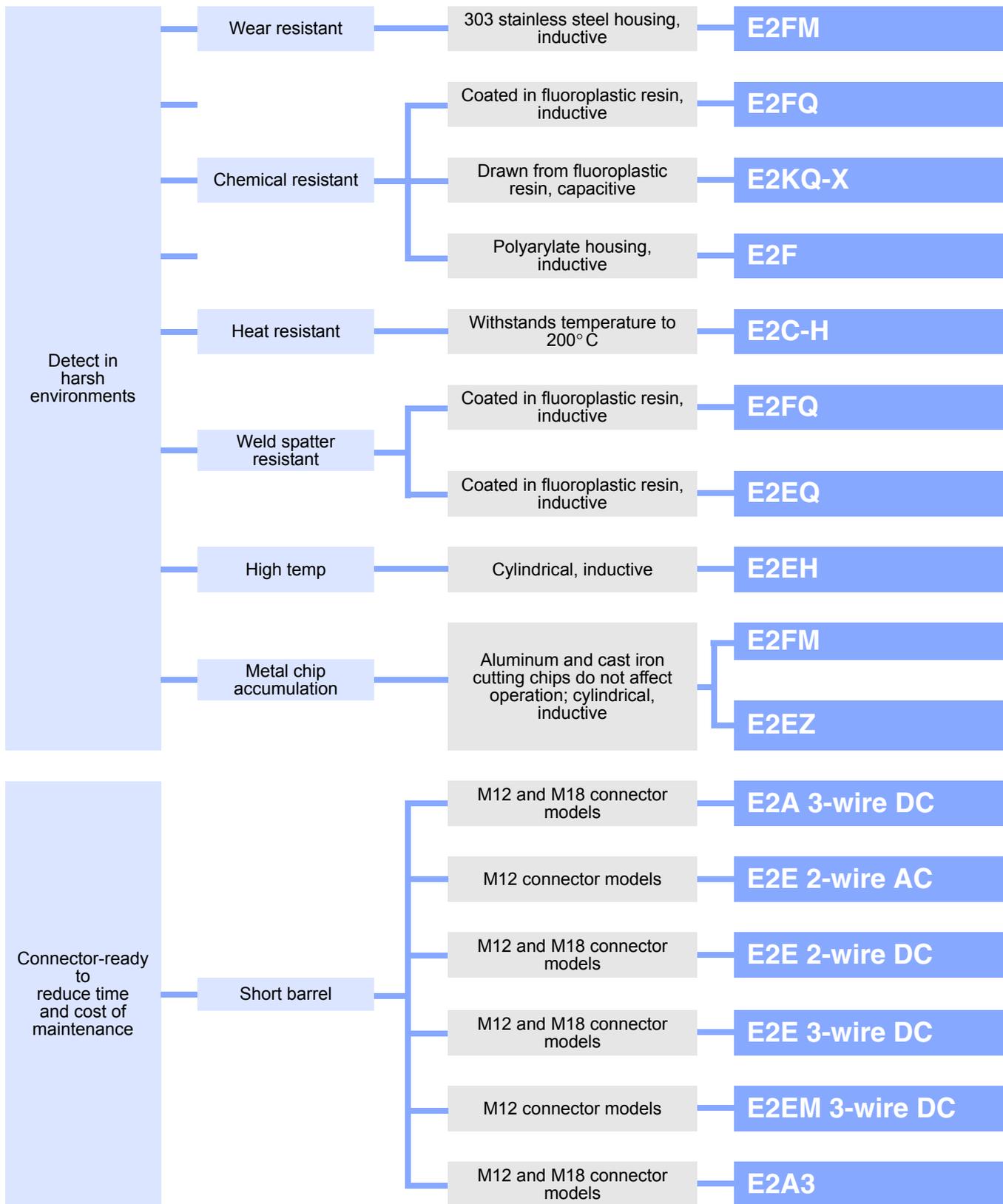
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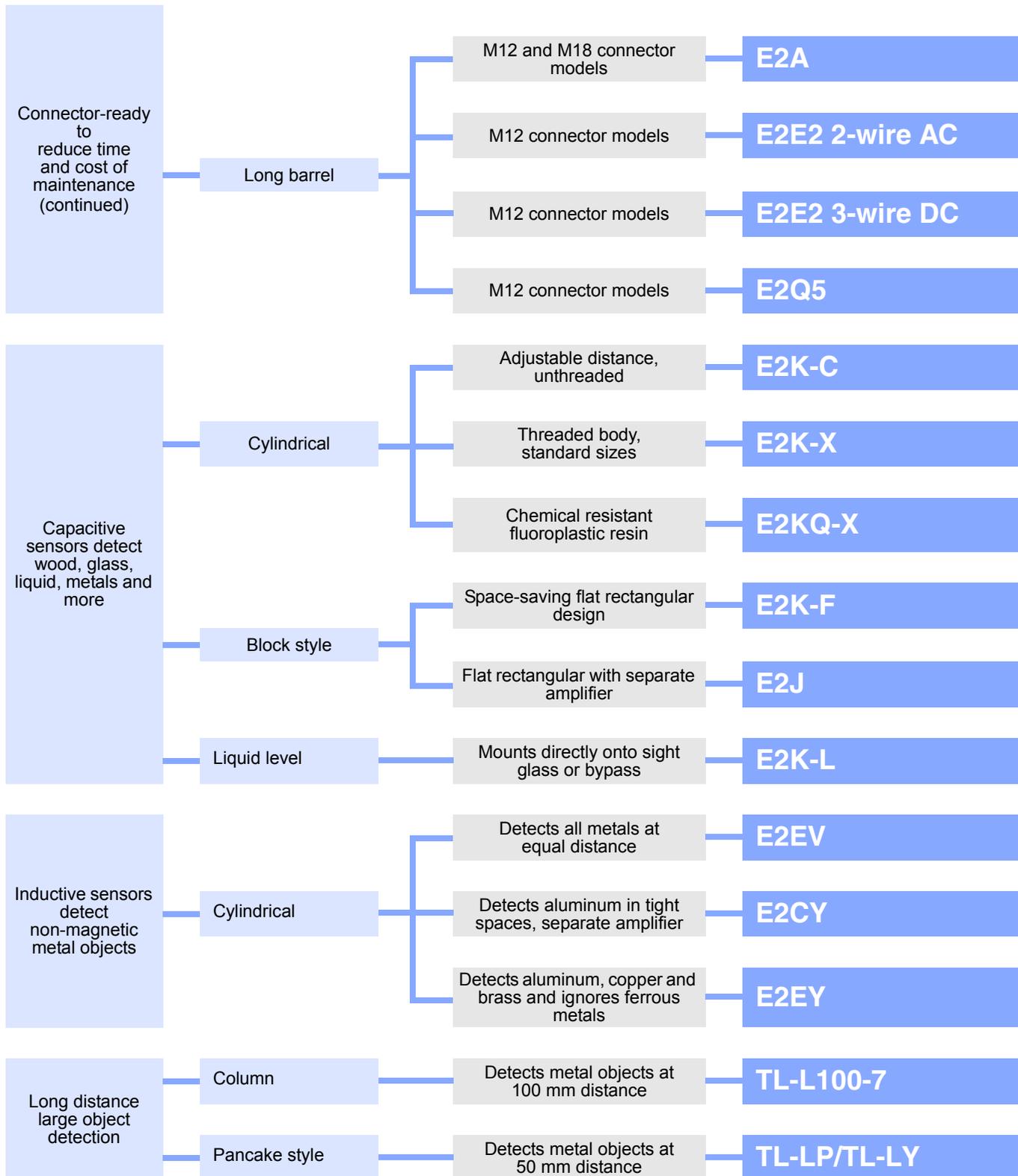
## Selection Guide



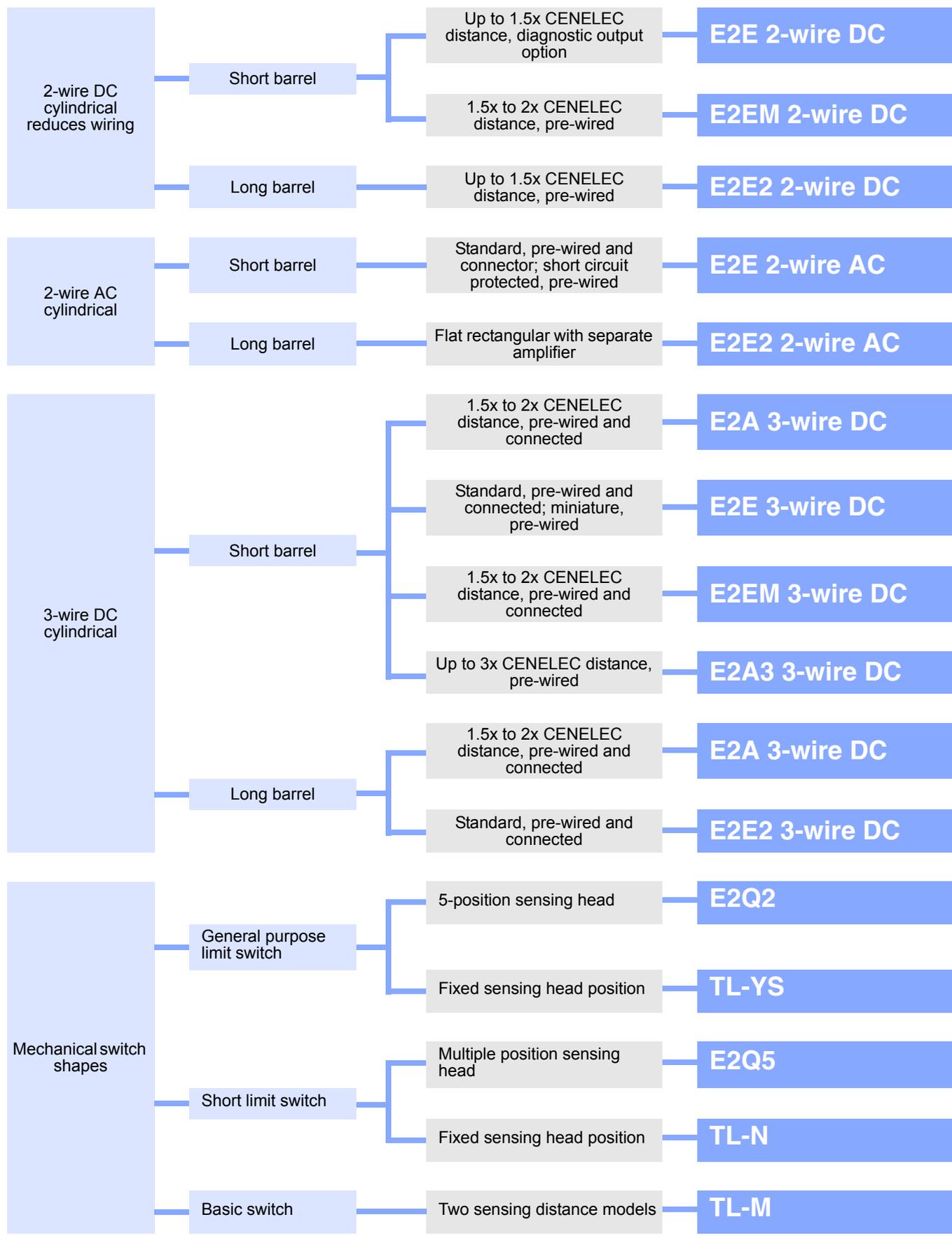
## Selection Guide



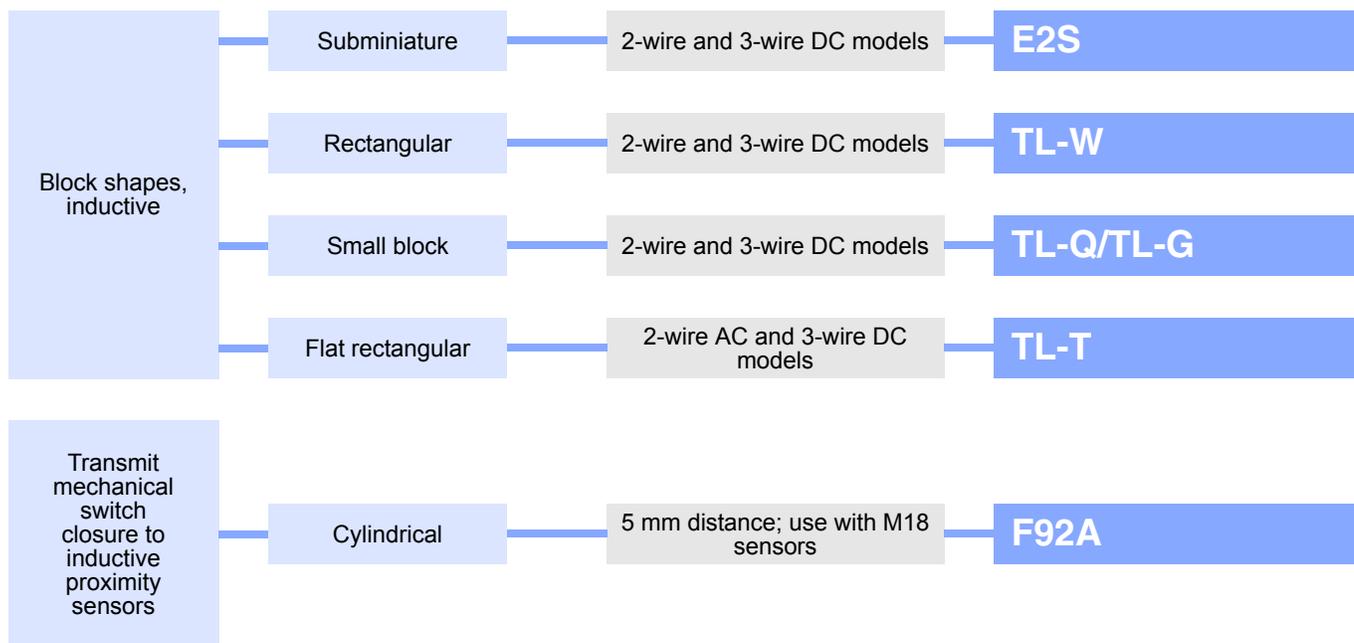
## Selection Guide



## Selection Guide



## Selection Guide



# Inductive Proximity Sensors E2E DC 2-Wire



## Short-Barrel DC 2-Wire Prox Sensors Reduce Wiring to Control Devices

- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water wash-down
- Up to 50% longer sensing range than CENELEC standards
- High visibility indicator
- Choose pre-wired or connector models
- Flush mountable shielded versions
- Built-in circuit protection
- Standard sizes: M8, M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available
- Sensor mounting and protective accessories, see Y92E



## Specifications

- Voltage range: 12-24 VDC
- Load rating: 3 to 100 mA with residual voltage of 3 V max.
  - 5 to 100 mA with residual voltage of 5 V for –M1J-T models
- Leakage current: 0.8 mA max.
- Circuit protection:
  - Surge absorber
  - Load short-circuit for control and diagnostic outputs
- Differential travel: 10% max. of sensing distance
  - 15% max. of sensing distance (M8 models)
- Diagnostic output delay: 0.3 to 1 s
- Operating ambient: -25° to 70° C, 35% to 95% RH

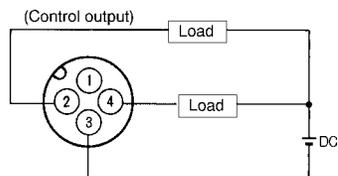
## DC 2-Wire Sensors with Self-Diagnostic Output Function

### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	3.0	Yes	NO	1000 Hz	NPB	33 (38)	E2E-X3D1S
	8.0	No		800 Hz		26 (38)	E2E-X8MD1S
M18	7.0	Yes		500 Hz		38 (43)	E2E-X7D1S
	14.0	No		400 Hz		28 (43)	E2E-X14MD1S
M30	10.0	Yes		43 (48)		E2E-X10D1S	
	20.0	No		100 Hz		35 (48)	E2E-X20MD1S

## Sensors with Built-In M12 Micro-Change® Connectors

Normally Open

**Note:** Terminal 1 is not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	3.0	Yes	NO	1000 Hz	NPB	26 (48)	E2E-X3D1S-M1
	8.0	No		800 Hz		33 (48)	E2E-X8MD1S-M1
M18	7.0	Yes		500 Hz		38 (53)	E2E-X7D1S-M1
	14.0	No		400 Hz		28 (53)	E2E-X14MD1S-M1
M30	10.0	Yes		43 (58)		E2E-X10D1S-M1	
	20.0	No		100 Hz		30 (58)	E2E-X20MD1S-M1

## M12 Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC Micro-Change®	22 AWG	2 m (6.56 ft)	Y96E-44SD2	Y96E-44RD2
		5 m (16.4 ft)	Y96E-44SD5	Y96E-44RD5
		10 m (32.8 ft)	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

## DC 2-Wire Sensors Without Diagnostic Output

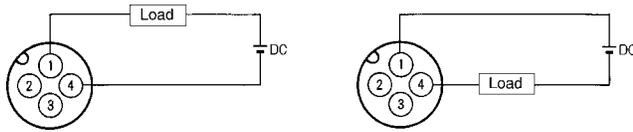
## Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NO	1500 Hz	SUS	26 (30)	E2E-X2D1-N
			NC				E2E-X2D2-N
	4.0	No	NO	1000 Hz		20 (30)	E2E-X4MD1-N
			NC				E2E-X4MD2-N
M12	3.0	Yes	NO	800 Hz	NPB	33 (38)	E2E-X3D1-N
			NC				E2E-X3D2-N
	8.0	No	NO	800 Hz		26 (38)	E2E-X8MD1-N
			NC				E2E-X8MD2-N
M18	7.0	Yes	NO	500 Hz	NPB	38 (43)	E2E-X7D1-N
			NC				E2E-X7D2-N
	14.0	No	NO	400 Hz		28 (43)	E2E-X14MD1-N
			NC				E2E-X14MD2-N
M30	10.0	Yes	NO	100 Hz	NPB	43 (48)	E2E-X10D1-N
			NC				E2E-X10D2-N
	20.0	No	NO	100 Hz		30 (48)	E2E-X20MD1-N
			NC				E2E-X20MD2-N

## Sensors with Built-In M12 Micro-Change® Connectors

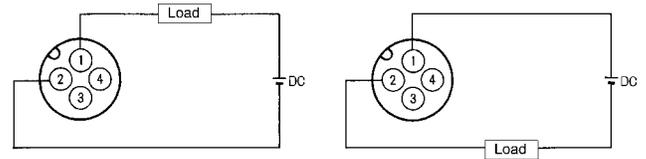
For Micro-Change® use OMRON Y96E-44□□ connector cordsets. These use IEC standard pin arrangement.

### Normally Open



**Note:** Terminals 2 and 3 are not used.

### Normally Closed



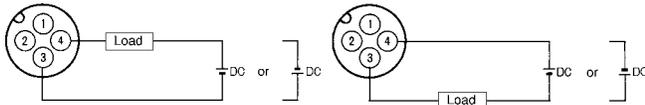
**Note:** Terminals 3 and 4 are not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NO	1500 Hz	SUS	26 (43)	E2E-X2D1-M1G
			NC				E2E-X2D2-M1G
	4.0	No	NO	1000 Hz		20 (43)	E2E-X4MD1-M1G
			NC				E2E-X4MD2-M1G
M12	3.0	Yes	NO	800 Hz	NPB	33 (48)	E2E-X3D1-M1G
			NC				E2E-X3D2-M1G
	8.0	No	NO	800 Hz		26 (48)	E2E-X8MD1-M1G
			NC				E2E-X8MD2-M1G
M18	7.0	Yes	NO	500 Hz	NPB	38 (53)	E2E-X7D1-M1G
			NC				E2E-X7D2-M1G
	14.0	No	NO	400 Hz		28 (53)	E2E-X14MD1-M1G
			NC				E2E-X14MD2-M1G
M30	10.0	Yes	NO	100 Hz	NPB	43 (58)	E2E-X10D1-M1G
			NC				E2E-X10D2-M1G
	20.0	No	NO	100 Hz		30 (58)	E2E-X20MD1-M1G
			NC				E2E-X20MD2-M1G

## Sensors with Pigtail Lead, M12 Connector

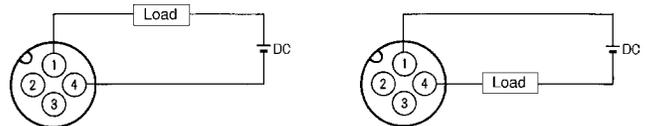
For Micro-Change® use OMRON Y96E-44□□ connector cordsets. Models with no polarity have a residual voltage of 5V.

### Normally Open, No Polarity (-M1J-T)



**Note:** 1. Terminals 1 and 2 are not used.  
2. Terminals 3 and 4 have no polarity.

### Normally Open with Polarity (-M1GJ)



**Note:** Terminals 2 and 3 are not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	3.0	Yes	NO, polarity	1000 Hz	NPB	33 (48)	E2E-X3D1-M1GJ
			NO, no polarity				E2E-X3D1-M1J-T
8.0	No	NO, polarity	800 Hz	26 (48)		E2E-X8MD1-M1GJ	
						NO, no polarity	E2E-X8MD1-M1J-T
M18	7.0	Yes	NO, polarity	500 Hz	38 (53)	E2E-X7D1-M1GJ	
			NO, no polarity			E2E-X7D1-M1J-T	
14.0	No	NO, polarity	400 Hz	28 (53)	E2E-X14MD1-M1GJ		
					NO, no polarity	E2E-X14MD1-M1J-T	
M30	10.0	Yes	NO, polarity	100 Hz	43 (58)	E2E-X10D1-M1GJ	
			NO, no polarity			E2E-X10D1-M1J-T	
20.0	No	NO, polarity	100 Hz	30 (58)	E2E-X20MD1-M1GJ		
					NO, no polarity	E2E-X20MD1-M1J-T	

## M12 Connector Cordsets\*

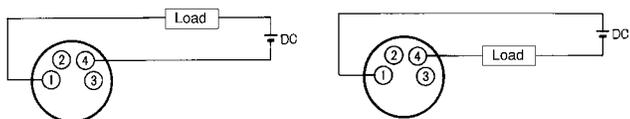
Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC Micro-Change®	22 AWG	2 m (6.56 ft)	Y96E-44SD2	Y96E-44RD2
		5 m (16.4 ft)	Y96E-44SD5	Y96E-44RD5
		10 m (32.8 ft)	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

## Sensors with Built-In M8 NanoChange® Connectors

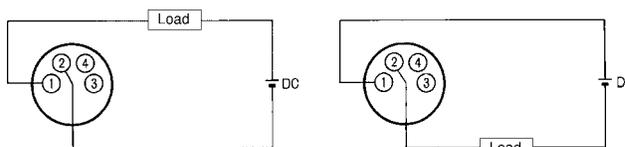
For NanoChange® use Omron XS3F-M42□-40□-R connector cordsets.

### Normally Open



**Note:** Terminals 2 and 3 are not used.

### Normally Closed



**Note:** Terminals 3 and 4 are not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NO	1500 Hz	SUS	31 (39)	E2E-X2D1-M3G
			NC				E2E-X2D2-M3G
	4.0	No	NO	1000 Hz		25 (39)	E2E-X4MD1-M3G
			NC				E2E-X4MD2-M3G

## M8 Connector Cordsets

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC NanoChange® style	22 AWG	2 m (6.56 ft)	XS3F-M421-402-R	XS3F-M422-402-R
		5 m (16.40 ft)	XS3F-M421-405-R	XS3F-M422-405-R

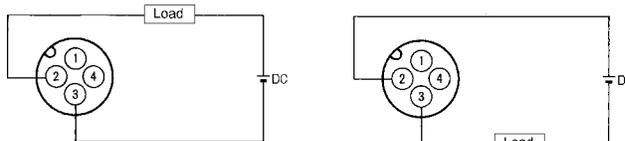
## Sensors with Built-In M12 Connectors, Alternate Pin Arrangement

### Normally Open



**Note:** Terminals 1 and 2 are not used.

### Normally Closed



**Note:** Terminals 1 and 4 are not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NO	1500 Hz	SUS	26 (43)	E2E-X2D1-M1
			NC				E2E-X2D2-M1
	4.0	No	NO	1000 Hz		20 (43)	E2E-X4MD1-M1
			NC				E2E-X4MD2-M1
M12	3.0	Yes	NO	800 Hz	NPB	33 (48)	E2E-X3D1-M1
			NC				E2E-X3D2-M1
	8.0	No	NO	800 Hz		26 (48)	E2E-X8MD1-M1
			NC				E2E-X8MD2-M1
M18	7.0	Yes	NO	500 Hz		38 (53)	E2E-X7D1-M1
			NC				E2E-X7D2-M1
	14.0	No	NO	400 Hz		28 (53)	E2E-X14MD1-M1
			NC				E2E-X14MD2-M1
M30	10.0	Yes	NO			43 (58)	E2E-X10D1-M1
			NC				E2E-X10D2-M1
	20.0	No	NO	100 Hz		30 (58)	E2E-X20MD1-M1
			NC				E2E-X20MD2-M1

# Inductive Proximity Sensors E2E DC 3-Wire



## Short-Barrel DC 3-Wire Prox Sensors Fit Tight Mounting Spaces

- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- Up to 25% longer sensing range than CENELEC standards
- High visibility indicator
- Voltage output eliminates the need for pull up/down resistors (standard models)
- Choose pre-wired or connector models
- Flush mountable shielded versions
- Built-in circuit protection
- Standard sizes: M8, M12, M18 and M30
- Miniature sizes: 4 mm, M5 and 5.4 mm
- Normally Open (NO) and Normally Closed (NC) available
- Sensor mounting and protective accessories, see Y92E



## Specifications

- Voltage range:
  - 12-24 VDC standard sizes
  - 10-30 VDC miniature sizes
- Load rating:
  - 200 mA (standard)
  - 100 mA open collector with 2 V max. voltage drop (miniature)
- Current consumption:
  - 13 mA max. (standard)
  - 17 mA max. (miniature)
- Circuit protection:
  - Reverse polarity (all models)
  - Surge absorber (standard)
  - Load short-circuit for control (standard)
- Differential travel:
  - 10% max. of sensing distance (standard)
  - 15% max. of sensing distance (miniature)
- Operating ambient:
  - -40° to 85° C, 35% to 95% RH (standard)
  - -25° to 70° C, 35% to 95% RH (miniature)

## Standard DC 3-Wire DC Sensors

### Pre-Wired with 2 m Cable, Normally Open

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	NPN-NO	2 kHz	SUS	26 (30)	E2E-X1R5E1
			PNP-NO				E2E-X1R5F1
	2.0	No	NPN-NO	800 Hz		20 (30)	E2E-X2ME1
			PNP-NO				E2E-X2MF1
M12	5.0	Yes	NPN-NO	1.5 kHz	NPB	33 (38)	E2E-X2E1
			PNP-NO				E2E-X2F1
	5.0	No	NPN-NO	400 Hz		26 (38)	E2E-X5ME1
			PNP-NO				E2E-X5MF1
M18	10.0	Yes	NPN-NO	600 Hz	NPB	38 (43)	E2E-X5E1
			PNP-NO				E2E-X5F1
	10.0	No	NPN-NO	200 Hz		28 (43)	E2E-X10ME1
			PNP-NO				E2E-X10MF1

**Pre-Wired with 2 m Cable, Normally Open (Continued)**

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M30	10.0	Yes	NPN-NO	400 Hz	NPB	43 (48)	E2E-X10E1
			PNP-NO				E2E-X10F1
	18.0	No	NPN-NO	100 Hz		30 (48)	E2E-X18ME1
			PNP-NO				E2E-X18MF1

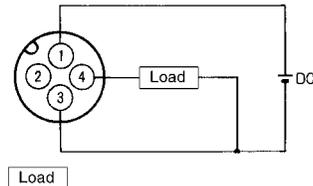
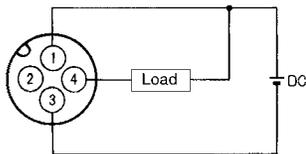
**Pre-Wired with 2 m Cable, Normally Closed**

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	NPN-NC	2 kHz	SUS	26 (30)	E2E-X1R5E2
			PNP-NC				E2E-X1R5F2
M8	2.0	No	NPN-NC	800 Hz		20 (30)	E2E-X2ME2
			PNP-NC				E2E-X2MF2
M12		Yes	Yes	NPN-NC	1.5 kHz	33 (38)	E2E-X2E2
				PNP-NC			E2E-X2F2
M18	5.0	No	NPN-NC	400 Hz	26 (38)	E2E-X5ME2	
			PNP-NC			E2E-X5MF2	
	Yes	Yes	NPN-NC	600 Hz	38 (43)	E2E-X5E2	
			PNP-NC			E2E-X5F2	
	10.0	No	No	NPN-NC	200 Hz	28 (43)	E2E-X10ME2
				PNP-NC			E2E-X10MF2
M30	Yes	Yes	NPN-NC	400 Hz	43 (48)	E2E-X10E2	
			PNP-NC			E2E-X10F2	
	18.0	No	No	NPN-NC	100 Hz	30 (48)	E2E-X18ME2
				PNP-NC			E2E-X18MF2

**Sensors with Built-In M12 Micro-Change® Connectors, Normally Open**

NPN Normally Open (E1-M1)

PNP Normally Open (F1-M1)



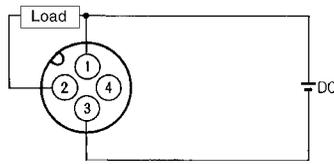
**Note:** Terminal 2 is not used.

**Note:** Terminal 2 is not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	NPN-NO	2 kHz	SUS	26 (43)	E2E-X1R5E1-M1
			PNP-NO				E2E-X1R5F1-M1
	2.0	No	NPN-NO	800 Hz		20 (43)	E2E-X2ME1-M1
			PNP-NO				E2E-X2MF1-M1
M12	Yes	Yes	NPN-NO	1.5 kHz	33 (48)	E2E-X2E1-M1	
			PNP-NO			E2E-X2F1-M1	
	5.0	No	No	NPN-NO	400 Hz	26 (48)	E2E-X5ME1-M1
				PNP-NO			E2E-X5MF1-M1
M18	Yes	Yes	NPN-NO	600 Hz	38 (53)	E2E-X5E1-M1	
			PNP-NO			E2E-X5F1-M1	
	10.0	No	No	NPN-NO	200 Hz	28 (53)	E2E-X10ME1-M1
				PNP-NO			E2E-X10MF1-M1
M30	Yes	Yes	NPN-NO	400 Hz	43 (58)	E2E-X10E1-M1	
			PNP-NO			E2E-X10F1-M1	
	18.0	No	No	NPN-NO	100 Hz	30 (58)	E2E-X18ME1-M1
				PNP-NO			E2E-X18MF1-M1

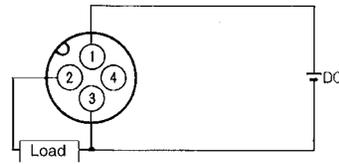
## Sensors with Built-In M12 Micro-Change® Connectors, Normally Closed

NPN Normally Closed



**Note:** Terminal 4 is not used.

PNP Normally Closed



**Note:** Terminal 4 is not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	NPN-NC	2 kHz	SUS	26 (43)	E2E-X1R5E2-M1
			PNP-NC				E2E-X1R5F2-M1
	2.0	No	NPN-NC	800 Hz		20 (43)	E2E-X2ME2-M1
			PNP-NC				E2E-X2MF2-M1
M12	5.0	No	NPN-NC	400 Hz	NPB	26 (48)	E2E-X5ME2-M1
			PNP-NC				E2E-X5MF2-M1
	10.0	Yes	NPN-NC	600 Hz		38 (53)	E2E-X5E2-M1
			PNP-NC				E2E-X5F2-M1
M18	10.0	No	NPN-NC	200 Hz	NPB	28 (53)	E2E-X10ME2-M1
			PNP-NC				E2E-X10MF2-M1
	18.0	Yes	NPN-NC	400 Hz		43 (58)	E2E-X10E2-M1
			PNP-NC				E2E-X10F2-M1
M30	18.0	No	NPN-NC	100 Hz	NPB	30 (58)	E2E-X18ME2-M1
			PNP-NC				E2E-X18MF2-M1

### M12 Connector Cordsets\*

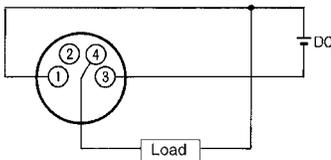
Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC Micro-Change®	22 AWG	2 m (6.56 ft)	Y96E-44SD2	Y96E-44RD2
		5 m (16.4 ft)	Y96E-44SD5	Y96E-44RD5
		10 m (32.8 ft)	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

## Sensors with Built-In M8 NanoChange® Connectors

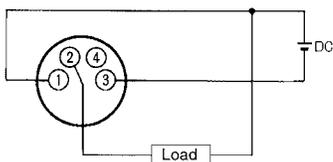
For NanoChange® use Omron XS3F-M42□-40□-R connector cordsets or Brad Harrison equivalent.

NPN Normally Open (E1-M3)



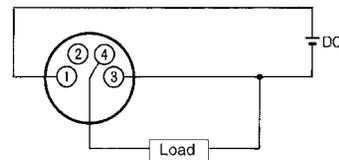
**Note:** Terminal 2 is not used.

NPN Normally Closed (E2-M3)



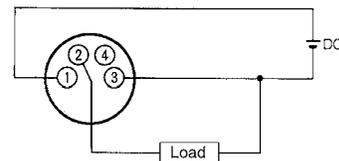
**Note:** Terminal 4 is not used.

PNP Normally Open (F1-M3)



**Note:** Terminal 2 is not used.

PNP Normally Closed (F2-M3)



**Note:** Terminal 4 is not used.

## Sensors with Built-In M8 NanoChange® Connectors (continued)

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NPN-NO	2 kHz	SUS	26 (39)	E2E-X1R5E1-M3
			NPN-NC				E2E-X1R5E2-M3
			PNP-NO				E2E-X1R5F1-M3
			PNP-NC				E2E-X1R5F2-M3
	1.5	No	NPN-NO	800 Hz		20 (39)	E2E-X2ME1-M3
			NPN-NC				E2E-X2ME2-M3
			PNP-NO				E2E-X2MF1-M3
			PNP-NC				E2E-X2MF2-M3

## M8 Connector Cordsets

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC NanoChange® style	22 AWG	2 m (6.56 ft)	XS3F-M421-402-R	XS3F-M422-402-R
		5 m (16.40 ft)	XS3F-M421-405-R	XS3F-M422-405-R

## Miniature Sensors

## Pre-Wired with 2 m Cable

Size (dia.)	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
4 mm	0.8	Yes	NPN-NO	3 kHz	SUS	26 (30)	E2E-CR8C1
			NPN-NC				E2E-CR8C2
			PNP-NO			20 (30)	E2E-CR8B1
			PNP-NC				E2E-CR8B2
M5	1.0		NPN-NO	NPB	33 (38)	E2E-X1C1	
			NPN-NC			E2E-X1C2	
			PNP-NO		26 (38)	E2E-X1B1	
			PNP-NC			E2E-X1B2	
5.4 mm		NPN-NO		38 (43)	E2E-C1C1		
		NPN-NC			E2E-C1C2		
		PNP-NO		28 (43)	E2E-C1B1		
		PNP-NC			E2E-C1B2		

# Inductive Proximity Sensors

## E2E AC 2-Wire

Quick Link  
A269

### Short-Barrel AC 2-Wire Prox Sensors Fit Tight Mounting Spaces

- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- Up to 25% longer sensing range than CENELEC standards
- High visibility indicator
- Choose pre-wired or connector models
- Flush mountable shielded versions
- Standard sizes: M8, M12, M18 and M30
- Short-circuit protection models available
- Normally Open (NO) models stocked; Normally Closed (NC) available
- Sensor mounting and protective accessories, see Y92E



### Specifications

- Voltage range:
  - 24-240 VAC, 50/60 Hz (standard)
  - 90 to 140 VAC, 50/60 Hz (short-circuit protection)
- Load rating:
  - 5 to 100 mA (standard M8)
  - 5 to 200 mA (standard M12)
  - 5 to 300 mA (standard M18, M30)
- Current consumption: 1.7 mA max. (standard)
- Leakage current: 1.5 mA max. (short-circuit protection)
- Differential travel: 10% max. of sensing distance
- Operating ambient:
  - -40° to 85° C, 35% to 95% RH (M12, M18, M30)
  - -25° to 70° C, 35% to 95% RH (M8)

### Standard AC 2-Wire Sensors

#### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	NO	25 Hz	SUS	36 (40)	E2E-X1R5Y1
	2.0	No				30 (40)	E2E-X2MY1-US
M12		Yes				NPB	38 (43)
	5.0	No					31 (43)
M18		Yes			38 (43)		E2E-X5Y1-US
	10.0	No			28 (43)		E2E-X10MY1-US
M30		Yes			43 (48)	E2E-X10Y1-US	
	18.0	No			30 (48)	E2E-X18MY1-US	

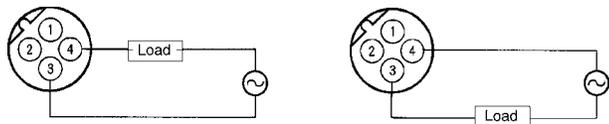
#### M12, 4-Pin Inverted Key-Way Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole AC Micro-Change®	22 AWG	6 ft	Y96E-44SA6	Y96E-44RA6
		12 ft	Y96E-44SA12	Y96E-44RA12
		20 ft	Y96E-44SA20	Y96E-44RA20

\* Not available in Canada.

## Sensors with M12, 3-Pin Single Key-Way Micro-Change® Connectors

Normally Open



**Note:** Terminals 1 and 2 are not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	2.0	Yes	NO	25 Hz	NPB	38 (53)	E2E-X2Y1-M1
	5.0	No				31 (53)	E2E-X5MY1-M1
M18		Yes				38 (53)	E2E-X5Y1-M1
	10.0	No				28 (53)	E2E-X10MY1-M1
M30	18.0	Yes				43 (48)	E2E-X10Y1-M1
		No				30 (48)	E2E-X18MY1-M1

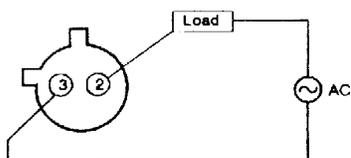
## M12, 4-Pin Single Key-Way Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 3-pole AC Micro-Change®	22 AWG	6 ft	Y96E-44SA6	Y96E-44RA6
		12 ft	Y96E-44SA12	Y96E-44RA12
		20 ft	Y96E-44SA20	Y96E-44RA20

\* Not available in Canada.

## Sensors with M12, 3-Pin Dual Key-way Micro-Change® Connectors

Normally Open



Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	2.0	Yes	NO	25 Hz	NPB	38 (53)	E2E-X2Y1-M4
	5.0	No				31 (53)	E2E-X5MY1-M4
M18		Yes				38 (53)	E2E-X5Y1-M4
	10.0	No				28 (53)	E2E-X10MY1-M4
M30	18.0	Yes				43 (58)	E2E-X10Y1-M4
		No				30 (58)	E2E-X18MY1-M4

## M12, 3-Pin Dual Key-Way Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 3-pole AC Micro-Change®	22 AWG	6 ft	Y96E-33SA6	Y96E-33RA6
		12 ft	Y96E-33SA12	Y96E-33RA12
		20 ft	Y96E-33SA20	Y96E-33RA20

\* Not available in Canada.

## AC 2-Wire Sensors with Short-Circuit Protection

### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M18	5.0	Yes	SCR-NO	25 Hz	NPB	29 (47)	E2E-X5Y1-53-US
	10.0	No				19 (47)	E2E-X10MY1-53-US
M30		Yes				38 (57)	E2E-X10Y1-53-US
	18.0	No				25 (57)	E2E-X18MY1-53-US

# Inductive Proximity Sensors

## E2A

Quick Link  
A272

### Long Distance, Short Barrel Cylindrical Inductive DC 3-wire

- 1.5 to 2 times longer sensing distance on all models compared with CENELEC standard
- Longer sensing distance reduces maintenance frequency by avoiding collisions between the work piece and the sensor
- Flush mountable M8 and M12 shielded versions; M18 and M30 versions allows flush mounting with the clearance from the nuts provided
- 360° view of yellow operation indicator
- Built-in circuit protection
- Connector and pre-wired models
- Standard sizes: M8, M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available
- Stainless steel (SUS) or Nickel-Plated Brass (NPB) body
- Sensor mounting and protective accessories, see Y92E



### Specifications

- Voltage range: 12-24 VDC
- Load rating:
  - 200 mA at 32 VDC max.
  - 100 mA max. below -25° C
- Current consumption: 10 mA max.
- Circuit protection:
  - Power source reverse polarity
  - Output reverse polarity (except M8 size)
  - Surge suppressor
  - Short-circuit
- Differential travel: 10% max. of sensing distance
- Operating ambient: -40° to 70° C, 35% to 95% RH

### Short-Barrel Models

#### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model	
M8	2.0	Yes	PNP-NO	1500 Hz	SUS	27 (40)	E2A-S08KS02-WP-B1-2M	
			NPN-NO				E2A-S08KS02-WP-C1-2M	
	4.0	No	PNP-NO	1000 Hz			E2A-S08KN04-WP-B1-2M	
			NPN-NO				E2A-S08KN04-WP-C1-2M	
M12	8.0	Yes	PNP-NO	800 Hz	NPB	34 (50)	E2A-M12KS04-WP-B1-2M	
			NPN-NO				E2A-M12KS04-WP-C1-2M	
	8.0	No	PNP-NO				800 Hz	E2A-M12KN08-WP-B1-2M
			NPN-NO					E2A-M12KN08-WP-C1-2M
M18	16.0	Yes	PNP-NO	500 Hz	NPB	39 (59)	E2A-M18KS08-WP-B1-2M	
			NPN-NO				E2A-M18KS08-WP-C1-2M	
	16.0	No	PNP-NO				400 Hz	E2A-M18KN16-WP-B1-2M
			NPN-NO					E2A-M18KN16-WP-C1-2M
M30	15.0	Yes	PNP-NO	250 Hz	NPB	44 (64)	E2A-M30KS15-WP-B1-2M	
			NPN-NO				E2A-M30KS15-WP-C1-2M	
	20.0	No	PNP-NO				100 Hz	E2A-M30KN20-WP-B1-2M
			NPN-NO					E2A-M30KN20-WP-C1-2M

## M12 Connector

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	PNP-NO	1500 Hz	SUS	27 (43)	E2A-S08KS02-M1-B1
			NPN-NO				E2A-S08KS02-M1-C1
			PNP-NO		NPB		E2A-M08KS02-M1-B1
			NPN-NO				E2A-M08KS02-M1-C1
	4.0	No	PNP-NO	1000 Hz	SUS		E2A-S08KN04-M1-B1
			NPN-NO				E2A-S08KN04-M1-C1
			PNP-NO		NPB		E2A-M08KN04-M1-B1
			NPN-NO				E2A-M08KN04-M1-C1
M12	8.0	No	PNP-NO	800 Hz	34 (48)	E2A-M12KS04-M1-B1	
			NPN-NO			E2A-M12KS04-M1-C1	
	Yes	PNP-NO	E2A-M12KN08-M1-B1				
		NPN-NO	E2A-M12KN08-M1-C1				
M18	16.0	No	PNP-NO	500 Hz		39 (53)	E2A-M18KS08-M1-B1
			NPN-NO				E2A-M18KS08-M1-C1
	Yes	PNP-NO	E2A-M18KN16-M1-B1				
		NPN-NO	E2A-M18KN16-M1-C1				
M30	15.0	Yes	PNP-NO	250 Hz	44 (58)		E2A-M30KS15-M1-B1
			NPN-NO				E2A-M30KS15-M1-C1
	No	PNP-NO	E2A-M30KN20-M1-B1				
		NPN-NO	E2A-M30KN20-M1-C1				

## M8 Connector (3-Pin)

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	PNP-NO	1500 Hz	SUS	27 (39)	E2A-S08KS02-M5-B1
			NPN-NO				E2A-S08KS02-M5-C1
	4.0	No	PNP-NO	1000 Hz			E2A-S08KN04-M5-B1
			NPN-NO				E2A-S08KN04-M5-C1

# Inductive Proximity Sensors E2EM DC 2-Wire



## Extended Range, DC 2-Wire Short Barrel Sensors

- 1.5 to 2 times longer sensing range than standard sensors reduces maintenance frequency by avoiding damage from work piece collisions with sensor
- Improved mounting strength with thick Nickel-Plated Brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- Built-in circuit protection
- Choose pre-wired or connector models
- Standard sizes: M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available



## Specifications

- Voltage range: 10-30 VDC, 10% ripple p-p
- Output type: Open collector
- Load rating: 3-100 mA at 24 VDC max.; Residual voltage 5 V
- Leakage current: 0.8 mA max.
- Circuit protection: Surge absorber; Output short-circuit
- Differential travel: 15% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

## DC 2-Wire Sensors, Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	4.0	Yes	NO	1 kHz	NPB	33 (38)	E2EM-X4X1
M18	8.0	No		500 Hz		50 (65)	E2EM-X8X1
	16.0			400 Hz		43 (48)	E2EM-X16MX1
M30	15.0	Yes		250 Hz		50 (70)	E2EM-X15X1
	30.0	No	100 Hz	E2EM-X30MX1			

# Inductive Proximity Sensors E2EM DC 3-Wire



## Extended Range, DC 3-Wire Short Barrel Sensors

- 1.5 to 2 times longer sensing range than standard sensors reduces maintenance frequency by avoiding damage from work piece collisions with sensor
- Improved mounting strength with thick Nickel-Plated Brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- Open collector output is suitable for use with no-voltage input devices such as timers
- Built-in circuit protection
- Choose pre-wired or connector models
- Standard sizes: M8, M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available



## Specifications

- Voltage range: 10 to 40 VDC, ripple 10% p-p
- Output type: NPN or PNP, NO and NC models
- Load rating: 200 mA at 24 VDC max.; Residual voltage 2 V
- Current consumption: 13 mA
- Circuit protection: Surge absorber; Output short-circuit; Reverse polarity
- Differential travel: 10% max. of sensing distance
- Operating ambient:
  - -40° to 85° C, 35% to 95% RH
  - -25° to 70° C, 35% to 95% RH (M30)

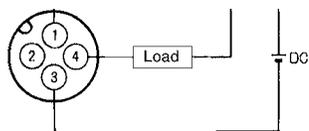
## DC 3-Wire Sensors

### Pre-Wired with 2 m Cable

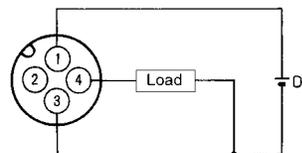
Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NPN-NO	1.5 kHz	NPB	26 (30)	E2EM-X2C1
			PNP-NO				E2EM-X2B1
M12	4.0		NPN-NO	500 Hz		33 (38)	E2EM-X4C1
			PNP-NO				E2EM-X4B1
M18	8.0		NPN-NO	300 Hz		38 (43)	E2EM-X8C1
M12			PNP-NO				E2EM-X8B1
M30	15.0		NPN-NO	100 Hz		43 (48)	E2EM-X15C1
			PNP-NO				E2EM-X15B1

## With M12 Micro-Change® Connectors

NPN Normally Open (C1-M1)



PNP Normally Open (B1-M1)



Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	NPN-NO	1.5 kHz	NPB	30 (43)	E2EM-X2C1-M1
			PNP-NO				E2EM-X2B1-M1
M12	4.0		NPN-NO	500 Hz		33 (48)	E2EM-X4C1-M1
			PNP-NO				E2EM-X4B1-M1
M18	8.0		NPN-NO	300 Hz		38 (53)	E2EM-X8C1-M1
			PNP-NO				E2EM-X8B1-M1
M30	15.0		NPN-NO	100 Hz		43 (58)	E2EM-X15C1-M1
			PNP-NO				E2EM-X15B1-M1

### M12 Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC Micro-Change®	22 AWG	6 ft	Y96E-44SD2	Y96E-44RD2
		12 ft	Y96E-44SD5	Y96E-44RD5
		20 ft	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

# Inductive Proximity Sensors

## E2A3 DC 3-Wire

Quick Link

A274

### Extra-Long Distance, Short Barrel Cylindrical Inductive DC 3-Wire

- CENELEC triple-distance operation
- Reduces maintenance frequency; avoids damage from workpiece collisions with sensor
- Flush mountable M8 and M12 shielded versions; M18 and M30 versions allow flush mounting with the clearance from the nuts provided
- 360° view of yellow operation indicator
- Built-in circuit protection
- Connector and pre-wired models
- Standard sizes: M8, M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available
- Stainless steel (SUS303) or Nickel-Plated Brass (NPB) body
- Rated IP67 for water washdown
- Sensor mounting and protective accessories, see Y92E



## Specifications

- Voltage range: 12-24 VDC
- Output type: NPN or PNP, open collector
- Load rating: 200 mA at 32 VDC max.
- Current consumption: 10 mA max.
- Circuit protection: Power source reverse polarity; Output reverse polarity (except M8 size); Surge suppressor; Short-circuit
- Differential travel: 10% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

## Short-Barrel Models

### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	3.0	Yes	PNP-NO	700 Hz	SUS	27 (40)	E2A3-S08KS03-WP-B1 2M
			NPN-NO				E2A3-S08KS03-WP-C1 2M
M12	6.0		PNP-NO	350 Hz	NPB	34 (50)	E2A3-M12KS06-WP-B1 2M
			NPN-NO				E2A3-M12KS06-WP-C1 2M
M18	11.0		PNP-NO	250 Hz		39 (60)	E2A3-M18KS11-WP-B1 2M
			NPN-NO				E2A3-M18KS11-WP-C1 2M
M30	20.0		PNP-NO	80 Hz		44 (65)	E2A3-M30KS20-WP-B1 2M
			NPN-NO				E2A3-M30KS20-WP-C1 2M

**M12 Connector (4-Pin)**

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	3.0	Yes	PNP-NO	700 Hz	SUS	27 (44)	E2A3-S08KS03-M1-B1
			NPN-NO				E2A3-S08KS03-M1-C1
M12	6.0		PNP-NO	350 Hz	NPB	34 (49)	E2A3-M12KS06-M1-B1
			NPN-NO				E2A3-M12KS06-M1-C1
M18	11.0		PNP-NO	250 Hz		39 (54)	E2A3-M18KS11-M1-B1
			NPN-NO				E2A3-M18KS11-M1-C1
M30	20.0		PNP-NO	80 Hz		44 (59)	E2A3-M30KS20-M1-B1
			NPN-NO				E2A3-M30KS20-M1-C1

**M8 Connector (3-Pin)**

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	3.0	Yes	PNP-NO	700 Hz	SUS	27 (40)	E2A3-S08KS03-M5-B1
			NPN-NO				E2A3-S08KS03-M5-C1

# Inductive Proximity Sensors

## E2E2 DC 2-Wire



### Long-Barrel DC 2-Wire Prox Sensors Reduce Wiring to Control Devices

- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- High visibility indicator
- Choose pre-wired or connector models
- Flush mountable shielded versions
- Built-in circuit protection
- Standard sizes: M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available
- Sensor mounting and protective accessories, see Y92E



## Specifications

- Voltage range: 12-24 VDC
- Load rating: 3 to 100 mA with residual voltage of 3 V max.
- Leakage current: 0.8 mA max.
- Circuit protection: Surge absorber; Load short-circuit for control and diagnostic outputs
- Differential travel: 10% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

## DC 2-Wire Sensors

### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	3.0	Yes	NO	1000 Hz	NPB	55 (60)	<b>E2E2-X3D1</b>
			NC				<b>E2E2-X3D2</b>
	8.0	No	NO	800 Hz		48 (60)	<b>E2E2-X8MD1</b>
			NC				<b>E2E2-X8MD2</b>
M18	7.0	Yes	NO	500 Hz	NPB	60 (65)	<b>E2E2-X7D1</b>
			NC				<b>E2E2-X7D2</b>
	14.0	No	NO	400 Hz		50 (65)	<b>E2E2-X14MD1</b>
			NC				<b>E2E2-X14MD2</b>
M30	10.0	Yes	NO	100 Hz	NPB	65 (70)	<b>E2E2-X10D1</b>
			NC				<b>E2E2-X10D2</b>
	20.0	No	NO	100 Hz		52 (70)	<b>E2E2-X20MD1</b>
			NC				<b>E2E2-X20MD2</b>

# Inductive Proximity Sensors

## E2E2 DC 3-Wire

Quick Link  
A276

### Long-Barrel DC 3-Wire Prox Sensors Built for Rugged Duty

- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- Up to 25% longer sensing range than CENELEC standards
- High visibility indicator
- Voltage output eliminates the need for pull up/down resistors (standard models)
- Choose pre-wired or connector models
- Flush mountable shielded versions
- Unshielded models offer longest sensing distances
- Built-in circuit and polarity protection
- Standard sizes: M12, M18 and M30
- Normally Open (NO) models stocked; Normally Closed (NC) available
- Sensor mounting and protective accessories, see Y92E



### Specifications

- Voltage range: 12-24 VDC standard sizes
- Load rating: 200 mA open collector with 2 V max. voltage drop
- Current consumption: 13 mA max.
- Circuit protection: Reverse polarity; Surge absorber; Load short-circuit for control
- Differential travel: 10% max. of sensing distance
- Operating ambient: -40° to 85° C, 35% to 95% RH

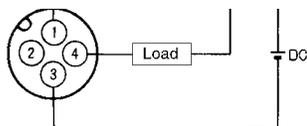
### Long-Barrel DC 3-Wire Sensors

#### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	2.0	Yes	NPN-NO	1.5 kHz	NPB	55 (60)	E2E2-X2C1
			PNP-NO				E2E2-X2B1
	5.0	No	NPN-NO	400 Hz		48 (60)	E2E2-X5MC1
			PNP-NO				E2E2-X5MB1
M18	5.0	Yes	NPN-NO	600 Hz	60 (65)	E2E2-X5C1	
			PNP-NO			E2E2-X5B1	
	10.0	No	NPN-NO	200 Hz	50 (65)	E2E2-X10MC1	
			PNP-NO			E2E2-X10MB1	
M30	10.0	Yes	NPN-NO	400 Hz	65 (70)	E2E2-X10C1	
			PNP-NO			E2E2-X10B1	
	18.0	No	NPN-NO	100 Hz	52 (70)	E2E2-X18MC1	
			PNP-NO			E2E2-X18MB1	

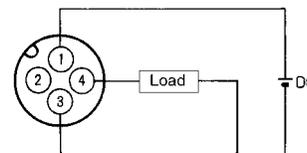
## Sensors with Built-In M12 Micro-Change® Connectors

NPN Normally Open (C1-M1)



**Note:** Terminal 2 is not used.

PNP Normally Open (B1-M1)



**Note:** Terminal 2 is not used.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	2.0	Yes	NPN-NO	1.5 kHz	NPB	55 (70)	E2E2-X2C1-M1
			PNP-NO				E2E2-X2B1-M1
	5.0	No	NPN-NO	400 Hz		48 (70)	E2E2-X5MC1-M1
			PNP-NO				E2E2-X5MB1-M1
M18	5.0	Yes	NPN-NO	600 Hz		60 (75)	E2E2-X5C1-M1
			PNP-NO				E2E2-X5B1-M1
	10.0	No	NPN-NO	200 Hz		50 (75)	E2E2-X10MC1-M1
			PNP-NO				E2E2-X10MB1-M1
M30	10.0	Yes	NPN-NO	400 Hz	65 (80)	E2E2-X10C1-M1	
			PNP-NO			E2E2-X10B1-M1	
	18.0	No	NPN-NO	100 Hz	52 (80)	E2E2-X18MC1-M1	
			PNP-NO			E2E2-X18MB1-M1	

### M12 Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC Micro-Change®	22 AWG	6 ft	Y96E-44SD2	Y96E-44RD2
		12 ft	Y96E-44SD5	Y96E-44RD5
		20 ft	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

# Inductive Proximity Sensors

## E2E2 AC 2-Wire



### Long-Barrel AC 2-Wire Prox Sensors Built for Rugged Duty

- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- IP67 rated, 1200 psi water washdown
- Up to 25% longer sensing range than CENELEC standards
- High visibility indicator
- Choose pre-wired or connector models
- Flush mountable shielded versions
- Standard sizes: M12, M18 and M30
- Normally Open (NO) models stocked; Normally Closed (NC) available
- Sensor mounting and protective accessories, see Y92E



### Specifications

- Voltage range: 24-240 VAC, 50/60 Hz (standard)
- Load rating:
  - 5 to 200 mA (standard M12)
  - 5 to 300 mA (standard M18, M30)
- Leakage current: 1.7 mA max.
- Differential travel: 10% max. of sensing distance
- Operating ambient: -40° to 85° C, 35% to 95% RH

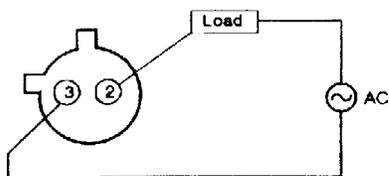
### Long-Barrel AC 2-Wire Sensors

#### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	2.0	Yes	NO	25 Hz	NPB	55 (60)	E2E2-X2Y1-US
	5.0	No				48 (60)	E2E2-X5MY1-US
M18	10.0	Yes				60 (65)	E2E2-X5Y1-US
		No				50 (65)	E2E2-X10MY1-US
M30	18.0	Yes				65 (70)	E2E2-X10Y1-US
		No				52 (70)	E2E2-X18MY1-US

## Sensors with M12, 3-Pin Dual Key-Way Micro-Change® Connectors

Normally Open



Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	2.0	Yes	NO	25 Hz	NPB	55 (70)	E2E2-X2Y1-M4
	5.0	No				48 (70)	E2E2-X5MY1-M4
M18		Yes				60 (75)	E2E2-X5Y1-M4
	10.0	No				50 (75)	E2E2-X10MY1-M4
M30	18.0	Yes				65 (80)	E2E2-X10Y1-M4
		No				52 (80)	E2E2-X18MY1-M4

### M12, 3-Pin Dual Key-Way Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 3-pole AC Micro-Change®	22 AWG	6 ft	Y96E-33SA6	Y96E-33RA6
		12 ft	Y96E-33SA12	Y96E-33RA12
		20 ft	Y96E-33SA20	Y96E-33RA20

\* Not available in Canada.

# Inductive Proximity Sensors E2A



## Long Distance, Long Barrel Cylindrical Inductive DC 3-wire

- 1.5 to 2 times longer sensing distance on all models compared with CENELEC standard
- Longer sensing distance reduces maintenance frequency by avoiding collisions between the work piece and the sensor
- Flush mountable M8 and M12 shielded versions; M18 and M30 versions allows flush mounting with the clearance from the nuts provided
- 360° view of yellow operation indicator
- Built-in circuit protection
- Connector and pre-wired models
- Standard sizes: M8, M12, M18 and M30
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available
- Stainless steel (SUS) or Nickel-Plated Brass (NPB) body
- Sensor mounting and protective accessories, see Y92E



## Specifications

- Voltage range: 12-24 VDC
- Load rating: 200 mA at 32 VDC max.; 100 mA max. below -25° C
- Current consumption: 10 mA max.
- Circuit protection: Power source reverse polarity; Output reverse polarity (except M8 size); Surge suppressor; Short-circuit
- Differential travel: 10% max. of sensing distance
- Operating ambient: -40° to 70° C, 35% to 95% RH

## Long-Barrel Models

### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	PNP-NO	1500 Hz	SUS	49 (62)	E2A-S08LS02-WP-B1-2M
			NPN-NO				E2A-S08LS02-WP-C1-2M
	4.0	No	PNP-NO	1000 Hz			E2A-S08LN04-WP-B1-2M
			NPN-NO				E2A-S08LN04-WP-C1-2M
M12	4.0	Yes	PNP-NO	800 Hz	NPB	56 (72)	E2A-M12LS04-WP-B1-2M
			NPN-NO				E2A-M12LS04-WP-C1-2M
	8.0	No	PNP-NO	800 Hz			E2A-M12LN08-WP-B1-2M
			NPN-NO				E2A-M12LN08-WP-C1-2M
M18	8.0	Yes	PNP-NO	500 Hz	NPB	61 (81)	E2A-M18LS08-WP-B1-2M
			NPN-NO				E2A-M18LS08-WP-C1-2M
	16.0	No	PNP-NO	400 Hz			E2A-M18LN16-WP-B1-2M
			NPN-NO				E2A-M18LN16-WP-C1-2M
M30	15.0	Yes	PNP-NO	250 Hz	NPB	66 (86)	E2A-M30LS15-WP-B1-2M
			NPN-NO				E2A-M30LS15-WP-C1-2M
	30.0	No	PNP-NO	100 Hz			E2A-M30LN30-WP-B1-2M
			NPN-NO				E2A-M30LN30-WP-C1-2M

## M12 Connector

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model	
M8	2.0	Yes	PNP-NO	1500 Hz	SUS	49 (65)	E2A-S08LS02-M1-B1	
			NPN-NO				E2A-S08LS02-M1-C1	
			PNP-NO		NPB		E2A-M08LS02-M1-B1	
			NPN-NO				E2A-M08LS02-M1-C1	
	4.0	No	PNP-NO	1000 Hz	SUS		E2A-S08LN04-M1-B1	
			NPN-NO				E2A-S08LN04-M1-C1	
			PNP-NO		NPB		E2A-M08LN04-M1-B1	
			NPN-NO				E2A-M08LN04-M1-C1	
M12	8.0	No	PNP-NO	800 Hz	SUS	56 (70)	E2A-M12LS04-M1-B1	
			NPN-NO				E2A-M12LS04-M1-C1	
	Yes	PNP-NO	E2A-M12LN08-M1-B1					
		NPN-NO	E2A-M12LN08-M1-C1					
M18	16.0	No	PNP-NO	500 Hz		NPB	61 (75)	E2A-M18LS08-M1-B1
			NPN-NO					E2A-M18LS08-M1-C1
	Yes	PNP-NO	E2A-M18LN16-M1-B1					
		NPN-NO	E2A-M18LN16-M1-C1					
M30	15.0	Yes	PNP-NO	250 Hz	SUS		66 (80)	E2A-M30LS15-M1-B1
			NPN-NO					E2A-M30LS15-M1-C1
	No	PNP-NO	E2A-M30LN30-M1-B1					
		NPN-NO	E2A-M30LN30-M1-C1					

## M8 Connector (3-Pin)

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	2.0	Yes	PNP-NO	1500 Hz	SUS	49 (61)	E2A-S08LS02-M5-B1
			NPN-NO				E2A-S08LS02-M5-C1
	4.0	No	PNP-NO	1000 Hz			E2A-S08LN04-M5-B1
			NPN-NO				E2A-S08LN04-M5-C1

# Inductive Proximity Sensors

## E2EC

Quick Link  
A226

### Subminiature Sensor with Inline Amplifier Offers Great Mounting Flexibility

- Small nickel-plated brass (NPB) sensing heads on 0.4 m cable fit space-confined installations
- Shielded sensing head allows the sensor to be flush-mounted in metal
- Easy operation monitoring with LED indicator on the amplifier unit
- Robotic cable on DC 2-wire models withstands repeated flexing on robots and reciprocating machinery
- DC 2-wire models have cylindrical amplifiers; DC 3-wire rectangular amplifiers allow side-by-side mounting
- Subminiature sizes: 3, 5.4 and 8 mm unthreaded; M12 threaded
- Normally Open (NO) circuit type stocked; Normally Closed (NC) available
- Rated IP67 (2-wire); IP64 (3-wire)



## Specifications

- Voltage range: 12-24 VDC (2-wire); 5-24 VDC (3-wire)
- Load rating: 5 to 100 mA (2-wire)
  - 100 mA max. at 30 VDC, NPN open collector (3-wire)
- Leakage current: 0.8 mA max. (2-wire)
- Current consumption: 10 mA max. (3-wire)
- Circuit protection: Surge absorber (all models); Short-circuit protection (2-wire)
- Differential travel: 10% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH
- Amplifier dimensions: 47 L x 8 W x 10 H mm, 2-wire
  - 35 L x 5 W x 10 H mm, 3 wire

## DC 2-Wire Sensors

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
3 mm dia.	0.8	Yes	NO	1.5 kHz	NPB	0 (12)	E2EC-CR8D1
			NC				E2EC-CR8D2
5.4 mm dia.	1.5		NO	1 kHz		0 (18)	E2EC-C1R5D1
			NC				E2EC-C1R5D2
8 mm dia.	3		NO	1 kHz		18 (23.6)	E2EC-C3D1
			NC				E2EC-C3D2
M12	4	NO	1 kHz	18 (23.6)	E2EC-X4D1		
		NC			E2EC-X4D2		

## DC 3-Wire Sensors

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
3 mm dia.	0.5	Yes	NPN-NO	1 kHz	NPB	0 (12)	E2EC-CR5C1
8 mm dia.	2.5					0 (18)	E2EC-C2R5C1

## Accessories

Description	Model
Mounting brackets	
Fits 5.4 mm dia. E2EC-C1R5D sensors, SUS304 strap	Y92E-F5R4
Fits M12 size E2EC-X4D□ sensors	Y92E-B12

# Inductive Proximity Sensors TL-W



## Subminiature, Flat-Pack DC Sensor Fits Tight Spaces

- Rated IP67 for water washdown
- Space-saving mounting area, as small as 10 x 27 mm (0.39 x 1.06 in), is ideal for conveyor wall mounting
- Mounts directly onto metal base or rail
- Rugged die-cast metal or heat-resistant ABS plastic housing
- Pre-wired with 2 m (6.56 ft) length cable
- Built-in circuit protection
- DC 2-wire and DC 3-wire models



## Specifications

- Voltage range: 12-24 VDC (ABS plastic models)
  - 10 to 30 VDC (Diecast aluminum models)
- Load rating: 3 to 100 mA; 3.3 V max. residual voltage (DC 2-wire)
  - 100 mA at 24 VDC max.; 1 V residual voltage (DC 3-wire, NPN open collector)
  - 200 mA at 24 VDC max.; 2 V residual voltage (DC 3-wire, NPN with pull-up resistor or PNP with pull-down resistor)
- Current consumption: 15 mA max. at 24 VDC (DC 3-wire)
  - 10 mA max. (TL-W5MC)
- Leakage current: 0.8 mA max. (DC 2-wire)
- Circuit protection:
  - Power source reverse polarity (DC 3-wire)
  - Surge absorber
  - Short-circuit (DC 2-wire)
- Operating ambient: -25° to 70° C, 35% to 95% RH

## Flat-Pack Inductive Sensors

### DC 2-Wire Models

Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Dimensions (H x W x D) mm	Model
5	No	NPN-NO	500 Hz	ABS	30.5 x 18 x 10	TL-W5MD1
		NPN-NC				TL-W5MD2

### DC 3-Wire Models

Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Dimensions (H x W x D) mm	Model	
1.5	No	NPN-NO	1 kHz	ABS	25 x 8 x 5.5	TL-W1R5MC1*	
3			600 Hz		27 x 10 x 6	TL-W 3MC1*	
5		Yes	NPN-NC		300 Hz	Diecast aluminum	50 x 24.9 x 10
	NPN-NO		30.5 x 18 x 10	TL-W5MC1			
	NPN-NC		TL-W5MC2				
	PNP-NO		TL-W5E1				
20	No	NPN-NO	40 Hz	ABS	53 x 40 x 23	TL-W5E2	
						PNP-NO	TL-W5F1
		PNP-NC				TL-W5F2	
		NPN-NC				TL-W20ME1	
						TL-W20MF1	

\* Model includes mounting bracket.

# Inductive Proximity Sensors

## E2Q2

Quick Link  
A228

### Limit Switch Style with 5-Position Sensing Head

- Sensing face easily adjusts to one of five directions
- Easy to install and same mounting directions as a standard limit switch
- Integrated short-circuit and reverse polarity protection
- Plastic body with aluminum base and stainless steel screws
- Weld field immune models available
- 1/2"-NPT conduit opening
- Measures 118 H x 40 W x 40 D mm
- Rated IP67 for water washdown
- High visibility yellow operation indicator



### Specifications

- Voltage range:
  - 10 to 60 VDC; 10 to 30 VDC (weld-field immune types) (DC models)
  - 20 to 253 VAC, 50/60 Hz (AC models)
- Load rating:
  - 200 mA (DC models)
  - 8 to 500 mA (AC models)
- Leakage current: 0.8 mA max. (AC models)
- Weld field immunity: 25,400 amps at 1 inch (100 mT)
- On-state voltage drop:
  - 3 VDC at 200 mA load (DC)
  - 12 VDC at 500 mA load (AC)
- Circuit protection: Reverse polarity; Output short-circuit
- Differential travel: 15% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

### DC Models

Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Voltage type	Model
20	Yes	NPN (NO+NC)	150 Hz	PBT	DC	E2Q2-N20E3-U
		PNP (NO+NC)			DC	E2Q2-N20F3-U
30	No	NPN (NO+NC)	100 Hz		DC	E2Q2-N30ME3-U
		PNP (NO+NC)			DC	E2Q2-N30MF3-U

### AC Models

Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Voltage type	Model
15	Yes	SCR (NO or NC)	20 Hz	PBT	AC	E2Q2-N15Y4-U
30	No					E2Q2-N30MY4-U

### Weld Field Immune Models

Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Voltage type	Model
15	Yes	PNP-NO	10 Hz	PBT	DC	E2Q2-N15F1-51
		SCR (NO or NC)	20 Hz		AC	E2Q2-N15Y4-51

# Long Distance Square Inductive Proximity Sensor

# E2Q5

Quick Link  
A229

- M12 Plug-in connection
- Integrated short circuit and reverse polarity protection
- Active face positioning:  
Y-axis 15°, X-axis 90°  
increments



## Ordering Information

Sensing distance	Connection	Active face	Output		
			Type	NO	NO + NC
20 mm shielded	Plug-in connector	Changeable	NPN	E2Q5-N20E1-M1	E2Q5-N20E3-M1
			PNP	E2Q5-N20F1-M1	E2Q5-N20F3-M1
40 mm non-shielded			NPN	E2Q5-N40ME1-M1	E2Q5-N40ME3-M1
			PNP	E2Q5-N40MF1-M1	E2Q5-N40MF3-M1

## Rating/performance

Item	Model	Shielded	Non-shielded
		E2Q5-N20□□-M1	E2Q5-N40M□3-M1
Sensing distance Sn		20 mm ± 10%	40 mm ± 10%
Standard target size, L x W x H, Fe 37		60 x 60 x 1 mm	120 x 120 x 1 mm
Setting distance		0 to 16.2 mm	0 to 32.4 mm
Switching frequency		150 Hz	
Sensing object		Ferrous metals	
Differential travel		15% max. of sensing distance Sn	
Operating voltage		10 to 30 VDC	
Current consumption		20 mA max.	
Control output	Type	E2Q5-N□□□E1-□□: NPN - NO E2Q5-N□□□E3-□□: NPN - NO + NC E2Q5-N□□□F1-□□: PNP - NO E2Q5-N□□□F3-□□: PNP - NO + NC	
	Load	200 mA max.	
	On-stage voltage drop	3 VDC max. (at 200 mA load current)	
Circuit protection		Reverse polarity, output short circuit	
Indicator		Operating indicator (yellow LED), operating voltage (green LED)	
Ambient temperature		Operating: -25° to 85°C	
Ambient humidity		35 to 95% RH	
Influence of temperature		± 10% max. of Sn at 23° in temperature range of -25° to 70°C	
Dielectric strength		1,500 VAC, 50/60 Hz for 1 min. between current carry parts and case	
Electromagnetic compatibility EMC		EN 60947-5-2	
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6	
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27	
Protection degree		IP67 IEC 60529, IP69K DIN 40050	
Connection	Connector	M12 plug, 4 pins	
Material	Case	PBT	
	Sensing face	PBT	
Approvals			

## Inductive Proximity Sensors

# E2C

Quick Link  
A233

### Miniature Sensors, Separate Amplifiers Offer Settable Sensing

- Detecting distance and differential travel can be adjusted to meet specific application requirements
- Cylindrical sensing head sizes range from 2.0 to 40 mm OD
- Sensing distances from 1.2 mm to 50 mm
- Separate amplifier allows sensor to fit in space-confined sites, providing easy access for monitoring and remote adjustments
- Adjustable differential travel to set switching trigger point available on some amplifiers
- Sensing heads rated IP67 (2 mm rated IP64)
- Sensing heads pre-wired with 3 m cable



### Specifications

- Supply voltage: 10 to 30 VDC, 20% ripple p-p
  - 100 to 240 VAC, 50/60 Hz (E2C-AK4A)
- Output rating: NPN and PNP, 100 mA
  - NPN and PNP, 200 mA
  - SPDT relay, 50 mA
- NO/NC operation selectable
- Current consumption: 12 mA max. (DC 3-wire)
- Differential travel: 1% to 6% of rated sensing distance depending on sensing head and amplifier combination
- Indicators: Operation indicator (red); Stability (green)

## Inductive Proximity Sensors

# E2S

Quick Link  
A234

### World's Smallest Square Sensor with Built-In Amplifier

- 5.5 x 5.5 mm type allows smaller, space-saving machines and devices
- High response frequency (1 kHz) for fast machine processes
- Long sensing distance: (E2S-□1, 1.6 mm) (E2S-□2, 2.5 mm)
- Front and end sensing face versions match mounting needs
- DC 2-wire and DC 3-wire models
- Pre-wired with 3 m cable
- Rated IP67 for water washdown



### Specifications

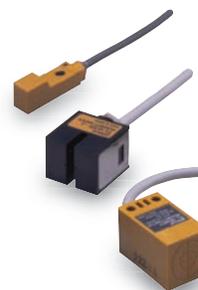
- Supply voltage: 10 to 30 VDC, 10% ripple p-p
- Output rating:
  - NO, 3 to 50 mA (DC 2-wire), 1 V residual voltage
  - NPN-NO, 100 mA (DC 3-wire), 3 V residual voltage
  - PNP-NO, 100 mA (DC-3-wire), 3 V residual voltage
- Leakage current: 0.8 mA (DC 2-wire)
- Current consumption: 13 mA max. (DC 3-wire)
- Differential travel: 10% max of rated sensing distance
- Circuit protection: Reverse polarity and surge absorber
- Dimensions:
  - 20 H x 6.4 W x 5.9 D mm
  - 23 H x 8 W x 7.4 or 8 D mm

## Inductive Proximity Sensors TL-Q/TL-G



### Miniature DC Proximity Sensor Mounts in Small Spaces

- End sensing models are ideal for miniature control installations; 2 mm and 5 mm sensing distances
- Grooved-head model provides high-speed pulse generation for revolution counting; 7.5 mm sensing distance
- Operation indicator on block models
- Two-wire models reduce wiring to control devices
- Watertight to IP67 standards; IP66 for grooved head
- Pre-wired with 2 m cable; 1 m on grooved head



### Specifications

- Supply voltage: 12 to 24 VDC, 10% ripple p-p (5% grooved head)
- Output rating: NPN-NO, 100 mA (DC 3-wire)
- Current consumption: 12 mA max. (DC 3-wire)
- Differential travel: 10% of rated sensing distance
- Indicators: Detection indicator
- Circuit protection: Surge absorber (all), reverse connection (3-wire), load short-circuit (2-wire)
- Dimensions:
  - 8 H x 9 W x 28 D mm (TL-Q2)
  - 17 H x 17. W x 32 D mm (TL-Q5)
  - 29.8 H x 21 W x 15 D mm; 10 dia. x 9.3 L mm slot

## Inductive Proximity Sensors TL-N



### Block Style Sensors

- Easy-to-install DC 2-wire sensors reduce wiring, offer longer sensing distances
- AC 2-wire, DC 3-wire and DC 2-wire models
- 5, 10 and 20 mm sensing distances (7 and 12 mm for DC 2-wire)
- DC types include mounting brackets
- Built-in amplifier with indicator
- Pre-wired with 2 m cable
- Rated IP67



### Specifications

- Supply voltage:
  - 10 to 30 VDC, 10% ripple p-p
  - 90 to 250 VAC, 50/60 Hz
- Output rating:
  - NO and NC, 3 to 100 mA (DC 2-wire)
  - NPN, NO or NC, 200 mA max. (DC 3-wire)
  - SCR, NO or NC, 10 to 200 mA (AC 2-wire)
- Current consumption: 15 mA max. (DC 3-wire)
- Leakage current: 0.8 mA max. (DC 2-wire)
- Differential travel:
  - 1% to 15% rated sensing distance; 10% (DC 2-wire)
- Indicators: Detection indicator (orange)
- Circuit protection: Surge absorber (all); output short-circuit (DC 2-wire); reverse polarity (DC 3-wire)
- Dimensions:
  - 40 H x 25 W x 25 D mm (TL-N5/TL-N7); 51.5 H mm (AC 2-wire)
  - 54 H x 30 W x 30 D (TL-N10/TL-N12)
  - 53 H x 40 W x 40 D mm (TL-N20)

# Inductive Proximity Sensors TL-T



## Space-Saving Slim Rectangular Sensor

- Ideal for timing cam and positioning table dog detection
- 2 mm shielded; 5 mm unshielded
- DC 3-wire and AC 2-wire models
- Ganged mounting possible for multiple pulse generation
- Versatile mounting: two mounting holes from the side; two from the rear of the housing
- Alternate frequency versions help avoid mutual interference
- Pre-wired with 2 m cable
- Rated IP67 for oil resistance and washdown



## Specifications

- Supply voltage: 10 to 30 VDC, 20% ripple p-p
  - 90 to 250 VAC, 50/60 Hz
- Output rating: NPN and PNP, 200 mA max. (DC 3-wire)
  - SCR, 10 to 200 (AC 2-wire)
- Current consumption: 15 mA max. (DC 3-wire)
- Leakage current: 2.5 mA (AC 2-wire)
- Differential travel: 10% of rated sensing distance
- Indicators: Operation indicator (red)
- Circuit protection: Surge absorber (all); Reverse polarity (DC 3-wire)
- Dimensions: 40 H x 12 W x 26 D mm

# Inductive Proximity Sensors TL-M



## Basic Switch Style Inductive Sensor

- Solid state switching without contact bounce of a basic switch
- Mounting pitch compatible with mechanical basic switches
- Unshielded sensor; 2 mm and 5 mm sensing distances
- DC 3-wire and AC 2-wire models
- Built-in amplifier with indicator and sensitivity adjuster
- Pre-wired with 2 m cable
- Watertight construction conforms to IP67



## Specifications

- Supply voltage:
  - 10 to 30 VDC, 20% ripple p-p
  - 90 to 250 VAC, 50/60 Hz
- Output rating:
  - NPN-NO, NPN-NC, 200 mA max. (DC 3-wire)
  - SCR-NO, 10 to 200 mA
- Current consumption: 15 mA max. (DC 3-wire)
- Leakage current: 2.5 mA max. (AC 2-wire)
- Differential travel: 10% max. of sensing distance
- Indicators: Operation indicator
- Circuit protection: Surge absorber (all); Reverse polarity (DC 3-wire)
- Dimensions:
  - 24.7 H x 49.2 W x 17.5 D mm (TL-M5)
  - 18.7 H x 49.2 W x 17.5 D mm (TL-M2)

# Inductive Proximity Sensors TL-YS



## Limit Switch Style Sensor in Economical Plastic Body

- Low-cost unshielded sensor with 15 mm sensing distance
- Front, side or end sensing area
- DC 3-wire and AC 2-wire models
- 1/2-14 NPT conduit opening; screw terminal connections
- Rated IP66



## Specifications

---

- Supply voltage:
  - 10 to 30 VDC
  - 90 to 250 VAC, 50/60 Hz
- Output rating:
  - NPN-NO, 200 mA (DC 3-wire)
  - SCR, 10 to 500 mA (AC 2-wire)
- Current consumption: 15 mA max. (DC 3-wire)
- Leakage current: 1.5 mA (110 VAC), 3.0 mA (220 VAC)
- Differential travel: 20% of rated detecting distance
- Indicators: Operation indicator
- Circuit protection: Reverse polarity (DC 3-wire)
- Dimensions: 114 H x 40 W x 40 D mm

# Capacitive Proximity Sensors

## E2K-F

Quick Link  
A322

### Thin Rectangular Plastic DC 3-Wire Sensor Fits Tight Spaces

- Non-contact detection of metallic and non-metallic targets including water, oil, glass, plastic and wood
- Detects level inside non-metallic containers
- Thin, 10 mm (0.39 inch) body is ideal for conveyor wall mounting
- Unshielded sensor has LED indicator and fixed sensitivity for simple installation
- Built-in amplifier provides NPN switching of loads to 100 mA
- Heat-resistant ABS plastic body rated IP66
- Pre-wired with 2 m (6.56 ft) length cable



### Specifications

- Voltage range: 12-24 VDC
- Load rating: 100 mA at 24 VDC max.; 1.5 V residual voltage
- Current consumption: 10 mA max. at 24 VDC
- Leakage current: 0.8 mA max. (DC 2-wire)
- Circuit protection:
  - Power source reverse polarity
  - Surge absorber
- Differential travel: 15% of maximum sensing distance
- Operating ambient: -10° to 55° C, 35% to 95% RH
- Dimensions: 20.5 H x 50 W x 10.1 D mm

### Flat-Pack Capacitive Sensors

Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Dimensions (H x W x D) mm	Model
10	No	NPN-NO	100 Hz	ABS	20.5 x 50 x 10.1	E2K-F10MC1
		NPN-NC				E2K-F10MC2
4-10		NPN-NO				E2K-F10MC1-A
		NPN-NC				E2K-F10MC2-A

# Capacitive Proximity Sensors

## E2K-X

Quick Link

A323

### Threaded, Cylindrical Sensor Detects Metallic and Non-Metallic Objects

- Non-contact detection of metallic and non-metallic targets including water, oil, glass, plastic and wood
- Detects level inside non-metallic containers
- Built-in amplifier switches loads up to 200 mA
- LED indicator and fixed sensitivity for simple installation
- 2-wire AC and 3-wire DC models available
- Pre-wired with 2 m (6.56 ft) length cable
- Built-in circuit protection
- Heat-resistant ABS plastic sensor rated IP66
- Standard sizes: M12, M18 and M30
- Normally Open (NO) and Normally Closed (NC) available
- CE (all models), UL, CSA (AC models)
- Sensor mounting and protective accessories, see Y92E



## Specifications

- Voltage range: 10-30 VDC • 90 to 250 VAC, 50/60 Hz • Load rating: 200 mA with residual voltage of 1 V max. (DC), 10-200 mA (AC) • Leakage current of 2.2 mA max. (AC) • Current consumption: 8 mA at 12 VDC; 15 mA at 24 VDC • Circuit protection: Surge absorber (all models), Reverse polarity (DC models) • Differential travel: 20% max. of sensing distance • Operating ambient: -25° to 70° C, 35% to 95% RH (M12, M18), -10° to 55° C, 35% to 95% RH (M30)

## DC 3-Wire Sensors

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	4.0	No	NPN-NO	100 Hz	ABS	40 (80)	E2K-X4ME1
			NPN-NC				E2K-X4ME2
			PNP-NO				E2K-X4MF1
			PNP-NC				E2K-X4MF2
M18	8.0	No	NPN-NO	100 Hz	ABS	40 (80)	E2K-X8ME1
			NPN-NC				E2K-X8ME2
			PNP-NO				E2K-X8MF1
			PNP-NC				E2K-X8MF2
M30	15.0	No	NPN-NO	100 Hz	ABS	50 (80)	E2K-X15ME1
			NPN-NC				E2K-X15ME2
			PNP-NO				E2K-X15MF1
			PNP-NC				E2K-X15MF2

## AC 2-Wire Sensors

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	4.0	No	SCR-NO	10 Hz	ABS	40 (80)	E2K-X4MY1
			SCR-NC				E2K-X4MY2
M18	8.0	No	SCR-NO	10 Hz	ABS	40 (80)	E2K-X8MY1
			SCR-NC				E2K-X8MY2
M30	15.0	No	SCR-NO	10 Hz	ABS	50 (80)	E2K-X15MY1
			SCR-NC				E2K-X15MY2

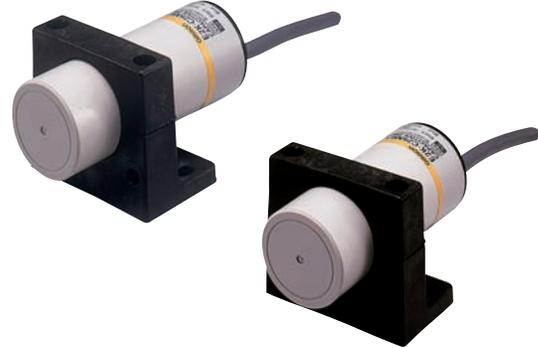
# Capacitive Proximity Sensors

## E2K-C

Quick Link  
A324

### Cylindrical Sensor Offers Adjustable Detecting Distance

- Non-contact detection of metallic and non-metallic targets including water, oil, glass, plastic and wood
- Detects level inside non-metallic containers
- Settable detection distance from 3 to 25 mm with multi-turn adjuster
- Reliably detects foamy liquids in sight glass applications
- Built-in amplifier switches up to 200 mA
- Mounting bracket included
- AC 2-wire and DC 3-wire models available
- Pre-wired with 2 m (6.56 ft) length cable
- Heat-resistant ABS plastic sensor rated IP66
- Normally Open (NO) and Normally Closed (NC) available
- CE (all models), UL, CSA (AC models)



### Specifications

- Voltage range:
  - 10-40 VDC
  - 90 to 250 VAC, 50/60 Hz
- Load rating:
  - 200 mA (DC)
  - 5-200 mA (AC) with residual voltage of 2 V max.
- Current consumption: 10 mA at 12 VDC; 16 mA at 24 VDC
  - 1 mA at 100 VAC; 2 mA at 200 VAC
- Circuit protection:
  - Surge absorber (all models)
  - Reverse polarity (DC models)
- Differential travel: 15% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

### DC 3-Wire Sensors

Size (dia.)	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
34 mm	3 to 25	No	NPN-NO	70 Hz	ABS	0 (89)	E2K-C25ME1
			NPN-NC				E2K-C25ME2
			PNP-NO				E2K-C25MF1
			PNP-NC				E2K-C25MF2

### AC 2-Wire Sensors

Size (dia.)	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
34 mm	3 to 25	No	SCR-NO	10 Hz	ABS	0 (89)	E2K-C25MY1
			SCR-NC				E2K-C25MY2

### Accessories

Barrel size	Description	Model
M30 (34 mm)	Sight Glass Mount for M30 (34 mm) Barrel Prox	Y92E-SGM34

## Capacitive Proximity Sensors

# E2J

Quick Link

A325

### Flat Capacitive Sensor with Adjustable Sensing Distance

- Thin sensor with separate amplifier ideal for robotic grippers, wafers, LCD, and PDP detection applications
- Adjustable sensitivity on separate amplifier
- Sensing area: 4 to 10 mm or 8 to 20 mm
- Flat sensing head is only 5.5 mm thick
- Robotic cable takes continuous flexing
- Dual LED indicator for power and output
- Sensors and amplifier pre-wired with 2 m cable
- Rated IP66 for sensing head; IP50 for amplifier



### Specifications

- Supply voltage: 24 VDC, ripple 10% p-p
- Output rating: NPN, 100 mA (DC 3-wire), NO/NC selectable
- Current consumption: 30 mA max.
- Response frequency: 70 Hz
- Differential travel: 15% max. of sensing distance
- Indicator: Target present
- Circuit protection: Reverse polarity, voltage surge, load short-circuit
- Dimensions: 5.5 H x 33 W x 20 L mm (E2J-W10MA sensor), 5.5 H x 43 W x 30 L mm (E2J-W20MA sensor), 29.8 H x 12 W x 65.1 L mm (E2J-JC4A amplifier)

## Capacitive Proximity Sensors

# E2K-L

Quick Link

A326

### Capacitive Liquid Level Sensor

- Mounts directly to sight glass and bypass pipes
- Sensors unaffected by liquid color
- Fits a wide range of pipe diameters: 8 to 11 mm or 12 to 26 mm
- Built-in amplifier with indicator and sensitivity adjuster
- Pre-wired with 2 m cable
- Sensing heads rated IP66



### Specifications

- Supply voltage: 10.8 to 30 VDC, 10% ripple p-p
- Output rating: NPN-NO, 100 mA (DC 3-wire)
- Current consumption: 12 mA max. (DC 3-wire)
- Repeat accuracy:  $\pm 0.2$  mm max.
- Differential travel: 0.6 to 5 mm (E2K-L13MC1), 0.3 to 3 mm (E2K-L26MC1)
- Indicators: Detection indicator (orange)
- Circuit protection: Reverse polarity, load short-circuit and voltage surge (DC 3-wire)
- Dimensions: 43 H x 24 W x 20 D mm (E2K-L13MC1), 34 H x 33 W x 20 D mm (E2K-L26MC1)

# Harsh Environment Proximity Sensors

## E2F

Quick Link  
A242

### Watertight and Chemical-Resistant Short Barrel, Plastic Body Sensors

- IP68 watertight construction allows prolonged submersion
- Polyarylate plastic housing offers good chemical resistance to acids and solvents
- Wide operating voltages: 10 to 30 VDC and 20 to 264 VAC
- Operation indicator on all models
- Short-circuit protection available on all DC and some AC models
- Standard sizes: M8, M12, M18 and M30
- Pre-wired with 2 m cable
- Normally Open (NO) and Normally Closed (NC) available
- CE all models; UL and CSA (M18, M30 AC 2-wire)
- Sensor mounting and protective accessories, see Y92E



### Specifications

- Voltage range: 10 to 30 VDC; 20 to 264 VAC, 50/60 Hz
- Load rating: 200 mA max. (DC 3-wire)
  - 5 to 100 mA max. (AC 2-wire M8, M12)
  - 5 to 300 mA max. (AC 2-wire M18, M30)
- Current consumption: 17 mA max. (DC 3-wire)
- Leakage current: 1.7 mA at 200 VAC (AC 2-wire)
- Circuit protection (DC 3-wire):
  - Reverse polarity
  - Surge absorber
  - Load short-circuit for control
- Differential travel: 10% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

### DC 3-Wire Sensors

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	NPN-NO	2 kHz	Polyarylate	20 (30)	E2F-X1R5E1
			NPN-NC				E2F-X1R5E2
			PNP-NO				E2F-X1R5F1
			PNP-NC				E2F-X1R5F2
M12	2.0	Yes	NPN-NO	1.5 kHz	Polyarylate	24 (38)	E2F-X2E1
			NPN-NC				E2F-X2E2
			PNP-NO				E2F-X2F1
			PNP-NC				E2F-X2F2
M18	5.0	Yes	NPN-NO	600 Hz	Polyarylate	29 (47)	E2F-X5E1
			NPN-NC				E2F-X5E2
			PNP-NO				E2F-X5F1
			PNP-NC				E2F-X5F2
M30	10.0	Yes	NPN-NO	400 Hz	Polyarylate	38 (57)	E2F-X10E1
			NPN-NC				E2F-X10E2
			PNP-NO				E2F-X10F1
			PNP-NC				E2F-X10F2

## AC 2-Wire Sensors

### Without Short-Circuit Protection

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M8	1.5	Yes	SCR-NO	25 Hz	Polyarylate	29 (40)	E2F-X1R5Y1
			SCR-NC				E2F-X1R5Y2
M12	2.0		SCR-NO	25 kHz		29 (43)	E2F-X2Y1
			SCR-NC				E2F-X2Y2
M18	5.0		SCR-NO	25 Hz		29 (47)	E2F-X5Y1-US
			SCR-NC				E2F-X5Y2-US
M30	10.0		SCR-NO			38 (57)	E2F-X10Y1-US
			SCR-NC				E2F-X10Y2-US

### With Short-Circuit Protection

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M18	5.0	Yes	SCR-NO	25 Hz	Polyarylate	29 (47)	E2F-X5Y1-53-US
			SCR-NC				E2F-X5Y2-53-US
M30	10.0		SCR-NO			38 (57)	E2F-X10Y1-53-US
			SCR-NC				E2F-X10Y2-53-US

# Harsh Environment Proximity Sensors

## E2FM

Quick Link  
A243

### All-Stainless Inductive Sensor Resists Abrasion and Chemicals

- One-piece 303 stainless steel face/barrel construction resists damage caused by work piece contact, scouring abrasion, and harsh chemicals
- Up to 0.8 mm thick sensing face for superior mechanical durability, wear resistance
- Operation not influenced by accumulation of aluminum or iron cutting chips and weld slag
- 20% longer sensing range (10 mm) with M30 models versus the CENELEC standard 8 mm
- Flush mountable in ferrous materials to protect sensor from side impact damage
- Thick insulation protects pig-tail lead for increased endurance in harsh environments
- IP67 enclosure rating



## Specifications

- Voltage range: 10 to 30 VDC operating range
- Output type: PNP-NO (3-wire DC)
  - NO with polarity or NO without polarity (2-wire DC)
- Load rating:
  - 200 mA at 30 VDC max.; 2 V residual voltage (3-wire DC);
  - 3 to 100 mA; 3 V residual voltage with polarity (2-wire DC)
  - 3 to 100 mA, 5 V residual voltage without polarity (2-wire DC)
- Current consumption: 10 mA max. (3-wire DC)
- Leakage current: 0.8 mA (2-wire DC)
- Circuit protection:
  - 3-wire DC: Reversed power supply polarity protection, Surge suppressor, Load short-circuit protection, and Reversed output polarity protection (except M8 size)
  - 2-wire DC: Surge suppressor, Load short-circuit protection
- Differential travel: 15% max. of sensing distance
- Operating ambient: -25° to 70° C, 35% to 95% RH

## Stainless Steel Proximity Sensors

### DC 3-Wire Sensors, Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Output type	Response frequency	Thread length (overall length) mm	Model
M8	1.5	Yes	PNP-NO	200 Hz	25 (49)	E2FM-X1R5B1
			NPN-NO			E2FM-X1R5C1
M12	2.0	Yes	PNP-NO	100 Hz	33 (53)	E2FM-X2B1
			NPN-NO			E2FM-X2C1
M18	5.0	Yes	PNP-NO	100 Hz	36 (56)	E2FM-X5B1
			NPN-NO			E2FM-X5C1
M30	10.0	Yes	PNP-NO	50 Hz	43 (63.5)	E2FM-X10B1
			NPN-NO			E2FM-X10C1

## DC 3-Wire Sensors, Built-In M12 Connector

Size	Sensing distance (mm)	Shielded	Output type	Response frequency	Thread length (overall length) mm	Model
M8	1.5	Yes	PNP-NO	200 Hz	25 (53.5)	E2FM-X1R5B1-M1
			NPN-NO			E2FM-X1R5C1-M1
M12	2.0		PNP-NO	100 Hz	33 (53)	E2FM-X2B1-M1
			NPN-NO			E2FM-X2C1-M1
M18	5.0		PNP-NO		36 (56)	E2FM-X5B1-M1
			NPN-NO			E2FM-X5C1-M1
M30	10.0	PNP-NO	50 Hz	43 (63.5)	E2FM-X10B1-M1	
		NPN-NO			E2FM-X10C1-M1	

## DC 2-Wire Sensors, Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Thread length (overall length) mm	Model	
						Standard	with Fluororesin Coating
M8	1.5	Yes	NO, polarity	200 Hz	25 (49)	E2FM-X1R5D1	E2FM-QX1R5D1
						E2FM-X1R5D1-M1GJ 0.3M	E2FM-QX1R5D1-M1GJ 0.3M
M12	2.0		NO, polarity	100 Hz	33 (53)	E2FM-X2D1	E2FM-QX2D1
						E2FM-X2D1-M1GJ 0.3M	E2FM-QX2D1-M1GJ 0.3M
			E2FM-X2D1-M1GJ-T 0.3M			E2FM-QX2D1-M1GJ-T 0.3M	
M18	5.0		NO, no polarity	36 (56)	50 Hz	E2FM-X5D1	E2FM-QX5D1
		NO, polarity	E2FM-X5D1-M1GJ 0.3M			E2FM-QX5D1-M1GJ 0.3M	
		NO, no polarity	E2FM-X5D1-M1GJ-T 0.3M			E2FM-QX5D1-M1GJ-T 0.3M	
M30	10.0	NO, polarity	43 (63.5)	50 Hz	E2FM-X10D1	E2FM-QX10D1	
		NO, no polarity			E2FM-X10D1-M1GJ 0.3M	E2FM-QX10D1-M1GJ 0.3M	
		NO, no polarity			E2FM-X10D1-M1GJ-T 0.3M	E2FM-QX10D1-M1GJ-T 0.3M	

## Connector Cordsets

Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
3-wire DC, female MicroChange™ socket	Single	22 AWG	2 m (6.56 ft)	Y96E-43SD2	Y96E-43RD2
			5 m (16.40 ft)	Y96E-43SD5	Y96E-43RD5
			10 m (32.8 ft)	Y96E-43SD10	Y96E-43RD10

MicroChange: Reg. TM Woodhead Industries

## Sensor Mounting Brackets

Description	Materials	Bracket shape	Sensor size	Model
Mounting brackets	303 stainless steel	Flat bracket 	M12	Y92E-B12FS
			M18	Y92E-B18FS
			M30	Y92E-B30FS
		Right angle bracket 	M12	Y92E-B12AS
			M18	Y92E-B18AS
			M30	Y92E-B30AS
Swiveling universal mounting bracket for flexible aiming	Glass-filled nylon	L-shape 	M12	Y92E-SUMB-12
			M18	Y92E-SUMB-18
			M30	Y92E-SUMB-30
Spring mount threaded brackets provide overtravel protection to eliminate collision damage from target and tooling	Stainless steel	Threaded cylinder 	M8	Y92E-GS08-SS
			M12	Y92E-GS12-SS
			M18	Y92E-GS18-SS
			M30	Y92E-GS30-SS
General-purpose mounting brackets	Plastic	Two-part block 	M8	Y92E-B8
			M12	Y92E-B12
			M18	Y92E-B18
			M30	Y92E-B30

# Proximity Sensors

## E2EH

Quick Link

A244

### E2E Quality Proximity Sensor Ideal for High Temperature and Washdown Applications

- Improved resistance to detergents and corrosion
- Applicable to 120° C (with DC 3-wire connection) (Heat resistance verified to 1,000 hours)
- Water resistant under high-temperature, high-pressure cleaning based on IP96K DIN 40050-9 (Pressure: 8,000 to 10,000 kPa, Water temperature: 80° C, For 30 s at all angles)
- Resists typical detergents and disinfectants used in the food industry



## Ordering Information

Size (Shielded)	Sensing distance	Output configuration	Pre-wired models	M12 Connector models
M12	3 mm	DC 2-wire, polarity	<b>E2EH-X3D1</b>	<b>E2EH-X3D1-M1G</b>
		DC 2-wire, no polarity	<b>E2EH-X3D1-T</b>	—
		DC 3-wire, PNP	<b>E2EH-X3B1</b>	<b>E2EH-X3B1-M1</b>
M18	7 mm	DC 2-wire, polarity	<b>E2EH-X7D1</b>	<b>E2EH-X7D1-M1G</b>
		DC 2-wire, no polarity	<b>E2EH-X7D1-T</b>	—
		DC 3-wire, PNP	<b>E2EH-X7B1</b>	<b>E2EH-X7B1-M1</b>
M30	12 mm	DC 2-wire, polarity	<b>E2EH-X12D1</b>	<b>E2EH-X12D1-M1G</b>
		DC 2-wire, no polarity	<b>E2EH-X12D1-T</b>	—
		DC 3-wire, PNP	<b>E2EH-X12B1</b>	<b>E2EH-X12B1-M1</b>

## Ratings and Specifications

Item				
Size		M12 shielded	M18 shielded	M30 shielded
Model		E2EH-X3□□	E2EH-X7□□	E2EH-X12□□
Sensing distance		3 mm ±10%	7 mm ±10%	12 mm ±10%
Set distance		0 to 2.4 mm	0 to 5.6 mm	0 to 9.6 mm
Differential travel		15% max. of sensing distance		
Power supply voltage (operating voltage range)		12 to 24 VDC, ripple (p-p): 10% max. (10 to 32 VDC) (24 VDC max. at 100° C or higher)		
Current consumption		10 mA max. (DC 3-wire)		
Leakage current		0.8 mA max. (DC 2-wire)		
Control output	Load current	DC 2-wire models: 3 to 100 mA (3 to 50 mA at 100 to 110° C), DC 3-wire models: 100 mA max. (50 mA max. at 100° C or higher)		
	Residual voltage	DC 2-wire models: 3 V max. (load current: 100 mA, with 2-m cable; 5 V max. for models with model numbers ending in -T) DC 3-wire models: 2 V max. (Load current: 100 mA, with 2-m cable)		
Indicators		DC 2-wire models: D1 models: Operating indicator (red) and setting indicator (yellow) DC models: Operating indicator (yellow); DC 3-wire models: Operating indicator (yellow)		
Ambient temperature (See note 2)		DC 3-wire models: 0 to 100° C (0 to 120° C for 1,000 hours), DC 2-wire models: 0 to 100° C (0 to 110° C for 1,000 hours)		
Temperature influence		±10% max. of sensing distance at 23° C in the temperature range of 0 to 70° C ±15% max. of sensing distance at 23° C in the temperature range of 70 to 100° C -15% to 20% of sensing distance at 23° C in the temperature range of 100 to 120° C		
Degree of protection		IEC IP67, DIN 40050-9 IP69K		

## Ratings and Specifications (Continued)

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Item		
Materials	Case, clamping nuts	Stainless steel (SUL316L)
	Sensing surface	PBT
	Cable	Heat-resistant PVC

- Note:**
1. Refer to the Sensor General Catalog for the influence of surrounding metal and mutual interference and use the Sensor in a suitable environment.
  2. Operation with power supplied for 1,000 h has been verified at 120° C for DC, 3-wire models and at 110° C for DC 2-wire models. Do not bend the cable repeatedly at 100° C or higher.

# Harsh Environment Proximity Sensors

## E2EQ



### Weld Spatter Resistant 2-Wire DC Sensors

- Fluoroplastic resin face prevents weld slag build-up on sensor
- Improved mounting strength with thick nickel-plated brass (NPB) barrel
- Wrench flats for easy installation
- Solid potted internal circuitry withstands shocks
- Stability and operation indicators for quick and easy setup
- Available with standard or long-range sensing
- Built-in circuit protection
- Pre-wired and pigtail connector models
- Standard sizes: M12, M18 and M30
- IP67 enclosure rating



### Specifications

- Voltage range: 12 to 24 VDC
- Load rating: 3 to 100 mA
- Residual voltage: 3.0 V max. (standard)
  - 5.0 V max. (long distance)
  - Leakage current: 0.8 mA max.
- Circuit protection:
  - Surge absorber
  - Load short-circuit for control
- Differential travel: 10% max. of sensing distance (standard)
  - 15% max. of sensing distance (long distance)
- Operating ambient: -25° to 70° C, 35% to 95% RH

### Long-Range DC 2-Wire Sensors

#### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	4.0	Yes	NO	1.0 kHz	Fluoroplastic resin coated brass	33 (38)	E2EQ-X4X1
M18	8.0			500 Hz		38 (43)	E2EQ-X8X1
M30	15.0			250 Hz		43 (48)	E2EQ-X15X1

#### M12 Connector on 300 mm Pigtail Lead

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	4.0	Yes	NO	1.0 kHz	Fluoroplastic resin coated brass	33 (38)	E2EQ-X4X1-M1J
M18	8.0			500 Hz		38 (43)	E2EQ-X8X1-M1J
M30	15.0			250 Hz		43 (48)	E2EQ-X15X1-M1J

#### M12 Connector Cordsets for “-M1J” Sensors

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC	22 AWG	2 m (6.56 ft)	XS2F-D421-DC0-A	XS2F-D422-DC0-A
		5 m (16.4 ft)	XS2F-D421-GC0-A	XS2F-D422-GC0-A

## Standard DC 2-Wire Sensors

### Pre-Wired with 2 m Cable

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	3.0	Yes	NO	1.0 kHz	Fluoroplastic resin coated brass	24 (38)	E2EQ-X3D1
M18	7.0			500 Hz		29 (47)	E2EQ-X7D1
M30	10.0			400 Hz		38 (56)	E2EQ-X10D1

### M12 Connector on 300 mm Pigtail Lead

For Micro-Change® use OMRON Y96E-44□D□ connector cordsets.

Size	Sensing distance (mm)	Shielded	Circuit type	Response frequency	Body material	Thread length (overall length) mm	Model
M12	3.0	Yes	NO	1.0 kHz	Fluoroplastic resin coated brass	24 (38)	E2EQ-X3D1-M1GJ
M18	7.0			500 Hz		29 (47)	E2EQ-X7D1-M1GJ
M30	10.0			400 Hz		38 (56)	E2EQ-X10D1-M1GJ

### M12 Micro-Change® Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole DC Micro-Change®	22 AWG	2 m (6.56 ft)	Y96E-44SD2	Y96E-44RD2
		5 m (16.4 ft)	Y96E-44SD5	Y96E-44RD5
		10 m (32.8 ft)	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

## Harsh Environment Proximity Sensors

# E2KQ-X

Quick Link

A327

### Chemical Resistant Capacitive Sensor

- Complete fluoroplastic resin coating for superior chemical and oil resistance
- Detect ferrous and non-ferrous metals as well as other materials
- Adjustable sensitivity from 6 to 10 mm
- Built-in indicator located on cable connection face
- Pre-wired with 2 meters of 3-conductor cable
- Rated IP66



CE

### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Output rating: NPN-NO or NPN-NC, 100 mA (DC 3-wire)
- Current consumption: 15 mA max.
- Response frequency: 35 Hz
- Differential travel: 4% to 20% max. of sensing distance
- Indicator: Target present
- Circuit protection: Reverse polarity, voltage surge
- Dimensions: M18 x 41.8 mm thread/61.8 mm overall length

## Harsh Environment Proximity Sensors

# E2FQ

Quick Link

A246

### Inductive Sensor Resists Welding Spatter

- Chemical and weld spatter resistant housing and mounting nuts made of fluoroplastic resin
- Shielded for flush mounting in metal
- Standard sizes: M12, M18, M30
- DC 2-wire, DC 3-wire and AC 2-wire models
- Sensing distance:
  - 2 mm (M12)
  - 5 mm (M18)
  - 10 mm (M30)
- Pre-wired with 2 m cable
- Sensing heads rated IP67



### Specifications

- Output rating: Control and diagnostic outputs
  - NPN-NO, 200 mA (DC 3-wire)
  - 5 to 100 mA (DC 2-wire)
  - 5 to 300 mA (AC 2-wire)
- Current consumption: 17 mA max. (DC 3-wire)
- Leakage current: 0.8 mA (DC 2-wire), 1.7 mA (AC 2-wire)
- Response frequency: 100 Hz (normal) or 40 Hz (fine-tuned)
- Differential travel:
  - 10% max. of sensing distance
  - 20% max. of sensing distance (DC 2-wire)
- Indicators: Target present
- Circuit protection: Reverse polarity, load short-circuit and voltage surge (DC 3-wire)
- Dimensions:
  - M12 x 29 mm thread/38 mm overall
  - M18 x 29 mm thread/47 mm overall
  - M30 x 38 mm thread/57 mm overall

# Harsh Environment Proximity Sensors

## E2C-H



### Heat-Resistant Inductive Sensor

- Resists temperatures from -10° and 200° C
- Suitable for checking the contact between mold halves and sensing solder bath levels
- Shielded for flush mounting in metal
- Sensing distance:
  - M8: 1.5 mm
  - M12: 2 mm
  - M18: 5 mm
- Separate track-mount amplifier with sensing distance adjuster
- Sensing heads pre-wired with 3 m cable, amplifier with 2 m cable
- Rated IP60 sensing head; IP20 amplifier



### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Current consumption: 45 mA max.
- Indicator: Target present
- Output rating: NPN 100 mA; NO/NC operation selectable
- Distance adjustment: 20% to 100% of sensing distance
- Dimensions: M8 x 15 mm thread/18 mm overall length
  - M12 x 15 mm thread/18 mm overall length
  - M18 x 27 mm thread/30 mm overall length
- Amplifier: 30 H x 14 W x 60 D mm

## Special Application Proximity Sensors

# E2EV

Quick Link  
A248

### Inductive Sensor Detects All Metals at Equal Distance

- One sensor detects all kinds of metal at equal distance
- Detect aluminum up to 3x conventional sensing distance
- Shielded for flush mounting in metal
- Sensing distance: 2 mm (M12); 5 mm (M18); 10 mm (M30)
- Pre-wired with 2 meters of 3-conductor cable
- Rated IP67, resists water splash and oil contamination



### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Output rating: NPN-NO or NPN-NC, 100 mA (DC 3-wire)
- Current consumption: 15 mA max.
- Response frequency: 150 Hz (M12), 70 Hz (M18, M30)
- Differential travel: 10% max. of sensing distance
- Indicator: Target present
- Circuit protection: Reverse polarity, load short-circuit and voltage surge
- Dimensions: M12 x 47 mm thread/60 mm overall length, M18 or M30 x 42 mm thread/60 mm overall length

## Special Application Proximity Sensors

# E2CY

Quick Link  
A249

### Inductive Sensor Detects Aluminum in Tight Spaces

- Compact sensing heads and separate amplifier for mounting flexibility
- Detect differences between object types, object position, distance within a range
- Monitor operation with excess gain level bar graph indicator and diagnostic output
- One-touch teaching for sensitivity adjustment
- Shielded for flush mounting in metal
- Sensing distance by sensing head:
  - 1.5 mm (M5 and unthreaded 5.4 mm dia.)
  - 2 mm (unthreaded 8 mm dia.)
  - 3 mm (flat)
- Pre-wired sensing heads and amplifier each with 2 m cable
- Sensing heads rated IP67



### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Output rating: Control and diagnostic outputs; NPN, 100 mA; switchable NO/NC operation
- Current consumption: 40 mA max.
- Response frequency: 100 Hz (normal) or 40 Hz (fine-tuned)
- Differential travel: 20% max. of sensing distance
- Indicators: Target present; excess gain level; fine-tuning
- Circuit protection: Reverse polarity, load short-circuit and voltage surge
- Dimensions: Cylindrical heads: M5 or 5.4 mm dia. or 8 mm dia. x 18 mm, Flat head: 4.5 H x 12 W x 25 D mm, Amplifier: 32.5 H x 10 W x 70 D mm

## Special Application Proximity Sensors

# E2EY

Quick Link  
A252

### Inductive Sensor for Aluminum and Non-Ferrous Metals

- Detects non-magnetic ones such as aluminum, copper and brass and ignores ferrous materials
- Shielded for flush mounting in metal
- Sensing distance: 4 mm (M18) and 8 mm (M30)
- Pre-wired with 2 m cable
- Rated IP67, resists water splash and oil contamination



### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Output rating: NPN-NO, 100 mA (DC 3-wire)
- Current consumption: 20 mA max.
- Response frequency: 70 Hz
- Differential travel: 20% max. of sensing distance
- Indicator: Target present
- Circuit protection: Reverse polarity, load short-circuit and voltage surge
- Dimensions: M18 or M30; 42 mm thread/60 mm overall length

## Special Application Proximity Sensors

# E2EZ

Quick Link  
A253

### Cutting Chip Resistant Inductive Sensor

- Detects objects without influence of accumulated aluminum and cast iron cutting chips
- Ideal for machine tool applications
- Sensing distance: 4 mm (M18) and 8 mm (M30)
- Shielded for flush mounting in metal
- DC 2-wire, DC 3-wire and AC 2-wire models
- Pre-wired with 2 m cable or pigtail M12 connector
- Rated IP67, resists water splash and oil contamination



### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Differential travel: 20% max. of sensing distance
- Indicator: Target present
- Circuit protection: Reverse polarity, load short-circuit and voltage surge
- Output rating:
  - NPN-NO output 100 mA (DC 3-wire)
  - 3 to 100 mA (DC 2-wire)
  - 10 to 200 mA (AC 2-wire)
- Differential distance: 20% max. of sensing distance
- Dimensions: M18 or M30; 60 mm thread/80 mm overall length

## Special Application Proximity Sensors

# TL-L100-7



### Long-Distance, Large Target Inductive Sensor

- Detect large metal objects at a distance up to 100 mm  $\pm$ 10%
- Diecast aluminum base with epoxy sensing face
- 100 ms response time
- Pre-wired with 1 m cable
- Rated IP66



### Specifications

- Supply voltage: 10 to 30 VDC, ripple 10% p-p
- Indicator: Target present
- Circuit protection: Reverse polarity, load short-circuit and voltage surge
- Output rating: NPN-NO output, 200 mA (DC 3-wire)
- Current consumption: 40 mA
- Differential distance: 15% max. of sensing distance
- Dimensions: 98 mm dia. face; 105 H x 106 W x 127 D mm base

## Special Application Proximity Sensors

# TL-LP/TL-LY



### Pancake Style Long Range Inductive Sensor

- Detect metal objects at 50 mm distance
- Rugged diecast aluminum case with polyester sensing face
- DC 3-wire and AC 2-wire models
- Response time of 15 ms (DC), 25 ms (AC)
- Pre-wired with 1 m cable
- Rated IP67 for water and oil resistance



### Specifications

- Supply voltage:
  - 10 to 30 VDC, ripple 10% p-p (TL-LP)
  - 90 to 250 VAC, 50/60 Hz (TL-LY)
- Indicator: Target present
- Output rating: NPN-NO output, 200 mA (DC 3-wire)
  - SCR-NO output, 10 to 200 mA (AC 2-wire)
- Current consumption: 10 mA (no load)
- Differential distance: 10% max. of sensing distance
- Dimensions: 85 mm dia. face; 76 H x 106 W x 127 D mm base

## Special Application Proximity Sensors

# E2R

Quick Link  
A257

### Compact, Low Profile Inductive Sensor

- Thin unshielded proximity sensor mounts on conveyor rails, offers plug-in connection
- Long sensing distance: 5 mm
- Fast response time of 0.2 milliseconds (5 kHz)
- NPN open collector output switches 100 mA at 24 VDC
- Enclosure rating: IEC144 IP50 for clean manufacturing
- Easy to mount package (6 mm thick)
- Connector for easy installation and servicing; use E22-01 connector with 1 m cable
- Compact size: 41.3 H x 28 W x 6 D mm



## Special Application Proximity Sensors

# F92A

Quick Link  
A258

### Inductive Signal Coupler

- Coupler transmits mechanical switch closure signals to inductive proximity sensors
- Ideal for reliable detection of revolving, moving objects
- 5 mm transmission distance
- Works with any M18 size inductive proximity sensor, such as E2E-X5 or E2F-X5
- Coupler operates without power supply
- Provides positive signal transmission even through non-metallic walls of glass or resin
- Water, oil and dust resistant to IP67 standards
- Pre-wired with 2 m of cable
- Measures 24 dia. x 46.5 L mm



CE

# Proximity Sensor Accessories

## Y92E

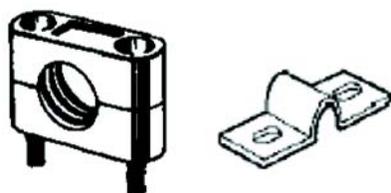


### Mounting and Protection Accessories for Proximity Sensors

- General purpose plastic mounting brackets
- Spring mount threaded cylindrical housings in anodized aluminum and stainless steel to reduce sensor damage due to collisions
- Spring mount blocks in anodized aluminum or stainless steel
- Fast mount cylindrical tubes in nickel-plated brass and Fluoroplastic resin-coated versions simplifies mounting and eliminates sensor positioning
- Fluoroplastic resin sensor caps and ceramic face discs protect sensor face from heat and abrasion
- Threaded metal block mounts
- Flat and right angle brackets in CRS or stainless steel fixed or adjustable versions
- Sight glass mounts
- Sensor wells
- Weld jacket for cable and cordset protection



### General Purpose Plastic Mounting Brackets



Description	Applicable sensor series	Model
Fits 3.5 mm dia. unthreaded sensor	E2C-C (Stainless bracket)	Y92E-F3R5
Fits M5 size sensors		Y92E-F5R4
Fits M8 size sensors	E2E, E2A, E2F, E2C-T, E2C, E2C-H, E3HT	Y92E-B8
Fits M12 size sensors	E2E, E2E2, E2A, E2F, E2C, E2EC, E2K-X, E2FQ, E2EQ, E2C-H, E2EV	Y92E-B12
Fits M18 size sensors	E2E, E2E2, E2A, E2F, E2C, E2K-X, E2KQ, E2FQ, E2EQ, E2ES, E2C-H, E2EV, E2EY, E2EZ, F92A, E3F2	Y92E-B18
Fits M30 size sensors	E2E, E2E2, E2A, E2F, E2C, E2K-X, E2FQ, E2EQ, E2ES, E2EV, E2EY, E2EZ, B7AP	Y92E-B30

### Swiveling Universal Mounting Bracket



Description	Thread	Model
Fits M12 size sensors	M12 x 1	Y92E-SUMB-12
Fits M18 size sensors	M18 x 1	Y92E-SUMB-18
Fits M30 size sensors	M30 x 1.5	Y92E-SUMB-30

Achieve easy, flexible aiming and secure mounting with these durable, glass-filled nylon brackets.

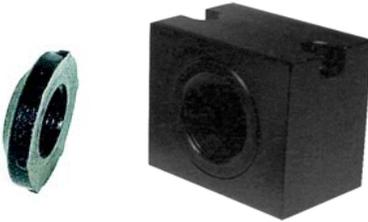
## Spring Mount Threaded Cylindrical Housings



- Acts as a shock absorber
- Reduces sensor damage due to collisions
- Anodized aluminum housing shown; stainless steel protective housings available
- Housings offer over-travel protection, resistance to abrasion, quicker installation and spare parts reduction
- Plastic end caps deflect targets approaching the sensor laterally; caps are included

Barrel size	Description	Model
M8	Spring mount for M8 shielded anodized aluminum	Y92E-GS08
	Spring mount for M8 unshielded anodized aluminum	Y92E-GS08N
M12	Spring mount for M12 shielded anodized aluminum	Y92E-GS12
	Spring mount for M12 unshielded anodized aluminum	Y92E-GS12N
M18	Spring mount for M18 shielded anodized aluminum	Y92E-GS18
	Spring mount for M18 unshielded anodized aluminum	Y92E-GS18N
M30	Spring mount for M30 shielded anodized aluminum	Y92E-GS30
	Spring mount for M30 unshielded anodized aluminum	Y92E-GS30N

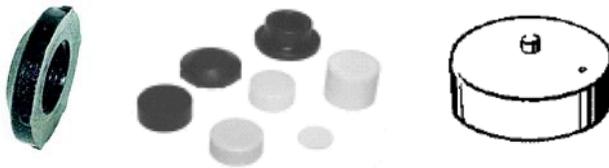
## Spring Mount Blocks



- Rugged, anodized aluminum
- Plastic, beveled end caps are included
- Blocks for shielded sensors shown; blocks for unshielded sensors available

Barrel size	Description	Model
M8	Spring mount block for M8 shielded anodized aluminum	Y92E-GSB08
M12	Spring Mount block for M12 shielded anodized aluminum	Y92E-GSB12
M18	Spring mount block for M18 shielded anodized aluminum	Y92E-GSB18
M30	Spring mount block for M30 shielded anodized aluminum	Y92E-GSB30

## Standard Sensor Caps for Spring Mounts



- Protect sensor face from heat and abrasion
- Threaded caps in glass-filled Nylon, Fluoroplastic, Polyallylate; Ceramic caps available
- Unthreaded Silicone resin caps shown
- Caps for shielded sensors shown; caps for unshielded sensors available

Barrel size	Description	Model
M8	Glass-filled nylon cap for M8 shielded prox	Y92E-ES08
M12	Glass-filled nylon cap for M12 shielded prox	Y92E-ES12
	Fluoroplastic resin sensor cap for M12 shielded prox	Y92E-SC12-T
	Polyallylate resin sensor cap for M12 shielded prox	Y92E-E12
	Silicone rubber protective cover for M12 shielded prox	Y92E-E12-2
M18	Glass-filled nylon cap for M18 shielded prox	Y92E-ES18
	Fluoroplastic resin sensor cap for M18 shielded prox	Y92E-SC18-T
	Polyallylate resin sensor cap for M18 shielded prox	Y92E-E18
	Silicone rubber protective cover for M18 shielded prox	Y92E-E18-2
M30	Glass-filled nylon cap for M30 shielded prox	Y92E-ES30
	Fluoroplastic resin sensor cap for M30 shielded prox	Y92E-SC30-T
	Polyallylate resin sensor cap for M30 shielded prox	Y92E-E30
	Silicone rubber protective cover for M30 shielded prox	Y92E-E30-2

## Fast Mount Cylindrical Tubes



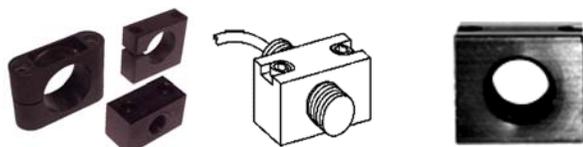
- Simplifies mounting and reduces installation time
- Maintains sensing gap to eliminates sensor positioning
- Caps are sold separately
- Fast Mount Tubes are not spring loaded
- Nickel-plated brass models shown; Fluoroplastic resin-coated versions available

Barrel size	Description	Model
M8 Short	Fast mount tube for M8 short barrel prox NPB	Y92E-G08S
M8 Long	Fast mount tube for M8 long barrel prox NPB	Y92E-G08L
M12 Short	Fast mount tube for M12 short barrel prox NPB	Y92E-G12S
M12 Long	Fast mount tube for M12 long barrel prox NPB	Y92E-G12L
M18 Short	Fast mount tube for M18 short barrel prox NPB	Y92E-G18S
M18 Long	Fast mount tube for M18 long barrel prox NPB	Y92E-G18L
M30 Short	Fast mount tube for M30 short barrel prox NPB	Y92E-G30S
M30 Long	Fast mount tube for M30 long barrel prox NPB	Y92E-G30L

## Sensor Caps for Fast-Mount Tubes

Barrel size	Description	Model
M8	Fluoroplastic sensor cap for M8 shielded prox	Y92E-EG08-T
M12	Fluoroplastic sensor cap for M12 shielded prox	Y92E-EG12-T
M18	Fluoroplastic sensor cap for M18 shielded prox	Y92E-EG18-T
M30	Fluoroplastic sensor cap for M30 shielded prox	Y92E-EG30-T

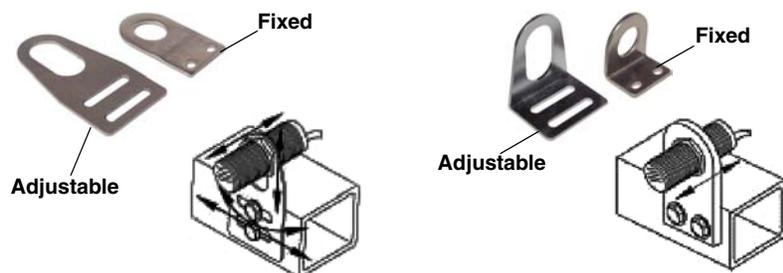
## Threaded Metal Block Mounts\*



\* Rugged anodized aluminum

Barrel size	Description	Model
M8	Block mount threaded metal for M8 barrel prox	Y92E-B08MT
M12	Block mount threaded metal for M12 barrel prox	Y92E-B12MT
M18	Block mount threaded metal for M18 barrel prox	Y92E-B18MT
M30	Block mount threaded metal for M30 barrel prox	Y92E-B30MT

## Flat and Right Angle Brackets



- Zinc-plated cold rolled steel (CRS) or 303 stainless steel
- Fixed and adjustable (slotted) versions

Barrel size	Description	Model
M12	Flat bracket fixed for M12 prox 303 stainless steel	Y92E-B12FS
M18	Flat bracket fixed for M18 prox 303 stainless steel	Y92E-B18FS
M30	Flat bracket fixed for M30 prox 303 stainless steel	Y92E-B30FS
M8	Flat bracket adjustable for M8 prox zinc-plated CRS	Y92E-B08FRAS
M12	Flat bracket adjustable for M12 prox zinc-plated CRS	Y92E-B12FRAS
M18	Flat bracket adjustable for M18 prox zinc-plated CRS	Y92E-B18FRAS
M30	Flat bracket adjustable for M30 prox zinc-plated CRS	Y92E-B30FRAS
M12	Right angle bracket fixed for M12 prox 303 SS	Y92E-B12AS
M18	Right angle bracket fixed for M18 prox 303 SS	Y92E-B18AS
M30	Right angle bracket fixed for M30 prox 303 SS	Y92E-B30AS
M8	Right angle bracket adjustable for M8 prox zinc-plated CRS	Y92E-B08RAS
M12	Right angle bracket adjustable for M12 prox zinc-plated CRS	Y92E-B12RAS
M18	Right angle bracket adjustable for M18 prox zinc-plated CRS	Y92E-B18RAS
M30	Right angle bracket adjustable for M30 prox zinc-plated CRS	Y92E-B30RAS

## Sight Glass Mounts Adapt Cylindrical Proximity Sensors for Level Detection



- Instantly converts tubular sensors for “out of tank” level detection
- Mount sensors to 9.5 mm (3/8”) through 44 mm (1-3/4”) OD glass and plastic pipes
- Use in pairs (high-low) to detect absence or presence of liquids to activate pumps and drains in process control applications
- Simplifies sensor change-out/replacement
- Delrin® acetal resin construction with all stainless steel fasteners provides corrosion resistance

**Note:** Delrin® is a registered trademark of E.I. duPont de Nemours and Company.

Barrel size	Description	Model
M12	Sight glass mount for M12 barrel prox	Y92E-SGM12
M18	Sight glass mount for M18 barrel prox	Y92E-SGM18
M30	Sight glass mount for M30 barrel prox	Y92E-SGM30
M30 (34 mm)	Sight glass mount for M30 (34 mm) barrel prox	Y92E-SGM34

## Sensor Wells Provide Through-Wall Installation in Tanks and Vessels



SAE Thread Model



Flange Mount Model



NPT Model

- Isolates the sensor from the system fluids/materials for increased reliability
- Keeps systems sealed prior to sensor installation and during sensor removal
- Attachment options include Flange Mount, SAE & NPT threads
- Available in Delrin®, HDPE and Fluoroplastic models
- Simplifies sensor change-out process
- Maximum operating temperature:
  - SWNPT Delrin: 180° F
  - SWNPT Fluoroplastic resin: 350° F
  - SWSAE UHMW material: 150° F

Sensor well type	Description	Model
Flange mount	Sensor well flange mount M30 proximity	Y92E-SWFM30
	Sensor well flange mount M30 (34mm) proximity	Y92E-SWFM34
NPT thread	Sensor well NPT thread Delrin M18	Y92E-SWNPT18-D
	Sensor well NPT thread Fluoroplastic M18	Y92E-SWNPT18-T
	Sensor well NPT thread Delrin M30	Y92E-SWNPT30-D
	Sensor well NPT thread Fluoroplastic M30	Y92E-SWNPT30-T
	Sensor well NPT thread Delrin 34 mm	Y92E-SWNPT34-D
	Sensor well NPT thread Fluoroplastic 34 mm	Y92E-SWNPT34-T
SAE thread	Sensor well SAE thread Delrin M18	Y92E-SWSAE18-D

## Weld Jackets Protect Sensor Cable and Cordset



- Slips over the cable and the connector portion
- Protects against spatter in harsh welding environments
- 3-foot and 50-foot lengths available

Jacket diameter	Description	Model
1/2"	1/2" Weld jacket 36 inch length	Y92E-WJ12X36IN
3/4"	3/4" Weld jacket 36 inch length	Y92E-WJ34X36IN

## Sensor Checker



- Pocket-sized, full-function Sensor Checker reduces troubleshooting time
- Confirms operation of inductive, photoelectric, capacitive and ultrasonic sensors
- Troubleshoots and/or demonstrates functions of DC sensors
- Easily confirm sensor operation and PNP vs. NPN output type
- Push-type terminals make wire connections simple and quick
- Wiring instructions printed on the non-metallic case
- Includes dual operation indicators LED and buzzer
- Uses two 9V batteries (supplied)

Description	Model
Sensor checker includes two 9V batteries	Y92E-SC1

# Connector Cordsets Y96E-M12



## AC Cordsets with M12 Micro-Change® Connectors

- Quick-disconnect AC cordsets allow easy installation and replacement of AC sensors
- Female 3-pole dual keyway socket
- Oil-resistant, PVC jacketed cable with internal metal sheath protects conductors against cuts and abrasions
- Straight and right-angle connector cordsets available
- Rated IP67
- UL recognized, CSA certified



Micro-Change®: Registered trademark of Woodhead Industries

Sold only in USA

Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
3-wire AC, female Micro-Change® socket	Dual	22 AWG	6 ft.	Y96E-33SA6	Y96E-33RA6
			12 ft.	Y96E-33SA12	Y96E-33RA12
			20 ft.	Y96E-33SA20	Y96E-33RA20

## Specifications

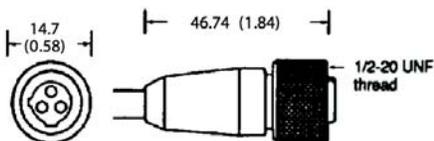
<b>Connector</b>	Molded head	PVC
	Head insert	Nylon with neoprene gasket
	Contacts	Gold/palladium/nickel-plated brass
	Coupling nut	Zinc diecast w/ epoxy coat
<b>Cable</b>	Jacket	Yellow PVC with metallic braid
	Conductors	22 AWG, PVC insulation
	Rated current	3 amps
	Rated voltage	300 V
	Temperature rating	105° C

## Dimensions (Units: mm)

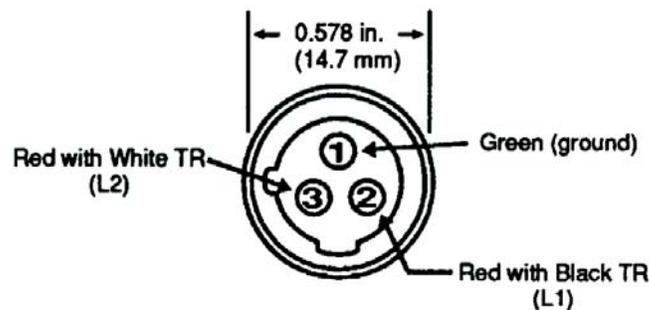
### Straight Connector Cordsets

Y96E-33SA□

Gold/palladium/nickel-plated brass contacts



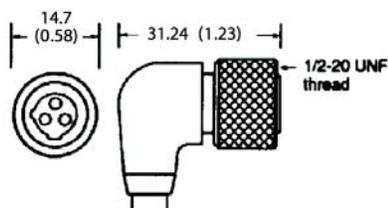
Face View Female Connector



### Right Angle Connector Cordsets

Y96E-33RA□

Gold/palladium/nickel-plated brass contacts



## DC Cordsets with M12 Micro-Change® Connectors

- Quick-disconnect DC cordsets allow easy installation and replacement of DC sensors
- Female 3-pole, 4-pole and 5-pole single keyway models
- Oil-resistant, PVC jacketed cable
- Straight and right-angle connector cordsets available
- Rated IP67
- UL recognized, CSA certified



Micro-Change®: Registered trademark of Woodhead Industries

Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
3-wire DC, female Micro-Change® socket	Single	22 AWG	2 m (6.56 ft)	Y96E-43SD2	Y96E-43RD2
			5 m (16.40 ft)	Y96E-43SD5	Y96E-43RD5
			10 m (32.8 ft)	Y96E-43SD10	Y96E-43RD10
4-wire DC, female Micro-Change® socket	Single	22 AWG	2 m (6.56 ft)	Y96E-44SD2	Y96E-44RD2
			5 m (16.40 ft)	Y96E-44SD5	Y96E-44RD5
			10 m (32.8 ft)	Y96E-44SD10	Y96E-44RD10
5-wire DC, female Micro-Change® socket	Single	22 AWG	2 m (6.56 ft)	Y96E-45SD2	Y96E-45RD2
			5 m (16.40 ft)	Y96E-45SD5	Y96E-45RD5

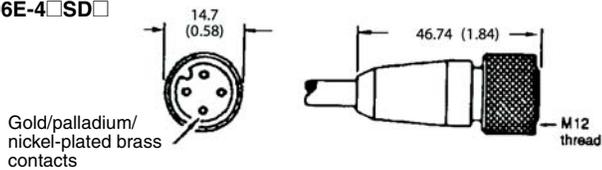
## Specifications

<b>Connector</b>	Molded head	PVC
	Head insert	Nylon
	Contacts	Gold/palladium/nickel-plated brass
	Coupling nut	Zinc diecast w/ epoxy coat
<b>Cable</b>	Jacket	Yellow PVC
	Conductors	22 AWG, PVC insulation
	Rated current	3 amps
	Rated voltage	300 V
	Temperature rating	90° C

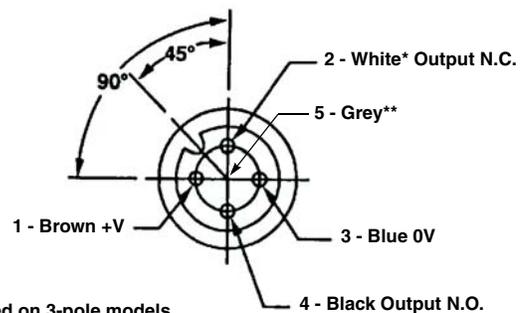
## Dimensions (Units: mm)

### Straight Connector Cordsets

Y96E-4□SD□

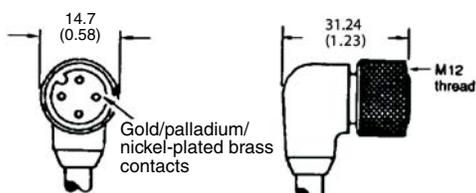


### Face View Female Connector



### Right Angle Connector Cordsets

Y96E-4□RD□



\*Note used on 3-pole models  
\*\*Not used on 4-pole models

Connector Cordsets

# Y96E-M12□-OCI



## Single-Ended, 5 m Cables, M12 Single Keyway (DC) Connector

- M12, female 4-Pin – 4 wire single keyway design
- 4-wire cables allow for use with normally open and normally closed proximity sensors and most photoelectric sensors
- PUR outside jacket, 22 AWG conductor, PVC insulation
- Straight or right angle connector
- CSA listed



*Sold only in Canada.*

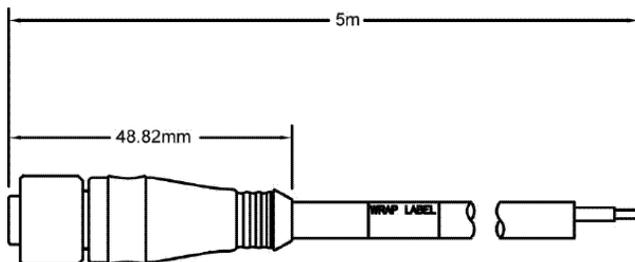
Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
4-wire DC, female socket	Single	22 AWG	5 m (16.40 ft)	Y96E-M12SK-44S5-OCI	Y96E-M12SK-44R5-OCI

## Specifications

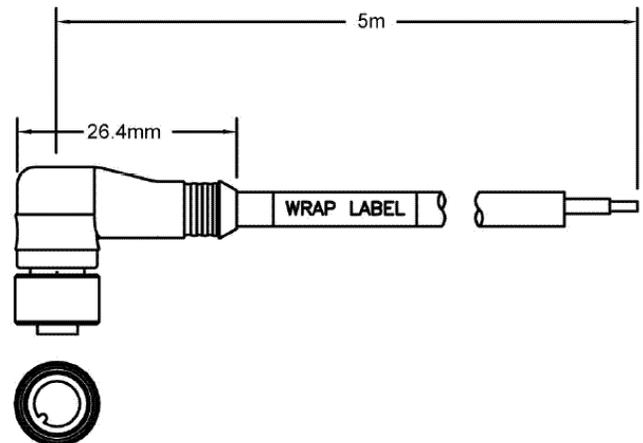
<b>Connector</b>	Molded head	Gray PVC
	Head insert	Nylon
	Contacts	Brass w/ gold flash
	Coupling nut	Zinc diecast w/ black epoxy coat
<b>Cable</b>	Jacket	Black PUR
	Conductors	22 AWG, PVC insulation
	Rated voltage	300 V
	Temperature rating	80° C

## Dimensions

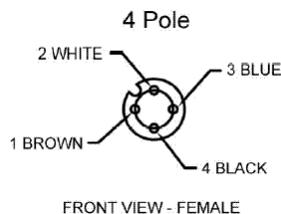
**Straight Connector Cordset**



**Right Angle Connector Cordset**



**Pin out**



# Connector Cordsets XS2



## M12 Watertight Single-Ended and Extension Cordsets

- Surpasses IP67 requirements and ensures 94V-0 fire retardant rating
- Quick disconnect simplifies maintenance and reduces down time
- Extension cable has one female socket, one male plug
- Single-end I/O connector has a female socket with attached cable
- Make custom length cordsets using connector assemblies



## Specifications

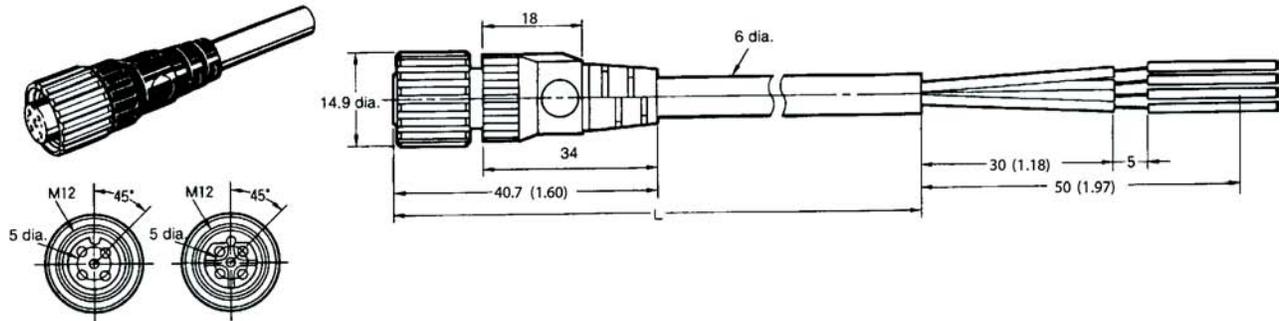
<b>Connector</b>	Molded head	Black PVC (XS2W/XS2F) Black PBT (XS2C/XS2G)
	Head insert	Gray PBT resin (UL94V-0)
	Contacts	Nickel/brass w/ gold plating
	Coupling nut	Nickel-plated brass
<b>Cable</b>	Jacket	PVC
	Conductors	22 AWG
	Rated current	3 A
	Rated voltage	48 VDC, 250 VAC (XS2W/XS2F) 125 VDC, 250 VAC (XS2C/XS2G)
	Temperature rating	-25° to 70° C

## Single-Ended Cordsets, Single Key Molded M12 Sensor Connector

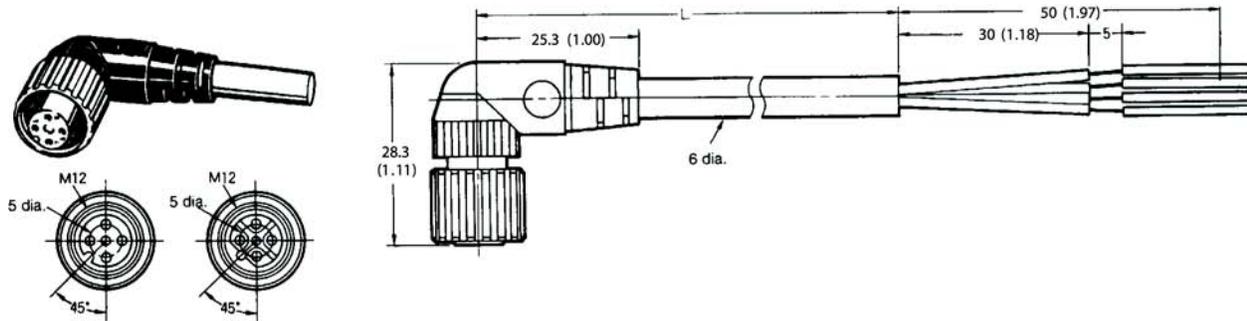
Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
3-wire DC, female socket	Single	22 AWG	2 m (6.56 ft)	XS2F-D421-DC0-A	XS2F-D422-DC0-A
			5 m (16.40 ft)	XS2F-D421-GC0-A	XS2F-D422-GC0-A
4-wire DC, female socket	Single	22 AWG	2 m (6.56 ft)	XS2F-D421-D80-A	XS2F-D422-D80-A
			5 m (16.40 ft)	XS2F-D421-G80-A	XS2F-D422-G80-A
4-wire AC, female socket	Single, reverse	22 AWG	2 m (6.56 ft)	XS2F-A421-D80-A	—
			5 m (16.40 ft)	XS2F-A421-G80-A	—

## Dimensions

### XS2F Straight Connectors



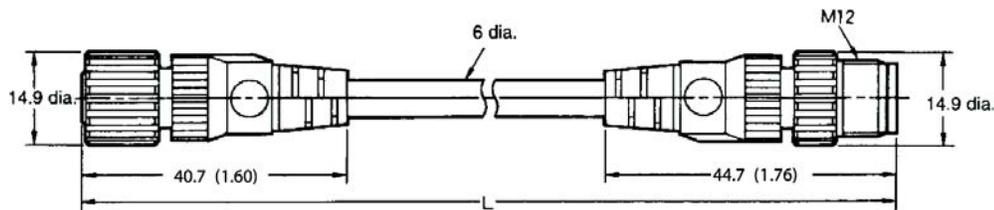
### XS2F Right Angle Connectors



## Extension Cordsets, Two Single Key Molded M12 Sensor Connectors

Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
4-wire DC female socket and male plug	Single	22 AWG	2 m (6.56 ft)	XS2W-D421-D81-A	—
			5 m (16.40 ft)	XS2W-D421-G81-A	

## Dimensions



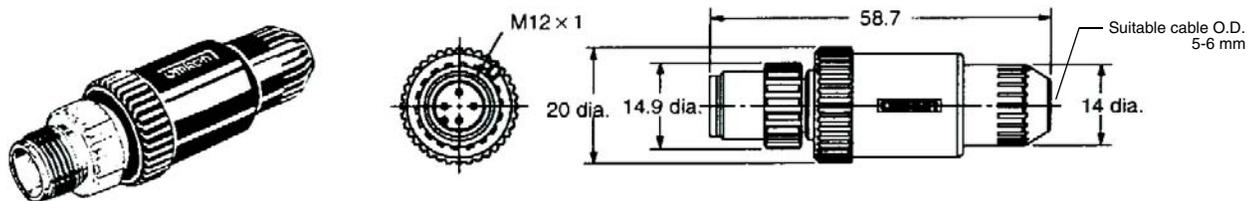
Model	L
XS2W-D421-D81-A	2 m
XS2W-D421-G81-A	5 m

## Plug and Socket Connector Assemblies for Custom Length Cordsets

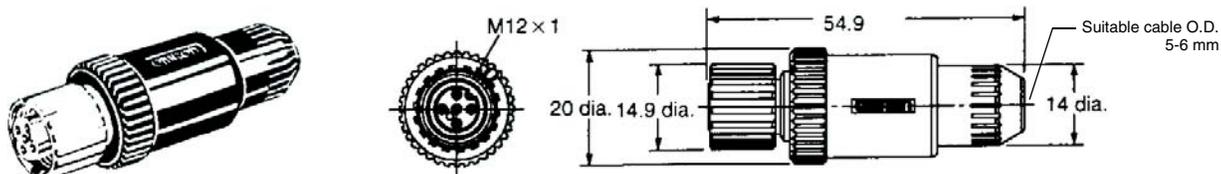
Description				Model
Connector type	Keyway	Cable size	Length	Straight connector
M12 male plug	Single	3 to 6 mm dia.	58.7 mm	XS2G-D4S1
M12 female socket			54.9 mm	XS2C-D4S1

### Dimensions

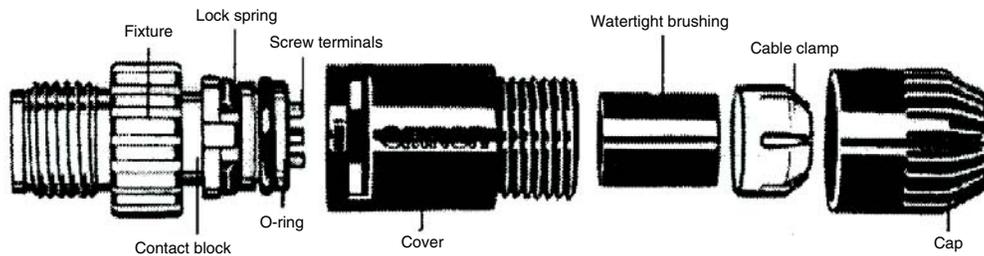
XS2G-D4S1  
Straight Connector Plug



XS2C-D4S1  
Straight Connector Socket



### Construction



# Connector Cordsets XS3



## M8 Single-Ended and Extension Cordsets Reduce Maintenance

- Surpasses IP67 requirements and ensures 94V-0 fire retardant rating
- Quick disconnect simplifies maintenance and reduces downtime
- Extension cable has one female socket, one male plug
- Single-end I/O connector has a female socket with attached cable
- Robotic cable and vibration-proof connectors withstand repeated flexing



## Specifications

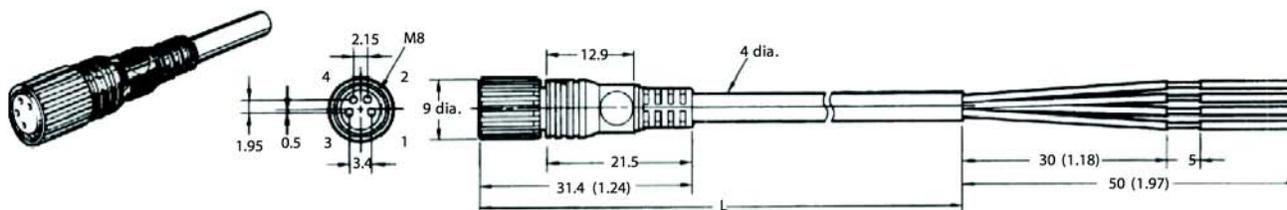
<b>Connector</b>	Molded head	Black thermoplastic elastomer
	Head insert	Gray PBT resin (UL94V-0)
	Contacts	Nickel/brass w/ gold plating
	Coupling nut	Nickel-plated brass
<b>Cable</b>	Jacket	PVC
	Conductors	22 AWG
	Rated current	1 A
	Rated voltage	125 VDC
	Temperature rating	-25° to 70° C

## Single-Ended Cordsets, Single Key Molded M8 Sensor Connector

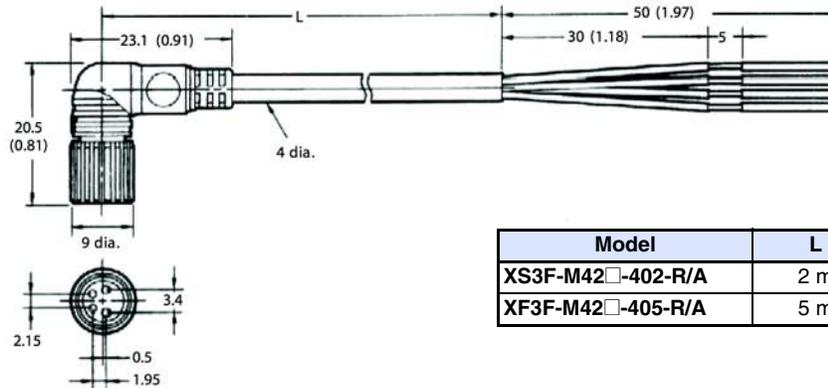
Description					Model	
Connector type	Keyway	Cable size	Cable type	Length	Straight connector	Right angle connector
4-wire DC, female socket	Single	22 AWG	Standard	2 m (6.56 ft)	XS3F-M421-402-A	XS3F-M422-402-A
				5 m (16.40 ft)	XS3F-M421-405-A	XS3F-M422-405-A
			Robotic	2 m (6.56 ft)	XS3F-M421-402-R	XS3F-M422-402-R
				5 m (16.40 ft)	XS3F-M421-405-R	XS3F-M422-405-R

## Dimensions

XS3F-M421  
Straight Connectors



**XS3F-M422**  
Right Angle Connectors

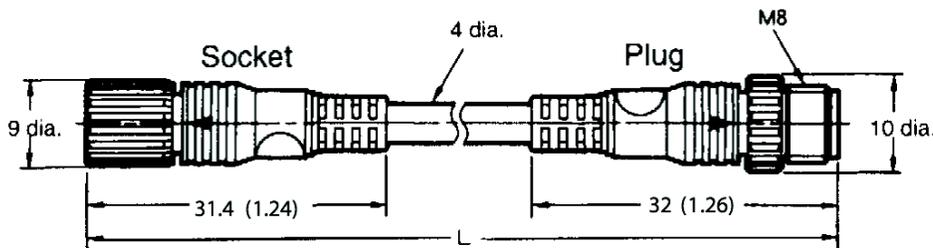


Model	L
XS3F-M42□-402-R/A	2 m
XF3F-M42□-405-R/A	5 m

**Extension Cordsets, Two Single Key Molded M8 Sensor Connectors**

Description					Model
Connector type	Keyway	Cable size	Cable type	Length	Straight connector
4-wire DC female socket and male plug	Single	22 AWG	Robotic	1 m (3.28 ft)	XS3W-M421-401-R
				2 m (6.56 ft)	XS3W-M421-402-R

**Dimensions**



Model	L
XS3W-M421-401-R	1 m
XS3W-M421-402-R	2 m

# Connector Cordsets Y96E-M8□-OCI



## Single-Ended Cables with 3- and 4-Pin M8 Connectors

- M8 Female 3-Pin – 3 wire or 4-Pin – 4 wire
- PUR outside jacket, 22 AWG conductor, PVC insulation
- Straight or right angle connector
- CSA listed



Sold only in Canada.

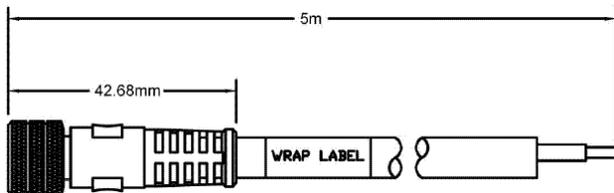
Description			Model	
Connector type	Cable size	Length	Straight connector	Right angle connector
M8 Female 3-wire DC	22 AWG	5 m (16.40 ft)	Y96E-M8-33S5-OCI	Y96E-M8-33R5-OCI
M8 Female 4-wire DC			Y96E-M8-44S5-OCI	Y96E-M8-44R5-OCI

## Specifications

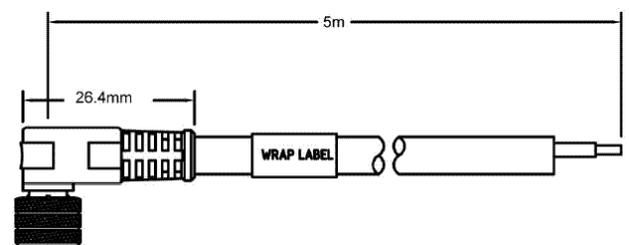
<b>Connector</b>	Molded head	Gray TPE
	Head insert	Elastollan
	Contacts	Brass w/ gold flash
	Coupling nut	Nickel-plated brass
<b>Cable</b>	Jacket	Black PUR
	Conductors	22 AWG-4, PVC insulation
	Rated voltage	300 V
	Temperature rating	80° C

## Dimensions

Straight Connector Cordset



Right Angle Connector Cordset



### Pin out



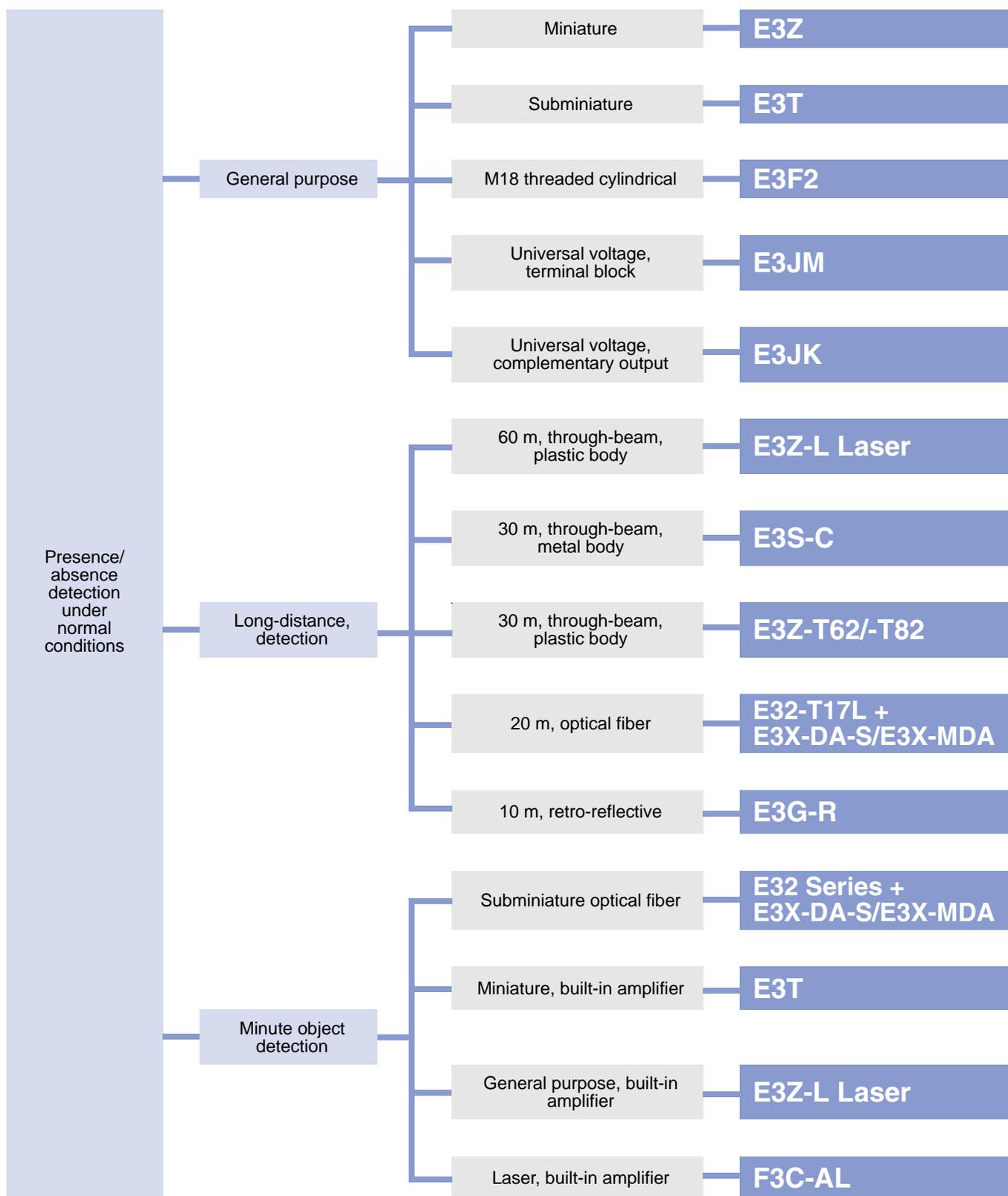


## Contents

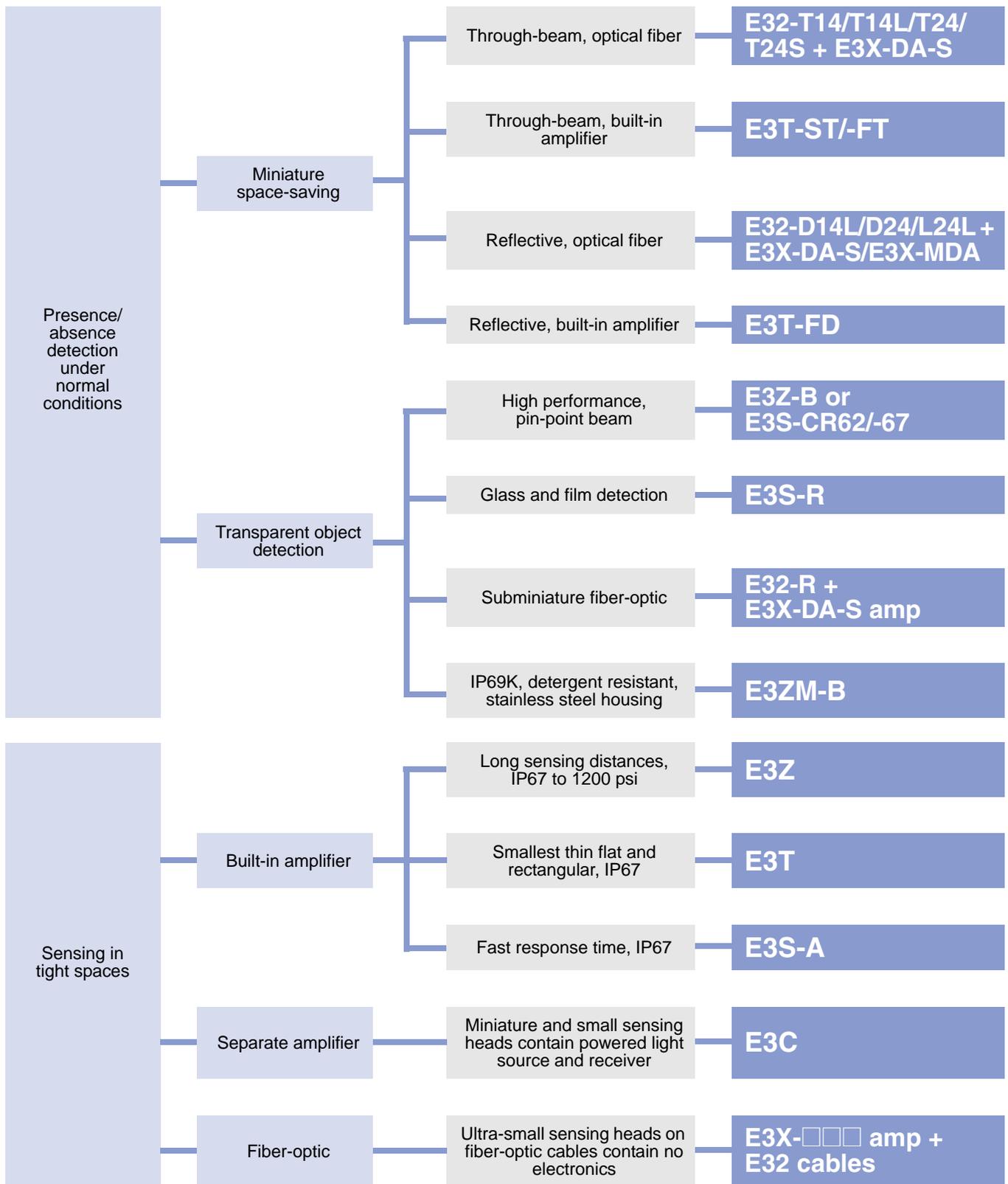
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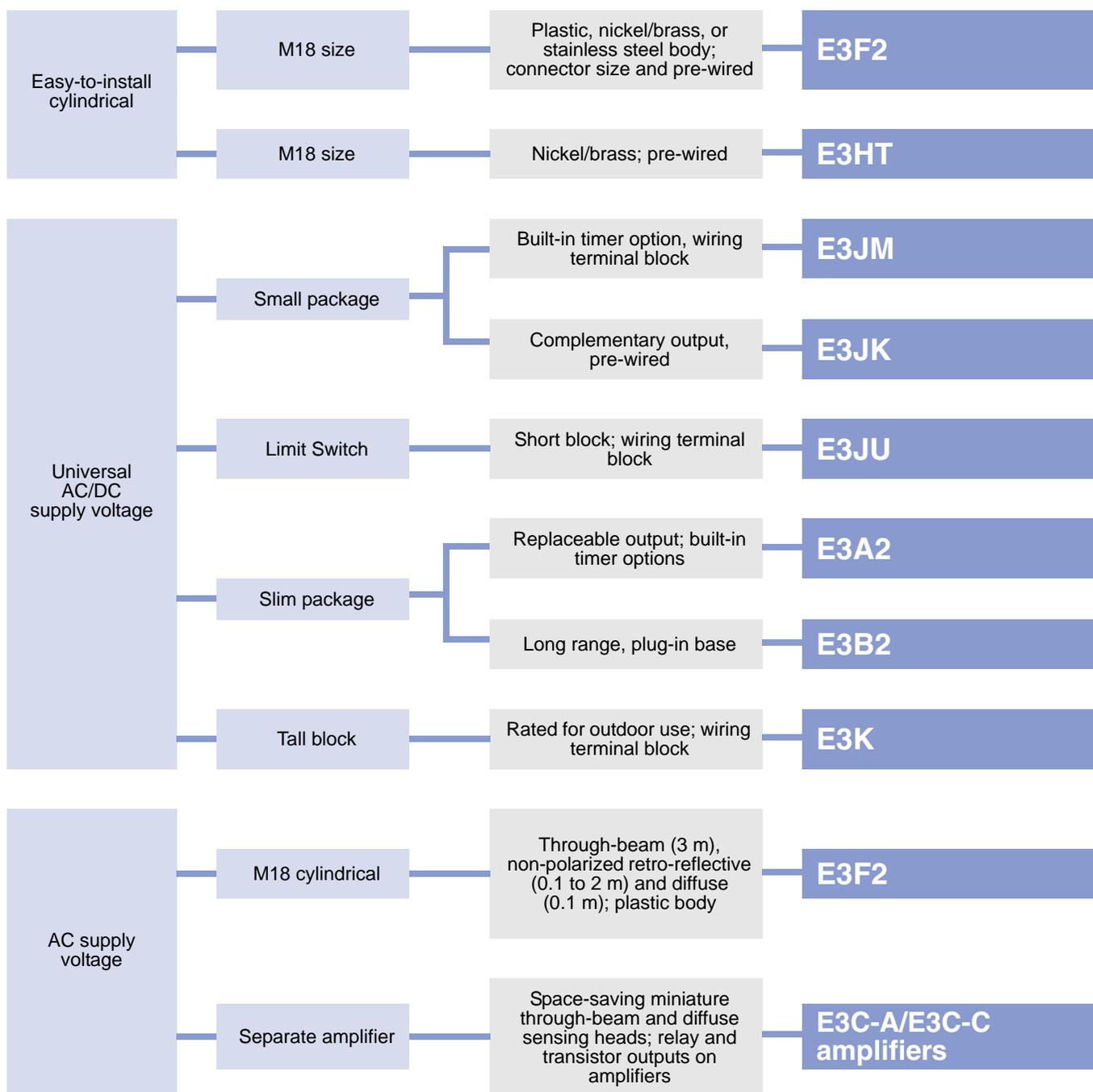
## Selection Guide



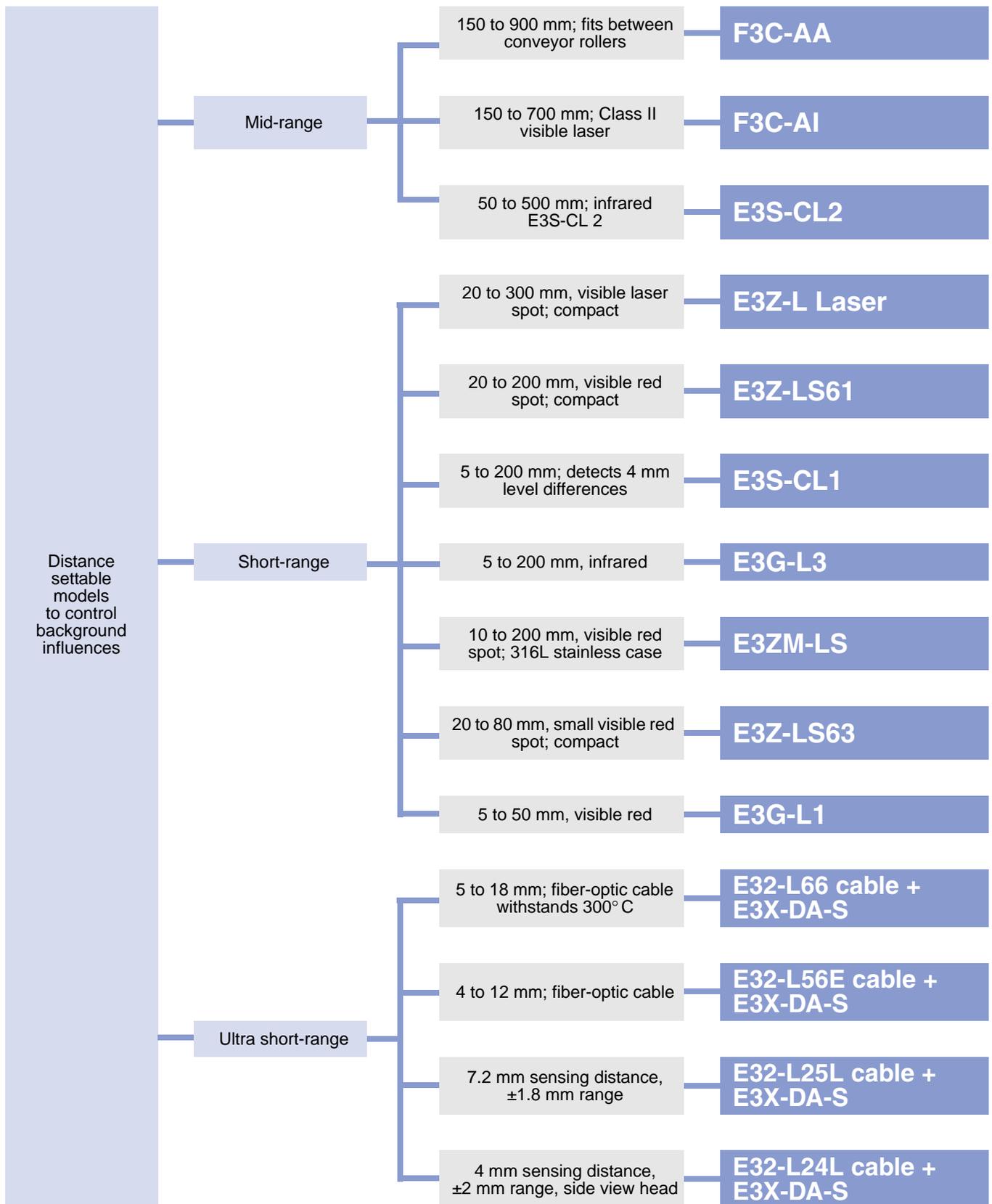
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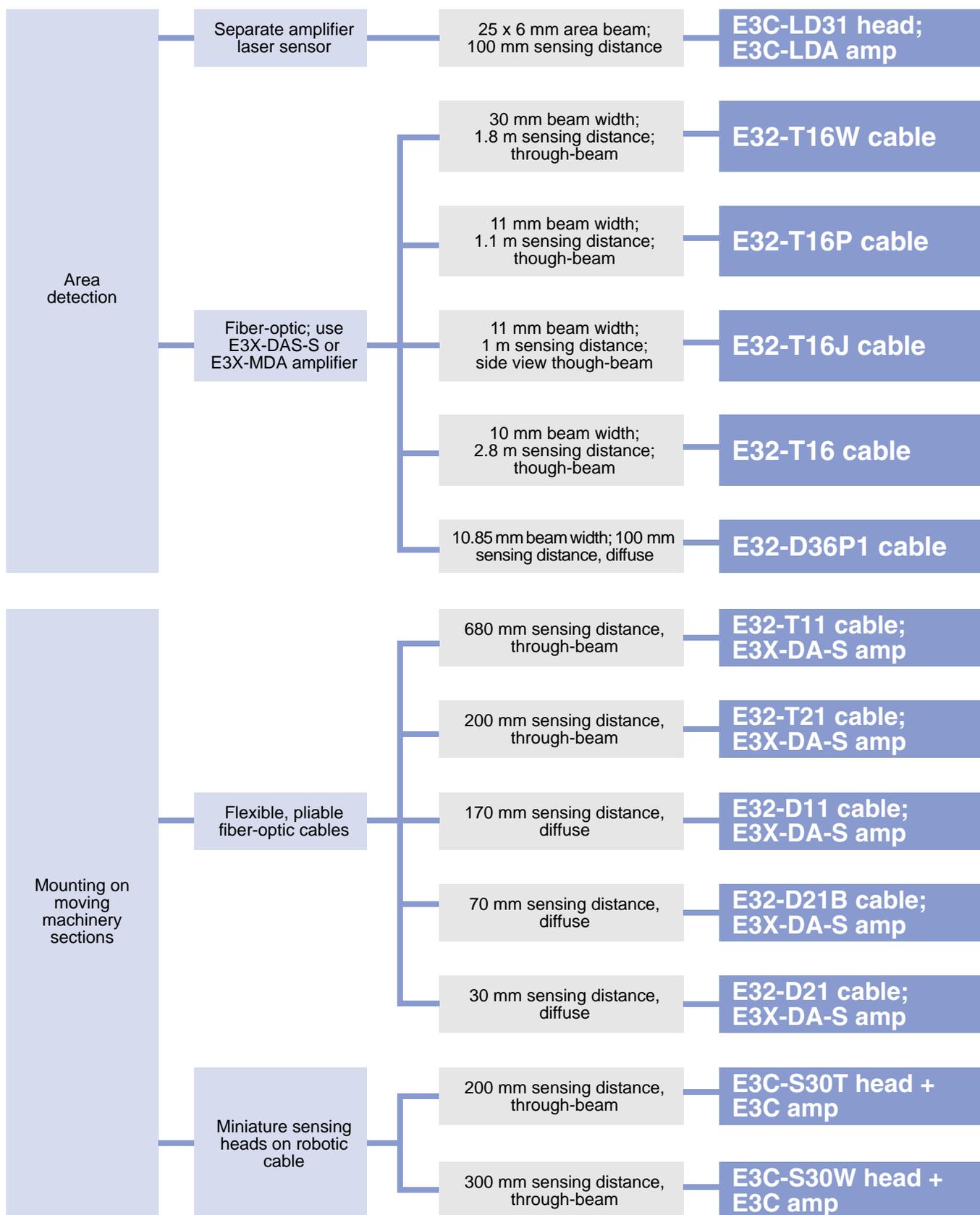
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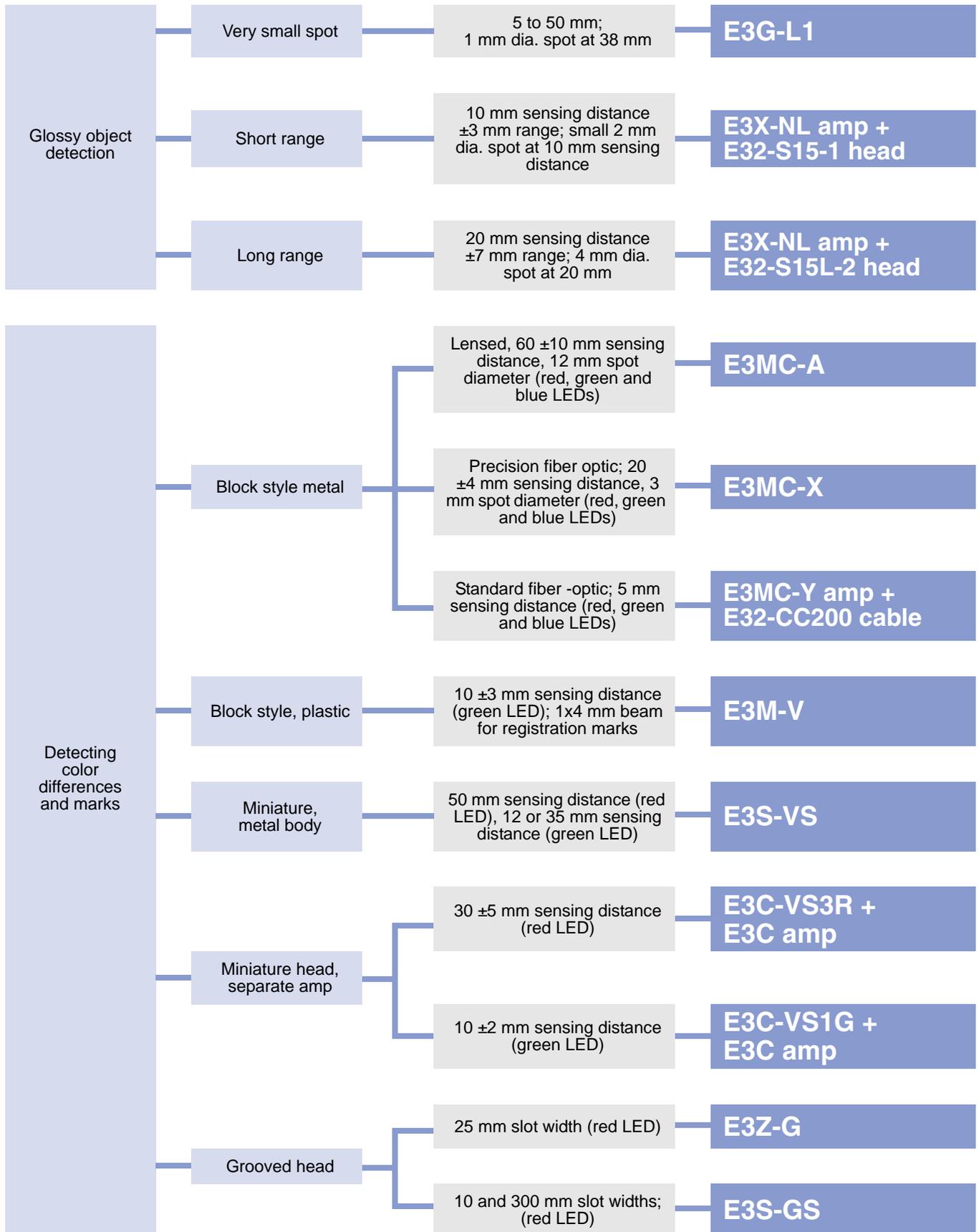
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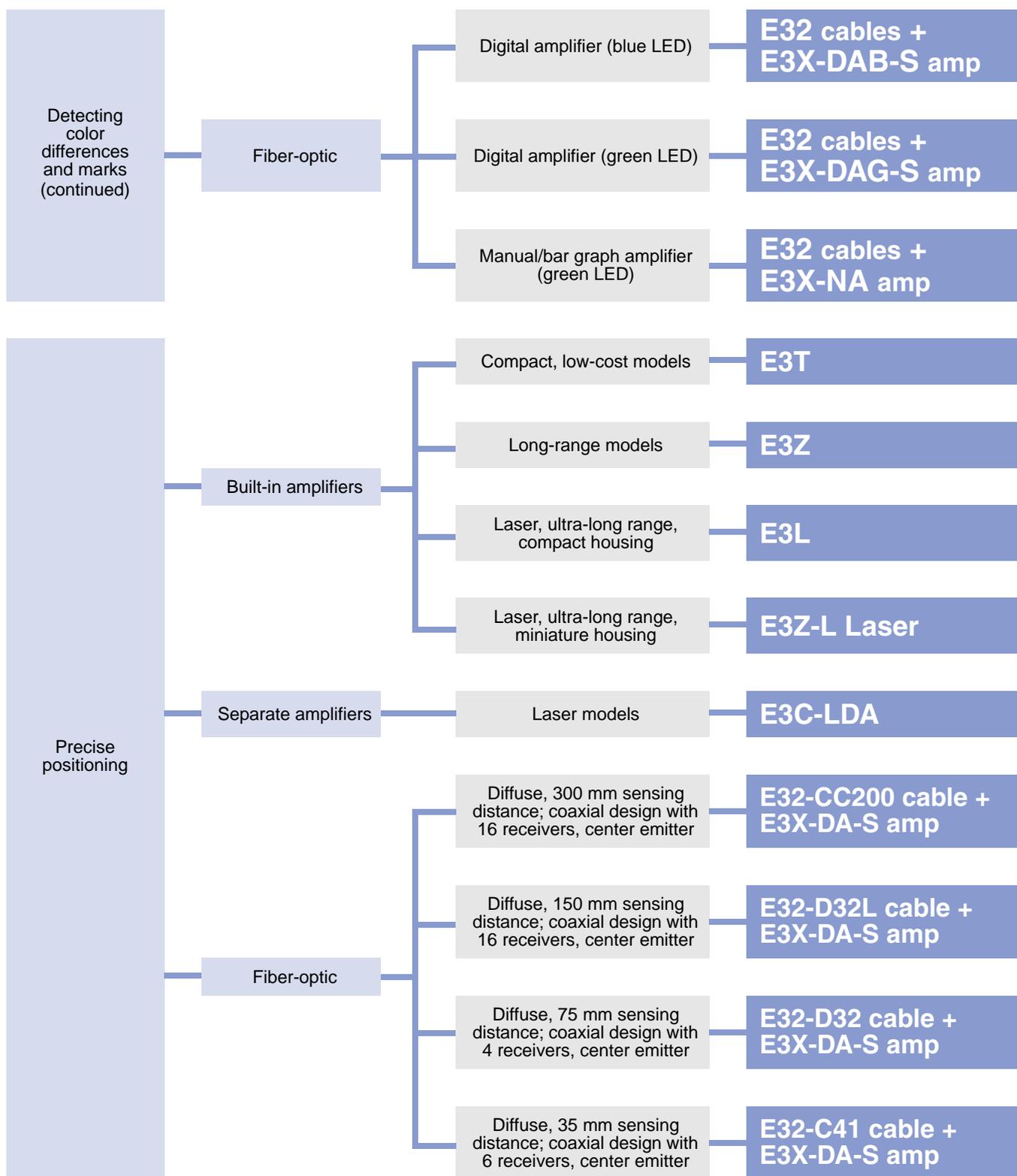
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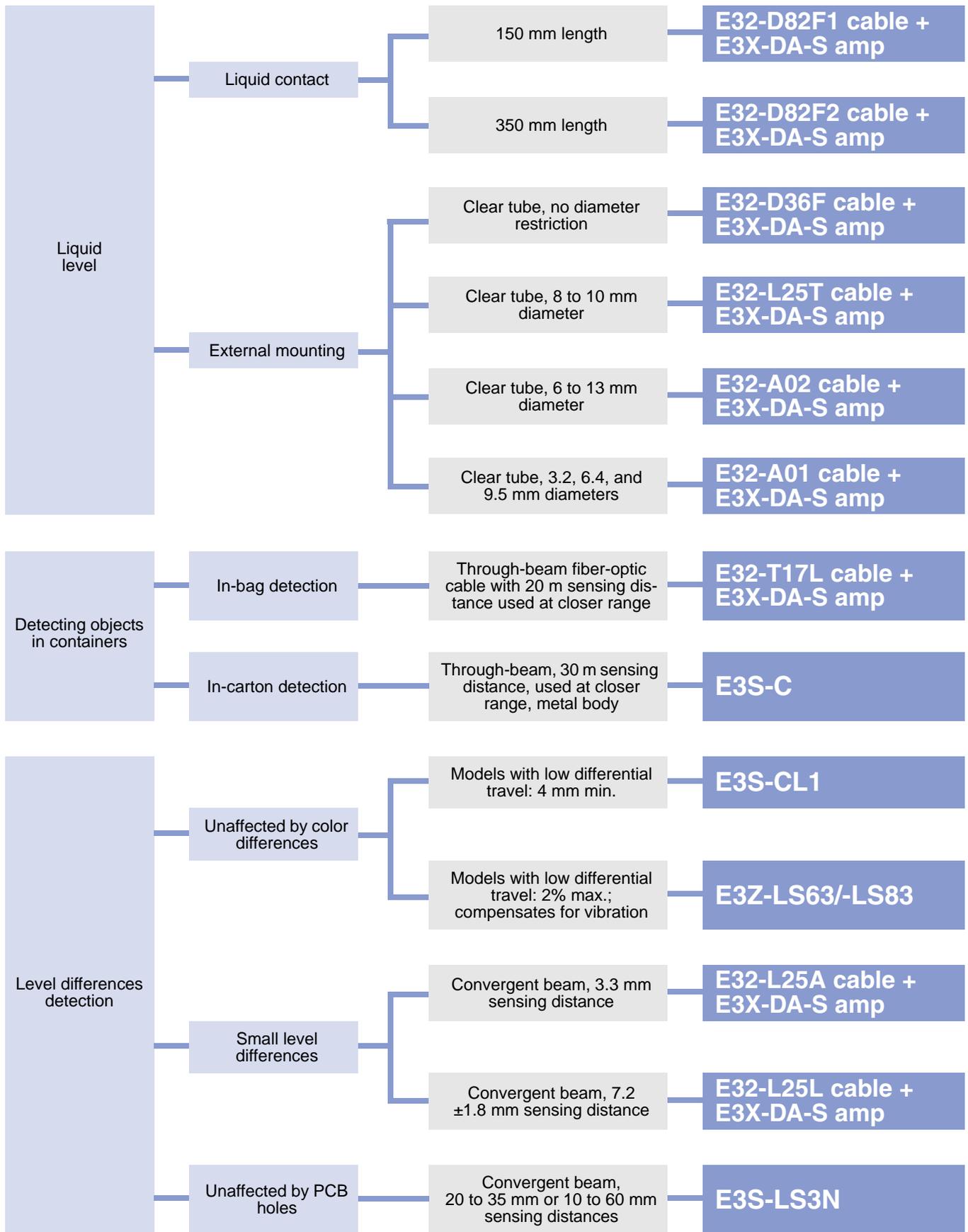
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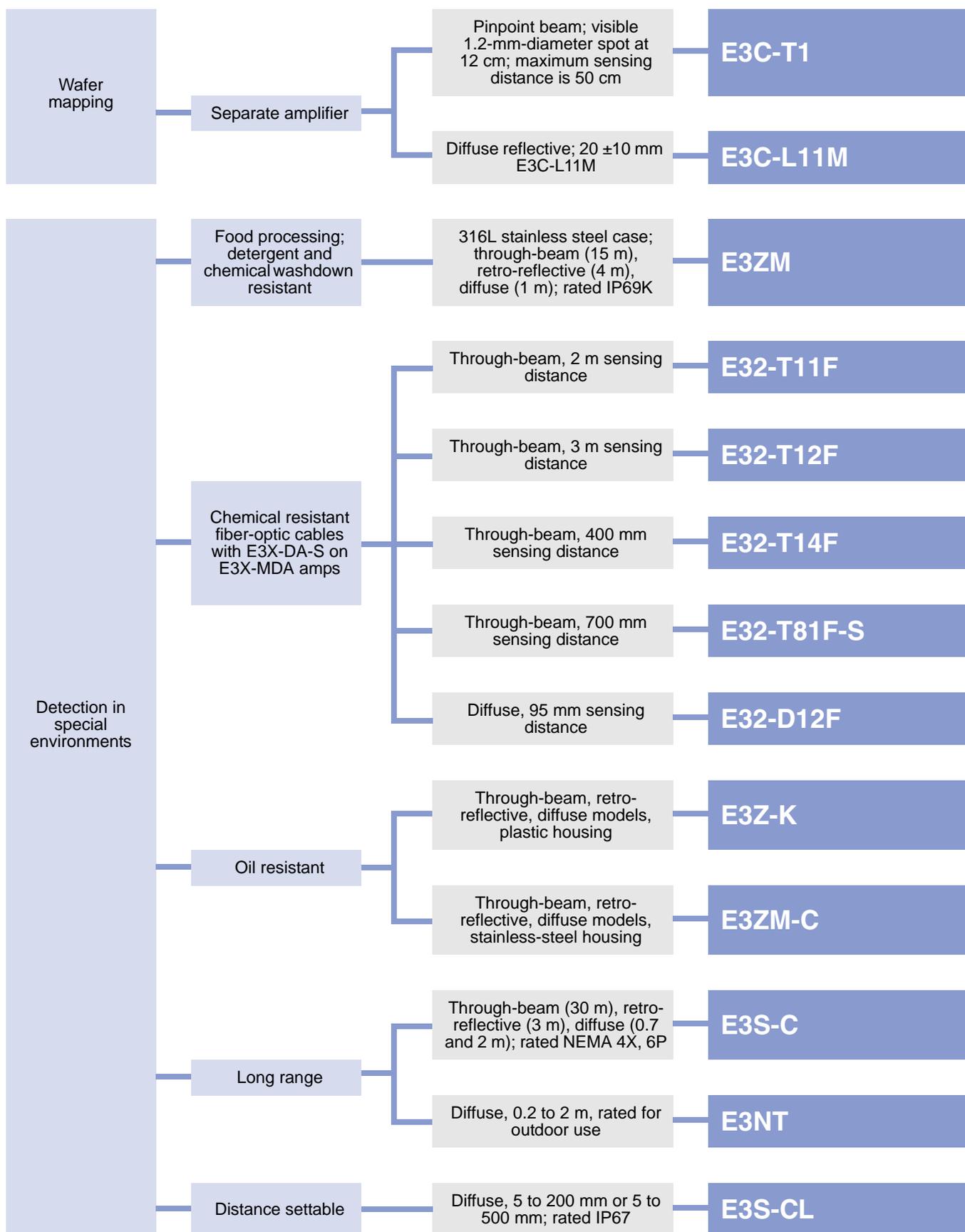
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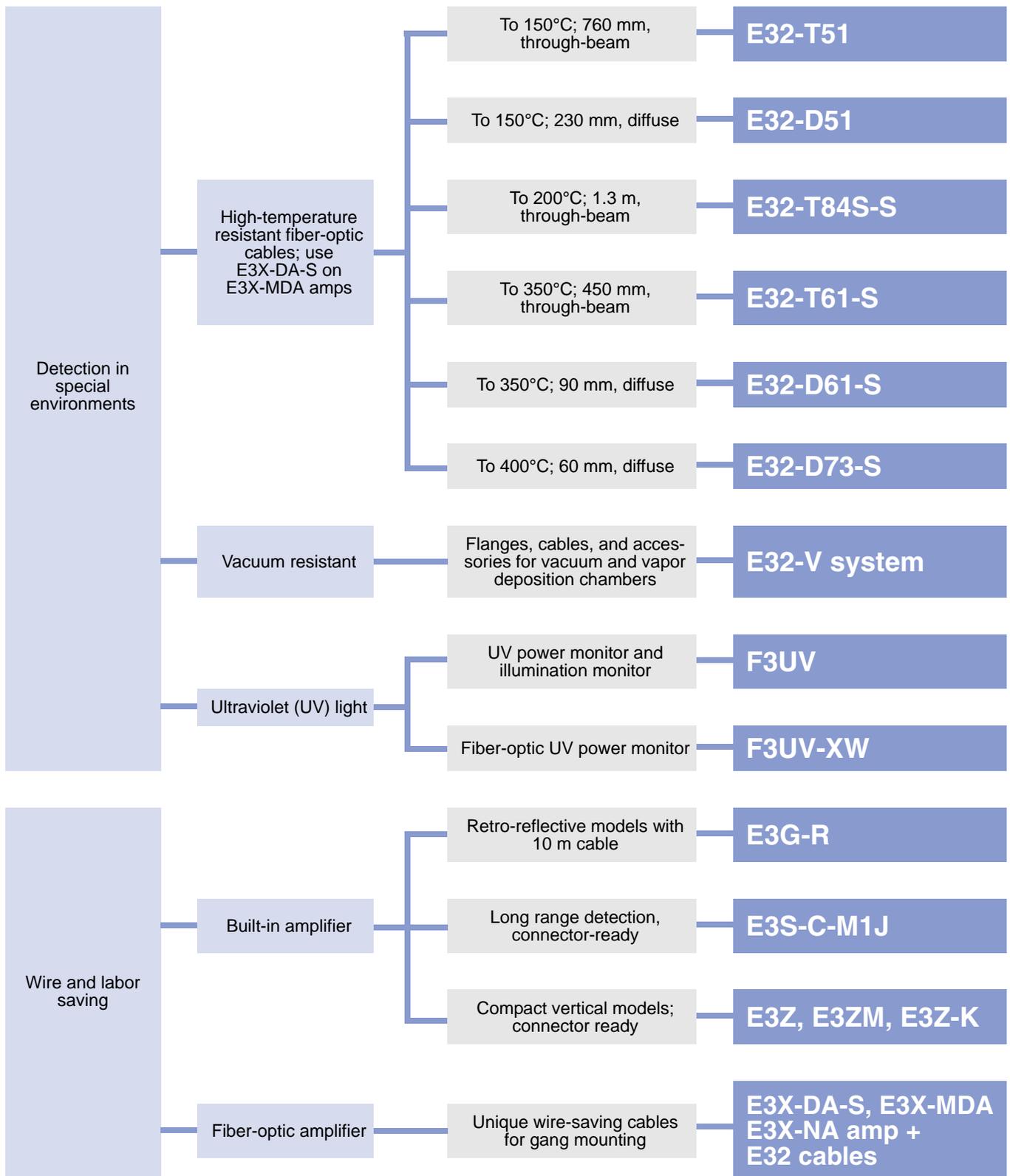
## Selection Guide



## Selection Guide



## Selection Guide



## Selection Guide

# General Purpose Photoelectric Sensors

## E3Z

Quick Link  
B222

### Space-Saving Miniature Sensors with Built-In Amplifiers

- Long distance sensing: 30 m through-beam models; 4 m retro-reflective; 1 m diffuse-reflective
- Integrated circuit design with advanced LED assures long sensing distances
- High noise immunity against interference from inverters and other inductive loads
- Rated IP67, withstands 1200 psi washdown
- Switch-selectable, Light-ON/Dark-ON operation
- M8 and M12 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available
- Compact size: 31 H x 10.8 W x 20 D mm; 41.4 H mm with connector



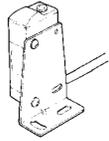
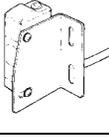
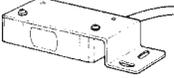
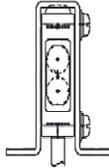
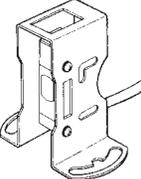
### Specifications

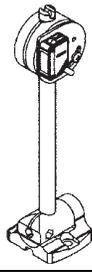
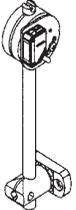
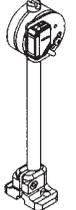
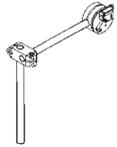
- Voltage range: 12-24 VDC
- Load rating: 100 mA at 26.4 VDC max.
- Current consumption; 30 mA max. (reflective), 15 mA emitter; 20 mA receiver (through-beam)
- Response time: 1 ms max.
- Circuit protection: Power source reverse polarity, Output reverse polarity, Short-circuit, Mutual interference (except through-beam)
- Operating ambient: -25° to 55° C, 35% to 85% RH

### Standard Sensors

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam		Multipurpose	Infrared (870 nm)	30 m	Pre-wired	E3Z-T62	E3Z-T82
					4-pin M8 connector	E3Z-T67	E3Z-T87
		Multipurpose		15 m	Pre-wired	E3Z-T61	E3Z-T81
					4-pin M8 connector	E3Z-T66	E3Z-T86
					Pigtail, 3-pin M8	E3Z-T61-M5J	E3Z-T81-M5J
					Pigtail, 4-pin M8	E3Z-T61-M3J	E3Z-T81-M3J
	Easy to align with visible beam	10 m	Red (660 nm)	Pigtail, 4-pin M12	E3Z-T61-M1J	E3Z-T81-M1J	
				Pre-wired	E3Z-T61A	E3Z-T81A	
				4-pin M8 connector	E3Z-T66A	E3Z-T86A	
				Pigtail, 3-pin M8	E3Z-T61A-M5J	E3Z-T81A-M5J	
				Pigtail, 4-pin M8	E3Z-T61A-M3J	E3Z-T81A-M3J	
				Pigtail, 4-pin M12	E3Z-T61A-M1J	E3Z-T81A-M1J	
Retro-reflective		Polarized; Order reflector separately	Red (660 nm)	0.1 to 4 m with E39-R1S reflector	Pre-wired	E3Z-R61	E3Z-R81
					4-pin M8 connector	E3Z-R66	E3Z-R86
				0.1 to 3 m with E39-R1 reflector	Pigtail, 3-pin M8	E3Z-R61-M5J	E3Z-R81-M5J
					Pigtail, 4-pin M8	E3Z-R61-M3J	E3Z-R81-M3J
					Pigtail, 4-pin M12	E3Z-R61-M1J	E3Z-R81-M1J
Diffuse reflective		Wide view	Infrared (860 nm)	5 to 100 mm	Pre-wired	E3Z-D61	E3Z-D81
					4-pin M8 connector	E3Z-D66	E3Z-D86
					Pigtail, 3-pin M8	E3Z-D61-M5J	E3Z-D81-M5J
					Pigtail, 4-pin M8	E3Z-D61-M3J	E3Z-D81-M3J
					Pigtail, 4-pin M12	E3Z-D61-M1J	E3Z-D81-M1J
	Standard	1 m	Infrared (860 nm)	Pre-wired	E3Z-D62	E3Z-D82	
				4-pin M8 connector	E3Z-D67	E3Z-D87	
				Pigtail, 3-pin M8	E3Z-D62-M5J	E3Z-D82-M5J	
				Pigtail, 4-pin M8	E3Z-D62-M3J	E3Z-D82-M3J	
				Pigtail, 4-pin M12	E3Z-D62-M1J	E3Z-D82-M1J	

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		<b>E39-L104</b>
L-bracket, vertical		<b>E39-L44</b>
Open top, 20° angle adjustability		<b>E39-L43</b>
Protected top 5° angle adjustability		<b>E39-L144</b>
Compact vertical protective cover bracket		<b>E39-L142</b>
Vertical protective cover bracket		<b>E39-L98</b>

Description	Appearance	Model
Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable		<b>E39-L93FH</b>
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees		<b>E39-L93FV</b>
Adjustable height and angle bracket for sensors; fixed horizontal base mounting		<b>E39-L93H</b>
Adjustable height and angle bracket for sensors; fixed vertical base mounting		<b>E39-L93V</b>
Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post		<b>E39-L93XY</b>

## Reflectors

Choose a reflector for E3Z-R retro-reflective sensors to match your application. The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a reflector other than models E39-R1 or E39-R1S.

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	0.1 to 3 m	For non-polarized light source	59.9 H x 40.3 W x 7.5 D	<b>E39-R1</b>
	0.1 to 4 m	For polarized light source	59.9 H x 40.3 W x 7.5 D	<b>E39-R1S</b>
	0.1 to 5 m	Double width	59.9 H x 80.8 W x 7.5 D	<b>E39-R2</b>
	0.1 to 2.5 m	Small square reflecting area	42.3 H x 30.9 W x 8 D	<b>E39-R9</b>
	0.1 to 3.5 m	Large square reflecting area	61.4 H x 51.6 W x 8 D	<b>E39-R10</b>
Miniature reflector	50 mm to 1.5 m	Includes mounting bracket	38 H x 22.5 W x 11 D	<b>E39-R3</b>
Tape reflector	150 mm to 700 mm	Acrylic face; adhesive back	10 H x 35 W x 0.6 D	<b>E39-RS1</b>
	150 mm to 1.1 m		35 H x 40 W x 0.6 D	<b>E39-RS2</b>
	150 mm to 1.4 m		70 H x 80 W x 0.6 D	<b>E39-RS3</b>

## Connectors and Accessories

### Connector Cordsets

Connector size	Cable type	Compatible sensors	Connector type	Cable length	Model*
M8	Four-wire	E3Z-□□6, E3Z-□□□-M3J	Straight	2 m (6.56 ft)	XS3F-M421-402-A
				5 m (16.40 ft)	XS3F-M421-405-A
			Right angle	2 m (6.56 ft)	XS3F-M422-402-A
				5 m (16.40 ft)	XS3F-M422-405-A
	Three-wire	E3Z-□□□-M5J	Straight	2 m (6.56 ft)	Y96E-M833SD2
				5 m (16.40 ft)	Y96E-M833SD5
Right angle			2 m (6.56 ft)	Y96E-M833RD2	
			5 m (16.40 ft)	Y96E-M833RD5	
M12	Four-wire	E3Z-□□□-M1J	Straight	2 m (6.56 ft)	Y96E-44SD2
				5 m (16.40 ft)	Y96E-44SD5
			Right angle	2 m (6.56 ft)	Y96E-44RD2
				5 m (16.40 ft)	Y96E-44RD5

\* Available in the US. In Canada please see "Cordsets" Section.

### Slits for Through-beam E3Z-T Sensors

Reduce beam size to detect smaller objects more accurately. Order one for emitter, one for receiver.

Slit size	Sensing distance (typical)	Minimum sensing object (typical)	Model
0.5 mm dia.	50 mm	0.5 mm dia.	E39-S65A
1 mm dia.	200 mm	1 mm dia.	E39-S65B
2 mm dia.	800 mm	2 mm dia.	E39-S65C
0.5 × 10 mm	1 m	0.7 mm dia.	E39-S65D
1 × 10 mm	2.2 m	1.2 mm dia.	E39-S65E
2 × 10 mm	5 m	2.4 mm dia.	E39-S65F

# General Purpose Photoelectric Sensors

## E3Z-L Laser



### Compact Laser Sensor with Built-In Amplifiers

- Reliable sensing in the most dusty of environments; Laser sensing provides the ultimate in long distance detection - 60 m for through-beam models, 15 m for retro-reflective models and 30 cm for distance-settable models
- Optical flexibility and characteristics allow for easier and simple sensor alignment
- Distance-settable models offer long distance, diffuse type BGS (background suppression) sensing for stable detection with no influence from a glossy background frame
- Enhanced IP67 with 1200 psi washdown enclosure rating at 55 degrees Celsius allows for harsher operating environments
- All models provide the safety and peace of mind of a Class 2 Laser (FDA)
- Reliable detection of minute objects and narrow gaps with small beam spot capabilities



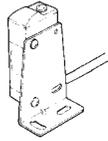
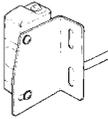
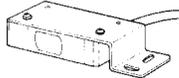
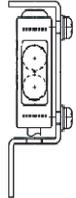
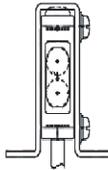
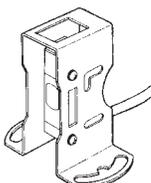
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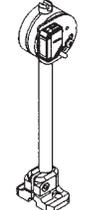
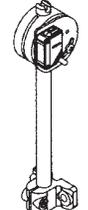
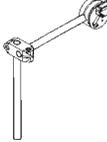
- Voltage range: 12-24 VDC
- Load rating: 100mA at 26.4 VDC max.
- Current consumption: 30 mA max. (reflective), 15 mA emitter; 20 mA receiver (through-beam)
- Response time: 1 ms max. (through-beam, retro-reflective, distance-settable) 0.5 ms max. (distance-settable with high-speed response)
- Circuit protection: Through-beam: Reversed power supply polarity protection, output short-circuit protection, and reversed output polarity protection; Retro-reflective and Distance-settable: Reversed power supply polarity protection, output short-circuit protection, mutual interference prevention and reversed output polarity protection
- Operating ambient: -10° to 55° C, 35% to 85% RH
- M8 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available
- Switch-selectable, Light-ON/Dark-ON operation
- Compact size: 31 H x 10.8 W x 20 D mm; 41.4 H mm with connector

### Sensor Type

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam		Multi-purpose	Class II Laser (655 nm)	60 m	Pre-wired (2 m)	<b>E3Z-LT61</b>	<b>E3Z-LT81</b>
					M8 4-pin connector	<b>E3Z-LT66</b>	<b>E3Z-LT86</b>
Retro-reflective		Polarized; order reflector separately	Class II Laser (655 nm)	300 mm to 15 m with E39-R1 reflector	Pre-wired (2 m)	<b>E3Z-LR61</b>	<b>E3Z-LR81</b>
					M8 4-pin connector	<b>E3Z-LR66</b>	<b>E3Z-LR86</b>
BGS reflective		Standard 1 ms response	Class II Laser (655 nm)	25 to 300 mm	Pre-wired (2 m)	<b>E3Z-LL61</b>	<b>E3Z-LL81</b>
					M8 4-pin connector	<b>E3Z-LL66</b>	<b>E3Z-LL86</b>
		High-speed response (0.5 ms)			Pre-wired (2 m)	<b>E3Z-LL63</b>	<b>E3Z-LL83</b>
					M8 4-pin connector	<b>E3Z-LL68</b>	<b>E3Z-LL88</b>

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		E39-L104
L-bracket, vertical		E39-L44
Open top, 20° angle adjustability		E39-L43
Protected top 5° angle adjustability		E39-L144
Compact vertical protective cover bracket		E39-L142
Vertical protective cover bracket		E39-L98

Description	Appearance	Model
Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable		E39-L93FH
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees		E39-L93FV
Adjustable height and angle bracket for sensors; fixed horizontal base mounting		E39-L93H
Adjustable height and angle bracket for sensors; fixed vertical base mounting		E39-L93V
Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post		E39-L93XY

## Reflectors (for E3Z-LR□□)

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	15 m (300 mm)	Order separately from sensor; Separate the Sensor and the reflector by at least the distance given in parentheses; the MSR function is enabled	59.9 H x 40.3 W x 7.5 D	E39-1
	7 m (200 mm)		60 H x 40 W x 4.8 D	E39-R12
	7 m (200 mm)		50 H x 40 W x 4.8 D	E39-R6

## Slit for Through-Beam (E3Z-LT□□)

Slit size	Sensing distance (typical)	Minimum sensing object (typical)	Model
0.5 mm dia.	3 m	0.1 mm dia.	E39-S65A

## Connector Cordsets

Connector size	Cable type	Compatible sensors	Connector type	Cable length	Model*
M8	Four-wire	E3Z-□□□6, E3Z-□□□□-M3J	Straight	2 m (6.56 ft)	<b>XS3F-M421-402-A</b>
				5 m (16.40 ft)	<b>XS3F-M421-405-A</b>
			Right angle	2 m (6.56 ft)	<b>XS3F-M422-402-A</b>
				5 m (16.40 ft)	<b>XS3F-M422-405-A</b>
	Three-wire	E3Z-□□□□-M5J	Straight	2 m (6.56 ft)	<b>Y96E-M833SD2</b>
				5 m (16.40 ft)	<b>Y96E-M833SD5</b>
Right angle			2 m (6.56 ft)	<b>Y96E-M833RD2</b>	
			5 m (16.40 ft)	<b>Y96E-M833RD5</b>	
M12	Four-wire	E3Z-□□□□-M1J	Straight	2 m (6.56 ft)	<b>Y96E-44SD2</b>
				5 m (16.40 ft)	<b>Y96E-44SD5</b>
			Right angle	2 m (6.56 ft)	<b>Y96E-44RD2</b>
				5 m (16.40 ft)	<b>Y96E-44RD5</b>

\* Available in the US. In Canada please see "Cordsets" Section.

# General Purpose Photoelectric Sensors

## E3Z-L



### Narrow-Beam Sensor Detects Small Objects

- Small 2.5 mm beam diameter at 90 mm sensing distance enables detection through small holes or gaps
- Detect objects as small as 0.1 mm diameter
- Adjustable distance setting of 90 ± 30 mm
- Visible red light beam simplifies alignment for visual checking of sensing spot position
- Integrated circuit design with advanced LED assures long sensing distances
- High noise immunity against interference from inverters and other inductive loads
- Rated IP67, withstands 1200 psi washdown
- Switch-selectable, Light-ON/Dark-ON operation
- M8 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available
- Switch selectable Light-ON/Dark-ON operations
- Compact size: 31 H x 10.8 W x 20 D mm; 41.4 H mm with connector



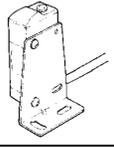
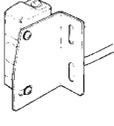
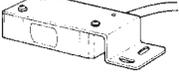
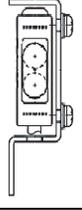
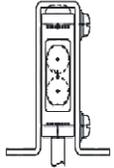
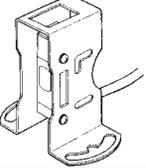
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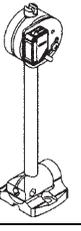
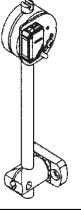
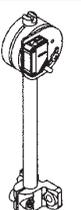
- Voltage range: 12-24 VDC
- Load rating: 100 mA at 26.4 VDC max.
- Current consumption: 30 mA max.
- Response time: 1 ms max.
- Circuit protection:
  - Power source reverse polarity
  - Output reverse polarity
  - Short-circuit
  - Mutual interference
- Operating ambient: -25° to 55° C, 35% to 85% RH

### Narrow-Beam Sensors

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Diffuse reflective		Detects 0.1 mm dia. objects	Red (650 nm)	90 ±30 mm	Pre-wired	E3Z-L61	E3Z-L81
					4-pin M8 connector	E3Z-L66	E3Z-L86

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		E39-L104
L-bracket, vertical		E39-L44
Open top, 20° angle adjustability		E39-L43
Protected top 5° angle adjustability		E39-L144
Compact vertical protective cover bracket		E39-L142
Vertical protective cover bracket		E39-L98

Description	Appearance	Model
Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable		E39-L93FH
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees		E39-L93FV
Adjustable height and angle bracket for sensors; fixed horizontal base mounting		E39-L93H
Adjustable height and angle bracket for sensors; fixed vertical base mounting		E39-L93V
Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post		E39-L93XY

## Connectors and Accessories

### Connector Cordsets

Connector size	Cable type	Compatible sensors	Connector type	Cable length	Model*
M8	Four-wire	E3Z-□□6, E3Z-□□□-M3J	Straight	2 m (6.56 ft)	XS3F-M421-402-A
				5 m (16.40 ft)	XS3F-M421-405-A
			Right angle	2 m (6.56 ft)	XS3F-M422-402-A
				5 m (16.40 ft)	XS3F-M422-405-A
	Three-wire	E3Z-□□□-M5J	Straight	2 m (6.56 ft)	Y96E-M833SD2
				5 m (16.40 ft)	Y96E-M833SD5
M12	Four-wire	E3Z-□□□-M1J	Straight	2 m (6.56 ft)	Y96E-44SD2
				5 m (16.40 ft)	Y96E-44SD5
			Right angle	2 m (6.56 ft)	Y96E-44RD2
				5 m (16.40 ft)	Y96E-44RD5

\* Available in the US. In Canada please see "Cordsets" Section.

# General Purpose Photoelectric Sensors E3T



## Ultra Thin Subminiature Sensors with Built-In Amplifiers

- Through-beam, retro-reflective, diffuse reflective, convergent reflective and new BGS (Background Suppression) reflective models available to match desired sensing requirement
- Side view and thin flat models available to fit in space-confined areas
- New BGS reflective models (E3T-FL) offer superior resistance against sensing background objects
- E3T-SL convergent beam models offer ideal performance to detect extremely small targets with its 0.8 mm dia. pinpoint beam
- Coaxial retro-reflective models use Omron's unique Free Angle Optics to detect 2 mm objects from a 100 mm distance
- High visibility output indicators
- Visible red emitter beam simplifies alignment for installation and operation
- One-chip photo IC ensures high reliability



- Rated IP67, withstands 1200 psi washdown
- Separate Light-ON or Dark-ON models available
- NPN or PNP output models available
- All models are standard with pre-wired with 2 m cables, optional models available with robotic cables
- Compact size: Side view: 18.5 H x 7 W x 9.5 D mm; Flat: 19 H x 12 W x 3.5 D mm

## Specifications

- Voltage range: 10.8-26.4 VDC
- Load rating: NPN or PNP open collector, 50 mA max.
- Current consumption: 20 mA max. (reflective), 12 mA emitter; 12 mA receiver (through-beam)
- Directional angle: 2° to 20° (through-beam emitter, retro-reflective); 2° to 70° (through-beam receiver)
- Differential distance: 6 mm (flat diffuse, side convergent); 2 mm (side convergent, flat BGS reflective at 30 mm max. distance); 0.5 mm (flat BGS reflective at 15 mm max. distance)
- Response time: 1 ms max.
- Circuit protection: Power source reverse polarity (all); Output short-circuit (all); Mutual interference prevention (reflective models only)
- Operating ambient: -25° to 55° C, 35% to 85% RH

## Standard Sensors

Sensing method	Setup	Feature	Light source	Sensing distance	Operation	Connection method	Model	
							NPN output	PNP output
Through-beam	 Side view	Multipurpose	Red (650 nm)	1 m	Light-ON	Pre-wired	E3T-ST11	E3T-ST13
					Dark-ON		E3T-ST12	E3T-ST14
	 Flat	Multipurpose		0.5 m	Light-ON		E3T-FT11	E3T-FT13
					Dark-ON		E3T-FT12	E3T-FT14
Retro-reflective	 Side view	Non-polarized; E39-R4 reflector included	10 to 200 mm with E39-R4 reflector	Light-ON		E3T-SR21	E3T-SR23	
				Dark-ON		E3T-SR22	E3T-SR24	
	 Side view	Non-polarized; E39-R4 reflector included		10 to 100 mm with E39-R4 reflector		Light-ON	E3T-SR31	E3T-SR33
						Dark-ON	E3T-SR32	E3T-SR34

Sensing method	Setup	Feature	Light source	Sensing distance	Operation	Connection method	Model	
							NPN output	PNP output
Diffuse reflective	 Flat	—	Red (650 nm)	5 to 30 mm	Light-ON	Pre-wired	E3T-FD11	E3T-FD13
					Dark-ON		E3T-FD12	E3T-FD14
Convergent reflective	 Side view	0.15 mm spot diameter for tiny objects		5 to 15 mm	Light-ON		E3T-SL11	E3T-SL13
					Dark-ON		E3T-SL12	E3T-SL14
				5 to 30 mm	Light-ON		E3T-SL21	E3T-SL23
					Dark-ON		E3T-SL22	E3T-SL24
<b>NEW</b> BGS Reflective	 Flat	Resists sensing background objects		1 to 15 mm	Light-ON		E3T-FL11	E3T-FL13
					Dark-ON		E3T-FL12	E3T-FL14
				1 to 30 mm	Light-ON		E3T-FL21	E3T-FL23
					Dark-ON		E3T-FL22	E3T-FL24

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal, for E3T-S side view sensors		E39-L116
L-bracket, vertical, for E3T-S side view sensors		E39-L117
Narrow S-bracket, vertical, for E3T-S side view sensors		E39-L118

Description	Appearance	Model
L-bracket, vertical, for E3T-F flat sensors		E39-L119
Thin S-bracket, vertical, for E3T-F flat sensors		E39-L120

## Reflectors

Choose a reflector for E3T-SR retro-reflective sensors to match your application.

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	10 to 200 mm	Supplied with E3T-SR	23 H x 13.7 W x 4.9 D	E39-R4
	10 to 100 mm	10.2 x 8.7 reflective area; 301 SUS mount	23 H x 13.7 W x 1.1 D	E39-R37

## Slits for Through-Beam E3T Sensors

Reduce beam size to detect smaller objects more accurately. Includes 0.5 and 1 mm dia. slits, one each for emitter and receiver.

Slit width	Sensing distance (typical)	Minimum sensing object (typical)	Sensor shape	Model
0.5 mm dia.	100 mm	0.5 mm dia.	Side view E3T-ST	E39-S63
1.0 mm dia.	300 mm	1.0 mm dia.		
0.5 mm dia.	50 mm	0.5 mm dia.	Flat E3T-FT	E39-S64
1.0 mm dia.	100 mm	1.0 mm dia.		

## Sensitivity Adjustment Unit

Use with E3T-ST through-beam emitter to adjust the gain and sensing distance.

Shape	Sensing distance (typical)	Sensor shape	Model
	300 to 800 mm	Side view E3T-ST	E39-E10

# General Purpose Photoelectric Sensors

## E3F2

Quick Link  
B225

### M18 Cylindrical Sensors with Built-In Amplifiers

- Threaded with built-in amplifier
- PVC cable sheath
- Compact and space-saving
- Watertight construction exceeds IP67 ratings
- DC switching types available with connector connection
- Housing materials: ABS plastic and nickel-plated brass (NPB) models stocked; 303 stainless steel models available
- Through-beam models include emitter and receiver pair
- Retro-reflective models include reflector
- Selectable Light-ON/Dark-ON operation on DC 3-wire models
- DC models with full metal plug-in connector for easy maintenance



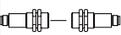
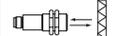
### Specifications

- Voltage range: AC models: 24-240 VAC  $\pm$ 10%, 50/60 Hz; DC models: 10-30 VDC
- Load rating:
  - DC models: NPN or PNP open collector, 100 mA max.
  - AC models: SCR, 200 mA; 5 V max. residual voltage
- Current consumption:
  - 50 mA max. (through-beam)
  - 30 mA max. (polarized retro-reflective, diffuse and background suppression)
  - 25 mA max. (wide beam diffuse)
- Directional angle: 3° to 20° (through-beam, retro-reflective);
- Differential travel: 20% max. (diffuse reflective); 5% max. (background suppression)
- Response time: AC models: 30 ms max.; DC models 2.5 ms max.
- Circuit protection:
  - Power source reverse polarity (DC)
  - Output short-circuit (DC)
- Operating ambient: -25° to 55° C, 35% to 85% RH

### DC Switching Sensors

#### Plastic Body, Axial Type

Dimensions: Pre-wired: M18 x 37 threaded/64.9 overall L mm  
Connector: M18 x 37 threaded/73 overall L mm

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam	 Axial	Multi-purpose	Infrared (880 nm)	7 m	Pre-wired	E3F2-7C4	E3F2-7B4
				10 m	M12 connector	E3F2-7C4-P1	E3F2-7B4-P1
		Precise detection with E39-ES18 slit; test input	Pre-wired	E3F2-10C4	E3F2-10B4		
			M12 connector	E3F2-10C4-P1	E3F2-10B4-P1		
Retro-reflective	 Axial	Non-polarized; E39-R1	Infrared (850 nm)	0.1 - 2 m	Pre-wired	E3F2-R2C4	E3F2-R2B4
		Polarized; fixed sensitivity; E39-R1S reflector	Red (660 nm)	0.1 - 4 m	M12 connector	E3F2-R2C4-P1	E3F2-R2B4-P1
					Pre-wired	E3F2-R4C4F	E3F2-R4B4F
		Polarized; adjustable sensitivity; E39-R1S reflector	M12 connector	E3F2-R4C4F-P1	E3F2-R4B4F-P1		
				Pre-wired	E3F2-R4C4	E3F2-R4B4	
		M12 connector	E3F2-R4C4-P1	E3F2-R4B4-P1			

## Plastic Body, Axial Type (Continued)

Dimensions: Pre-wired: M18 x 37 threaded/64.9 overall L mm  
Connector: M18 x 37 threaded/73 overall L mm

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Diffuse reflective	 Axial	Wide beam, fixed sensitivity	Infrared (880 nm)	0.1 m	Pre-wired	E3F2-DS10C4-N	E3F2-DS10B4-N
					M12 connector	E3F2-DS10C4-P1	E3F2-DS10B4-P1
		Adjustable sensitivity		0.3 m	Pre-wired	E3F2-DS30C4	E3F2-DS30B4
					M12 connector	E3F2-DS30C4-P1	E3F2-DS30B4-P1
1 m	Pre-wired	E3F2-D1C4	E3F2-D1B4				
	M12 connector	E3F2-D1C4-P1	E3F2-D1B4-P1				
Background suppression	 Axial	Fixed sensing distance	Red (660 nm)	10 cm	Pre-wired	E3F2-LS10C4	E3F2-LS10B4
					M12 connector	E3F2-LS10C4-P1	E3F2-LS10B4-P1

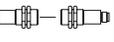
## Plastic Body, Radial Type

Dimensions: Pre-wired: M18 x 37 threaded/71.8 overall L mm  
Connector: M18 x 37 threaded/79.9 overall L mm

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Retro-reflective	 Radial	Polarized; E39-R1 reflector	Red (660 nm)	0.1 - 2 m	Pre-wired	E3F2-R2RC41	E3F2-R2RB41
					M12 connector	E3F2-R2RC41-P1	E3F2-R2RB41-P1
Diffuse reflective	 Radial	Adjustable sensitivity	Infrared (880 nm)	0.3 m	Pre-wired	E3F2-DS30C41	E3F2-DS30B41
					M12 connector	E3F2-DS30C41-P1	E3F2-DS30B41-P1
				10 cm		E3F2-LS10C4-P1	E3F2-LS10B4-P1

## Metal Body (NPB), Axial Type

Dimensions: Pre-wired: M18 x 37 threaded/64.9 overall L mm  
Connector: M18 x 37 threaded/76 overall L mm

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam	 Axial	Multi-purpose	Infrared (880 nm)	7 m	Pre-wired	E3F2-7C4-M	E3F2-7B4-M
					M12 connector	E3F2-7C4-M1-M	E3F2-7B4-M1-M
		Precise detection with E39-ES18 slit; test input		10 m	Pre-wired	E3F2-10C4-M	E3F2-10B4-M
					M12 connector	E3F2-10C4-M1-M	E3F2-10B4-M1-M
Retro-reflective	 Axial	Polarized; fixed sensitivity; E39-R1S reflector	Red (660 nm)	0.1 - 4 m	Pre-wired	E3F2-R4C4F-M	E3F2-R4B4F-M
					M12 connector	E3F2-R4C4F-M1-M	E3F2-R4B4F-M1-M
		Polarized; adjustable sensitivity; E39-R1S reflector			Pre-wired	E3F2-R4C4-M	E3F2-R4B4-M
					M12 connector	E3F2-R4C4-M1-M	E3F2-R4B4-M1-M
Diffuse reflective	 Axial	Wide beam, fixed sensitivity	Infrared (880 nm)	0.1 m	Pre-wired	E3F2-DS10C4-M	E3F2-DS10B4-M
					M12 connector	E3F2-DS10C4-M1-M	E3F2-DS10B4-M1-M
		Adjustable sensitivity		0.3 m	Pre-wired	E3F2-DS30C4-M	E3F2-DS30B4-M
					M12 connector	E3F2-DS30C4-M1-M	E3F2-DS30B4-M1-M
		1 m		Pre-wired	E3F2-D1C4-M	E3F2-D1B4-M	
				M12 connector	E3F2-D1C4-M1-M	E3F2-D1B4-M1-M	
Background suppression	 Axial	Fixed sensing distance	Red (660 nm)	10 cm	Pre-wired	E3F2-LS10C4-M	E3F2-LS10B4-M
					M12 connector	E3F2-LS10C4-M1-M	E3F2-LS10B4-M1-M

## Metal Body (NPB), Radial Type

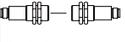
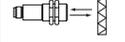
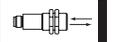
Dimensions: Pre-wired: M18 x 37 threaded/64.9 overall L mm  
Connector: M18 x 37 threaded/76 overall L mm

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Retro-reflective	 Radial	Polarized; E39-R1 reflector	Red (660 nm)	0.1 - 2 m	Pre-wired	E3F2-R2RC41-M	E3F2-R2RB41-M
Diffuse reflective	 Radial	Adjustable sensitivity	Infrared (880 nm)	0.3 m	Pre-wired	E3F2-DS30C41-M	E3F2-DS30B41-M
					M12 connector	E3F2-DS30C41-M1-M	E3F2-DS30B41-M1-M

## AC Switching Sensors

### Plastic Body, Axial Type

Dimensions: Pre-wired: M18 x 62 threaded/90 overall L mm

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						Light-ON	Dark-ON
Through-beam	 Axial	Multi-purpose	Infrared (880 nm)	3 m	Pre-wired	E3F2-3Z1	E3F2-3Z2
Retro-reflective	 Axial	Non-polarized; E39-R1 reflector		0.1 - 2 m		E3F2-R2Z1	E3F2-R2Z2
Diffuse reflective	 Axial	Wide beam, fixed sensitivity		0.1 m		E3F2-DS10Z1-N	E3F2-DS10Z2-N

## Mounting Brackets

Description	Appearance	Model
Mounting bracket for sensor, screw mount		Y92E-B18
Mounting bracket for sensor, quick access type		Y92E-G18
Mounting bracket for E39-R1(S) reflector; M5 threaded stud and nut	—	E39-L7

## Reflectors

Choose an optional reflector for retro-reflective sensors to match your application. Model E39-R1 is included with most sensors; model E39-R1S is supplied with polarized E3F2-R4 models.

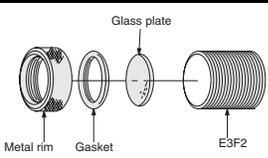
Description	Sensing distance					Dimensions H x W x D (mm)	Model
	E3F2-R2	E3F2-R2R axial	E3F2-R2R radial	E3F2-R4	E3F2-R2Z		
Reflector	0.1 to 4 m	0.1 to 3.7 m	0.1 to 2.4 m	—	0.1 to 3.4 m	59.9 x 40.3 x 7.5	E39-R1
	—	—	—	0.1 to 4.3 m	—		E39-R1S
	0.1 to 4.5 m	0.1 to 4.2 m	0.1 to 2.7 m	0.1 to 4.8 m	0.1 to 3.9 m	84 dia. x 7.4	E39-R7
	0.1 to 5.3 m	0.1 to 5.3 m	0.1 to 3.1 m	0.1 to 5.6 m	0.1 to 5.2 m	100 x 100 x 9	E39-R8
	—	—	—	4.3 m	—	84.5 x 84.5 x 8.7	E39-R40
Tape reflector	—	—	—	2 m	—	70 x 80 x 0.6	E39-RS3

## Connectors and Accessories

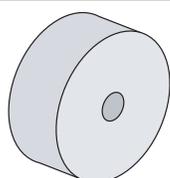
### Connector Cordsets

Description				Model	
Connector type	Keyway	Cable size	Length	Straight connector	Right angle connector
4-wire DC, female socket	Single	22 AWG	2 m (6.56 ft)	XS2F-D421-D80-A	XS2F-D422-D80-A
			5 m (16.40 ft)	XS2F-D421-G80-A	XS2F-D422-G80-A
4-wire DC, female socket, vibration-proof robotic cable			2 m (6.56 ft)	XS2F-D421-D80-R	XS2F-D422-D80-R
			5 m (16.40 ft)	XS2F-D421-G80-R	XS2F-D422-G80-R

### Lens Cap

Description	Appearance	Model
Lens cap prevents dirt, scratches and damage to sensor lens; screw-on cap, glass window	 <p>The diagram illustrates the lens cap assembly. It consists of a metal rim, a gasket, a glass plate, and the E3F2 sensor. The metal rim is shown with a screw-on cap. The gasket is positioned between the metal rim and the glass plate. The glass plate is shown with a central opening for the E3F2 sensor.</p>	E39-F31

### Slits for Through-beam E3F2-10 Sensors

Description	Appearance	Model
Slits (4 mm dia.) for precision detection; one for emitter and receiver	 <p>The diagram shows a cylindrical component with a central hole. This is a slit for precision detection, used for emitter and receiver alignment.</p>	E39-ES18

# General Purpose Photoelectric Sensors E3JM



## AC/DC Universal Supply Voltage Sensor with Terminal Block

- Long sensing distances: 10 m through-beam; 4 m polarized retro-reflective; 70 cm diffuse reflective
- Easy-to-wire terminal block speeds installation and servicing
- High visibility indicators for light incidence and stability
- Relay or transistor output models; Light-ON and Dark-ON operation selectable
- Built-in timer models offer selectable ON-delay, OFF-delay and one-shot
- Conduit opening 1/2-14 NPT; use 5-conductor cable of 6 to 8 mm OD
- Rated IP66
- Mounting hardware and terminal protection cover included
- Retro-reflective models include E39-R1 reflector
- Compact size: 65 H x 25 W x 75 D mm



## Specifications

- Voltage range: 24 to 240 VAC, 50/60 Hz; 12-240 VDC
- Load rating:
  - SPDT relay, 10 mA to 3 A at 250 VAC
  - NPN or PNP open collector output, 100 mA at 48 VDC max.
- Power consumption: 2 W (reflective)
  - 3 W (through-beam)
- Directional angle:
  - 3° to 20° (through-beam)
  - 1° to 5° (retro-reflective)
- Differential distance: 20% max. of sensing distance (diffuse)
- Response time: 30 ms ON/ 30 ms OFF (relay)
  - 5 ms ON/5 ms OFF (transistor)
  - 0.1 to 5 seconds for timer models
- Operating ambient: -25° to 55° C, 45% to 85% RH

## AC/DC Sensors with Terminal Block Connection

Sensing method	Setup	Feature	Light source	Sensing distance	Timer functions	Model
Through-beam		Relay output	Infrared (950 nm)	10 m	No	<b>E3JM-10M4-US</b>
		NPN output			Yes	<b>E3JM-10M4T-US</b>
		PNP output			No	<b>E3JM-10S4-US</b>
					Yes	<b>E3JM-10S4T-US</b>
					No	<b>E3JM-10R4-US</b>
					Yes	<b>E3JM-10R4T-US</b>
Retro-reflective	 Polarized; includes E39-R1 reflector	Relay output	Red (660 nm)	0 to 4 m with E39-R1 reflector (included); Optional reflectors: E39-R2: 0 to 5 m E39-R3: 0 to 3.5 m E39-RS1: 0.2 to 1 m E39-RS2: 0.2 to 1.6 m E39-RS3: 0.2 to 2 m	No	<b>E3JM-R4M4-US</b>
		NPN output			Yes	<b>E3JM-R4M4T-US</b>
		PNP output			No	<b>E3JM-R4S4-US</b>
					Yes	<b>E3JM-R4S4T-US</b>
					No	<b>E3JM-R4R4-US</b>
					Yes	<b>E3JM-R4R4T-US</b>
Diffuse reflective		Relay output	Infrared (950 nm)	0 to 70 cm	No	<b>E3JM-DS70M4-US</b>
		NPN output			Yes	<b>E3JM-DS70M4T-US</b>
		PNP output			No	<b>E3JM-DS70S4-US</b>
					Yes	<b>E3JM-DS70S4T-US</b>
					No	<b>E3JM-DS70R4-US</b>
					Yes	<b>E3JM-DS70R4T-US</b>

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket (included with product)	 29.5 H x 54.5 W x 22 D	E39-L53
Reflector mounting bracket for E39-R1	59 H x 39.3 W x 12.5 D	E39-L7

## Reflectors

Choose a reflector for E3JM-R retro-reflective sensors to match your application.

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	0 to 4 m	Included with E3JM-R; use E39-L7 mounting bracket	59.9 H x 40.3 W x 7.5 D	E39-R1
	0 to 5 m	—	59.9 H x 80.8 W x 7.5 D	E39-R2
	0 to 3.5 m	Includes mounting bracket	38 H x 22.5 W x 11 D	E39-R3
Adhesive tape back reflector	0.2 to 1 m	—	10 H x 35 W x 0.5 D	E39-RS1
	0.2 to 1.2 m	—	35 H x 40 W x 0.5 D	E39-RS2
	0.2 to 2 m	—	70 H x 80 W x 0.5 D	E39-RS3

# General Purpose Photoelectric Sensors E3JK



## Pre-Wired AC/DC Universal Supply Voltage Sensor

- Sensing distances: 5 m through-beam; 4 m retro-reflective or 2.5 m polarized retro; 0.3 m diffuse reflective
- Relay output models stocked; transistor output models available
- Separate Light-ON and Dark-ON operation models
- Polarized retro-reflective models accurately detect shiny objects
- Pre-wired with 2 m cable
- Models include mounting hardware
- Retro-reflective models include E39-R1 reflector
- Rated IP64
- Compact size: 50 H x 18 W x 50 D mm



## Specifications

- Voltage range: 24 to 240 VAC, 50/60 Hz; 12 to 240 VDC
- Load rating: SPDT relay, 10 mA to 3 A at 250 VAC
  - NPN output, 100 mA at 30 VDC max.
- Power consumption: 2 W (reflective)
  - 3 W (through-beam)
- Directional angle:
  - 3° to 20° (through-beam)
  - 1° to 5° (retro-reflective)
- Differential distance: 20% max. of sensing distance (diffuse)
- Response time: 30 ms ON/30 ms OFF (relay)
  - 5 ms ON/5 ms OFF (transistor)
- Operating ambient: -25° to 55° C, 45% to 85% RH

## Pre-Wired AC/DC Sensors

Sensing method	Setup	Feature	Light source	Sensing distance	Operation	Model
Through-beam		Includes E39-L40 mounting bracket	Infrared (950 nm)	5 m	Light-ON	E3JK-5M1-US
					Dark-ON	E3JK-5M2-US
Retro-reflective		Includes E39-R1 reflector and E39-L40 mounting bracket	Red (660 nm)	0 to 4 m with E39-R1 reflector (included); Optional reflector: E39-R2: 0 to 5 m	Light-ON	E3JK-R2M1-US
					Dark-ON	E3JK-R2M2-US
Retro-reflective		Polarized; includes E39-R1 reflector and E39-L40 mounting bracket		0 to 2.5 m with E39-R1 reflector (included); Optional reflectors: E39-R2: 0 to 3 m E39-R3: 5 mm to 1 m E39-RS1: 0.2 to 0.75 m E39-RS2: 0.2 to 1.2 m E39-RS3: 0.2 to 1.5 m	Light-ON	E3JK-R4M1-US
					Dark-ON	E3JK-R4M2-US
Diffuse reflective		Includes E39-L40 mounting bracket	Infrared (950 nm)	0 to 30 cm	Light-ON	E3JK-DS30M1-US
					Dark-ON	E3JK-DS30M2-US

## Optional Mounting Brackets

Description	Appearance	Model
Sensor mounting bracket (included)	 60 H x 58 W x 22 L	E39-L40
Reflector mounting bracket for E39-R1	59 H x 39.3 W x 12.5 D	E39-L7

## Reflectors

Choose a reflector for E3JK-R retro-reflective sensors to match your application.

Description	Sensing distance		Feature	Dimensions (mm)	Model
	E3JK-R2	E3JK-R4			
Reflector	0 to 2.5 m	0 to 4 m	Included; use E39-L7 mounting bracket	59.9 H x 40.3 W x 7.5 D	E39-R1
	0 to 3 m	0 to 5 m	—	59.9 H x 80.8 W x 7.5 D	E39-R2
	5 mm to 1 m	—	Includes mounting bracket	38 H x 22.5 W x 11 D	E39-R3
Adhesive tape back reflector	0.2 to 0.75 m	—	—	10 H x 35 W x 0.5 D	E39-RS1
	0.2 to 1.2 m	—	—	35 H x 40 W x 0.5 D	E39-RS2
	0.2 to 1.5 m	—	—	70 H x 80 W x 0.5 D	E39-RS3

## General Purpose Photoelectric Sensors

# E3G

Quick Link  
B228

### Long Distance Sensors for Large Workpieces

- Retro-reflective (not polarized) models have a sensing distance of 0.5 to 10 m; E39-R2 reflector supplied
- Distance settable diffuse models have 0.2 to 2 m sensing range and zone mode for precise targeting
- Circuit protection from reversed power supply connection, load short-circuit and mutual interference
- Light-ON/Dark-ON operation, NPN/PNP output are switch selectable
- Relay or transistor output models
- Rated IP67 for water washdown
- Pre-wired (2 m cable), M12 3-pin connector and terminal block models available



### Specifications

- Supply voltage: 10 to 30 VDC; 24-240 VAC/12-240 VDC
- Current consumption: 50 mA (retro); 60 mA (diffuse); 2 W (terminal block)
- Control output; NPN/PNP: 100 mA at 30 VDC, Relay: 3 A at 250 VAC/30 VDC
- Sensitivity adjustment; Retro-reflective: 1-turn potentiometer, Diffuse: Teaching
- Response time; Retro-reflective: 1 ms, Diffuse: 5 ms
- Compact housings; Pre-wired: 67.8 H x 21 W x 47.8 D mm, Connector: 67.8 H x 29 W x 51 D mm, Terminal block: 84.9 H x 29 W x 68 D mm

## General Purpose Photoelectric Sensors

# E3L

Quick Link  
B229

### Laser Sensor for Long Distance Spot Sensing

- Laser sensors detect objects at long distance through small gaps or holes in machinery
- Detect objects as small as 0.1 mm dia. at 30 cm using apertures supplied Class I laser sensors require no additional safety protection
- Long sensing distances:
  - Through-beam: 10 m Class II laser  
2 m Class I laser
  - Diffuse reflective: 20 to 50 cm Class I laser
- Stability indicator and alarm output signal deteriorating conditions



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 50 mA
- Control output; Class II through-beam: NPN open collector output: 100 mA at 24 VDC, Class I sensors: NPN with constant current source: 80 mA at 24 VDC
- PNP open collector: 100 mA at 24 VDC
- Response time: 1 ms ON/OFF for through-beam; 3 ms ON/OFF for diffuse
- Compact housings; Through-beam: 20.4 H x 23 W x 55 D mm, Diffuse: 55 H x 17 W x 50 D mm

## General Purpose Photoelectric Sensors

# E3S-A

Quick Link

B232

### High Performance Small DC Sensors

- Enclosure meets NEMA 4X, 6 and IP67
- User-friendly features for ease of installation and use
- Timer/alarm/turbo aiming tool models available
- Light-ON/Dark-ON, switch selectable
- Mounting bracket E39-L69 supplied with horizontal sensors
- Mounting bracket E39-L70 supplied with vertical sensors
- Polarized retro-reflective sensors include E39-R1 reflector
- Through-beam sensors include both emitter and receiver
- Pre-wired versions have 2 m cable; M12 4-pin connector versions available



### Specifications

- Supply voltage: 10 to 30 VDC
- Current consumption: 30 to 55 mA depending on model
- Control output: NPN or PNP open collector; 100 mA at 30 VDC
- Response time: 0.5 ms max. ON/0.5 ms max. OFF
- Dimensions; Horizontal: 22.3 H x 12.4 W x 40 D mm; 50 D mm with connector, Vertical: 21 H x 12.4 W x 40 D mm; 51.3 D mm with connector

## General Purpose Photoelectric Sensors

# E3C

Quick Link

B233

### Miniature Sensors with Separate Amplifiers Fit Tight Spaces

- Space-saving sensing heads as small as 8 H x 3 W x 15 D mm
- Fast, 1 ms response time
- Light incident indicator on sensor
- Dust-resistant flat lens surface
- Pre-wired sensing heads have 2 m (6.56 ft) cable
- AC amplifiers, available with built-in ON-, OFF- and one-shot delays
- Pre-wired DC amplifier designed for track mounting has alarm output to signal unstable sensing conditions
- DC amplifiers also available in socket mount or front terminal models
- Long sensing distances:
  - Diffuse: 50 or 100 mm
  - Distance settable diffuse:  $30 \pm 3$  mm
  - Through-beam: 100, 200, 300, 500 mm; 1 and 2 m



### Specifications

- Amplifier supply voltage: 12-240 VDC or 100-240 VAC, 50/60 Hz
- Power consumption: 3 W max. (AC); 50 mA max. (DC)
- Control output; Relay, 1 A at 220 VAC; 80 mA transistor output (AC models), NPN, 100 mA at 24 VDC (DC pre-wired), NPN/PNP selectable, 100 mA at 40 VDC (DC front terminal), NPN or PNP, 80 mA at 24 VDC (DC socket mount)
- Response time; Transistor: 1 or 2 ms (switch selectable); 1 ms (DC pre-wired), Relay: 20 ms max.

## General Purpose Photoelectric Sensors

# E3HT

Quick Link  
B235

### Threaded Cylindrical M8 Size Sensor with Built-In DC Amplifier

- Rugged nickel-plated brass housing
- Long sensing distance for size: 1 m through-beam; 3.5 cm diffuse
- Dual output NPN and TTL logic
- Light-ON or Dark-ON models
- Short-circuit and reverse polarity protection
- Through-beam sensors include both emitter and receiver
- Pre-wired versions have 2 m cable; M12 4-pin connector version (diffuse) available
- Rated IP66



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption:
  - 25 mA emitter/15 mA receiver (through-beam)
  - 30 mA (diffuse)
- Control output: NPN, 80 mA
- Response time:
  - 5 ms max. ON/OFF (through-beam)
  - 3 ms max. ON/OFF (diffuse)
- Dimensions: M8 x 30 threaded/40 overall L mm

## General Purpose Photoelectric Sensors

# E3HF

Quick Link  
B236

### Thin Profile Sensor for Small Object Detection

- General-purpose DC sensor just 7 mm thick fits conveyor rails and other tight spaces
- Ideal for packaging, material handling and small parts assembly applications
- Detect objects as small as 0.5 mm dia. using slits (3 pairs included)
- Through-beam: 1 m  
Diffuse reflective: 5 cm
- Top and side through holes for easy mounting
- Rated IP64
- Pre-wired with 2 m cable



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 25 mA emitter/15 mA receiver (through-beam); 30 mA (diffuse)
- Control output: NPN output with pull-up resistor, rated 80 mA at 12 VDC
- Response time:
  - 10 ms max. ON/OFF (through-beam)
  - 6 ms max. ON/OFF (diffuse)
- Dimensions: 28 H x 50 W x 7 D mm

## General Purpose Photoelectric Sensors

# E3JU

Quick Link

B237

### Universal AC/DC Photoelectric Sensors

- General-purpose sensors with contact or MOS FET output switch AC and DC loads
- Popular compact shape for material handling and packaging applications
- Long sensing distances:
  - Through-beam: 25 m, includes both emitter and receiver
  - Polarized retro-reflective: 5 m, includes E39-R1 reflector
  - Diffuse reflective: 1 m or 2 m models
- NEMA 4X, IP67 rated for water wash down
- Timers available
- Sensitivity adjustment standard, all models
- Pre-wired and connector models



### Specifications

- Supply voltage: 24-240 VAC, 50/60 Hz and 12-240 VDC
- Power consumption:
  - Through-beam: 2 W emitter/3.5 W receiver
  - Retro-reflective: 3 W
  - Diffuse reflective: 4 W
- Control output:
  - Relay: SPDT, 3 A at 250 VAC
  - MOS FET relay: 400 mA at 240 VAC/100 VDC
- Response time:
  - Contact: 12 ms ON/12 ms OFF max.
  - MOS FET relay: 8 ms ON/12 ms OFF max.
- Dimensions: 69.5 H x 45.6 W x 36 L mm

## General Purpose Photoelectric Sensors

# E3A2

Quick Link

B238

### Universal AC/DC Sensors with Plug-In Output

- Easy-to-install and service with plug-in interchangeable outputs, terminal strip wiring and conduit opening
- Ideal for general-purpose applications in packaging and material handling
- Long sensing distances:
  - Through-beam: 10 m, includes both emitter and receiver
  - Polarized retro-reflective: 3 m, includes E39-R1 reflector
  - Diffuse reflective: 70 cm
  - Timer delay models available
- Rated NEMA 4X, IP66



### Specifications

- Supply voltage: 24-240 VAC and 12-240 VDC
- Current consumption:
  - Relay output: 0.82 W emitter/1.2 W receiver (through-beam); 1.5 W (retro and diffuse)
  - DC solid state output: same as above
  - AC solid state output: 0.82 VA emitter/1.2 VA receiver (through-beam) 2 VA (retro and diffuse)
- Control output: Plug-in interchangeable units
  - Relay, 3 A at 250 VAC/30 VDC supplied
  - SCR, 200 mA at 250 VAC
  - NPN or PNP complementary, 200 mA at 30 VDC
- Response time:
  - Relay: 15 ms max.
  - DC solid state output: 1 ms max.
  - AC solid state output: 30 ms max.
- Dimensions: 75 H x 26 W x 75.3 D mm

## General Purpose Photoelectric Sensors

# E3B2

Quick Link  
B239

### Universal AC/DC Sensors with Easy-to-Service Plug-In Base

- General-purpose sensors with long ranges for packaging and material handling
- Plug-in base with relay output and conduit opening simplify installation and servicing
- Detect shiny objects and dark objects at long distances:
  - Retro-reflective: 0 to 5 m polarized, 0 to 7 m non-polarized; includes E39-R2 reflector
  - Diffuse reflective: 0 to 2 m or 0 to 3 m
- Access cover protects settings
- Built-in independent timer models available
- Removable sensing head simplifies cleaning



### Specifications

- Supply voltage: 24 to 240 VAC, 12 to 240 VDC universal power supply
- Current consumption: 2 VA (AC), 1.5 W (DC)
- Control output: Relay output rated 3 A at 250 VAC
- Response time: 30 ms max. ON/30 ms max. OFF
- Dimensions: 90.3 H x 36 W x 80.3 D mm

## General Purpose Photoelectric Sensors

# E3K

Quick Link  
B242

### Universal AC/DC Photoelectric Sensors

- Long-range sensors for material handling and door control applications with heavy-duty switching requirements
- Long sensing distances:
  - Retro-reflective: 10 m, includes E39-R1 reflector
  - Diffuse reflective: 2 m
- Clean interior, easy-to-wire terminal strip
- Plug-in replaceable relay output
- Timer modules available
- Rated IP67, NEMA 4X, 6 for washdown



### Specifications

- Supply voltage: 42 to 240 VAC, 24 to 240 VDC
- Power consumption: 10 VA max.
- Control output: Heavy duty DPDT relay, 10 A at 240 VAC
- Response time: 30 ms max. ON/30 ms max. OFF
- Dimensions: 186 H x 89 W x 63 D mm

# Color/Mark Sensors

# E3MC

Quick Link

B243

## Detect Subtle Color Differences with RGB Sensor

- Accurately discriminates colors regardless of workpiece irregularities, background influences, and changes in ambient temperature or brightness of sensing objects using OMRON's unique Free Angle Optics (FAO) technology
- Red, green and blue LED light sources ensure long life and require no separate light source
- ON/OFF and analog output models in 3 sensing configurations:
  - Lensed, 60 ±10 mm sensing distance, 12 mm spot diameter
  - Precision fiber-optic, 20 ±4 mm sensing distance, 3 mm spot diameter
  - Standard fiber-optic (with E32-CC200 cable), 5 mm sensing distance
- Store up to 4 colors in memory then monitor conformity with registered colors on an 8-level bar (detection level) indicator
- Monitor fine or coarse adjustments with threshold level indicators for precise settings
- Tolerates mechanical fluctuations for stable detection with a threshold of ±10 mm for Lensed models and ±4 mm for Fiber-Optic models



- Remote control of color setting from PC or PLC
- Convert color data to analog RGB data using analog output models
- Rugged zinc diecast housing, rated IP66
- M12 connector with 2 meter cable included
- Compact size: 53.2 H x 30.4 W x 98 D mm

## Specifications

- Voltage range: 12-24 VDC (ON/OFF); 24 VDC (analog)
- Load rating: NPN or PNP open collector output, 100 mA at 24 VDC max. (ON/OFF), 1- and 4- output models, 0 to 10 VDC, three independent outputs (analog)
- Current consumption: 100 mA max.
- Directional angle: 15° (lensed); 10° (fiber-optic)
- Response time: 1 ms ON/1 ms OFF; 40 ms OFF-delay timer (ON/OFF), 1.7 ms (analog)
- Operating ambient: -20° to 55° C, 35% to 85% RH (ON/OFF), 0° to 50° C, 35% to 85% RH (analog)

## RGB Color Sensors with ON/OFF Outputs

Sensing method	Setup	Feature	Light source	Sensing distance	Number of outputs	Model
Diffuse, lensed		NPN output	Red (680 nm), Green (525 nm), and Blue (450 nm) LEDs	60 ±10 mm	1	<b>E3MC-A11</b>
					4	<b>E3MC-MA11</b>
		PNP output			1	<b>E3MC-A41</b>
					4	<b>E3MC-MA41</b>
Diffuse, dedicated fiber-optic sensing head		NPN output		20 ±4 mm	1	<b>E3MC-X11</b>
					4	<b>E3MC-MX11</b>
		PNP output			1	<b>E3MC-X41</b>
					4	<b>E3MC-MX41</b>
Amplifier for E32-series fiber-optic sensing heads		NPN output		5 mm with diffuse head E32-CC200; 200 mm with through-beam head E32-T16	1	<b>E3MC-Y11</b>
					4	<b>E3MC-MY11</b>
		PNP output			1	<b>E3MC-Y41</b>
					4	<b>E3MC-MY41</b>

## RGB Color Sensors with Analog Outputs

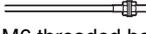
Sensing method	Setup	Feature	Light source	Sensing distance	Number of outputs	Model
Diffuse, lensed		0 to 10 VDC analog output	Red (680 nm), Green (525 nm), and Blue (450 nm) LEDs	60 ±10 mm	3	E3MC-A81
Diffuse, dedicated fiber-optic sensing head				20 ±4 mm		E3MC-X81
Amplifier for E32-series fiber-optic sensing heads				5 ±1 mm with diffuse head E32-CC200		E3MC-Y81

## E32-Series Fiber-Optic Sensing Heads

The sensing heads with plastic fiber cores and plastic sheaths shown below. The cable can be cut to length in the field using a fiber-optic cutter supplied with each cable.

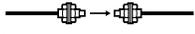
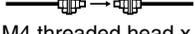
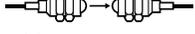
### Diffuse Sensing Heads/Cables

Differentiate eleven colors at the distances shown below. For a typical example, nine colors are discriminated at a sensing distance of 12 mm.

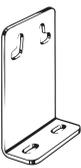
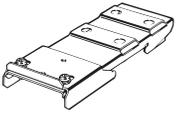
Application	Features	Appearance	Sensing distance	Model
General purpose	Compact threaded head; 25 mm bending radius; 1 mm ID fiber	 M6 threaded head x 14 mm L 2 m cable length	5 mm	E32-DC200
General purpose	Compact threaded head; 25 mm bending radius; 1 mm ID fiber	 M6 threaded head x 17 mm L 2 m cable length		E32-D11L
High-precision positioning	Concentric beam; emitter in the center and a ring of 16 receivers in the 2.5 mm dia. tip; 25 mm bending radius; 1 mm ID fiber; coaxial diffuse	 M6 threaded head x 20 mm L 2 m cable length		E32-CC200
Precise positioning	Concentric beam; emitter in the center and a ring of 16 receivers in the 3 mm dia tip; 25 mm bending radius; 1 mm ID fiber; coaxial diffuse	 3 mm dia. x 15 mm L 2 m cable length	4.5 mm	E32-D32L

### Through-Beam Sensing Heads/Cable

Differentiate red, blue, and yellow films in stable operation at the distances shown below.

Application	Features	Appearance	Sensing distance	Model
General purpose	Compact threaded head; 25 mm bending radius; 1 mm ID fiber	 M4 threaded head x 14 mm L 2 m cable length	30 mm	E32-TC200
Long distance	Compact threaded head; 25 mm bending radius; 1.4 mm ID fiber	 M4 threaded head x 11 mm L 2 m cable length	60 mm	E32-T11L
Area sensing	10 mm wide beam, long sensing distance; 25 mm bending radius; 1 mm ID fiber	 27 H x 8.4 W x 15.5 D mm 2 m cable length	200 mm	E32-T16
Long distance	M14 with magnifying lens extends sensing distance; 25 mm bending radius; 1 mm ID fiber	 M14 threaded head x 23 mm L 10 m cable length	1.1 m	E32-T17L

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, sensor can be inclined to 15°; 304 stainless steel	 70 H x 50 W x 22 D	<b>E39-L114</b>
Adapts sensor for DIN track mounting; 304 stainless steel	 100 H x 37 W x 15 D	<b>E39-L115</b>

## M12 Connector Cordsets

Description				Model
Connector type	Keyway	Cable size	Length	Straight connector
8-wire DC, female socket	Single	22 AWG	2 m (6.56 ft)	<b>E39-C1 2M</b>
			5 m (16.40 ft)	<b>E39-C1 5M</b>

## Color/Mark Sensors

# E3S-VS

Quick Link  
B244

### Color Mark Detector, Metal Body

- Accurately detect color marks from background by contrast method
- Red light source models detect most mark/background combinations
- Green light source models detect yellow-on-white and other difficult color combinations
- Diffuse reflective sensing:
  - Green LED: 12 mm or 35 mm
  - Red LED: 50 mm
- Vertical and horizontal mounting types
- Rugged compact diecast body
- Rated IP67, NEMA 4X for water washdown



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 40 mA
- Control output; NPN output: 80 mA at 24 VDC, PNP output: 100 mA at 24 VDC
- Response time: 2 ms ON/OFF
- Dimensions; Horizontal: 23 H x 20.4 W x 66.6 D mm, Vertical: 74.6 H x 20.4 W x 23 D mm

## Color/Mark Sensors

# E3C-V

Quick Link  
B245

### Mark/Pinpoint Object Sensing Head, Separate Amplifier

- Accurately detect color marks against many different backgrounds
- Pinpoint beam sensors detect minute objects, marks, and wires as small as 0.2 mm
- Ideal for parts sensing, color register mark detection, inspection and accurate positioning
- Miniature sensing heads and separate amplifiers fit tight spaces
- Sensing distance:
  - Color mark: 30 ±5 mm (E3C-VS3R); 10 ±2 mm (E3C-VS1G)
  - Pinpoint: 70 ±10 mm (E3C-VS7R); 35 ±5 mm (E3C-VM35R)
- Pre-wired DC amplifiers offer fine sensitivity adjustment and diagnostic alarm output
- AC amplifiers offer both relay and transistor outputs



### Specifications

- Supply voltage (amp): 12 to 24 VDC; 100 to 240 VAC, 50/60 Hz
- Current consumption: 50 mA (DC); 3 VA max. (AC)
- Control output; SPDT output: 1 A, NPN output: 80 mA at 24 VDC, PNP output: 100 mA at 24 VDC
- Response time; 2 ms max. ON/OFF (solid state), 40 ms max. ON/OFF (contact)
- Dimensions; Color mark: 20 H x 10 W x 47 D mm, Pinpoint: 15 H x 10 W x 28 D mm

## Color/Mark Sensors

# E3M-V

Quick Link

B246

### High-Speed Registration Mark Sensor with Teaching

- Fast response
- Sensing distance: 10 ±3 mm
- 1 x 4 mm spot size, in vertical or horizontal orientation
- Pushbutton programming for quick setup
- Remote input for on-the-fly adjustments
- Green LED detects yellow-on-white and other difficult color combinations
- Stable operation even on shiny surfaces
- Rated IP67 for water washdown
- Quick-disconnect M12, single keyway 4-pin connector



### Specifications

- Supply voltage: 10 to 30 VDC
- Current consumption: 100 mA max.
- Control output:
  - NPN, 100 mA, at 30 VDC
  - PNP, 100 mA at 30 VDC
- Response time: 50 μs ON, 70 μs OFF
- Dimensions: 68.5 H x 21 W x 47.7 D mm

## Color/Mark Sensors

# E3X-NL

Quick Link

B247

### Glossy Object Detector, Fiber-Optic Sensing Heads

- Detects minute differences in glossiness, the Sensor is not affected by colors and patterns
- Sensing distance:
  - Short-range/small spot: 10 ±3 mm; ±4° inclination from mounting hole
  - Long-range: 20 ±7 mm; ±7° inclination from mounting hole
- Teaching system ensures easy setup at the press of a button
- Fiber-optic sensing heads available in short-range/small spot and long-range models
- Uses the pulse-ON system to minimize the influence of external light interference
- Fuzzy Teaching function enhances detection reliability
- Amplifier and sensing heads rated IP50



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 100 mA
- Control output: NPN open collector, 100 mA at 30 VDC
- Response time: 2 ms max. ON/OFF
- Dimensions:
  - Amplifier: 33 H x 32.2 W x 65.2 D mm
  - Short range sensor: 29 H x 10.4 W x 29 D mm
  - Long range sensor: 42 H x 20.4 W x 47 D mm

## Color/Mark Sensors

# E3Z-G

Quick Link  
B268

### Slotted Edge Control/Mark Detector, Plastic Body

- Slotted head eliminates the need for optical axis adjustment
- One or two axes models available
- Ideal for slowdown, then stop applications
- Sensing distance: 25 mm
- CE and UL approved
- Pre-wired or pigtail lead with M12 connector
- Separate outputs on two-axes models



### Specifications

- Supply voltage: 10.8 to 26.4 VDC
- Current consumption: 25 mA max. single; 40 mA max. dual
- Control output:
  - NPN, 100 mA, at 26.4 VDC
  - PNP, 100 mA at 26.4 VDC
- Response time: 2 ms max. ON/OFF
- Dimensions: 11 H x 40 W x 50 D mm

## Color/Mark Sensors

# E3S-GS

Quick Link  
B248

### Slotted, Edge/Registration Sensors

- Easy-to-install sensors for edge, registration and mark detection applications in printing or packaging equipment
- Slotted head eliminates the need for optical axis adjustment
- Fast 1 ms maximum response time ideal for packaging applications
- 1 cm slot model detects marks on transparent film
- 3 cm slot model detects edges, labels and marks
- Sensitivity adjustment standard
- Plastic body 1 cm slot model rated IP65
- Diecast metal body 3 cm slot model rated IP67
- Pre-wired with 2 m cable



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 40 mA max.
- Control output:
  - NPN, 80 mA at 24 VDC
  - PNP, 100 mA at 24 VDC
  - Selectable Light-ON/Dark-ON operation
- Response time: 2 ms max. ON/OFF
- Dimensions:
  - E3S-GS1: 52 H x 20 W x 73 D mm
  - E3S-GS3: 20 H x 52 W x 79 D mm

# Background/Foreground Suppression Sensors E3Z-LS



## Miniature Distance Settable Sensors with Built-In Amplifiers

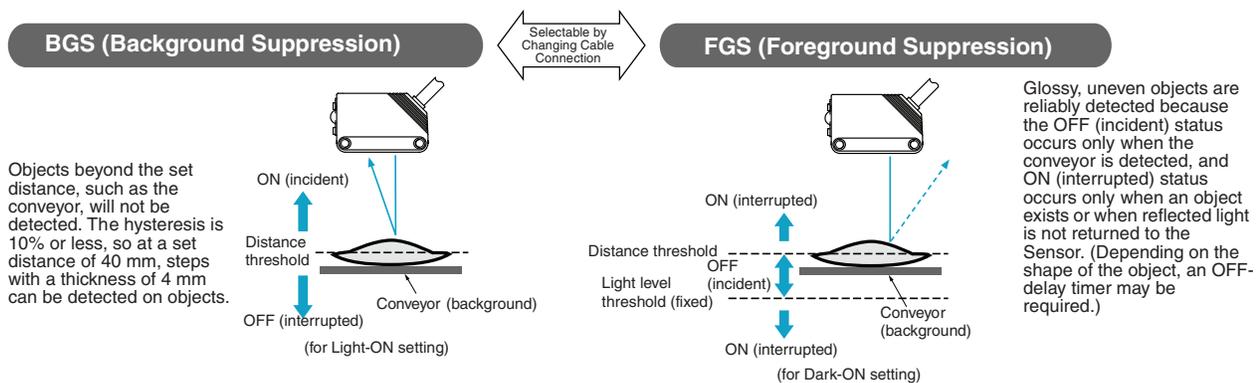
- Detect glossy/uneven surfaces with foreground suppression
- Ignore objects beyond the set distance such as a conveyor belt or rail using background suppression
- Web/edge position detection sensors (E3Z-LS63/-LS83) with 2 mm spot eliminate background influences in printing, converting and packaging
- Detect presence of strip and sheet materials and non-woven fabric edges with 2% max. differential travel to compensate for vibration (E3Z-LS63/-LS83)
- Integrated circuit design with advanced LED assures long sensing distances
- High noise immunity against interference from inverters and other inductive loads
- Rated IP67, withstands 1200 psi washdown
- Switch-selectable, Light-ON/Dark-ON operation
- M8 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available
- Compact size: 31 H x 10.8 W x 20 D mm; 41.4 H mm with connector



## Specifications

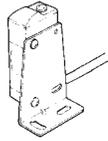
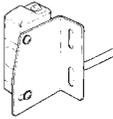
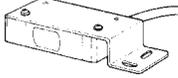
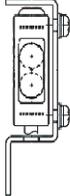
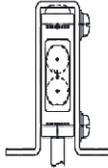
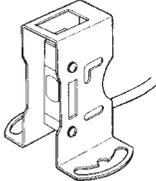
- Voltage range: 12-24 VDC • Load rating: 100 mA at 26.4 VDC max., Current consumption: 30 mA max. • Response time: 1 ms max. • Circuit protection: Power source reverse polarity, Output reverse polarity, Short-circuit, Mutual interference
- Operating ambient: -25° to 55° C, 35% to 85% RH

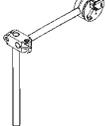
## Background/Foreground Suppression Sensors



Sensing method	Shape	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Distance settable		Resists interference from fluorescent lighting	Red (680 nm)	Background setting 20 to 200 mm	Pre-wired	E3Z-LS61	E3Z-LS81
				Foreground setting 40 to 200+ mm	4-pin M8 connector	E3Z-LS66	E3Z-LS86
		Web/edge position detector	Red (650 nm)	Background setting 2 to 80 mm	Pre-wired	E3Z-LS63	E3Z-LS83
					4-pin M8 connector	E3Z-LS68	E3Z-LS88

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		E39-L104
L-bracket, vertical		E39-L44
Open top, 20° angle adjustability		E39-L43
Protected top 5° angle adjustability		E39-L144
Compact vertical protective cover bracket		E39-L142
Vertical protective cover bracket		E39-L98

Description	Appearance	Model
Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable		E39-L93FH
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees		E39-L93FV
Adjustable height and angle bracket for sensors; fixed horizontal base mounting		E39-L93H
Adjustable height and angle bracket for sensors; fixed vertical base mounting		E39-L93V
Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post		E39-L93XY

## Connectors and Accessories

### Connector Cordsets

Connector size	Cable type	Compatible sensors	Connector type	Cable length	Model*
M8	Four-wire	E3Z-□□6, E3Z-□□□-M3J	Straight	2 m (6.56 ft)	XS3F-M421-402-A
				5 m (16.40 ft)	XS3F-M421-405-A
			Right angle	2 m (6.56 ft)	XS3F-M422-402-A
				5 m (16.40 ft)	XS3F-M422-405-A
	Three-wire	E3Z-□□□-M5J	Straight	2 m (6.56 ft)	Y96E-M833SD2
				5 m (16.40 ft)	Y96E-M833SD5
M12	Four-wire	E3Z-□□□-M1J	Straight	2 m (6.56 ft)	Y96E-44SD2
				5 m (16.40 ft)	Y96E-44SD5
			Right angle	2 m (6.56 ft)	Y96E-44RD2
				5 m (16.40 ft)	Y96E-44RD5

\* Available in the US. In Canada please see "Cordsets" Section.

# Background/Foreground Suppression Sensors E3S-CL



## Compact Metal Body Sensor with Simplified Distance Setting

- Sensor delivers stable detection regardless of target workpiece color, material or size
- Standard and long distance models:
  - 5 to 200 mm sensing distance with 40 to 200 mm setting range (standard);
  - 5 to 500 mm sensing distance with 50 to 500 mm setting range (long distance)
- Black/white error of only 2% max. (standard) and 10% max. (long distance) for reliable
- Simple to set distance with 6-turn adjuster and indicator
- Switch selectable NPN or PNP output and Light-ON/ Dark-ON operation
- Rugged zinc diecast body rated IP67, NEMA 6P
- Pre-wired with 2 m cable and includes mounting hardware
- Dimensions: 43.7 H x 15.4 W x 40 D mm



## Specifications

- Voltage range: 10-30 VDC
- Load rating: NPN/PNP open collector, 100 mA max.
- Current consumption: 35 mA max. (standard); 50 mA max. (long distance)
- Response time: 1 ms max. (standard); 2 ms max. (long distance)
- Circuit protection:
  - Power source reverse polarity
  - Output short-circuit
  - Mutual interference
- Operating ambient: -25° to 55° C, 35% to 85% RH

## Metal Body Distance Settable Sensors

Sensing method	Shape	Light source	Sensing/setting distance	Connection method	Model
Distance settable diffuse		Red (700 nm)		Pre-wired, 2 m cable	E3S-CL1
		Infrared (860 nm)			E3S-CL2

# Background/Foreground Suppression Sensors

## E3G-L

Quick Link  
B252

### Miniature, Distance Settable Photoelectric Sensors

- Sharply reduces issues of glossiness, inclination and color interference for stable, accurate detection
- Visible red models (E3G-L1) offer 5 to 50 mm sensing range; 30 to 50 mm setting range and 20 to 30 mm minimum setting
- Infrared models (E3G-L3) offer 5 to 200 mm sensing range; 50 to 200 mm setting range and 30 to 50 mm minimum setting
- One-touch teaching for Normal and Zone modes
- NPN and PNP models, Light-ON/Dark-ON operation switch selectable
- Rated IP67 for water washdown with cover attached
- Pre-wired (2 m cable), M8 connector models available



### Specifications

- Supply voltage: 10 to 30 VDC
- Current consumption: 50 mA (retro); 60 mA (diffuse)
- Control output: 100 mA at 30 VDC
- Response time: 1.5 ms ON/1.5 ms OFF
- Compact housings:
  - Pre-wired: 44.6 H x 18.4 W x 30 D mm
  - Connector: 53.7 H x 18.4 W x 30 D mm

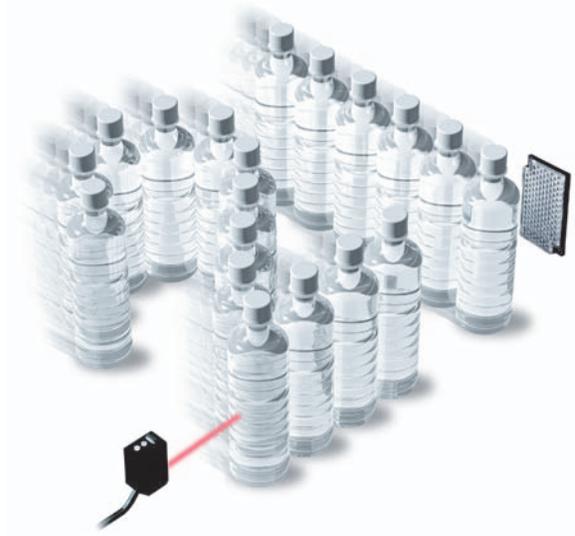
# Photoelectric Sensor Solutions for Packaging

## E3Z-B

Quick Link  
B271

### Transparent PET Bottle Detection Photoelectric Sensor

- Reliably detects PET and thin wall plastic bottles with complex geometries that fool other polarized retro-reflective sensors
- Detect various shapes of PET bottles from 500-ml to 2-liter size
- Eliminates missed product, miscounts, jams, mislabeling or marking, inconsistent packaging
- Short range model detects single bottles, from 80 to 500 mm
- Long range model detects multiple or "stacked" bottles on conveyors or across accumulators, from 0.1 to 2 m
- Unique "Inner View Optics" focus and intensify emitted light in a precise pattern eliminating the influences of extra light energy that can cause unreliable detection
- Compact size: 31 H x 10.8 W x 20 D mm; 41.4 H mm with connector
- Rated IP67, withstands 1200 psi washdown
- Switch-selectable, Light-ON/Dark-ON operation
- M8 connector-ready and 2 m, pre-wired models
- Order standard E39-R1S or fog-proof E39-R1K reflector separately



## Specifications

- Voltage range: 12-24 VDC
- Load rating: 100 mA at 26.4 VDC max.
- Current consumption: 30 mA max.
- Response time: 1 ms max.
- Circuit protection:
  - Power source reverse polarity
  - Output reverse polarity
  - Short-circuit
- Operating ambient: -25° to 55° C, 35% to 85% RH

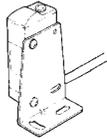
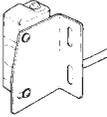
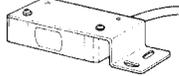
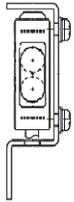
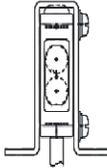
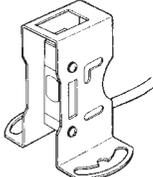
## PET Plastic Bottle Detection Sensors

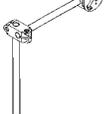
Sensing method	Shape	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Retro-reflective		Non-polarized	Red (680 nm)	80 to 500 mm	Pre-wired	E3Z-B61	E3Z-B81
					4-pin M8 connector	E3Z-B66	E3Z-B86
				0.1 to 2 m	Pre-wired	E3Z-B62	E3Z-B82
					4-pin M8 connector	E3Z-B67	E3Z-B87

## Reflectors

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	80 to 500 mm and 0.1 to 2 m	For polarized light source	59.9 H x 40.3 W x 7.5 D	E39-R1S
		Fog-proof coating	59.9 H x 40.3 W x 7.5 D	E39-R1K
Reflector mounting bracket	—	304 stainless steel	60 H x 45 W x	E39-L96

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		E39-L104
L-bracket, vertical		E39-L44
Open top, 20° angle adjustability		E39-L43
Protected top 5° angle adjustability		E39-L144
Compact vertical protective cover bracket		E39-L142
Vertical protective cover bracket		E39-L98

Description	Appearance	Model
Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable		E39-L93FH
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees		E39-L93FV
Adjustable height and angle bracket for sensors; fixed horizontal base mounting		E39-L93H
Adjustable height and angle bracket for sensors; fixed vertical base mounting		E39-L93V
Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post		E39-L93XY

## Connectors and Accessories

### Connector Cordsets

Connector size	Cable type	Compatible sensors	Connector type	Cable length	Model*
M8	Four-wire	E3Z-□□6, E3Z-□□□-M3J	Straight	2 m (6.56 ft)	XS3F-M421-402-A
				5 m (16.40 ft)	XS3F-M421-405-A
			Right angle	2 m (6.56 ft)	XS3F-M422-402-A
				5 m (16.40 ft)	XS3F-M422-405-A
	Three-wire	E3Z-□□□-M5J	Straight	2 m (6.56 ft)	Y96E-M833SD2
				5 m (16.40 ft)	Y96E-M833SD5
Right angle			2 m (6.56 ft)	Y96E-M833RD2	
			5 m (16.40 ft)	Y96E-M833RD5	
M12	Four-wire	E3Z-□□□-M1J	Straight	2 m (6.56 ft)	Y96E-44SD2
				5 m (16.40 ft)	Y96E-44SD5
			Right angle	2 m (6.56 ft)	Y96E-44RD2
				5 m (16.40 ft)	Y96E-44RD5

\* Available in the US. In Canada please see "Cordsets" Section.

# Photoelectric Sensor Solutions for Packaging

## E3ZM-B



### Transparent PET Plastic Bottle Detection Sensors in a High-Temperature and High-Pressure Washdown Environment

- Includes Bi-refringent, P-opaques sensing technology to provide the margin necessary to overcome the challenges in geometry, color and contents of PET bottle detection which standard retro-reflective sensors can not perform
- Simple push button teach operation
- Unique AC<sup>3</sup> technology compensates for lens contamination to maintain expected sensor output
- IP69K (DIN 40050-9) compliant sensor housing, suitable for high-temperature, high-pressure jet water spray cleaning applications
- 316L stainless steel body resists detergents and disinfectants used for in-situ cleaning of food-processing or beverage filling machinery
- Shape and markings designed for greater hygiene; few indentations means less dust and water can collect, and no labels prevents foreign matter contamination
- High noise immunity against interference from inverters and other inductive loads
- M8 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available
- Compact size: 31 H x 10.8 W x 21 D mm; 41.4 H mm with connector



### Specifications

- Voltage range: 10-30 VDC
- Load rating: 100 mA at 30 VDC max.
- Current consumption: 15 mA max.
- Circuit protection: Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection
- Operating ambient: -40° to 60° C, 35% to 85% RH

### Sensor Type

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Retro-reflective with MSR function		Purchase reflector separately	Red (650 nm)	0.1 to 500 mm using required E39-RP1 reflector	Pre-wired	E3ZM-B61	E3ZM-B81
					4-pin M8 connector	E3ZM-B66	E3ZM-B86
		Pre-wired			E3ZM-B61-C	E3ZM-B81-C	
		4-pin M8 connector			E3ZM-B66-C	E3ZM-B86-C	

### Reflectors

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	500 mm	For polarized light source	80.0 H x 44.0 W x 8.5 D	E39-RP1

## Optional Mounting Brackets

Appearance	Model (material)	Quantity	Remarks	
	<b>E39-L153</b> (SUS304)	1	Mounting brackets	
	<b>E39-L104</b> (SUS304)			
	<b>E39-L43</b> (SUS304)			Horizontal mounting bracket *
	<b>E39-L142</b> (SUS304)			Horizontal protective cover bracket *
	<b>E39-L44</b> (SUS304)			Rear mounting bracket

Appearance	Model (material)	Quantity	Remarks
	<b>E39-L98</b> (SUS304)	1	Metal protective cover bracket *
	<b>E39-L150</b> (SUS304)	1 set	(Sensor adjuster)  Easily mounted to the aluminum frame rails of conveyors and easily adjusted.
	<b>E39-L151</b> (SUS304)		For vertical angle adjustment
	<b>E39-L144</b> (SUS304)	1	Compact protective cover bracket *

\* Cannot be used for Standard Connector models.

## Connector Cordsets

Connector size	Cable type	Compatible sensor	Enclosure rating	Connector type	Cable length	Model
M8	Four-wire	E3ZM-□□6c	IP67	Straight	2 m (6.56 ft)	<b>XS3F-M421-402-A</b>
					5 m (16.40 ft)	<b>XS3F-M421-405-A</b>
				Right angle	2 m (6.56 ft)	<b>XS3F-M422-402-A</b>
					5 m (16.40 ft)	<b>XS3F-M422-405-A</b>
			IP67 Detergent resistant	Straight	2 m (6.56 ft)	<b>Y96E-S08PVC4S2M-L</b>
					5 m (16.40 ft)	<b>Y96E-S08PVC4S5M-L</b>
				Right angle	2 m (6.56 ft)	<b>Y96E-S08PVC4A2M-L</b>
					5 m (16.40 ft)	<b>Y96E-S08PVC4A5M-L</b>

## Photoelectric Sensor Solutions for Packaging

# E3S-R

Quick Link

B253

### Transparent Film or Bottle Detection Photoelectric Sensor

- Detects clear glass or plastic bottles, and transparent films with simple setup
- Sensing ranges of 0.1 to 1 m (visible red) and 10 to 30 cm (infrared)
- Infrared models detect cylindrical objects (plastic and glass bottles)
- Visible red models excel detecting flat objects (glass plate, wafers, circuit boards)
- Built-in DC amplifier provides PNP or NPN outputs
- Light-ON/Dark-ON operation, selectable
- Vertical and horizontal mounting styles
- Retro-reflective sensors supplied with E39-R1 reflector
- M12 connector and pre-wired with 2 m cable models; all include mounting brackets



### Specifications

- Supply voltage; 10 to 30 VDC, 12 to 24 VDC (E3S-RS1/E3S-RS30)
- Current consumption: 30 mA max.; 40 mA max. (E3S-RS1/E3S-RS30)
- Control output; NPN or PNP, 100 mA max. at 30 VDC, NPN, 80 mA with 1.5 to 4 mA source logic, PNP, 100 mA with 1.5 to 4 mA load logic
- Response time: 1 ms max. ON/1 ms max. OFF
- Dimensions: Pre-wired; 21 H x 12.4 W x 40 or 42.3 D mm (plastic horizontal), 45.3 H x 12.4 W x 21 or 23.3 D mm (plastic vertical), 23 H x 20.4 W x 66.6 D mm (metal horizontal), 74.6 H x 20.4 W x 23 D mm (metal vertical)
- Dimensions: Connector; 21 H x 12.4 W x 50 or 52.3 D mm (plastic horizontal), 51.3 H x 12 W x 21 or 23.3 D mm (plastic vertical)

## Photoelectric Sensor Solutions for Packaging

# E3S-CR

Quick Link

B254

### Transparent Glass/Plastic Bottle Photoelectric Sensor

- Detects clear bottles reliably, even with "lens" effect
- Narrow, precise beam for accurate sensing
- Advanced optics for enhanced reliability
- Sensing distance of 250 mm or 1 m
- Visible red LED for easy alignment
- Watertight IP67 (NEMA 6P) rating
- Rugged die-cast metal housing
- NPN/PNP output switch selectable
- Retro-reflective sensor requires E39-R1 or E39-R6 reflector, ordered separately
- M12 connector or pre-wired with 2 m cable



### Specifications

- Supply voltage: 10 to 30 VDC
- Current consumption: 40 mA
- Control output: 100 mA at 30 VDC; Light-ON/Dark-ON, switch-selectable
- Response time: 1 ms ON/1 ms OFF
- Dimensions; 59.2 H x 20.4 W x 23 D mm (pre-wired), 75 H x 20.4 W x 23 D mm (connector)

## Photoelectric Sensor Solutions for Packaging

# E3S-CD

Quick Link  
B255

### Label Detector Photoelectric Sensor

- Detect labels regardless of label color or luster, bottle color or clarity
- Diffuse sensor detects labels at 40 mm  $\pm$ 10 mm H
- Rated IP67 for washdown
- Fast response time for high-speed production
- Rugged metal body
- NPN or PNP output, Light-ON/Dark-ON operation in one unit (switch selectable)
- M12 connector and pre-wired 2 m cable models



### Specifications

- Supply voltage: 10 to 30 VDC
- Current consumption: 40 mA
- Control output: 100 mA at 30 VDC
- Response time: 1 ms on, 1 ms off
- Dimensions:
  - 59.2 H x 20.4 W x 23 D mm (pre-wired)
  - 75 H x 20.4 W x 23 D mm (connector)

## Photoelectric Sensor Solutions for Packaging

# F3UV

Quick Link  
B256

### UV Power Monitor for Sterilizing and Curing Operations

- Monitor ultraviolet light (UV) intensity or wavelength to maintain effective levels for critical processes
- Compact monitors fit tight inspection spaces on existing machinery
- Built-in amplifier models detect incident UV light power in two ranges (1 to 30 mW/cm<sup>2</sup> or 0.2 to 3 mW/cm<sup>2</sup>) and provide a 1-5 V analog output
- Fiber-optic detection heads and separate amplifiers detect in two ranges (10 to 300 mW/cm<sup>2</sup> or 30 to 300 mW/cm<sup>2</sup>)
- Fiber-optic monitor available with judgment, answer-back and current/voltage analog outputs



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 15 mA (F3UV-A, F3UV-XA); 75 mA (F3UV-XW)
- Control output: 1 to 5 V (F3UV-A, F3UV-XA); 4-20 mA/1-5 V, 100 mA NPN or PNP (F3UV-XW)
- Response time: 300 ms max. (F3UV-A, F3UV-XA); 500 ms max. (F3UV-XW)
- Dimensions: 39.9 H x 16.4 W x 19.4 D mm (Built-in amp F3UV-A), 58 H x 30 W x 98 D mm (Fiber amp F3UV-XW), 30 H x 12 W x 65 D mm (Fiber amp F3UV-XA), 5 dia. x 39 L mm or 10 dia. x 68 L mm (Fiber-optic sensing heads)

# Photoelectric Sensors for Chemical-Washdown

## E3ZM

Quick Link  
B223

### Detergent-Proof Sensors in Food-Grade 316L Stainless Steel

- Resists detergents and disinfectants used for in-situ cleaning of food-processing machinery
- World's first photoelectric sensor in food-grade 316L stainless steel housing
- IP69K (DIN 40050-9) compliant sensor housing, suitable for high-temperature, high-pressure jet water spray cleaning applications
- Shape and markings designed for greater hygiene: few indentations means less dust and water can collect, and no labels prevents foreign matter contamination
- Integrated circuit design with advanced LED assures long sensing distances
- High noise immunity against interference from inverters and other inductive loads
- Switch-selectable, Light-ON/Dark-ON operation
- M8 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available



- Compact size: 32.2 H x 10.8 W x 21 D mm
- Suppress background objects for stable sensing using E3ZM-LS

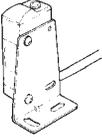
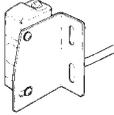
## Specifications

- Voltage range: 12-30 VDC
- Load rating: 100 mA at 30 VDC max.
- Current consumption: 25 mA max. (reflective)
  - 20 mA, emitter and receiver (through-beam)
- Response time: 1 ms max.
- Circuit protection:
  - Power source reverse polarity
  - Output reverse polarity
  - Short-circuit
  - Mutual interference (except through-beam)
- Operating ambient: -25° to 55° C, 35% to 85% RH

## 316L Stainless Steel Sensors

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam		Detects 12 mm dia. objects Built-in slits allow 2 mm dia. object detection	Infrared (870 nm)	15 m (49.2 ft)	2 m cable	E3ZM-T61 2M	E3ZM-T81 2M
					M8 4-pin connector	E3ZM-T66	E3ZM-T86
				0.8 m	2 m cable	E3ZM-T63 2M	E3ZM-T83 2M
					M8 4-pin connector	E3ZM-T68	E3ZM-T88
Retro-reflective		Polarized; Order reflector separately	Red (660 nm)	0.1 to 4 m with E39-R1S reflector 0.1 to 3 m with E39-R1 reflector	2 m cable	E3ZM-R61 2M	E3ZM-R81 2M
					M8 4-pin connector	E3ZM-R66	E3ZM-R86
Diffuse reflective		Detects 60 mm square min. object (300 mm, rated value)	Infrared (860 nm)	1 m	2 m cable	E3ZM-D62 2M	E3ZM-D82 2M
					M8 4-pin connector	E3ZM-D67	E3ZM-D87
Distance settable		Background suppression	Red (650 nm)	10 to 100 mm; 4 mm spot dia.	2 m cable	E3ZM-LS61H 2M	E3ZM-LS81H 2M
					M8 4-pin connector	E3ZM-LS66H	E3ZM-LS86H
			Red (660 nm)	10 to 150 mm; 12 mm spot dia.	2 m cable	E3ZM-LS62H 2M	E3ZM-LS82H 2M
					M8 4-pin connector	E3ZM-LS67H	E3ZM-LS87H
				10 to 200 mm; 18 mm spot dia.	2 m cable	E3ZM-LS64H 2M	E3ZM-LS84H 2M
					M8 4-pin connector	E3ZM-LS69H	E3ZM-LS89H

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		E39-L153
L-bracket, horizontal		E39-L104
L-bracket, vertical		E39-L44

## Reflectors

Choose a reflector for E3ZM-R retroreflective sensors to match your application. The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a Reflector other than models E39-R1 or E39-R1S.

Name	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	0.1 to 3 m	For non-polarized light source	59.9 H x 40.3 W x 7.5 D	E39-R1
	0.1 to 4 m	For polarized light source		E39-R1S
	0.1 to 5 m	Double width	59.9 H x 80.8 W x 7.5 D	E39-R2
	0.1 to 2.5 m	Small square reflecting area	42.3 H x 30.9 W x 8 D	E39-R9
	0.1 to 3.5 m	Large square reflecting area	61.4 H x 51.6 W x 8 D	E39-R10
Fog preventive coating	0.1 to 3 m	For non-polarized light source	59.9 H x 40.3 W x 7.5 D	E39-R1K
Small reflector	50 mm to 1.5 m	Includes mounting bracket	38 H x 22.5 W x 11 D	E39-R3
Tape reflector	150 mm to 700 mm	Acrylic face; adhesive back	10 H x 35 W x 0.6 D	E39-RS1
	150 mm to 1.1 m		35 H x 40 W x 0.6 D	E39-RS2
	150 mm to 1.4 m		70 H x 80 W x 0.6 D	E39-RS3

## Connectors

Connector size	Cable type	Compatible sensor	Enclosure rating	Connector type	Cable length	Model
M8	Four-wire	E3ZM-□□6	IP67	Straight	2 m (6.56 ft)	XS3F-M421-402-A
					5 m (16.40 ft)	XS3F-M421-405-A
				Right angle	2 m (6.56 ft)	XS3F-M422-402-A
					5 m (16.40 ft)	XS3F-M422-405-A
			IP67 Detergent resistant	Straight	2 m (6.56 ft)	Y96E-S08PVC4S2M-L
					5 m (16.40 ft)	Y96E-S08PVC4S5M-L
				Right angle	2 m (6.56 ft)	Y96E-S08PVC4A2M-L
					5 m (16.40 ft)	Y96E-S08PVC4A5M-L

## Solutions for Semiconductor Manufacturing

# E3C-T1

Quick Link  
B257

### Wafer Mapping Photoelectric Sensor

- Reliably detect wafers in carriers with a non-laser visible red LED beam
- Safer and more cost-effective than comparable laser products
- Pinpoint beam delivers a visible 1.2-mm-diameter spot at 12 cm; maximum sensing distance is 50 cm
- Turbo setup function makes beam more clearly visible for fast, accurate alignment
- Ultra-high-speed response improves throughput
- Flexible robotics cable makes E3C-T1 ideal for applications requiring remote sensor placement on moving parts
- E3C-T1 includes sensing heads and amplifier; 1 m cable on sensing heads; 2 m cable on amplifier



### Specifications

- Supply voltage: 12-24 VDC
- Current consumption: 50 mA max.; 70 mA in "turbo" setup mode
- Control output: NPN open collector, 100 mA
- Response time: 0.1 ms ON/0.1 ms OFF
- Dimensions:
  - Sensing heads: 14 H x 8 W x 11 D mm
  - Amplifier: 30 H x 14 W x 60 D mm

## Solutions for Semiconductor Manufacturing

# E3C-L11M

Quick Link  
B258

### Glass Plate Mapping Photoelectric Sensor

- Reliably detects edges of glass plates, silicon wafers and plastic memory media
- Sensing distance of  $20 \pm 10$  mm with 0.7 mm thick glass
- Ideal for mapping liquid crystal glass plates on cassette trays
- Detects even when objects shift position to stair-step or fanned arrangement
- Detection not affected by rounded edges or curling
- Robotic cable for repeated flexing
- Compact sensing head fits space-confined installations
- Remote amplifier for easy adjustments
- Built-in 40 ms OFF-delay switch selectable
- Slim amplifier mounts on DIN rail track
- Sensing head and amplifier pre-wired with 2 m cable



### Specifications

- Supply voltage: 12-24 VDC
- Current consumption: 50 mA max.
- Control output: NPN or PNP open collector, 100 mA
- Response time: 0.1 ms ON/0.1 ms OFF
- Dimensions:
  - Sensing heads: 12 H x 50 W x 30 D mm
  - Amplifier: 30 H x 14 W x 60 D mm

# Solutions for Semiconductor Manufacturing

# E3S-LS3N

Quick Link  
B259

## Printed Circuit Board Photoelectric Sensor

- Sensor performs stable detection without being affected by holes or notches in circuit board
- Wide range model suitable for component boards with high or irregularly shaped components
- Compact sensing head with built-in amplifier fits tight spaces
- Unaffected by color
- Elliptical, wide visible beam (6 x 19 mm)
- Two sensing ranges 20 to 35 mm or 10 to 60 mm
- Pre-wired with 2 m cable



## Specifications

- Supply voltage: 12-24 VDC
- Current consumption: 25 mA
- Control output: NPN open collector 100 mA, Light-ON operation
- Response time: 1 ms ON/1 ms OFF
- Dimensions: 37 H x 10 W x 19.3 D mm

# Oil-Resistant Photoelectric Sensors

## E3Z-K

Quick Link

B264

### Oil-Resistant Sensors with Built-In Amplifiers

- Sensor housing includes special coating to resist effects in environments subject to high pH oil mists, coolants and medium pH detergents that aggressively attach sensors
- Long distance sensing: 15 m through-beam models; 3 m retro-reflective; 1 m diffuse-reflective
- High noise immunity against interference from inverters and other inductive loads
- Rated IP67, withstands 1200 psi washdown
- Switch-selectable, Light-ON/Dark-ON operation
- M8 connector-ready and 2 m, pre-wired models
- NPN or PNP output models available
- Compact size: 31 H x 10.8 W x 20 D mm; 41.4 H mm with connector



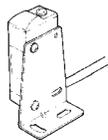
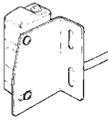
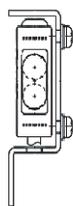
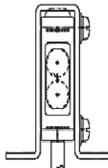
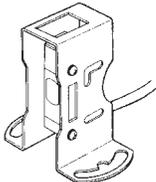
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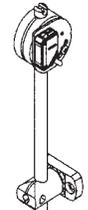
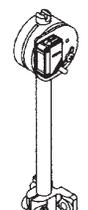
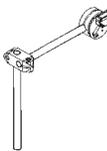
- Voltage range: 12-24 VDC
- Load rating: 100 mA at 26.4 VDC max.
- Current consumption: 30 mA max. (reflective), 15 mA emitter; 20 mA receiver (through-beam)
- Response time: 1 ms max.
- Circuit protection: Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection
- Operating ambient: -10° to 55° C, 35% to 85% RH

### Sensor Type

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam		—	Infrared (870 nm)	15 m	Pre-wired	<b>E3Z-T61K</b>	<b>E3Z-T81K</b>
					Pigtail, 4-pin M8	<b>E3Z-T61K-M3J 0.3M</b>	<b>E3Z-T81K-M3J 0.3M</b>
Retro-reflective		Polarized; Order reflector separately	Red (660 nm)	0.1 to 4 m with E39-R1S reflector	Pre-wired	<b>E3Z-R61K</b>	<b>E3Z-R81K</b>
				0.1 to 3 m with E39-R1 reflector	Pigtail, 4-pin M8	<b>E3Z-R61K-M3J 0.3M</b>	<b>E3Z-R81K-M3J 0.3M</b>
Diffuse reflective		Wide view	Infrared (860 nm)	5 to 100 mm	Pre-wired	<b>E3Z-D61K</b>	<b>E3Z-D81K</b>
					Pigtail, 4-pin M8	<b>E3Z-D61K-M3J 0.3M</b>	<b>E3Z-D81K-M3J 0.3M</b>
		Standard		1 m	Pre-wired	<b>E3Z-D62K</b>	<b>E3Z-D82K</b>
					Pigtail, 4-pin M8	<b>E3Z-D62K-M3J 0.3M</b>	<b>E3Z-D82K-M3J 0.3M</b>

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, horizontal		<b>E39-L104</b>
L-bracket, vertical		<b>E39-L44</b>
Open top, 20° angle adjustability		<b>E39-L43</b>
Protected top 5° angle adjustability		<b>E39-L144</b>
Compact vertical protective cover bracket		<b>E39-L142</b>
Vertical protective cover bracket		<b>E39-L98</b>

Description	Appearance	Model
Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable		<b>E39-L93FH</b>
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees		<b>E39-L93FV</b>
Adjustable height and angle bracket for sensors; fixed horizontal base mounting		<b>E39-L93H</b>
Adjustable height and angle bracket for sensors; fixed vertical base mounting		<b>E39-L93V</b>
Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post		<b>E39-L93XY</b>

## Reflectors

Choose a reflector for E3Z-R retro-reflective sensors to match your application. The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a reflector other than models E39-R1 or E39-R1S.

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	0.1 to 3 m	For non-polarized light source	59.9 H x 40.3 W x 7.5 D	<b>E39-R1</b>
	0.1 to 4 m	For polarized light source		<b>E39-R1S</b>
	0.1 to 5 m	Double width	59.9 H x 80.8 W x 7.5 D	<b>E39-R2</b>
	0.1 to 2.5 m	Small square reflecting area	42.3 H x 30.9 W x 8 D	<b>E39-R9</b>
	0.1 to 3.5 m	Large square reflecting area	61.4 H x 51.6 W x 8 D	<b>E39-R10</b>
Miniature reflector	50 mm to 1.5 m	Includes mounting bracket	38 H x 22.5 W x 11 D	<b>E39-R3</b>
Tape reflector	150 mm to 700 mm	Acrylic face; adhesive back	10 H x 35 W x 0.6 D	<b>E39-RS1</b>
	150 mm to 1.1 m		35 H x 40 W x 0.6 D	<b>E39-RS2</b>
	150 mm to 1.4 m		70 H x 80 W x 0.6 D	<b>E39-RS3</b>

## Slits

Reduce beam size to detect smaller objects more accurately. Order one for emitter, one for receiver.

Slit size	Sensing distance (typical)	Minimum sensing object (typical)	Model
0.5 mm dia.	50 mm	0.5 mm dia.	E39-S65A
1 mm dia.	200 mm	1 mm dia.	E39-S65B
2 mm dia.	800 mm	2 mm dia.	E39-S65C
0.5 × 10 mm	1 m	0.7 mm dia.	E39-S65D
1 × 10 mm	2.2 m	1.2 mm dia.	E39-S65E
2 × 10 mm	5 m	2.4 mm dia.	E39-S65F

## Connector Cordsets

Connector size	Cable type	Compatible sensors	Connector type	Cable length	Model*
M8	Four-wire	E3Z-□□6, E3Z-□□□-M3J	Straight	2 m (6.56 ft)	XS3F-M421-402-A
				5 m (16.40 ft)	XS3F-M421-405-A
			Right angle	2 m (6.56 ft)	XS3F-M422-402-A
				5 m (16.40 ft)	XS3F-M422-405-A
	Three-wire	E3Z-□□□-M5J	Straight	2 m (6.56 ft)	Y96E-M833SD2
				5 m (16.40 ft)	Y96E-M833SD5
M12	Four-wire	E3Z-□□□-M1J	Straight	2 m (6.56 ft)	Y96E-44SD2
				5 m (16.40 ft)	Y96E-44SD5
			Right angle	2 m (6.56 ft)	Y96E-44RD2
				5 m (16.40 ft)	Y96E-44RD5

\* Available in the US. In Canada please see "Cordsets" Section.

# Oil-Resistant Photoelectric Sensors

## E3ZM-C

Quick Link  
B267

### Oil-Resistant, Robust, Compact Photoelectric Sensor with Built-In Amplifier

- Robust 316L stainless steel body is oil and water resistant
- IP69K (DIN 40050-9) compliant sensor housing, suitable for high-temperature, high-pressure jet water spray cleaning applications
- Long distance sensing: 20 m through-beam models; 4 m retro-reflective; 1 m diffuse-reflective; 20 cm BGS reflective
- Through-beam models available with orange LED provide a spot visible from 1 m for easily set up alignment
- High noise immunity against interference from inverters and other inductive loads
- Switch-selectable, Light-ON/Dark-ON operation
- Models available with M12 twist-and-click pre-wired connectors for fast connection; M8 connector-ready and 2 m, pre-wired models also available
- NPN or PNP output models available
- Compact size: 31 H x 10.8 W x 21 D mm; 41.4 H mm with connector



CE **NEW**

## Specifications

- Voltage range: 10-30 VDC
- Load rating: 100 mA at 30 VDC max.
- Current consumption: 25 mA max. (reflective), 20mA emitter; 20 mA receiver (through-beam)
- Circuit protection: Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection
- Operating ambient: -25° to 55° C, 35% to 85% RH

## Sensor type

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
Through-beam		Multi-purpose	Infrared (870 nm)	15 m	Pre-wired (2 m)	E3ZM-CT61	E3ZM-CT81
					M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CT61-M1TJ	E3ZM-CT81-M1TJ
					M8 4-pin connector	E3ZM-CT66	E3ZM-CT86
		Visible LED	Orange (615 nm)	20 m	Pre-wired (2 m)	E3ZM-CT62B	E3ZM-CT82B
					M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CT62B-M1TJ	E3ZM-CT81-M1TJ
					M8 4-pin connector	E3ZM-CT67B	E3ZM-CT86
Retro-reflective		Polarized; Order reflector separately	Red (650 nm)	0.1 to 4 m with E39-R1 reflector	Pre-wired (2 m)	E3ZM-CR61	E3ZM-CR81
					M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CR61-M1TJ	E3ZM-CR81-M1TJ
					M8 4-pin connector	E3ZM-CR66	E3ZM-CR86
Diffuse-reflective		Wide view	Infrared (860 nm)	1 M	Pre-wired (2 m)	E3ZM-CD62	E3ZM-CD82
					M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CD62-M1TJ	E3ZM-CD82-M1TJ
					M8 4-pin connector	E3ZM-CD67	E3ZM-CD87

Sensing method	Setup	Features	Light source	Sensing distance	Connection method	Model	
						NPN output	PNP output
BSG reflective		Resists interference from fluorescent lighting	Red (650 nm)	10 to 100 mm	Pre-wired (2 m)	E3ZM-CL61H	E3ZM-CL81H
					M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CL61H-M1TJ	E3ZM-CL81H-M1TJ
					M8 4-pin connector	E3ZM-CL66H	E3ZM-CL86H
			Red (660 nm)	10 to 150 mm	Pre-wired (2 m)	E3ZM-CL62H	E3ZM-CL82H
					M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CL62H-M1TJ	E3ZM-CL82H-M1TJ
					M8 4-pin connector	E3ZM-CL67H	E3ZM-CL87H
			10 to 200 mm	Pre-wired (2 m)	E3ZM-CL64H	E3ZM-CL84H	
				M12 twist-and-click pre-wired connector (0.3 m)	E3ZM-CL64H-M1TJ	E3ZM-CL84H-M1TJ	
				M8 4-pin connector	E3ZM-CL69H	E3ZM-CL89H	

## Reflectors

Name	E3ZM-CR Sensing distance (typical)*	Model	Quantity	Remarks
Reflector	3 m (100 mm) (rated value)	E39-R1	1	Reflectors are not provided with retro-reflective models.  The MSR function is enabled.
	4 m (100 mm) (rated value)	E39-R1S		
	5 m (100 mm)	E39-R2		
	2.5 m (100 mm)	E39-R9		
	3.5 m (100 mm)	E39-R10		
Small Reflector	1.5 m (50 mm)	E39-R3		

**Note:** When using a Reflector without a rated value, use 0.7 times typical value as a guideline for the sensing distance.

\* Values in parentheses indicate the minimum required distance between the Sensor and Reflector.

## Optional Mounting Brackets

Appearance	Model (material)	Quantity	Remarks	
	E39-L153 (SUS304)	1	Mounting brackets	
	E39-L104 (SUS304)			
	E39-L43 (SUS304)			Horizontal mounting bracket *
	E39-L142 (SUS304)			Horizontal protective cover bracket *
	E39-L44 (SUS304)			Rear mounting bracket

Appearance	Model (material)	Quantity	Remarks
	E39-L98 (SUS304)	1	Metal protective cover bracket *
	E39-L150 (SUS304)	1 set	(Sensor adjuster)  Easily mounted to the aluminum frame rails of conveyors and easily adjusted.
	E39-L151 (SUS304)		For vertical angle adjustment
	E39-L144 (SUS304)	1	Compact protective cover bracket *

\* Cannot be used for Standard Connector models.

## Connector Cordsets

Size	Cable	Appearance	Cable type		Model
M12 (For -M1TJ models)	Standard	Straight 	2 m	4-wire	XS5F-D421-D80-A
			5 m		XS5F-D421-G80-A
M8 (4 pins)		Straight 	2 m		XS3F-M421-402-A
			5 m		XS3F-M421-405-A
		L-shaped 	2 m		XS3F-M422-402-A
			5 m		XS3F-M422-405-A

**Note:** Ask your OMRON representative about connectors with other specifications.

# Oil-Resistant Photoelectric Sensors

## E3S-C

Quick Link  
B262

### Long Distance Sensor in Oil-Resistant, Metal Case

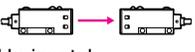
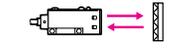
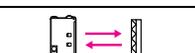
- Long sensing distances: 30 m through-beam; 3 m polarized retro-reflective; 2 m or 0.7 m diffuse reflective
- Rugged zinc diecast housing protects against vibration (10 Hz to 2 kHz) and shock (up to approx. 100 G)
- Meets IP67 and NEMA 4X, 6P for water washdown
- High visibility indicators for light incidence and stability
- Light-ON and Dark-ON operation selectable
- M12, 4-pin connector or 2 m pre-wired models available
- Retro-reflective models include E39-R1 reflector
- Compact size:
  - Side view: 18.5 H x 7 x W x 9.5 D mm;
  - Flat: 19 H x 12 W x 3.5 D mm



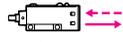
### Specifications

- Voltage range: 10-30 VDC
- Load rating: Selectable NPN or PNP open collector, 100 mA max.
- Current consumption: 20 mA max. (reflective)
  - 12 mA max. emitter; 12 mA receiver max. (through-beam)
- Directional angle:
  - 3° to 15° (through-beam);
  - 3° to 10° (retro-reflective)
- Differential distance: 20% max. of sensing distance (diffuse)
- Response time: 1 ms max.; 2 ms (long-distance diffuse)
- Circuit protection:
  - Power source reverse polarity (all)
  - Output short-circuit (all)
  - Mutual interference prevention (reflective)
- Operating ambient: -25° to 55° C, 35% to 85% RH

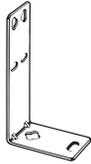
### Metal Body Sensors

Sensing method	Setup	Feature	Light source	Sensing distance	Connection method	Model
Through-beam	 Horizontal	Includes E39-L102 mounting bracket	Infrared (880 nm)	30 m Using E39-S61 slits: 4-mm slit: 15 m 2-mm slit: 7 m 1-mm slit: 3.5 m 0.5-mm slit: 1.8 m	Pre-wired	<b>E3S-CT11</b>
	 Vertical	Includes E39-L103 mounting bracket			Pre-wired	<b>E3S-CT61</b>
Retro-reflective	 Horizontal	Polarized; includes E39-R1 reflector and E39-L102 mounting bracket	Red (700 nm)	0 to 3 m with E39-R1 reflector (included); Optional reflectors: E39-R2: 0 to 4 m E39-R3: 0 to 150 cm E39-R4: 0 to 75 cm E39-RSA: 5 to 35 cm E39-RSB: 5 to 60 cm	Pre-wired	<b>E3S-CR11</b>
	 Vertical	Polarized; includes E39-R1 reflector and E39-L103 mounting bracket			M12 4-pin connector	<b>E3S-CR16</b>
Diffuse reflective	 Horizontal	Includes E39-L102 mounting bracket	Infrared (880 nm)	0 to 70 cm	Pre-wired	<b>E3S-CD11</b>
	 Vertical	Includes E39-L103 mounting bracket			M12 4-pin connector	<b>E3S-CD16</b>
					Pre-wired	<b>E3S-CD61</b>
					M12 4-pin connector	<b>E3S-CD66</b>

## Metal Body Sensors (Continued)

Sensing method	Setup	Feature	Light source	Sensing distance	Connection method	Model
Diffuse reflective (long distance)	 Horizontal	Includes E39-L102 mounting bracket	Infrared (880 nm)	0 to 2 m	Pre-wired	<b>E3S-CD12</b>
					M12 4-pin connector	<b>E3S-CD17</b>
	 Vertical	Includes E39-L103 mounting bracket			Pre-wired	<b>E3S-CD62</b>
					M12 4-pin connector	<b>E3S-CD67</b>

## Optional Mounting Brackets

Description	Appearance	Model
L-bracket, vertical	 75.6 H x 25 W x 41 L	<b>E39-L87</b>
Reflector mounting bracket for E39-R1	59 H x 39.3 W x 12.5 D	<b>E39-L7</b>

## Reflectors

Choose a reflector for E3S-CR retro-reflective sensors to match your application.

Description	Sensing distance	Feature	Dimensions (mm)	Model
Reflector	0 to 3 m	Included with E3S-CR; use E39-L7 mounting bracket	59.9 H x 40.3 W x 7.5 D	<b>E39-R1</b>
	0 to 4 m		59.9 H x 80.8 W x 7.5 D	<b>E39-R2</b>
	0 to 150 cm	Includes mounting bracket	38 H x 22.5 W x 11 D	<b>E39-R3</b>
	0 to 75 cm		23 H x 13.7 W x 4.9 D	<b>E39-R4</b>
Adhesive tape back reflector	5 to 35 cm		10 H x 35 W x 0.7 D	<b>E39-RSA</b>
	5 to 60 cm		35 H x 40 W x 0.7 D	<b>E39-RSB</b>

## Connectors and Accessories

### M12 4-Wire Connector Cordsets

Connector type	Description			Model*	
	Keyway	Cable size	Length	Straight connector	Right angle connector
4-wire DC, female MicroChange® socket	Single	22 AWG	2 m (6.56 ft)	<b>Y96E-44SD2</b>	<b>Y96E-44RD2</b>
			5 m (16.40 ft)	<b>Y96E-44SD5</b>	<b>Y96E-44RD5</b>

\* Available in the US. In Canada please see “Cordsets” Section.

### Slit Kit for Through-Beam E3S-CT Sensors

Reduce beam size to detect smaller objects more accurately. Includes pairs of 0.5, 1, 2, and 4 mm dia. slits, one each for emitter and receiver, and mounting hardware.

Slit width	Sensing distance (typical)	Minimum sensing object (typical)	Model
0.5 mm	1.8 m	0.5 mm dia.	<b>E39-S61</b>
1.0 mm	3.5 m	1.0 mm dia.	
2.0 mm	7 m	2.5 mm dia.	
4.0 mm	15 m	2.6 mm dia.	

# Photoelectric Sensor Accessories

## E39-L/E39-R/E39-S



### Mounting Brackets

- Brackets enhance mounting flexibility
- Protective mounts fortify sensors against contact damage
- Height adjustable and rotating mounts available



### Mounting Brackets

Applicable sensor	Description	Bracket materials	Hardware included	Model			
E3Z, E3Z-B, E3Z-L, E3Z-LS, E3Z-T	Tall L-bracket	304 stainless steel	M3x8 slotted/Phillips screws with spring and plain washers	E39-L153			
	Standard L-bracket, horizontal			E39-L104			
	Horizontal mounting bracket, 20-degree angle adjustability			E39-L43			
	Compact vertical protective cover bracket			E39-L142			
	Rear mounting vertical L-bracket			E39-L44			
	Vertical protective cover bracket			M3x12 slotted/Phillips screws with spring and plain washers	E39-L98		
	Short protective cover bracket, 5-degree angle adjustability				E39-L144		
	Short post mount for E3S-R6 and E3S-R8				304 and XM7 stainless steel, PBT	Post, screws, nut and bolt, holder/bracket	E39-L150
	Tall post mount for E3S-R6 and E3S-R8					E39-L151	
	Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees			E39-L93FH			
Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees	E39-L93FV						
Adjustable height and angle bracket for sensors; fixed horizontal base mounting	E39-L93H						
Adjustable height and angle bracket for sensors; fixed vertical base mounting	E39-L93V						
E3T	Horizontal L-bracket for E3T-S side view sensors	304 stainless steel	Not provided	E39-L116			
	Vertical L-bracket for E3T-S side view sensors			E39-L117			
	Vertical S-bracket for E3T-S side view sensors			E39-L118			
	Vertical L-bracket for E3T-F flat sensors			E39-L119			
	Vertical S-bracket for E3T-F flat sensors			E39-L120			
E3F2	Mounting block for sensor, screw mount	Plastic	M5x32 bolt	Y92E-B18			
	Mounting bracket for sensor, quick access type	Nickel plated brass	Not provided	Y92E-G18S			
E39-R1 reflector	Mounting bracket; M5 threaded stud and nut	Iron	M5 spring washer and nut	E39-L7			
E3S-C	L-bracket, vertical	304 stainless steel	M4x12 hex bolts with spring and plain washers	E39-L87			
E3JK, F3C-AA, F3C-AL	L-bracket	Zinc-plated iron	M4x25 Phillips screws	E39-L40			
E3JM			Not provided	E39-L53			

## Mounting Brackets (Continued)

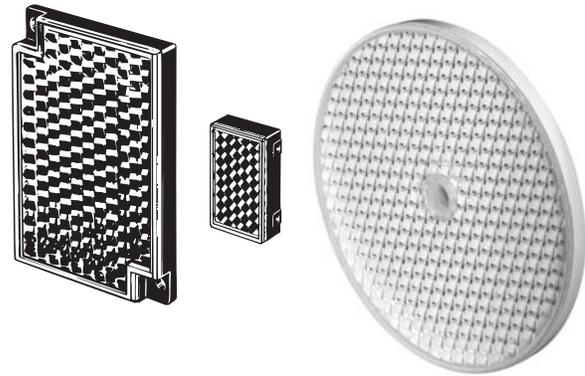
Applicable sensor	Description	Bracket materials	Hardware included	Model
E3G	L-bracket for E3G-R1/E3G-L7	304 stainless steel	M4x25 slotted/Phillips screws with spring and plain washers	E39-L131
	L-bracket for rear mounting E3G-R1/E3G-L7			E39-L132
	L-bracket for E3G-MR/E3G-ML, narrow base		M4x35 slotted/Phillips screws with spring and plain washers	E39-L135
	L-bracket for E3G-MR/E3G-ML			E39-L136
E3L	L-bracket for E3L-2□4-50, E3L-2RC4	Zinc plated iron	M4x12 hex bolts with spring and plain washers	E39-L6
	L-bracket for E3L-DS50E4-50		M4x20 hex bolts with spring and plain washers	E39-L5
E3S-A	L-bracket for horizontal sensors	304 stainless steel	M3x12 slotted/Phillips screws with spring and plain washers	E39-L69
	L-bracket for vertical sensors			E39-L70
E3C	L-bracket for E3C-1 sensing heads (use 2)	Zinc plated iron	M3x14 Phillips screws with spring and plain washers	E39-L41
	L-bracket for E3C-2 (use 2), E3C-DS10, E3C-VS1G, E3C-VS3R sensing heads	Iron, black coating	M3x10 Phillips screws with spring and plain washers	E39-L42
	L-bracket with 10 mm slot for E3C-S10	Zinc plated iron	M2.3x8 Phillips screws and spring washers	E39-L127-T1
	L-bracket with 20 mm slot for E3C-S10			E39-L127-T2
	L-bracket with 30 mm slot for E3C-S10			E39-L127-T3
E3S-B	L-bracket for horizontal sensors	Stainless steel	M3x8 slotted/Phillips screw with spring washer	E39-L71
	L-bracket for vertical sensors			E39-L72
E3HT	Mounting block for sensor, screw mount	Plastic	M4x20 bolt	Y92E-B8
E3JU	L-bracket with 90-degree angle adjustability	Iron	Not provided	E39-LU1
E3A2, E3A2-X	L-bracket		M5 hex bolts and nuts	E39-L34
E3B2	L-bracket with 10-degree angle adjustability			E39-L35
E3K	L-bracket with 90-degree angle adjustability		1/4-20 x 0.55 inch hex bolts	E39-L37
E3S-VS	L-bracket for horizontal sensors		Zinc plated iron	M4x12 hex bolts with spring and plain washers
	L-bracket for vertical sensors	E39-L6		
E3C-V	L-bracket for sensing heads		M3x14 Phillips screws with spring and plain washers	E39-L41
E3M-V	L-bracket with 90-degree angle adjustability	304 stainless steel	M4x25 slotted/Phillips screws with spring and plain washers	E39-L131
	L-bracket			E39-L132
E3X-NL	Bracket for E32-S15 sensing heads, 45-degree angle adjustability	430 stainless steel	Not provided	E39-L109
E3NT	Universal L-bracket	Stainless steel	M5 hex bolts with spring and plain washers	E39-EL1
	L-bracket adapter			E39-EL2
F3C-AA, F3C-AL	L-bracket	Zinc-plated iron	M4 nut	E39-L40
E3G-L	L-bracket for E3G-L□1/-L□2	304 stainless steel	M3x12 slotted/Phillips screws	E39-L139
	L-bracket for E3G-L□5/-L□6			E39-L140
E3X-DA-S, E3X-MDA	L-bracket		Not provided	E39-L143
E3X-DA-N				E39-L143
	L-bracket for water-resistant E3X-DA□V			E39-L148
E3X-NA	L-bracket			E39-L143
	L-bracket for water-resistant E3X-NA□V			E39-L148
E3X, E3X-NH, E3X-N, E3X-NVG	L-bracket			E39-L143

## Mounting Brackets (Continued)

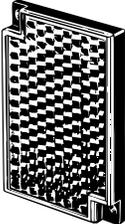
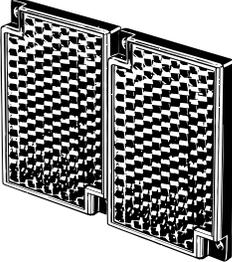
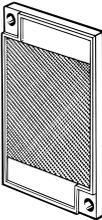
Applicable sensor	Description	Bracket materials	Hardware included	Model
E3S-X3	L-bracket	Zinc plated iron	M4x12 hex bolts with spring and plain washers	<b>E39-L6</b>
E3S-R	L-bracket for horizontal sensors E3S-RS30 and E3S-R1	304 stainless steel	M3x12 slotted/Phillips screws with spring and plain washers	<b>E39-L2</b>
	L-bracket for vertical sensors E3S-RS30 and E3S-R1			<b>E39-L6</b>
	L-bracket for horizontal E3S-R1 and E3S-R3			<b>E39-L69</b>
	L-bracket for vertical E3S-R1 and E3S-R3	304 and XM7 stainless steel, PBT	M3x12 slotted/Phillips screws with spring and plain washers	<b>E39-L70</b>
	Horizontal protective cover bracket for E3S-R1 and E3S-R3			<b>E39-L97</b>
	Vertical protective cover bracket for E3S-R6 and E3S-R8	304 and XM7 stainless steel, PBT	Post, screws, nut and bolt, holder/bracket	<b>E39-L98</b>
	Adjustable height and angle bracket for E3S-R1/R3/R6/R8 sensors; horizontal mounting rotates every 45 degrees			<b>E39-L93FH</b>
	Adjustable height and angle bracket for E3S-R1/R3/R6/R8 sensors; vertical mounting rotates every 45 degrees			<b>E39-L93FV</b>
	Adjustable height and angle bracket for E3S-R1/R3/R6/R8 sensors; fixed horizontal base mounting			<b>E39-L93H</b>
	Adjustable height and angle bracket for E3S-R1/R3/R6/R8 sensors; fixed vertical base mounting			<b>E39-L93V</b>
Short post mount for E3S-R6 and E3S-R8	<b>E39-L150</b>			
Tall post mount for E3S-R6 and E3S-R8	<b>E39-L151</b>			
E3S-CR62/66	L-bracket	304 stainless steel	M4x12 hex bolts with spring and plain washers	<b>E39-L87</b>
E3S-CD63/68	L-bracket, ±20 degree angle adjustment			<b>E39-L113</b>
F3UV	L-bracket for F3UV-A amplifier			M3x25 slotted/Phillips screws, plain washer
E3C-T1	L-bracket for amplifier		Not provided	<b>E39-L143</b>

**Reflectors**

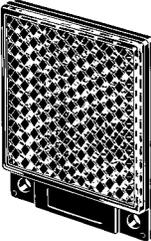
- Corner cube reflectors return maximum light back to the sensor receiver
- Reflectors extend or shorten sensing distance to match installation needs
- Hard acrylic reflectors are backed by ABS plastic
- Easy-to-apply, adhesive-backed reflectors are ultra-thin to save space



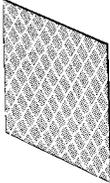
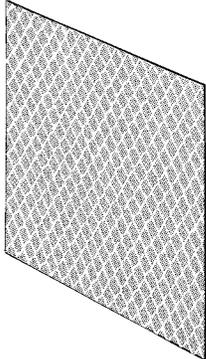
**Hard Acrylic Reflectors**

Appearance	Dimensions H x W x D mm	Compatible sensors	Directional angle	Model
	59.9 x 40.3 x 7.5	E3Z, E3F2, E3JK, E3JM, E3S-CR, E3S-A, E3G, E3S-R	30° min.; 40° with E3JK-R and E3JM-R	<b>E39-R1</b> <b>E39-R1S</b>
	59.9 x 80.8 x 7.5	E3Z, E3F2, E3JK, E3JM, E3S-CR, E3G	30° min.; 40° with E3G-R	<b>E39-R2</b>
	38 x 22.5 x 11	E3Z, E3JK, E3JM, E3S-CR, E3S-A	30° min.	<b>E39-R3</b>
	23 x 13.7 x 4.9	E3T, E3S-CR, E3S-A	2° to 20° min.	<b>E39-R4</b>
	50 x 40 x 4.8	E3S-CR62/E3S-CR68	30° min.	<b>E39-R6</b>

## Hard Acrylic Reflectors (Continued)

Appearance	Dimensions H x W x D mm	Compatible sensors	Directional angle	Model
	84 dia. x 7.4	E3F2	30° min.	E39-R7
	100 x 100 x 9			E39-R8
	42.3 x 30.9 x 8	E3Z		E39-R9
	61.4 x 51.6 x 8			E39-R10
	23 x 13.7 x 1.1	E3T		E39-R37
	84.5 x 84.5 x 8.7	E3F2		E39-R40

## Adhesive-Backed Tape Reflectors

Appearance	Dimensions H x W x D mm	Compatible sensors	Directional angle	Model
	10 x 35 x 0.6	E3Z, E3JK, E3JM	30° min.	E39-RS1
	35 x 40 x 0.6			E39-RS2
	70 x 80 x 0.6	E3Z, E3F2, E3JK, E3JM		E39-RS3
	10 x 35 x 0.7	E3F2, E3S-CR, E3S-A		E39-RSA
	35 x 40 x 0.7			E39-RSB

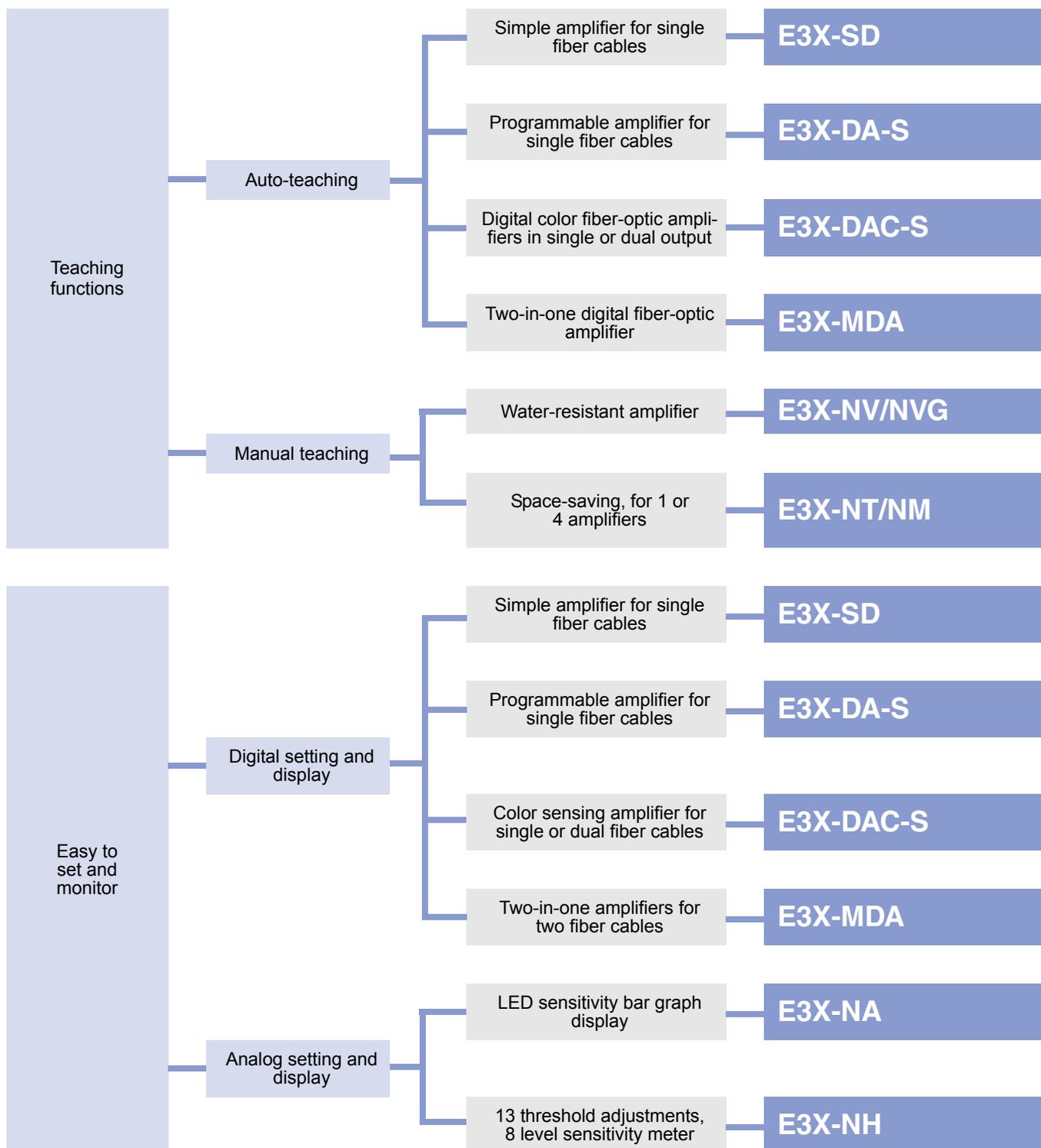


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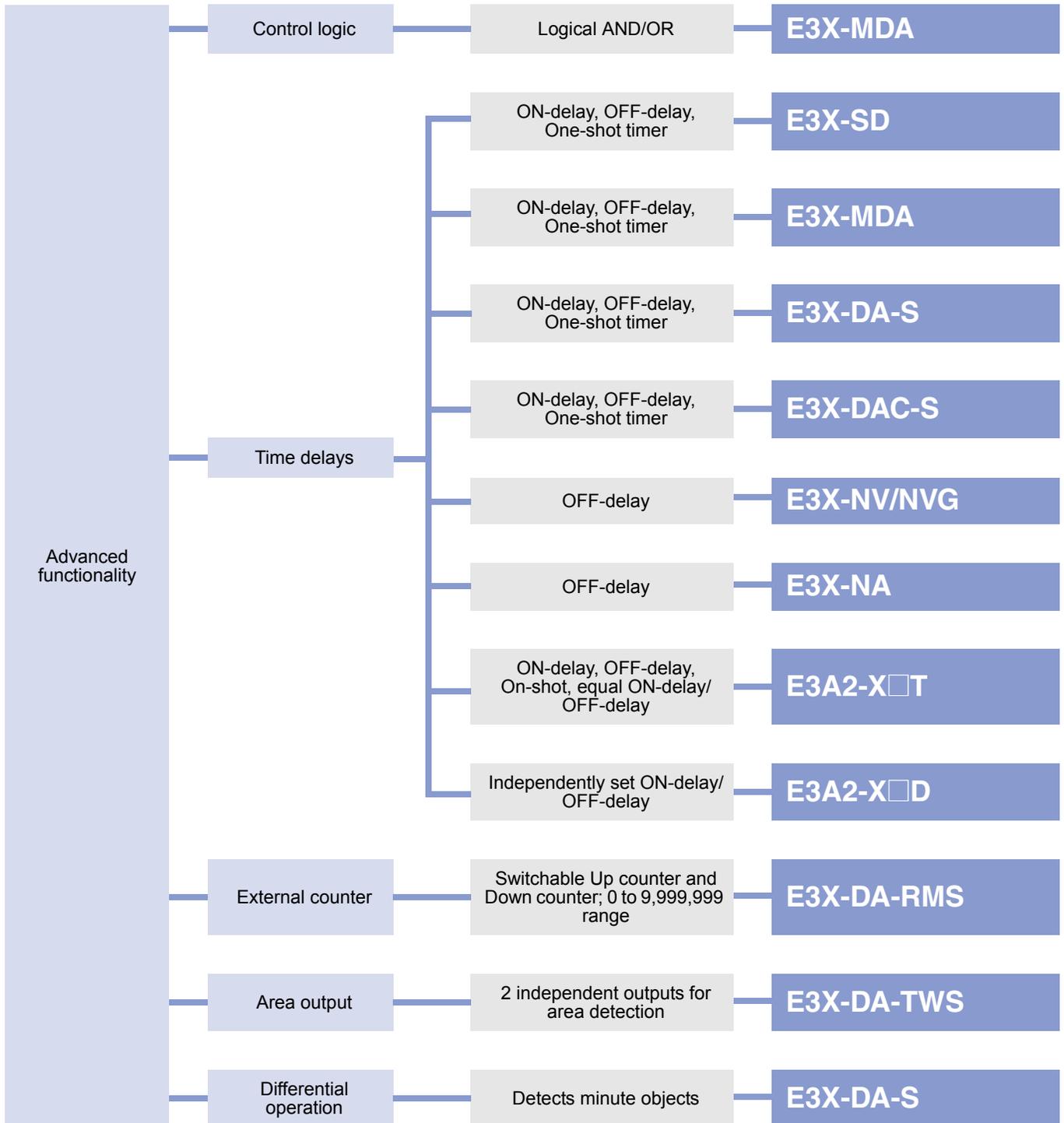
## Selection Guide

### Amplifiers



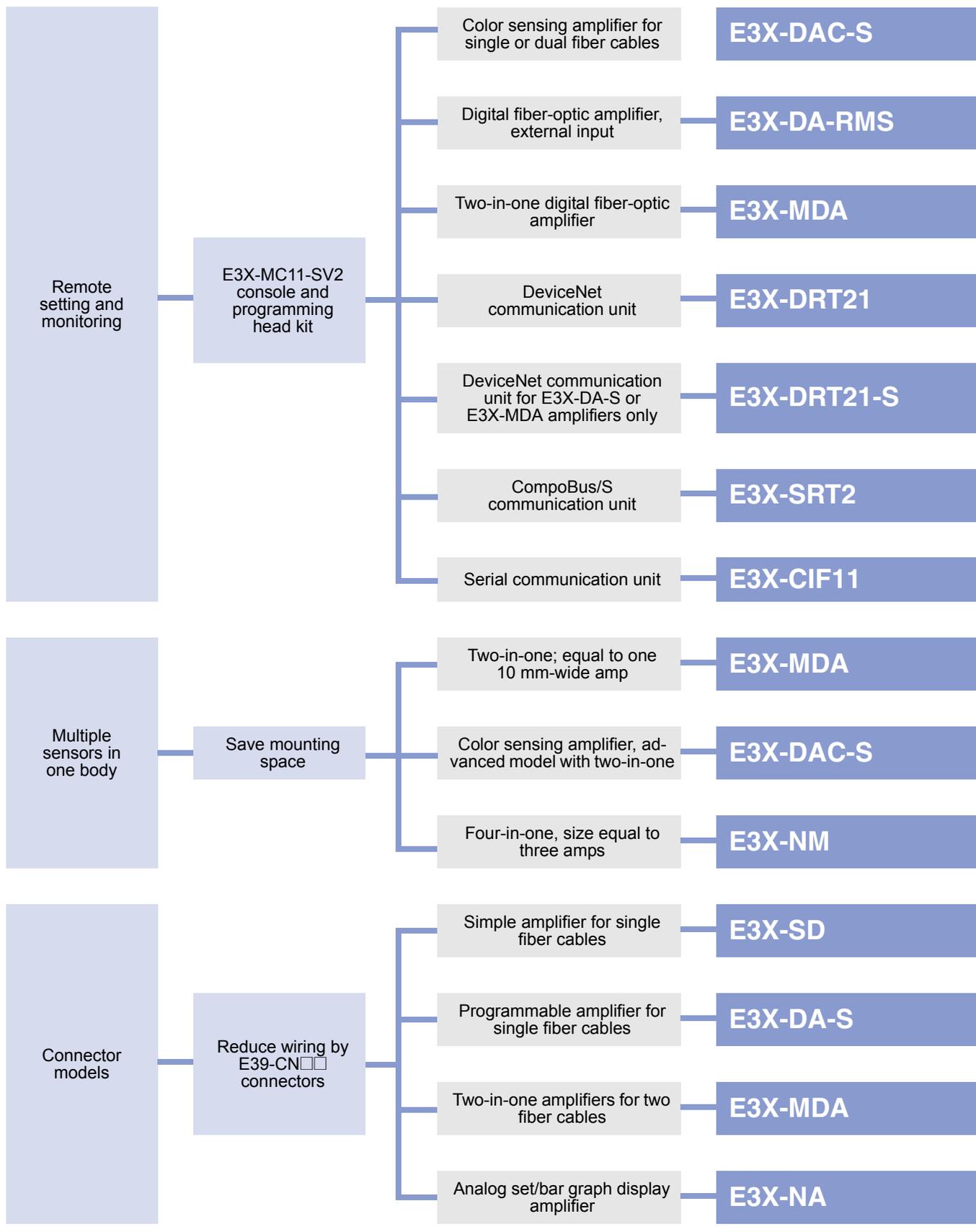
## Selection Guide

### Amplifiers



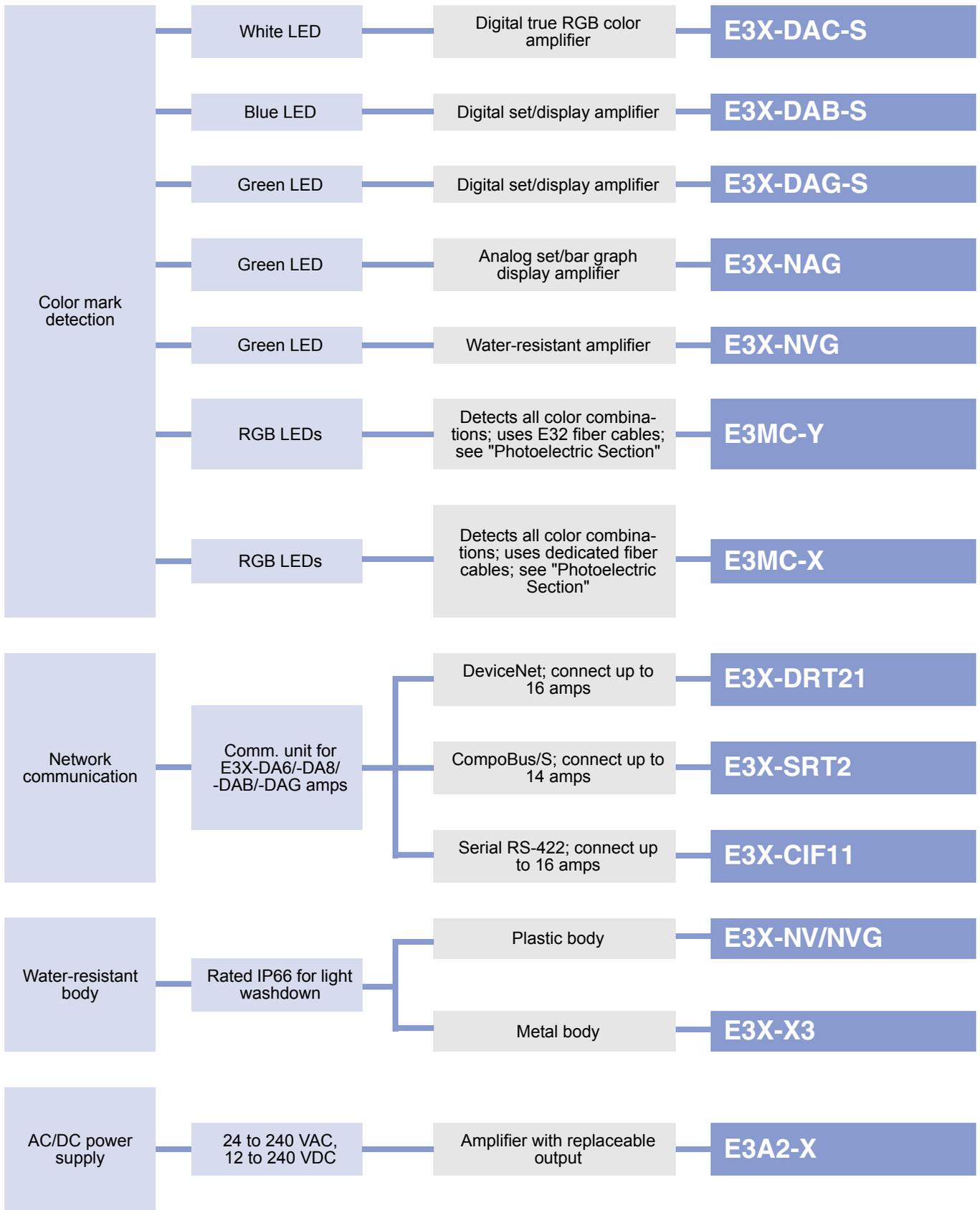
## Selection Guide

### Amplifiers



## Selection Guide

### Amplifiers

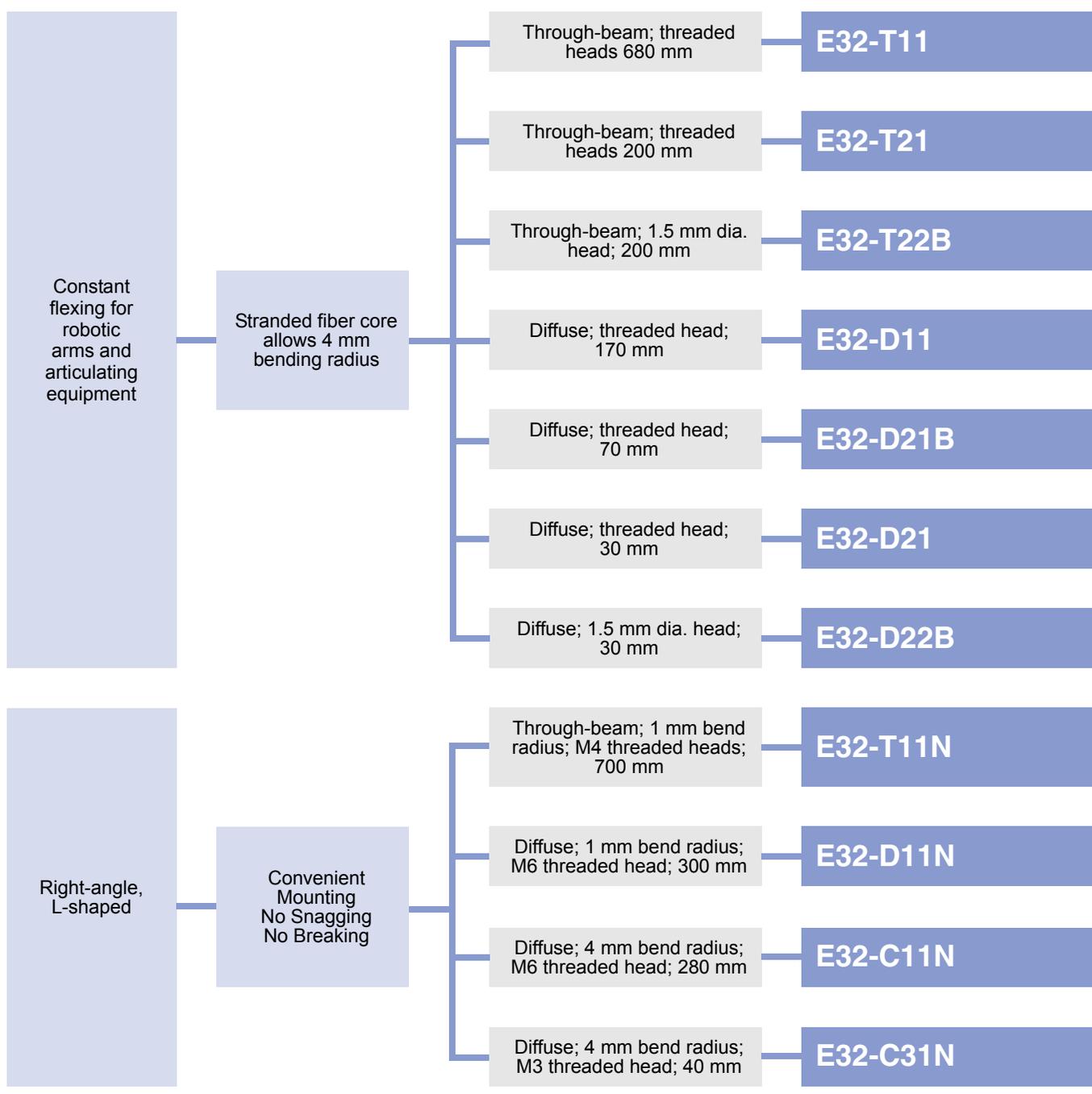


## Selection Guide

### Fiber-Optic Cables and Systems

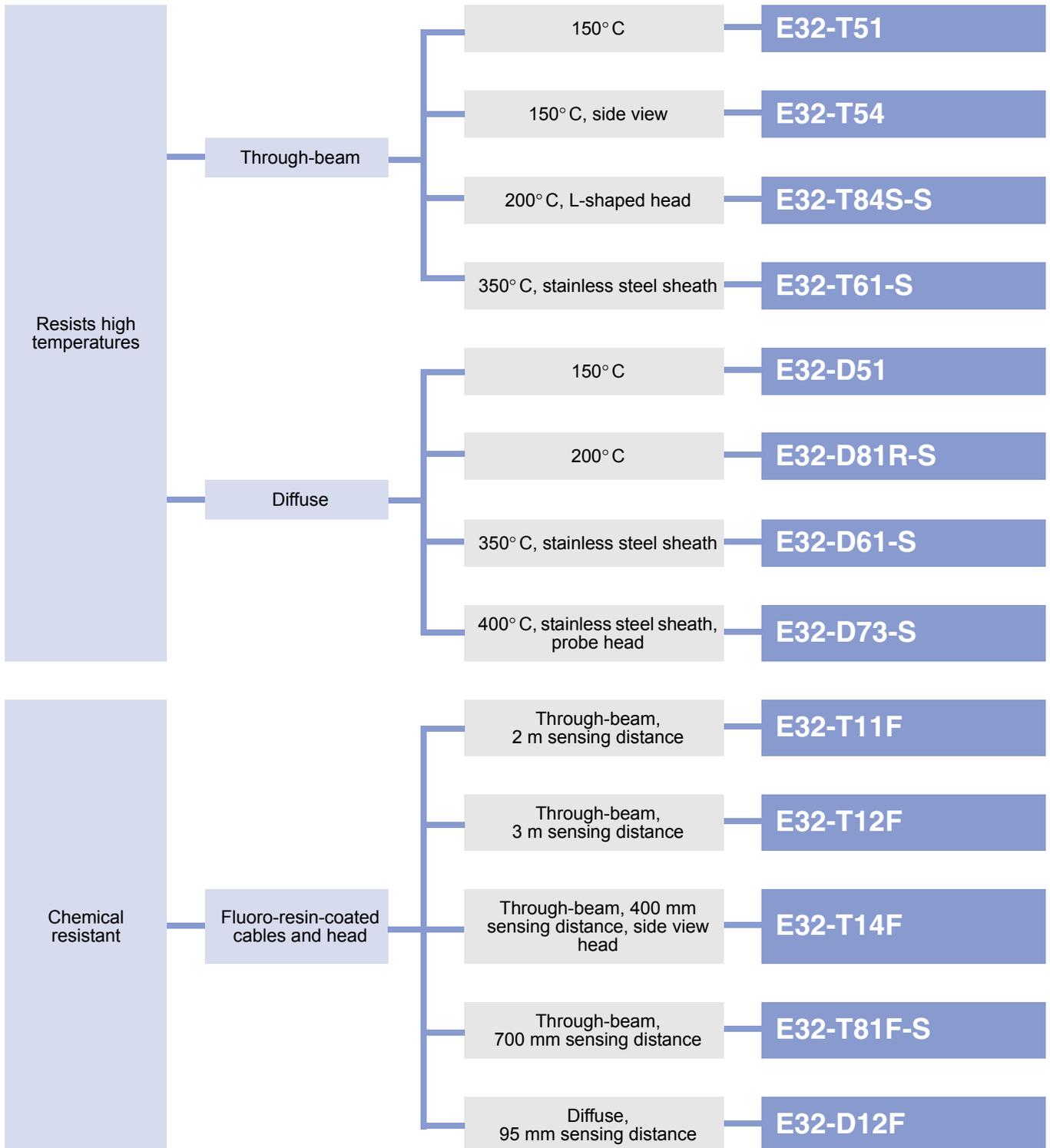
Omron offers over 100 fiber-optic sensor cables. Most have a plastic core and plastic sheath that can be cut to length in the field. They solve many application problems in addition to the special cases detailed below:

- Wide area sensing
- Precise positioning
- Minute object detection
- Background suppression
- Long-range detection of small objects
- Fluid level detection
- Transparent object detection
- Extreme bending for tight installations
- General-purpose space-confined detection



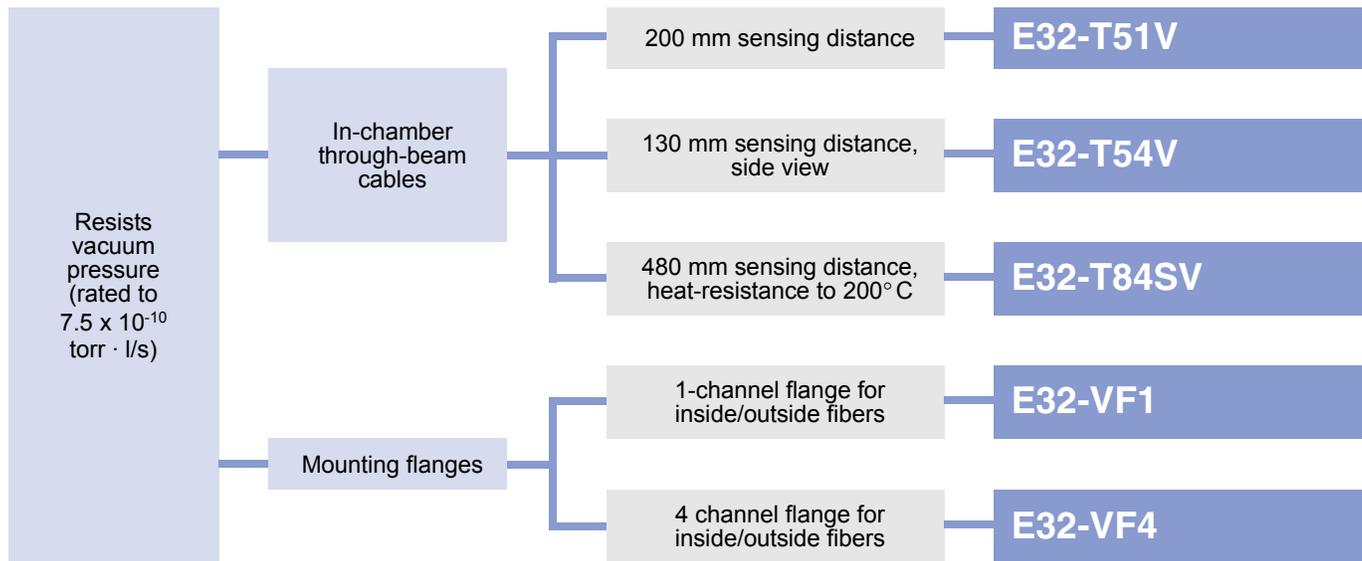
## Selection Guide

### Fiber-Optic Cables and Systems



## Selection Guide

### Fiber-Optic Cables and Systems



# Fiber-Optic Photo Sensors

## E32

Quick Link  
B322

### Fiber-Optic Cables with Sensing Heads Fit Space-Confined Sites

- Over 100 sensing heads/cables available to match your exact requirements
- Sensing distance relies on the combination of fiber-optic cable and amplifier selected
- Fiber-optic sensor solutions cover all automation tasks: basic object detection, positioning, color analysis and high-accuracy sensing
- E32 fiber-optic cables combine with Omron's advanced amplifier models E3X-DA-S, E3X-MDA, E3X-NA and many other series
- Protective spiral tubes (armor), lens adapters to modify sensing distance and direction, and fiber connectors available as accessories



### Specifications

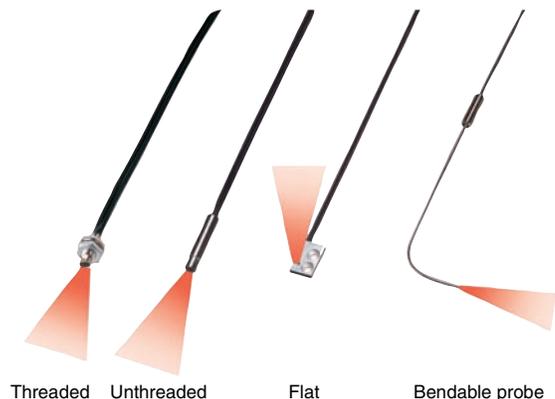
- Sensing distances: All values reference the E3X-DA-S amplifier in standard sensing mode; values vary by amplifier model, light source color and sensing mode
- Dimensions: 1- and 2-mm dia. fiber bundles x 2 m length; cut plastic fibers to desired length, except glass core and armored models
- Operating temperature: -40° to 70°C, unless otherwise noted
- Minimum detectable object: 0.005-mm dia. for most models

### Use Omron's Online Fiber-Optic Selection Tool

Find the right amplifier and fiber-optic cable combination based on a few simple answers.

### Standard Models

- Pliable multi-core cables with 1 mm bending radius
- Standard with 10 or 25 mm bending radius, depending on fiber diameter
- Break-resistant robotic cable with 4 mm bending radius, 1 million flexes minimum
- Fluorine resin coated cable resists degradation from oil adhesion
- Wide variety of shapes for adapting to different installation locations
- Choose the model that suites the installation space from a wide variety of shapes and sizes (7 shapes in standard or small sizes)



## Right-Angle (L-shaped attachment) Models

- L-shaped for space savings, easy mounting and will not snag during setup or routine maintenance
- Innovative sensor head shape accommodates two wrench sizes for quick tightening to mounting bracket

### Through-Beam

#### E32-T11N

(700 mm sensing distance, M4 threaded head, 1 mm bend radius)

#### E32-T11N+

#### E39-F1

(focusing lens, 4 m sensing distance)



### Diffuse

#### E32-D11N

(300 mm sensing distance, M6 threaded head, 1 mm bend radius)

#### E32-C11N

(280 mm sensing distance, M6 threaded head, 4 mm bend radius)

#### E32-C31N

(40 mm sensing distance, M3 threaded head, 4 mm bend radius)

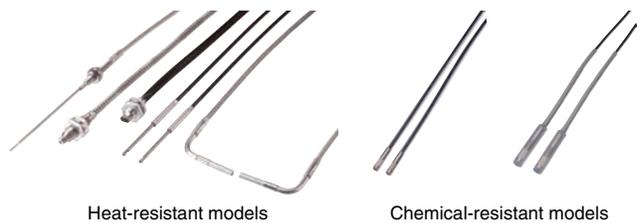
## Special Beam Models

- Long distance, high power
- Ultra-compact, ultra-fine sleeve
- Coaxial beam, small spot
- Fine beam (narrow vision field)
- Area sensing
- Retro-reflective
- Limited-reflective
- Resistant to dust and dirt
- Capable of detecting small workpieces
- Resistant to workpiece vibration
- Use these cables to handle unstable detection conditions



## Harsh Environment Models

- Heat-resistant for high-temperature environments
- Chemical-resistant where cable and/or sensing head are exposed to chemical splatter



## Application-Specific Models

- Label detection
- Liquid-level detection
- Alignment and mapping of glass substrates
- Wafer mapping

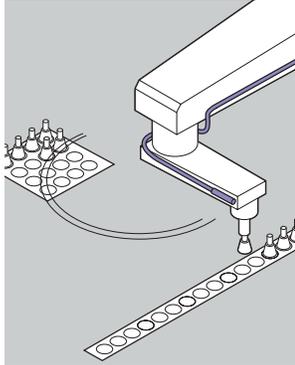


## Over 100 Fiber-Optic Sensor Cables

One exactly matches your requirements

### Constant Flexing Applications

- Special construction resists breaking and enables them to withstand the punishing effects of constant flexing or tight bending
- Stranded fiber core can be bent to a radius as small as 4 mm with no loss in light intensity
- Ideal for use on moving and articulating equipment such as robotic arms



#### Through-Beam

**E32-T11**  
(680 mm sensing distance, M4 threaded head)

**E32-T21**  
(200 mm sensing distance, M3 threaded head)

**E32-T22B**  
(200 mm sensing distance, 1.5 mm dia. head)

#### Diffuse

**E32-D11**  
(170 mm sensing distance, M6 threaded head)

**E32-D21**  
(30 mm sensing distance, M3 threaded head)

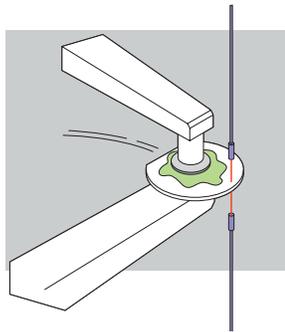
**E32-D21B**  
(70 mm sensing distance, M4 threaded head)

**E32-D22B**  
(30 mm sensing distance, 1.5 mm dia. head)



### Chemical Resistant Applications

- Fluororesin coated fiber optic cables provide long lasting reliability in sensing environments where corrosive fluids and gasses are present
- Designed for use where strong chemicals are manufactured or being used for processing or cleaning



#### Through-Beam

**E32-T11F**  
(2000 mm sensing distance, 7.2 mm dia. head)

**E32-T12F**  
(3000 mm sensing distance, 5 mm dia. head)

**E32-T14F**  
(400 mm sensing distance, 5 mm dia., side view head)

**E32-T81F-S**  
(700 mm sensing distance, 6 mm dia. head, to 200°C)

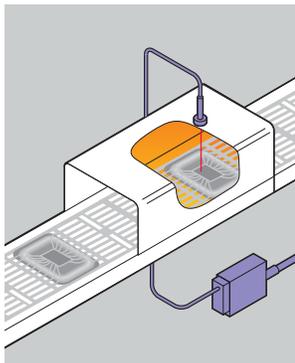
#### Diffuse

**E32-D12F**  
(95 mm sensing distance, 6 mm dia. head)



### High Temperature Applications

- A variety of heat resistant fiber optic cables that can operate reliably in temperatures up to 400°C (752°F)
- Fluororesin and armored stainless steel sheaths protect the fibers for use in ovens and other high heat applications



#### Through-Beam

**E32-T51**  
(760 mm sensing distance, M4 threaded head, to 150°C)

**E32-T54**  
(230 mm sensing distance, 2 mm dia., side view head, to 150°C)

**E32-T61-S**  
(450 mm sensing distance, M4 threaded head, stainless steel sheath, to 350°C)

**E32-T84S-S**  
(1300 mm sensing distance, 3 mm dia. L-shaped head, to 200°C)

#### Diffuse

**E32-D51**  
(230 mm sensing distance, M6 threaded head, to 150°C)

**E32-D61-S**  
(90 mm sensing distance, M6 threaded heads, stainless steel sheath, to 350°C)

**E32-D73-S**  
(60 mm sensing distance, M4 threaded head, stainless steel probe, to 400°C)

**E32-D81R-S**  
(90 mm sensing distance, M6 threaded head, to 200°C)

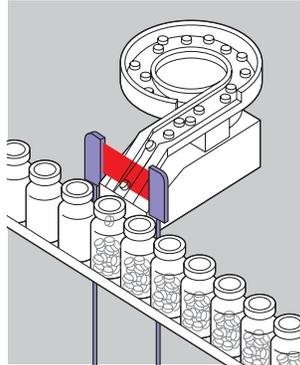


## Over 100 Fiber-Optic Sensor Cables cont.

One exactly matches your requirements.

### Wide Area Sensing Applications

- Ideal for applications that require a larger target area for sensing small, randomly positioned objects
- Project a wide plane of light that can detect very small objects anywhere within the width of the beam
- Use for detecting pills in packaging and similar applications



#### Through-Beam

##### E32-M21

(610 mm sensing distance, four M3 heads)

##### E32-T16

(2800 mm sensing distance, 10 mm wide beam)

##### E32-T16P

(1100 mm sensing distance, 11 mm wide beam)

##### E32-T16W

(1800 mm sensing distance, 30 mm wide beam)

##### E32-T16J

(1000 mm sensing distance, 11 mm wide beam, side view)

#### Diffuse

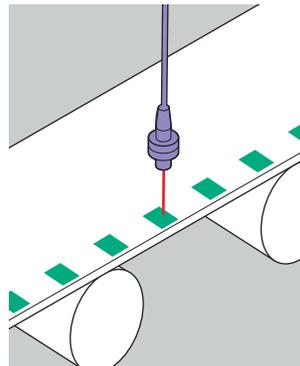
##### E32-D36P1

(100 mm sensing distance, 10.85 mm wide beam)



### Precise Positioning Applications

- Unique coaxial cable design that surrounds the light emitting fiber with light detection fibers
- Designed for use when it is critical to position objects or machinery accurately and consistently



#### Diffuse

##### E32-CC200

(300 mm sensing distance, M6 threaded head, 16 receivers)

##### E32-D32L

(150 mm sensing distance, 3 mm dia. head, 16 receivers)

##### E32-D32

(75 mm sensing distance, 2 mm dia. head, 4 receivers)

##### E32-C31

(75 mm sensing distance, M3 threaded head, 4 receivers)

##### E32-C41

(35 mm range, M3 threaded head, 6 receivers)

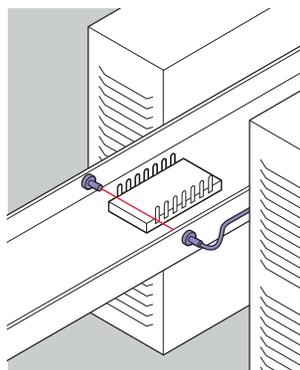
##### E32-C42

(35 mm range, 2 mm dia. head, 6 receivers)



### Detect Minute Objects

- Detect extremely small objects, as small as 0.5 mm, in very space restricted areas
- Most are available with bendable "probe" tips that let you mount the head away from the detection area and bend the probe tip to the precise sensing area



#### Through-Beam

##### E32-T22

(220 mm sensing distance, 2 mm dia. head)

##### E32-TC200B

(760 mm sensing distance, 1.2 mm dia. head, probe tip)

##### E32-TC200E

(220 mm sensing distance, M3 threaded head)

##### E32-TC200F

(220 mm sensing distance, 0.9 mm dia. head, probe tip)

#### Diffuse

##### E32-DC200B

(300 mm sensing distance, 2.5 mm dia. head, probe tip)

##### E32-DC200E

(80 mm sensing distance, M3 threaded head)

##### E32-DC200F

(80 mm sensing distance, 1.2 mm dia. head, probe tip)

##### E32-D33

(16 mm sensing distance, 0.8 mm dia. head, probe tip)

##### E32-D331

(3 mm sensing distance, 0.5 mm dia. head, probe tip)

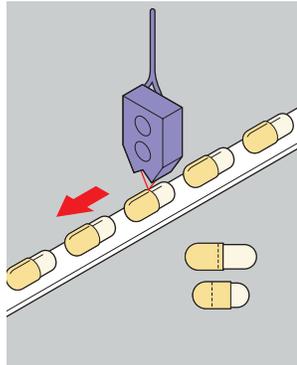


## Over 100 Fiber-Optic Sensor Cables cont.

One exactly matches your requirements.

### Background Suppression Applications

- Solve the problem of background reflections in space constricted areas
- Can be used for precise positioning of objects or machinery
- Left- and right-side emitter models eliminate interference when using two or more E32-L56 sensing heads



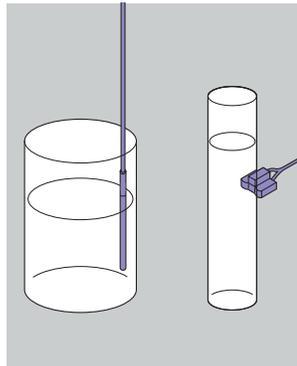
#### Convergent Beam

- E32-L24L**  
(4 ±2 mm range, side view head, to 105°C)
- E32-L24S**  
(0-4 mm range, side view head)
- E32-L25**  
(3.3 mm range, side view head)
- E32-L25L**  
(7.2 ±1.8 mm range)
- E32-L25A**  
(3.3 mm range)
- E32-L56E□**  
(4-12 mm range)
- E32-L66**  
(5-18 mm range, sensing head to 300°C)



### Fluid Level Detection

- Detect fluid levels in space-confined areas
- Immersion style sensing heads can be submerged in the fluid to be monitored
- Tube mounted sensing heads can sense fluids through a clear tube

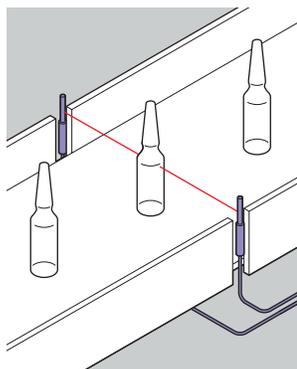


- E32-D82F1**  
(Immersion type, 150 mm length)
  - E32-D82F2**  
(Immersion type, 350 mm length)
  - E32-A01**  
(External mount; 3.2, 6.4, 9.5 mm clear tube)
  - E32-A02**  
(External mount; 6 to 13 mm clear tube)
  - E32-L25T**  
(External mount, 8 to 10 mm clear tube)
  - E32-D36F**  
(External mount; clear tube, no diameter restriction)
- Also consider EE-SPX613  
Amplified Photomicrosensor



### Long Range Detection of Small Objects

- Detect small objects over longer distances in space-confined areas
- Available in through-beam or diffuse versions with threaded and non-threaded heads



#### Through-Beam

- E32-T11L**  
(1330 mm sensing distance, M4 threaded head)
- E32-T12L**  
(1330 mm sensing distance, 3 mm dia. head)
- E32-T14L**  
(460 mm sensing distance, 3 mm dia., side view head)
- E32-T17L**  
(20,000 mm sensing distance, M14 threaded head)
- E32-T21L**  
(440 mm sensing distance, M3 threaded head)
- E32-T22L**  
(440 mm sensing distance, 2 mm dia. head)

#### Diffuse

- E32-D11L**  
(400 mm sensing distance, M6 threaded head)
- E32-D12**  
(230 mm sensing distance, 3 mm dia. head)
- E32-D16**  
(40 to 700 mm sensing distance, 17.5 mm square head)
- E32-D21L**  
(130 mm sensing distance, M4 threaded head)
- E32-D22L**  
(130 mm sensing distance, 3 mm dia. head)

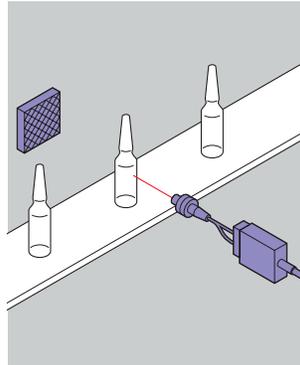


## Over 100 Fiber-Optic Sensor Cables cont.

One exactly matches your requirements.

### Transparent Object Detection

- Fiber optic cables that are polarized and reflectors specially designed for sensing small transparent objects in tight spaces
- Ideal for sensing lenses, clear plastics, and transparent packaging materials



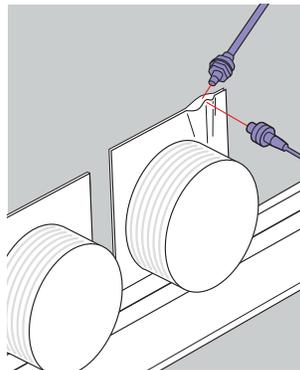
**E32-R21**  
(Retroreflective, 10–250 mm range)

**E32-R16**  
(Retroreflective, 150–1,500 mm range)



### General-Purpose Industrial Applications

- For most sensing applications, the space-saving combination of a fiber-optic amplifier and general-purpose fiber unit provides an economical solution.



#### Through-Beam

**E32-TC200**  
(760 mm sensing distance, M4 threaded head)

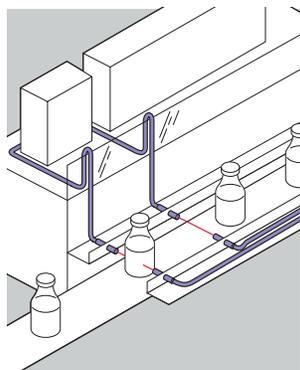
**E32-TC200A**  
(680 mm sensing distance, M3 threaded head)

**Diffuse**  
**E32-DC200**  
(300 mm sensing distance, M6 threaded head)



### Extreme Bending Applications

- For machine applications that require extreme bending of fiber optic cables to conform to tight spaces, Omron offers a variety of cables that feature a unique multi-core construction
- Multi-core design ensures optimal light transmission even when bent 180° with a bending radius of 1 mm, unlike single-core cables that can lose their light transmission capability when bent tightly



#### Through-Beam

**E32-T11R**  
(530 mm sensing distance, M4 threaded head)

**E32-T12R**  
(530 mm sensing distance, 3 mm dia. head)

**E32-T14LR**  
(210 mm sensing distance, 3 mm dia. head)

**E32-T21R**  
(130 mm sensing distance, M3 threaded head)

**E32-T16WR**  
(1300 mm sensing distance, 30 mm wide beam)

**E32-T16JR**  
(750 mm sensing distance, 11 mm wide beam, side view)

**E32-T16PR**  
(840 mm sensing distance, 11 mm wide beam)

**E32-T22R**  
(130 mm sensing distance, 2 mm dia. head)

**E32-T24R**  
(50 mm sensing distance, 1 mm dia. head, side view)

#### Diffuse

**E32-D11R**  
(170 mm sensing distance, M6 threaded head)

**E32-D12R**  
(170 mm sensing distance, 3 mm dia. head)

**E32-D14LR**  
(45 mm sensing distance, 6 mm dia. head, side view)

**E32-D21R**  
(30 mm sensing distance, M3 threaded head)

**E32-D22R**  
(30 mm sensing distance, 3 mm dia. head)

**E32-D24R**  
(15 mm sensing distance, 2 mm dia. head, side view)



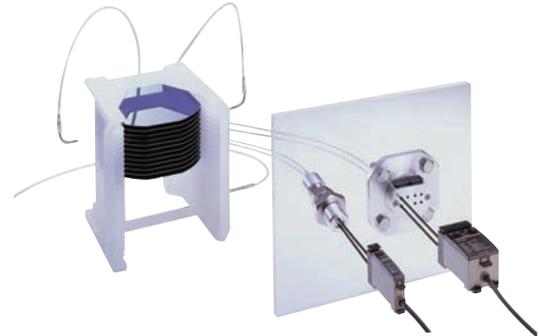
# Vacuum Chamber Fiber-Optic System

## E32-V



### Solutions for Semiconductor Manufacturing

- Confirm proper positioning of objects in vacuum chambers with space-saving mounting flanges and in-chamber fiber-optic sensing heads/cables
- Ideal for semiconductor and biomedical vacuum and environmental chambers to confirm cassettes, wafers, slides and petri dishes are properly positioned for processing
- 4-channel mounting flange features one-touch fiber mounting reducing setup time and conserves space in the vacuum chamber
- 1-channel threaded flange available
- Heat-resistant vacuum fiber (E32-T84SV) can be used up to 200°C
- Cut outside fiber at both ends to avoid messy routing
- Through-beam sensing heads fit E3X-DA-S, E3X-MDA and E3X-NA amplifiers



### Specifications

- Sensing distances with E3X-DA-S fiber-optic amplifier in standard mode:
  - E32-T51V: 200 mm
  - E32-T54V: 130 mm
  - E32-T84SV: 480 mm
- Compact system components:
  - 4-channel flange: 90 dia. x 49 D mm
  - 1-channel flange: 20 dia. x 96 D mm
  - Vacuum fibers: 1 m length
  - Outside fibers: 2 m length, freely cut

# Fiber-Optic Photo Sensors

# E3X-DA-S

Quick Link

B324

## Digital Display Amplifier Automatically Optimizes Settings

- Mount up to 16 sensors on DIN rail and program all of them from a single point
- Three inspection speeds/distances in one model: standard, high-speed and high-resolution
- Dual digital display can monitor current and preset values, including digital, bar, percent, and hold display functions
- Power tuning function addresses saturation or insufficient light conditions
- 4-element LED and Auto Power Control ensure stable, long term performance
- Advanced functions include differential operation for minute object detection, 2 independent outputs for area detection, remote input function and counter function
- Threshold adjustment performed manually or by teaching
- Built-in OFF-delay, ON-delay, one-shot timer (adjustable from 1 ms to 5 s)
- Optical communications ports built into each sensor enables data exchange with one another and the Mobile Console remote control
- Rated IP50
- Pre-wired (2 m cable) and wire-saving connector models available
- Requires E32 series fiber-optic cables



## Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 40 mA max.; 45 mA max. (E3X-DA-TWS and -RMS)
- Control output: NPN or PNP, 50 mA at 30 VDC; Light-ON/Dark-ON operation switch selectable
- Sensing distance in standard mode (red light source):
  - Through-beam fiber cable E32-TC200: 760 mm
  - Diffuse fiber cable E32-DC200: 300 mm
- Color mark (green/blue light source):
  - Through-beam fiber cable E32-TC200: 75 mm
  - Diffuse fiber cable E32-DC200: 25 mm
- Response time:
  - 1 ms ON/1 ms OFF (standard mode)
  - 48 ms ON/50 ms OFF (high-speed mode); 80 ms for 2-output models
  - 4 ms ON/4 ms OFF (high resolution mode)
- Light source: Red LED (650 nm)
  - Green LED (525 nm) or Blue LED (470 nm) mark detection models
- Dimensions: 32 H x 10 W x 70 D mm

## Fiber-Optic Amplifiers

### Pre-Wired with 2 m Cable

Sensing heads	Setup	Features	Light source	Model	
				NPN output	PNP output
Order E32 fiber-optic cables separately		Standard	Red (650 nm)	<b>E3X-DA11-S</b>	<b>E3X-DA41-S</b>
		Mark detection	Green (525 nm)	<b>E3X-DAG11-S</b>	<b>E3X-DAG41-S</b>
		Mark detection	Blue (470 nm)	<b>E3X-DAB11-S</b>	<b>E3X-DAB41-S</b>
		Two-outputs: Area output, self-diagnostics, different operation	Red (650 nm)	<b>E3X-DA11TW-S</b>	<b>E3X-DA41TW-S</b>
		External input: Remote setting, counter, differential operation	Red (650 nm)	<b>E3X-DA11RM-S</b>	<b>E3X-DA41RM-S</b>

Sensing heads	Setup	Features	Light source	Model	
				NPN output	PNP output
Order E32 fiber-optic cables separately		Standard	Red (650 nm)	<b>E3X-DA6-S</b>	<b>E3X-DA8-S</b>
		Mark detection	Green (525 nm)	<b>E3X-DAG6-S</b>	<b>E3X-DAG8-S</b>
		Mark detection	Blue (470 nm)	<b>E3X-DAB6-S</b>	<b>E3X-DAB8-S</b>
		Two-outputs: Area output, self-diagnostics, different operation	Red (650 nm)	<b>E3X-DA6TW-S</b>	<b>E3X-DA8TW-S</b>
		External input: Remote setting, counter, differential operation	Red (650 nm)	<b>E3X-DA6RM-S</b>	<b>E3X-DA8RM-S</b>

### Connectors

Description	Appearance	Compatible amplifiers	Cable length	Conductors	Model
Master connector (for first unit)		E3X-DA6-S, E3X-DA8-S, E3X-DAG6-S, E3X-DAG8-S, E3X-DAB6-S, E3X-DAB8-S	2 m	3	<b>E3X-CN11</b>
		E3X-DA6TW-S, E3X-DA8TW-S, E3X-DA6RM-S, E3X-DA8RM-S		4	<b>E3X-CN21</b>
Slave connector (for second and additional units)		E3X-DA6-S, E3X-DA8-S, E3X-DAG6-S, E3X-DAG8-S, E3X-DAB6-S, E3X-DAB8-S		1	<b>E3X-CN12</b>
		E3X-DA6TW-S, E3X-DA8TW-S, E3X-DA6RM-S, E3X-DA8RM-S		2	<b>E3X-CN22</b>

### Wire-Saving Connector Models

- Streamlines installation and maintenance to reduce service time
- Unique connector design reduces wiring and space requirement because one master connector supplies power to all other slave connectors
- Detach the sensor without disturbing the fiber installation or output wiring for servicing



**Pre-wired models** require three wiring connections for each sensor. **Shown: 15 wires plus extension connector wires.**



The **E3X-DA-S** requires three wires for the master sensor only. Each additional sensor in a group requires only one wiring connection. **Shown: ONLY 7 WIRES** with no additional extension connectors.

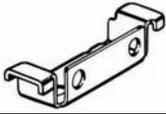
## Accessories

### Mobile Console

- Program and monitor sensor operation with the mobile console
- 1.5 m cable for remote setup connects console to the programming head
- Programming head track mounts flush against the leftmost amplifier
- AC adapter powers console

Description	Appearance/dimensions	Model
Mobile console kit Includes console, programming head, cable and AC adapter		<b>E3X-MC11-SV2</b>
Mobile console (only)	 136 H x 52.8 W x 22 D mm	<b>E3X-MC11-C1-SV2</b>
Programming console (only) mounts on DIN rail	 51.3 H x 20 W x 30.3 D mm	<b>E3X-MC11-H1</b>
Cable	 1.5 m length	<b>E3X-Z12-1</b>

### Mounting Bracket and Track

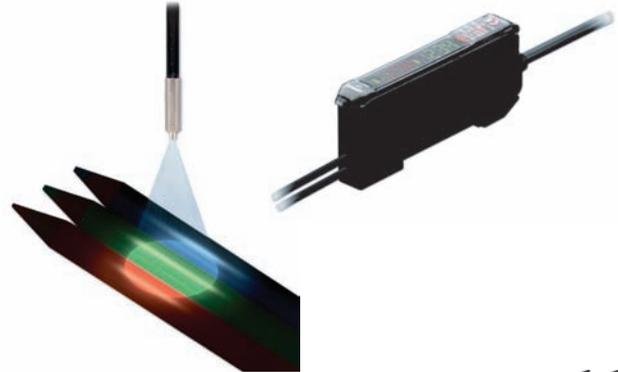
Description	Appearance	Dimensions H x W x D mm	Specification	Model
Surface mounting bracket		7.3 H x 35 W x 12 D	304 stainless steel, fits the DIN track holder	<b>E39-L143</b>
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PFP-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PFP-M</b>

# Fiber-Optic Sensors E3X-DAC-S



## Easy and Reliable Digital Fiber-Optic Amplifier Offers True Color Detection

- Reliability through precise and true color detection with white LED emitter and RGB (Red, Green and Blue) processing
- Enhanced stability: workpiece movement does not affect the sensor as the receiver element processes light as a ratio to compensate for intensity variations
- Easy push button setup guides the user to place the workpiece in an appropriate position for teaching
- Full-functional, dual digital display can monitor current and preset values, including digital, bar, percent and hold display functions.
- On-Board timing function incorporating OFF-Delay, ON-delay, and one-shot timing functions (adjustable from 1 ms to 5 s)
- Advanced models offer remote control as well as twin sensing and output to simultaneously distinguish between two registered colors
- Pre-wired (2 m cable) and wire-saving connector models available



**NEW** CE

- Master/slave connector design affords connectivity for up to 16 wire and cost saving amplifiers
- Uses E32 family of fiber optics for a wide variety of applications

## Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 40 mA max.
- Control output: NPN or PNP, 50 mA max.; Light-ON/Dark-ON operation switch selectable
- Operating mode:
  - ON for match (ON for same color as registered color)
  - ON for mismatch (ON for different color from registered color)
- Sensing distance:
  - Through-beam fiber cable E32-TC200: 200 mm (high resolution mode)
  - Diffuse fiber cable E32-DC200: 70 mm (high resolution mode)
- Response time:
  - 60 μs operate or reset (super-high-speed mode)
  - 300 μs operate or reset (high-speed mode)
  - 1 ms operate or reset (standard mode)
  - 4 ms operate or reset (high-resolution mode)
- Light source: white LED (420 to 700 nm)
- Dimensions: 31.5 H x 10 W x 70 D

## Fiber-Optic Amplifiers

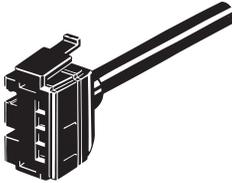
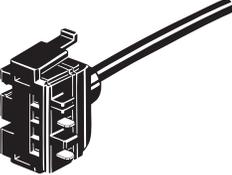
### Pre-Wired with 2 m Cable

Sensing heads	Setup	Features	Model	
			NPN output	PNP output
Order E32 fiber-optic cables separately		Standard with timer, response speed change	E3X-DAC11-S	E3X-DAC41-S
		Advanced with simultaneous determination (2 colors) AND/OR output, remote setting	E3X-DAC21-S	E3X-DAC51-S

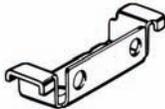
## With Wire Saving Connectors

Sensing heads	Setup	Features	Model	
			NPN output	PNP output
Order E32 fiber-optic cables separately		Standard with timer, response speed change	E3X-DAC6-S	E3X-DAC8-S

## Connectors

Description	Appearance	Cable length	Conductors	Model
Master connector (for first unit)		2 m	3	E3X-CN11
Slave connector (for second and additional units)			1	E3X-CN12

## Mounting Bracket and Track

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Surface mounting bracket		7.3 H x 35 W x 12 D	304 stainless steel, fits the DIN track holder	E39-L143
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	PFP-50N
		1000 L x 35 H x 7.3 D	1 m length	PFP-100N
		1000 L x 35 H x 16.0 D	1 m length	PFP-100N2
End plate		50 x 10 x 10	Holds track-mounted devices in place	PFP-M

# Fiber-Optic Sensors E3X-MDA



## Two Digital Amplifiers in One Slim Unit with Built-In Logic

- Two independent fiber-optic amplifiers in a 10-mm-wide track-mount unit
- Designed for gang mounting up to 18 sensors (9 units)
- Three inspection speeds/distances in one model: standard, high-speed and high-resolution
- Dual digital display can monitor current and preset values, including digital, bar, percent, and hold display functions
- Logical AND/OR control output for local control in high-speed applications
- One-touch teaching or manual sensitivity setting
- Threshold adjustment performed manually or by teaching
- Built-in OFF-delay, ON-delay, one-shot timer (adjustable from 1 ms to 5 s)
- Optical communications ports built into each sensor enables data exchange with one another and the Mobile Console remote control
- Rated IP50
- Pre-wired (2 m cable) and wire-saving connector models available
- Requires E32 series fiber-optic cables
- DIN rail mounting



## Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 40 mA max.
- Control output: NPN or PNP, 50 mA at 26.4 VDC; Light-ON/ Dark-ON operation switch selectable
- Sensing distance in standard mode:
  - Through-beam fiber cable E32-TC200: 500 mm
  - Diffuse fiber cable E32-DC200: 300 mm
- Response time:
  - 1 ms (standard mode)
  - 130 μs (high-speed mode)
  - 4 ms (long distance mode)
- Light source: Red LED (650 nm)
- Dimensions: 32 H x 10 W x 70 D mm

## Dual Amplifiers

Sensing heads	Setup	Features	Light source	Connection method	Model	
					NPN output	PNP output
Order E32 fiber-optic cables separately		AND/OR logic output 3 sensing speeds	Red (650 nm)	Pre-wired	E3X-MDA11	E3X-MDA41
		One master connector for ganged units		Connector	E3X-MDA6	E3X-MDA8

## Connectors

Description	Appearance	Cable length	Conductors	Model
Master connector (for first unit)		2 m	4	E3X-CN21
Slave connector (for second and additional units)			2	E3X-CN22

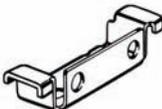
## Accessories

### Mobile Console

- Program and monitor sensor operation with the mobile console
- 1.5 m cable for remote setup connects console to the programming head
- Programming head track mounts flush against the leftmost amplifier
- AC adapter powers console

Description	Appearance/dimensions	Model
Mobile console kit Includes console, programming head, cable and AC adapter		<b>E3X-MC11-SV2</b>
Mobile console (only)	 136 H x 52.8 W x 22 D mm	<b>E3X-MC11-C1-SV2</b>
Programming head (only) Mounts on DIN rail	 51.3 H x 20 W x 30.3 D mm	<b>E3X-MC11-H1</b>
Cable	 1.5 m length	<b>E3X-Z12-1</b>

### Mounting Bracket and Track

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Surface mounting bracket		7.3 H x 35 W x 12 D	304 stainless steel; fits the DIN track holder	<b>E39-L143</b>
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PFP-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PFP-M</b>

Fiber-Optic Sensors

# E3X-DRT21/SRT21/CIF11



## Fiber Amplifier Communication Units E3X-DRT21/SRT21/CIF11

- Reduce wiring to communicate status from up to 16 fiber-optic sensors
- DeviceNet, RS-422 serial and CompoBus/S remote I/O units
- Compatible with E3X-DA6, -DA8, -DAB and -DAG fiber-optic amplifiers
- One contact input from a basic switch can be used in each block (E39-TM1)
- Mobile Console simplifies setting sensor parameters and monitoring
- Communication unit measures 34.5 H x 30 W x 71.3 D mm



E3X-DRT21  
for DeviceNet



E3X-SRT21  
for CompoBus/S



E3X-CIF11  
for RS-422



**Reduced Wiring**

New connectors enable wiring and space reductions, as well as easier maintenance.  
Create the Required Number of Channels by Connecting Up To 16 Units (14 Units for CompoBus/S).

# Networking Solutions

# E3X-DRT21S

Quick Link  
B327

## Sensor Block Communication Unit

Connect up to 16 sensors with this DeviceNet-ready communication unit. A wide range of sensor models can be grouped together to match application needs.

- Reduce wiring to communicate status from up to 16 fiber-optic sensors
- DeviceNet, RS-422 serial and CompoBus/S remote I/O units
- Compatible with E3X-DA6, -DA8, -DAB and -DAG fiber-optic amplifiers
- One contact input from a basic switch can be used in each block (E39-TM1)
- Mobile Console simplifies setting sensor parameters and monitoring
- Communication unit measures 34.5 H x 30 W x 71.3 D mm



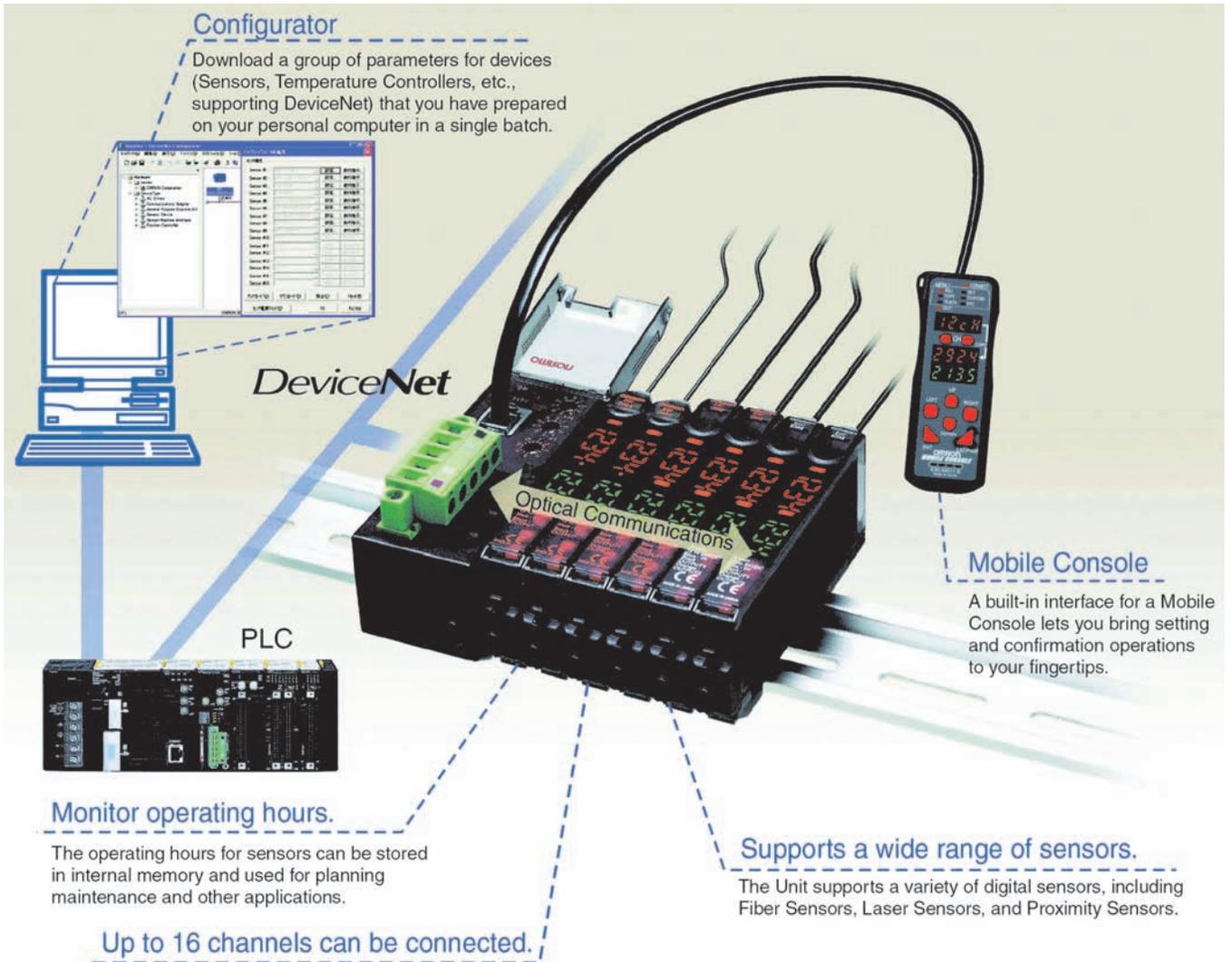
## Capabilities

- Remote setting, monitoring and operating through CX-Integrator software
- Supports explicit message communications
- Reduces wiring back to control cabinet
- Compatible sensors with connector-type amplifier units:
  - E3X-DA-S Series or E3X-MDA Series Digital Fiber-Optic Sensor Amplifier
  - E3C-LDA Series Laser Photoelectric Sensor with separate digital amplifier
  - E2C-EDA High-resolution Digital Proximity Sensor with separate amplifier
- Use the E3X-CN02 Cordless Slave Connector for each sensor
- Mobile programming console for simple setting and monitoring locally
- Send ON/OFF signals and incident light levels to the host PLC without any need for programming (using the Remote I/O Communications Slave function)
- Threshold values and function settings can be read, written, or taught (using the Message Communications function)
- Device parameters prepared on a personal computer connected to the network can be downloaded in a batch operation using the configurator in CX-Integrator

## Ordering Information

Description	Specifications	Model
DeviceNet photoelectric sensor communication module	71.3 H x 30 W x 34.6 D mm	E3X-DRT21S
Cordless slave connector	Fits space saving connector models of sensor amplifiers	E3X-CN02

# Configurations



# Fiber-Optic Sensors

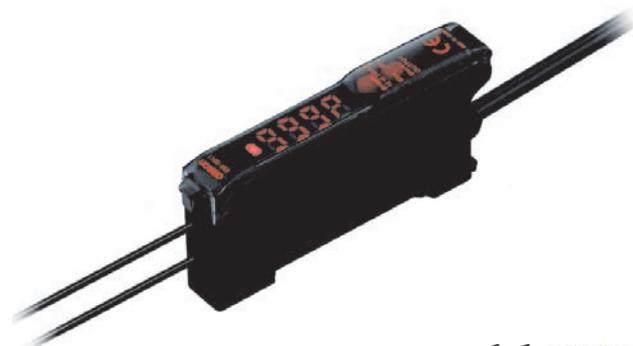
## E3X-SD

Quick Link

B334

### Simple, High Performance Fiber-Optic Amplifier with Digital Display

- Streamlined features provide basic sensing immediately after plug-in
- Easy push button teach with or without workpiece
- Large, 6 mm wide digital display provides read-out of incident and operating level
- Incident settings and management can be performed reliably with 0 to 999% (10 times) fine tune adjustment
- Built-in OFF-Delay, ON-delay, one-shot timer
- Rated IP50
- Pre-wired (2 m cable) and wire-saving connector models available
- Master/slave connector design affords connectivity for up to 16 wire-saving amplifiers
- Requires E32 series fiber-optic cables

CE **NEW**

## Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 40 mA max.
- Control output: NPN or PNP, 50 mA max.; Light-ON/Dark-ON operation switch selectable
- Sensing distance:
  - Through-beam fiber cable E32-TC200: 400 mm
  - Diffuse fiber cable E32-DC200: 150 mm
- Response time: 200  $\mu$ s
- Light source: Red LED (620 nm)
- Dimensions: 31.5 H x 10 W x 70 D

## Fiber-Optic Amplifiers

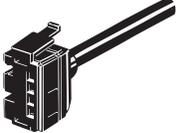
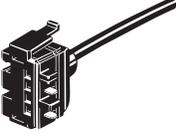
### Pre-Wired with 2 m Cable

Sensing heads	Setup	Features	Model	
			NPN output	PNP output
Order E32 fiber-optic cables separately		Standard	E3X-SD11	E3X-SD41

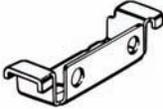
### With Wire Saving Connectors

Sensing heads	Setup	Features	Model	
			NPN output	PNP output
Order E32 fiber-optic cables separately		Standard	E3X-SD6	E3X-SD8

## Connectors

Description	Appearance	Cable length	Conductors	Model
Master connector (for first unit)		2 m	3	E3X-CN11
Slave connector (for second and additional units)			1	E3X-CN12

## Mounting Bracket and Track

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Surface mounting bracket		7.3 H x 35 W x 12 D	304 stainless steel, fits the DIN track holder	E39-L143
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	PFP-50N
		1000 L x 35 H x 7.3 D	1 m length	PFP-100N
		1000 L x 35 H x 16.0 D	1 m length	PFP-100N2
End plate		50 x 10 x 10	Holds track-mounted devices in place	PFP-M

# Fiber-Optic Sensors

## E3X-NA

Quick Link

B328

### Amplifier with Bar Graph Display, Manual Adjustment

- Streamlined features provide basic sensing immediately after plug-in
- Wire-saving amplifiers reduce installation time and minimize space requirements
- Master/slave connector design affords connectivity for up to 16 wire-saving amplifiers
- Use the LED bar display to quickly confirm sensor performance
- Optical communication design prevents mutual interference for up to 5 amplifiers
- Green LED models address mark-detecting applications
- High-speed models have a response time of 50  $\mu$ s
- Rated IP50
- Water-resistant version rated IP66 available in pre-wired 2 m cable models or M8 connector models



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 35 mA max.
- Control output: NPN or PNP, 50 mA max.; Light-ON/ Dark-ON operation switch selectable
- Sensing distance for standard models in standard mode:
  - Through-beam fiber cable E32-TC200: 400 mm
  - Diffuse fiber cable E32-DC200: 150 mm
- Response time: 200  $\mu$ s (standard and color mark models)
  - 20  $\mu$ s ON/30  $\mu$ s OFF (high-speed model)
  - OFF delay timer (fixed at 40 ms)
- Light source:
  - Red LED (680 nm) for standard, high-speed, and water-resistant models
  - Green LED (520 nm) for mark detection
- Compact housings:
  - Pre-wired: 31.5 H x 10 W x 64.3 D mm
  - Water-resistant: 33 H x 12 W x 81.5 D mm

# Fiber-Optic Sensors

# E3X-NH

Quick Link  
B329

## High Precision Fiber Amplifier

- Industry's first sensor with a 16-bit processor
- Automatic sensitivity adjustment feature allows for stable detection of objects in frequently changing environments
- Manual fine tuning allows 13 threshold adjustments, 8 level sensitivity meter
- Ideal for detecting small objects or fine wires
- Pre-wired with 2 m cable
- Enclosure rating: IP50
- Mounts on DIN rail track



## Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 75 mA max.
- Control output: NPN and PNP models, 50 mA max.; Light-ON/Dark-ON operation, switch selectable
- Sensing distance:
  - Through-beam fiber cable E32-TC200: 300 mm
  - Diffuse fiber cable E32-DC200: 150 mm
- Response time: 1 ms max.
- Sensitivity setting: Teaching method
- Light source: Red LED (680 nm)
- Compact housing: 32.5 H x 10 W x 65 D mm
- Requires E32 fiber-optic cables sold separately

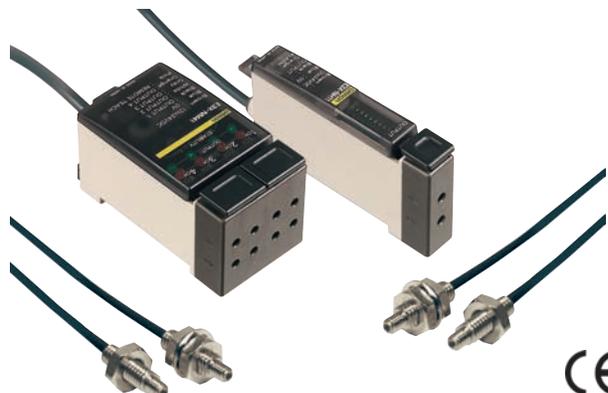
# Fiber-Optic Sensors

# E3X-NT/-NM



## Auto-Tuning Fiber Amplifier

- Single fiber-optic amplifier (E3X-NT) and four-amplifier block (E3X-NM) models
- Pushbutton teaching for sensitivity adjustment simplifies setup and maintenance
- Four amplifiers in a single housing saves space and wiring
- Four fiber-optic cables can be mounted directly next to each other without mutual interference
- Enclosure rating: IP50



## Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 50 mA max. single; 150 mA max. 4-amp model
- Control output: NPN or PNP, 100 mA at 30 VDC; Light-ON/Dark-ON operation, switch selectable
- Sensing distance for single amp (E3X-NT):
  - Through-beam fiber cable E32-TC200: 210 mm
  - Diffuse fiber cable E32-DC200: 110 mm
- Sensing distance for 4-amp (E3X-NM):
  - Through-beam fiber cable E32-TC200: 200 mm
  - Diffuse fiber cable E32-DC200: 100 mm
- Response time: 500 ms
- Light source: Red LED (680 nm)
- Compact housings:
  - Single amp: 32.5 H x 10 W x 65 D mm
  - 4-amp model: 33 H x 32.2 W x 65.2 D mm
- Requires E32 fiber-optic cables sold separately

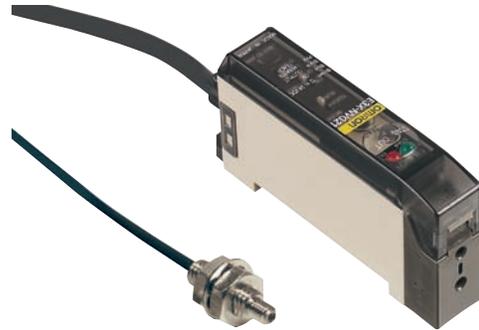
## Fiber-Optic Sensors

# E3X-NV/NVG

Quick Link  
B333

### Water-Resistant Fiber Amplifier

- Teach function with No-object teaching capability speeds setup
- Remote teaching function for easy teaching from a controller
- Water resistant, rated IP66 to withstand light washdown
- Pre-wired with 2 m cable
- Mounts on DIN rail track



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 50 mA max.
- Control output: NPN open collector, 100 mA load; Light-ON/Dark-ON operation, switch selectable
- Sensing distance, red light source (E3X-NV):
  - Through-beam fiber cable E32-TC200: 210 mm
  - Diffuse fiber cable E32-DC200: 110 mm
- Sensing distance, green light source (E3X-NVG):
  - Through-beam fiber cable E32-TC200: 18 mm
  - Diffuse fiber cable E32-DC200: 10 mm
- Response time: 500 ms max.; 40 ms with OFF-delay timer
- Sensitivity setting: Teaching method
- Light source: Red LED (680 nm); green LED (565 nm)
- Dimensions: 32 H x 12 W x 65 D mm
- Requires E32 fiber-optic cables sold separately

## Fiber-Optic Sensors

# E3S-X3

Quick Link  
B335

### Compact Metal Body Fiber Amplifier

- Diecast housing withstands rugged use
- Mutual interference protection permits side-by-side mounting
- Rated NEMA 4X/IP66
- Pre-wired with 2 m cable, includes mounting bracket



### Specifications

- Supply voltage: 12 to 24 VDC
- Current consumption: 50 mA max.
- Control output: Light-ON/Dark-ON operation, selectable
  - NPN open collector with 80 mA load
  - PNP open collector, 100 mA load
- Sensing distance:
  - Through-beam fiber cable E32-TC200: 120 mm
  - Diffuse fiber cable E32-DC200: 50 mm
- Response time: 1 ms max.
- Sensitivity setting: Multi-turn potentiometer
- Light source: Red LED
- Dimensions: 20 H x 23 W x 70 D mm
- Requires E32 fiber-optic cables sold separately

# Fiber-Optic Sensors

## E3A2-X

Quick Link

B336

### Universal Voltage Fiber Amplifier, Replaceable Output

- Universal AC/DC supply voltage
- Plug-in interchangeable outputs
- Rated NEMA 4/IP66
- Easy-to-wire terminal strip wiring; standard 1/2-14 NPT conduit opening
- Time delay models available
- Mounting hardware included



## Specifications

- Supply voltage: 24 to 240 VAC, 50/60 Hz; 12 to 240 VDC
- Current consumption: 1.5 W/2 VA max.
- Control output: Light-ON/Dark-ON operation, switch selectable
  - Relay, 3 A at 250 VAC/30 VDC (supplied)
  - SCR, 200 mA at 250 VAC (optional)
  - NPN or PNP complementary, 200 mA at 30 VDC (optional)
- Sensing distance:
  - Through-beam fiber cable E32-TC200: 120 mm
  - Diffuse fiber cable E32-DC200: 50 mm
- Response time:
  - 15 ms max. (Relay)
  - 30 ms max. (AC SCR)
  - 1 ms max. (DC SSR)
- Sensitivity setting: Multi-turn potentiometer
- Light source: Red LED
- Dimensions: 75 H x 26 W x 75.3 D mm
- Requires E32 fiber-optic cables sold separately

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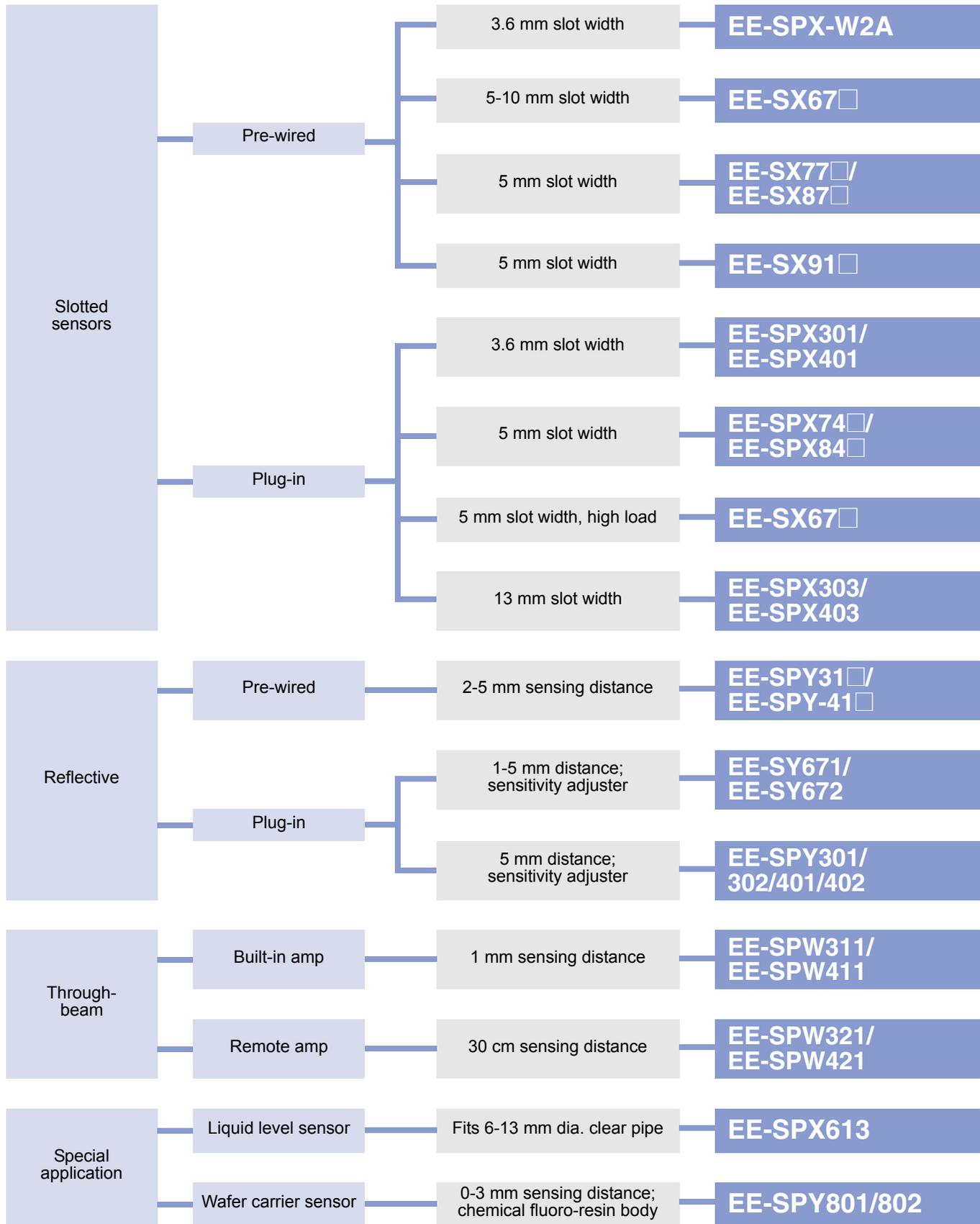
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## Selection Guide



## Slotted Photomicrosensors EE-SX91 □

Quick Link  
B424

### Ultra-Small Size Offers Sensing Solution for Space Constrained Locations

- Ultra compact for the ultimate in space savings for the application
- 5 difference body shapes to enable easier fit and alignment in a greater number of potential applications
- Indicator light can be viewed from 4 directions for easy installation and operation
- Mountable with either M3 or M2 screws for ease of installation
- Separate pre-wired junction connector or pre-wired 2 m cable models available
- Flexible robot cable is standard on all models, ideal for moving part applications
- Each model has Dark-ON or Light-ON output which can be selected based on a simple wiring change
- Maximum load current is 100 mA for the ability to drive a larger electromechanical load



**NEW**  
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### Specifications

- Voltage range: 5 to 24 VDC
- Load rating: 100 mA max.
- Current consumption: 15 mA max.
- Response frequency: 3 kHz min. (8 kHz typ.)
- Light source: GaAs infrared LED
- Operating ambient: -25 to 55°C, 5% to 85% RH
- Enclosure rating: IP50

## Pre-Wired Slotted Photomicrosensors

Appearance	Sensor type	Slot width/depth	Dimensions H x W x D mm	Output form	Connection method (cable length)	Model	
						NPN Output	PNP Output
	Through-beam with slot	5 mm W x 6.5 mm H	12 x 24 x 6	Light-ON Dark-ON (2 outputs)	Pre-wired models (1 m)	EE-SX910-R	EE-SX910P-R
					Models with junction connectors (0.3 m)	EE-SX910-C1J-R	EE-SX910P-C1J-R
			12 x 13.4 x 12		Pre-wired models (1 m)	EE-SX911-R	EE-SX911P-R
					Models with junction connectors (0.3 m)	EE-SX911-C1J-R	EE-SX911P-C1J-R
			12 x 13.4 x 11.7		Pre-wired models (1 m)	EE-SX912-R	EE-SX912P-R
					Models with junction connectors (0.3 m)	EE-SX912-C1J-R	EE-SX912P-C1J-R
			12 x 13.4 x 11.7		Pre-wired models (1 m)	EE-SX913-R	EE-SX913P-R
					Models with junction connectors (0.3 m)	EE-SX913-C1J-R	EE-SX913P-C1J-R
			16 x 13.4 x 6		Pre-wired models (1 m)	EE-SX914-R	EE-SX914P-R
					Models with junction connectors (0.3 m)	EE-SX914-C1J-R	EE-SX914P-C1J-R

## Connector

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Connector with cable	2 m cable	8 x 10 x 5.8	EE-1016-R

# Slotted Photomicrosensors EE-SX77□/EE-SX87□ Series



## Pre-Wired Photomicrosensors with Open Collector Output

- Standard, L-shaped, and T-shaped models available
- Pre-wired with 2 m flexible cable that conforms to machine contours
- Models available with Light-ON or Dark-ON output configurations
- Response frequency as high as 1 kHz
- Easy to monitor, indicators are visible from both sides
- Indicator turns OFF when light is interrupted; opposite operation models available
- Readily-visible, molded workpiece insertion mark allows fine-tuning of sensing position
- Allows standard M3-screw mounting
- Wide operating voltage range simplifies sensor connection to TTLs, relays, and programmable controllers (PLC)
- Ideal for use in end-of-travel, home position and operation trigger applications



## Specifications

- Voltage range: 5 to 24 VDC
- Load rating:
  - NPN open collector: 100 mA (5 to 24 VDC), 40 mA (TTL)
  - PNP open collector 50 mA (5 to 24 VDC)
- Current consumption: 35 mA max. (NPN), 30 mA max. (PNP)
- Response frequency: 1 kHz max. (3 kHz typical)
- Light source: Non-pulse modulated infrared LED, 940 nm
- Operating ambient: -25° to 55°C, 5% to 85% RH
- Enclosure rating: IP60

## Pre-Wired Photomicrosensors

Appearance	Sensor type	Slot width/depth	Dimensions H x W x D mm	Output form	Output type	Model
Standard 	Through-beam (slot)	5 mm W x 9 mm D	31.1 x 18 x 4.6	Light-ON	NPN	EE-SX870
					PNP	EE-SX870P
				Dark-ON	NPN	EE-SX770
					PNP	EE-SX770P
L-shaped 			21 x 18 x 13	Light-ON	NPN	EE-SX871
					PNP	EE-SX871P
				Dark-ON	NPN	EE-SX771
					PNP	EE-SX771P
T-shaped 			31.1 x 12.3 x 19.1	Light-ON	NPN	EE-SX872
					PNP	EE-SX872P
				Dark-ON	NPN	EE-SX772
					PNP	EE-SX772P

## Slotted Photomicrosensors EE-SX47□/EE-SX67□ Series

Quick Link

B423

### Connector-Ready Slotted Sensors

- 8 body configurations available in standard, F-shaped, L-shaped, R-shaped, T-shaped, close-mounting horizontal and close-mounting vertical
- Separate models available with connector, pre-wired cable or pre-wired junction connector
- Easy operation monitoring with bright LED indicator
- Models available with Light-ON or Light-ON/Dark-ON output configurations
- Light modulation effectively reduces external light interference
- Fast response for high-speed applications
- Flexible robot cable is standard on all pre-wired models, ideal for moving part applications
- Wide operating voltage range simplifies sensor connection to TTLs, relays and programmable controllers (PLC)

**NEW**

### Specifications

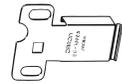
- Voltage range: 5 to 24 VDC
- Load rating: 100 mA (NPN), 40 mA (TTL) switching capacity
  - 50 mA (PNP)
- Current consumption: 35 mA max.
- Response frequency: 1 kHz min. (3 kHz typ.)
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -25 to 55°C, 5% to 85% RH
- Enclosure rating: IP50

## Connector-Ready Slotted Photomicrosensors

Appearance	Sensor type	Slot width/depth	Dimensions H x W x D mm	Output form	Indicator operation	Output type	Model		
	Through-beam with slot	5 mm W x 9 mm H	28.4 x 25.4 x 6.95	Light-ON	Light-ON	NPN	EE-SX470		
				Light-ON/Dark-ON selectable	Dark-ON		Dark-ON	EE-SX670	
					Light-ON			EE-SX670A	
			15.5 x 26.2 x 20.7	Light-ON	Light-ON	NPN	EE-SX471		
				Light-ON/Dark-ON selectable	Dark-ON		Dark-ON	EE-SX671	
					Light-ON			EE-SX671A	
		7 mm W x 9 mm H	28.4 x 29 x 13.7	Light-ON	Light-ON	NPN	EE-SX472		
				Light-ON/Dark-ON selectable	Dark-ON		Dark-ON	EE-SX672	
					Light-ON			EE-SX672A	
		5 mm W x 9 mm H	28.4 x 13.4 x 12.8	Light-ON	Light-ON	NPN	EE-SX473		
				Light-ON/Dark-ON selectable	Dark-ON		Dark-ON	EE-SX673	
					Light-ON			EE-SX673A	
			15.5 x 13.6 x 27.7	Light-ON	Light-ON	NPN	EE-SX474		
				Light-ON/Dark-ON selectable	Dark-ON		Dark-ON	EE-SX674	
					Light-ON			EE-SX674A	
		10 mm W x 9 mm H	28.4 x 31 x 16.7		Light-ON	NPN	EE-SX675		
								PNP	EE-SX675P
		5 mm W x 9 mm H	28.4 x 13.2 x 13.7			NPN	EE-SX676		
						PNP	EE-SX676P		
						NPN	EE-SX677		
						PNP	EE-SX677P		

## Connectors and Accessories

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Solder connector	—	16.8 x 13.0 x 4.0	EE-1001
		Makes selectable operation models into Light-ON operation sensors. The L and positive (+) terminals are already short-circuited.		EE-1001-1
		Connector has locking mechanism	13.5 x 13 x 4	EE-1009
	Connector with cable	2 m cable	11.8 x 16.2 x 5.3	EE-1006

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Connector with cable	2 m cable; connector has locking mechanism	13.5 x 13.0 x 4.0	EE-1010
		2 m robotic cable; connector has locking mechanism		EE-1010R
	Connector holder	For EE-1006	25.2 x 29.2 x 5.5	EE-1006A
	NPN/PNP conversion connector	2 m cable	16.2 x 11.8 x 5.3	EE-2002

## Pre-Wired Slotted Photomicrosensors

Appearance	Sensor type	Slot width/ depth	Dimensions H x W x D mm	Output form	Connection Method (cable length)	Model	
						NPN Output	PNP Output
	Through-beam with slot	5 mm W x 9 mm H	28 x 25.4 x 6.95	Light-ON Dark-ON (selectable)	Pre-wired models (1 m)	EE-SX670-WR	EE-SX670P-WR
					Models with junction connectors (0.3 m)	EE-SX670-C1J-R	EE-SX670P-C1J-R
		15.5 x 26.2 x 20.7	Pre-wired models (1 m)		EE-SX671-WR	EE-SX671P-WR	
			Models with junction connectors (0.3 m)		EE-SX671-C1J-R	EE-SX671P-C1J-R	
		7 mm W x 9 mm H	28.4 x 29 x 13.7		Pre-wired models (1 m)	EE-SX672-WR	EE-SX672P-WR
					Models with junction connectors (0.3 m)	EE-SX672-C1J-R	EE-SX672P-C1J-R
		5 mm W x 9 mm H	28.4 x 13.4 x 12.8		Pre-wired models (1 m)	EE-SX673-WR	EE-SX673P-WR
					Models with junction connectors (0.3 m)	EE-SX673-C1J-R	EE-SX673P-C1J-R
		15.5 x 13.6 x 27.7	28.4 x 13.4 x 12.8		Pre-wired models (1 m)	EE-SX674-WR	EE-SX674P-WR
					Models with junction connectors (0.3 m)	EE-SX674-C1J-R	EE-SX674P-C1J-R
	10 mm W x 9 mm H	28.4 x 31 x 16.7	Pre-wired models (1 m)	EE-SX675-WR	EE-SX675P-WR		
			Models with junction connectors (0.3 m)	EE-SX675-C1J-R	EE-SX675P-C1J-R		
	5 mm W x 9 mm H	28.4 x 13.2 x 13.7	Pre-wired models (1 m)	EE-SX676-WR	EE-SX676P-WR		
			Models with junction connectors (0.3 m)	EE-SX676-C1J-R	EE-SX676P-C1J-R		
	28.4 x 13.2 x 13.7	28.4 x 13.2 x 13.7	Pre-wired models (1 m)	EE-SX677-WR	EE-SX677P-WR		
			Models with junction connectors (0.3 m)	EE-SX677-C1J-R	EE-SX677P-C1J-R		

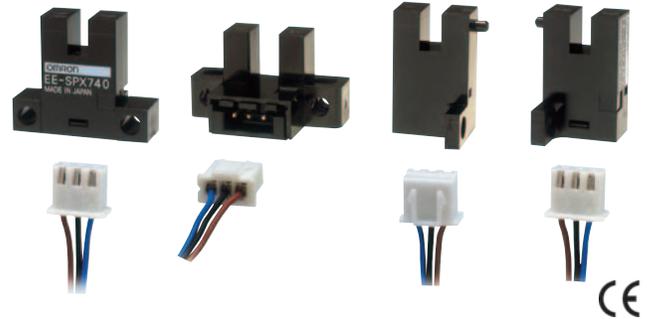
**Note:** For all sensor models with junction connectors (-C1J-R), use model EE-1016-R connector with cable.

# Slotted Photomicrosensors EE-SPX74□/EE-SPX84□ Series



## Connector-Ready Photomicrosensors with Open Collector Output

- Compact sensor for high-density mounting
- Standard, L-shaped, and T-shaped models available
- Easy to maintain, plugs into Connector cordset EE-1013
- Connector features built-in safety lock vibration and shock resistance
- Models available with Light-ON or Light-ON/Dark-ON output configurations
- Powerful light modulation against external light interference
- Easy operation monitoring with bright LED indicator
- Wide operating voltage range simplifies sensor connection to TTLs, relays, and programmable controllers (PLC)



- Ideal for use in end-of-travel, home position and operation trigger applications

## Specifications

- Voltage range: 5-24 VDC
- Load rating: NPN open collector, 50 mA
- Current consumption: 15 mA max.
- Response frequency: 500 Hz max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 5% to 85% RH
- Enclosure rating: IP50

## Plug-In Slotted Photomicrosensors

Appearance	Sensor type	Slot width/depth	Dimensions H x W x D mm	Output form	Output type	Model
 Standard	Through-beam (slot)	3.6 mm W x 6.6 mm D	21.2 x 25 x 7.4	Light-ON	NPN	EE-SPX840
				Dark-ON		EE-SPX740
 L-shaped, left tab			21.2 x 15.5 x 13	Light-ON		EE-SPX842
				Dark-ON		EE-SPX742
 L-shaped, right tab			21.2 x 15.5 x 13	Light-ON		EE-SPX843
				Dark-ON		EE-SPX743
 T-shaped		5 mm W x 9 mm D	15.4 x 27.2 x 15.5	Light-ON	EE-SPX841	
				Dark-ON	EE-SPX741	

## Connector

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Connector with cable	1 m cable	11.8 x 16.2 x 5.3	EE-1013

# Slotted Photomicrosensors

## EE-SPX301/401

Quick Link

B426

### Narrow Slot Sensors with Plug-In Connection

- Slotted DC sensor with plug-in connection for counting and presence/absence detection applications
- Narrow slot size: 3.6 W x 9 L mm
- Light modulation reduces external light interference
- Light-ON and Dark-ON operation models
- Built-in Light-ON indicator
- Easily connects to TTLs, relays and PLCs
- Connector simplifies installation and maintenance: choose connector with 1 m cable (EE-1003) or solder terminals (EE-1002)
- Convert EE-SPX301/401 NPN output to PNP with EE-2001 output converter
- Dimensions: 31.5 H x 26 W x 7 D mm



### Specifications

- Voltage range: 5 to 24 VDC
- Load rating: 80 mA (NPN) at 24 VDC
- Current consumption: 15 mA max.
- Response frequency: 500 Hz max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 35% to 85% RH
- Enclosure rating: IP50

# Slotted Photomicrosensors EE-SPX-W2A Series



## Pre-Wired Photomicrosensors with Open Collector Output

- Compact sensor for high-density mounting
- Standard, L-shaped, and T-shaped models available
- Amplifier's NPN output can be directly connected to a TTL and programmable controller (PLC)
- Incorporating dust-proof slit
- Detects objects as small as 0.5 mm diameter
- Light-ON or Dark-ON output configurations models available
- Optical axis monitoring with a Light-ON indicator
- Light modulation effectively reduces external light interference
- Pre-wired with 2 m cable
- Ideal for use in space confined applications



## Specifications

- Voltage range: 5-24 VDC
- Load rating: NPN open collector, 80 mA
- Current consumption: 15 mA max.
- Response frequency: 500 Hz max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 35% to 85% RH
- Enclosure rating: IP50

## Pre-Wired Photomicrosensors

Appearance	Sensor type	Slot width/depth	Dimensions H x W x D mm	Output form	Output type	Model
 Standard	Through-beam (slot)	3.6 mm W x 6.6 mm D	29.2 x 25 x 7.4	Light-ON	NPN	EE-SPX306-W2A
				Dark-ON		EE-SPX406-W2A
 L-shaped, left tab			29.2 x 15.5 x 13	Light-ON		EE-SPX302-W2A
				Dark-ON		EE-SPX402-W2A
 L-shaped, right tab	21.2 x 15.5 x 13	Light-ON	EE-SPX304-W2A			
		Dark-ON	EE-SPX404-W2A			
 T-shaped	5 mm W x 9 mm D	15.5 x 27.2 x 22.5	Light-ON	EE-SPX305-W2A		
			Dark-ON	EE-SPX405-W2A		

# Slotted Photomicrosensors EE-SPX303/EE-SPX403 Series



## Connector-Ready Wide Slot Sensors

- Large slot width (13 mm W x 10 mm D)
- Models available with Light-ON or Dark-ON output configurations
- Powerful light modulation against external light interference
- Easy adjustment and optical axis monitoring with a Light-ON indicator
- Wide operating voltage range simplifies sensor connection to TTLs, relays, and programmable controllers (PLC)
- Convert to PNP output with EE-2002 conversion connector
- 5 VDC input model is available for TTL applications



## Specifications

- Voltage range: 12-24 VDC; 5 VDC
- Load rating: NPN, 80 mA; TTL, 10 mA
- Current consumption: 15 mA max.
- Response frequency: 500 Hz max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 5% to 85% RH
- Enclosure rating: IP50

## Wide Slot Photomicrosensors

Appearance	Sensor type	Slot width/depth	Dimensions H x W x D mm	Output form	Output type	Model
	Through-beam (slot)	13 mm W x 10 mm D	26 x 26 x 7.4	Light-ON	NPN	EE-SPX303
				Dark-ON, 5 VDC		EE-SPX303-1
				Dark-ON		EE-SPX403

## Connectors and Accessories

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Solder connector	Connector makes selectable operation sensors into Light-ON operation sensors. Short-circuits L and positive (+) terminals.	16.8 x 13.0 x 4.0	EE-1001
	Connector with cable	2 m cable	11.8 x 16.2 x 5.3	EE-1006
	Connector holder	For EE-1006	25.2 x 29.2 x 5.5	EE-1006A
	Connector with cable	2 m cable	13.5 x 13.0 x 4.0	EE-1010
	Connector with robotic cable			EE-1010R
	NPN/PNP conversion connector		16.2 x 11.8 x 5.3	EE-2002

# Reflective Photomicrosensors EE-SPY31□/EE-SPY41□ Series



## Connector-Ready Reflective Sensors

- Detect dark colored objects and targets in front of mirror-like backgrounds
- Detect objects as small as 0.05 mm diameter copper wire
- 2 to 5 mm sensing distance
- Vertical and horizontal mounting models available
- Easy to maintain, plugs into Connector cordset EE-1006
- Models available with Light-ON or Light-ON/Dark-ON output configurations
- Light modulation effectively reduces external light interference
- Easy operation monitoring with bright LED indicator
- Wide operating voltage range simplifies sensor connection to TTLs, relays, and programmable controllers (PLC)



## Specifications

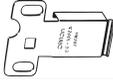
- Voltage range: 5-24 VDC
- Load rating: 80 mA (NPN), 10 mA (TTL) switching capacity
- Current consumption: 15 mA max.
- Response frequency: 100 Hz max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 35% to 85% RH
- Enclosure rating: IP50

## Plug-In Reflective Photomicrosensors

Appearance	Sensor type	Sensing area	Dimensions H x W x D mm	Output form	Output type	Model
Horizontal 	Convergent reflective	10 x 5 mm	29 x 26 x 8	Light-ON	NPN	EE-SPY311
				Dark-ON		EE-SPY411
Vertical 				Light-ON		EE-SPY312
				Dark-ON		EE-SPY412

## Connectors and Accessories

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Solder connector	—	16.8 x 13.0 x 4.0	EE-1001
		Makes selectable operation models into Light-ON operation sensors. The L and positive (+) terminals are already short-circuited.		EE-1001-1
	Solder connector	Connector has locking mechanism	13.5 x 13 x 4	EE-1009
	Connector with cable	2 m cable	11.8 x 16.2 x 5.3	EE-1006

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Connector holder	For EE-1006	25.2 x 29.2 x 5.5	EE-1006A
	Connector with cable	2 m cable; connector has locking mechanism	13.5 x 13.0 x 4.0	EE-1010
		2 m robotic cable; connector has locking mechanism		EE-1010R
	NPN/PNP conversion connector	2 m cable	16.2 x 11.8 x 5.3	EE-2002

# Reflective Photomicrosensors EE-SY671/EE-SY672



## Reflective Sensors with Sensitivity Adjuster

- 1 to 5 mm sensing distance
- Vertical and horizontal mounting models available
- Light-ON/Dark-ON output wire selectable
- Light modulation effectively reduces external light interference
- Easy operation monitoring with bright LED indicator
- Wide operating voltage range simplifies sensor connection relays and programmable controllers (PLC)



## Specifications

- Voltage range: 5 to 24 VDC ±10%, ripple 10% max. p-p
- Load rating: 100 mA (NPN)
- Current consumption: 40 mA max.
- Response frequency: 50 Hz max. (500 Hz typical)
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 45% to 85% RH
- Enclosure rating: IP50

## Plug-In Reflective Photomicrosensors

Appearance	Sensor type	Sensing area	Dimensions H x W x D mm	Output form	Output type	Model
	Convergent reflective	12.2 x 4 mm	31.4 x 25.4 x 6.95	Light-ON/Dark-ON, selectable	NPN	EE-SY671
		12.2 x 5.15 mm	31.2 x 25.4 x 6.95			EE-SY672

## Connectors and Accessories

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Solder connector	Connector has locking mechanism	13.5 x 13 x 4	EE-1009
	Connector with cable	2 m cable; connector has locking mechanism	13.5 x 13.0 x 4.0	EE-1010
		2 m robotic cable; connector has locking mechanism	13.5 x 13.0 x 4.0	EE-1010R
	NPN/PNP conversion connector	2 m cable	16.2 x 11.8 x 5.3	EE-2002

## Diffuse Reflective Sensors EE-SPY301/302/401/402

Quick Link

B433

### Diffuse Reflective Sensors

- Slim DC diffuse sensor detects objects without background interference
- 5 mm sensing distance
- Vertical and horizontal mounting models available
- Light-ON/Dark-ON output wire selectable
- Light modulation effectively reduces external light interference
- Easy adjustment and optical axis monitoring with a Light-ON indicator
- Wide operating voltage range simplifies sensor connection relays, TTLs and programmable controllers (PLC)
- Connector simplifies installation and maintenance: choose connector with 1 m cable (EE-1003) or solder terminals (EE-1002)
- Convert NPN to PNP output with EE-2001 conversion connector
- Dimensions: 27.5 H x 26 W x 7 D mm



### Specifications

- Voltage range: 5 to 24 VDC
- Load rating: 80 mA (NPN) at 24 VDC
- Current consumption: 15 mA max.
- Response frequency: 100 Hz max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 45% to 85% RH
- Enclosure rating: IP50

# Through-Beam Photomicrosensors EE-SPW311/411



## Long Distance Miniature Sensors with Built-In Amplifier

- 1 meter sensing distance with 5 mm diameter minimum object size
- Quick disconnect connector assures ease of maintenance
- Models available with Light-ON or Dark-ON output configurations
- Light modulation effectively reduces external light interference
- Easy operation monitoring with bright LED indicator
- Wide operating voltage range simplifies sensor connection to relays, TTLs and programmable controllers (PLC)
- Cordsets with 2 m cable supplied for emitter and receiver
- Convert to PNP output with EE-2002 conversion connector
- Extend cabling up to 10 m



## Specifications

- Voltage range: 5 to 24 VDC
- Load rating: 100 mA (NPN), 40 mA (TTL) switching capacity
- Current consumption: 20 mA max. (emitter); 20 mA max. (receiver)
- Response frequency: 100 Hz max. (200 Hz typical)
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 45% to 85% RH
- Enclosure rating: IP60

## Through-Beam Photomicrosensors

Appearance	Sensor type	Sensing distance	Dimensions H x W x D mm	Output form	Output type	Model
 (Receiver shown)	Through-beam	1 m	33.2 x 25.4 x 8.6	Light-ON	NPN	EE-SPW411
				Dark-ON		EE-SPW311

## Connector Cordsets

### Cordsets Included with Sensor

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Emitter cordset	2 m cable, 2 conductors	16.2 x 11.8 x 5.3	EE-1006L
	Receiver cordset	2 m cable, 3 conductors	16.2 x 11.8 x 5.3	EE-1006D

### Optional Cordsets

Appearance	Item	Description	Dimensions H x W x D mm	Model
	Connector with cable	2 m cable, 4 conductors; connector has locking mechanism	13.5 x 13.0 x 4.0	EE-1010
		2 m robotic cable, 4 conductors; connector has locking mechanism	13.5 x 13.0 x 4.0	EE-1010R
	NPN/PNP conversion connector	2 m cable	16.2 x 11.8 x 5.3	EE-2002

# Through-Beam Photomicrosensors EE-SPW321/421



## Miniature Sensing Heads with In-Line Cable Amplifier

- 30 cm sensing distance with 2 mm diameter minimum object size
- Detect objects as small as 0.5 mm using slit pairs supplied
- Operation indicators allow monitoring from the amplifier housing or sensor head
- Models available with Light-ON or Dark-ON output configurations
- Light modulation effectively reduces external light interference
- Slim amplifier (12 H x 7.5 W x 50 D mm) with NPN output for easy handling and mounting
- Pre-wired with 2 m, 3-conductor cable for simple wiring
- 0.5 or 1 m sensing head-to-amplifier cable lengths available



## Specifications

- Voltage range: 12 to 24 VDC
- Load rating: 100 mA (NPN) Current consumption: 30 mA max.
- Response time: 1 ms max. ON/1 ms max. OFF
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -20° to 55°C, 35% to 85% RH
- Enclosure rating: IP64

## Pre-Wired Through-Beam Photomicrosensors

Appearance	Sensor type	Sensing distance	Dimensions H x W x D mm	Output form	Output type	Model
	Through-beam	30 cm	14 x 5.8 x 14, 0.5 m cable	Light-ON	NPN	EE-SPW421
			14 x 5.8 x 14, 1 m cable			EE-SPW421A
			14 x 5.8 x 14, 0.5 m cable	Dark-ON		EE-SPW321
			14 x 5.8 x 14, 1 m cable			EE-SPW321A

## Slit Sets

Reduce beam size to detect smaller objects more accurately by applying slits to the emitter and receiver. Two sizes included with the sensor.

Size of aperture	Sensing distance	Minimum object size
0.5 x 3 mm	10 cm	Opaque: 0.5 mm dia.
1 x 3 mm	20 cm	Opaque: 1 mm dia.

# Special Application Photomicrosensors EE-SPX613



## Liquid Level Detector with Built-In Amplifier

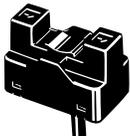
- Detect liquid level in manufacturing processes used in food & beverage and semiconductor industries
- Fits 6-13 mm diameter transparent or semi-transparent pipe with a wall thickness of 1 mm
- Easy to install tie-wrap and rubber tube prevent slippage
- Incorporates a sensitivity selector, built-in amplifier, and operation mode selector
- Built-in amplifier with NPN output saves space and wiring effort
- Pre-wired with 1 m, talc-free cable, safe for use in clean room equipment



## Specifications

- Voltage range: 12 to 24 VDC
- Load rating: 100 mA (NPN)
- Current consumption: 30 mA max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 5% to 85% RH
- Enclosure rating: IP50

## Liquid Level Photomicrosensor

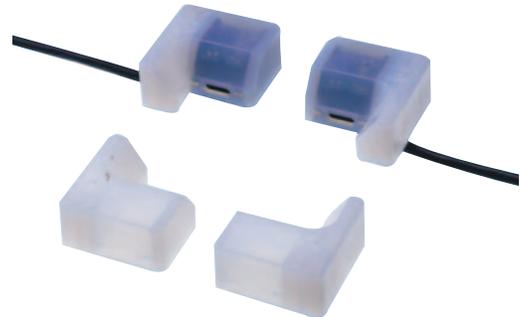
Appearance	Sensor type	Sensing distance	Dimensions H x W x D mm	Output form	Output type	Model
	Through-beam (slot)	6-13 mm diameter pipes, as transparent as FEP	16 x 26 x 19	Light-ON/ Dark-ON selectable	NPN	EE-SPX613

# Special Application Photomicrosensors EE-SPY801/802



## Wafer Carrier Position Sensor

- Unique optical system enables stable detection of almost all wafer-carriers
- Contact surfaces with the wafer carrier use a special chemical-resistant fluoro-resin
- Set the mounting position using optional pedestals
- Light modulation effectively reduces external light interference
- Pre-wired with 2 m, talc-free cable, safe for use in clean room equipment



## Specifications

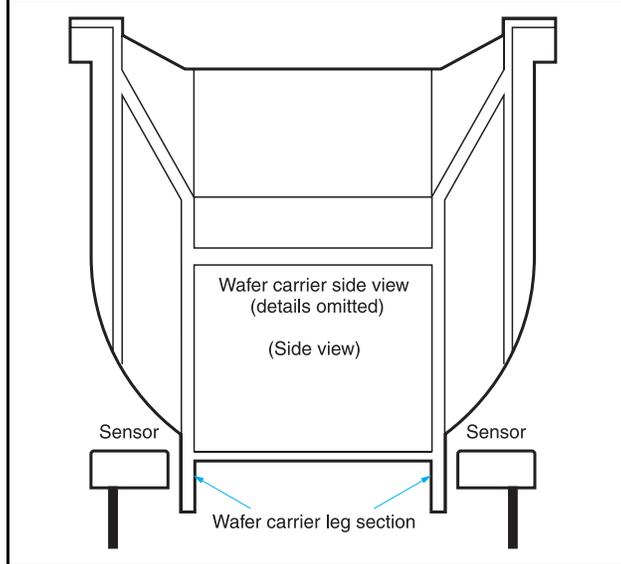
- Voltage range: 12 to 24 VDC
- Load rating: 100 mA (NPN)
- Current consumption: 30 mA max.
- Response time: 5 ms max.
- Light source: Pulse modulated infrared LED, 940 nm
- Operating ambient: -10° to 55°C, 5% to 85% RH
- Enclosure rating: IP30

## Wafer Carrier Positioning Sensor

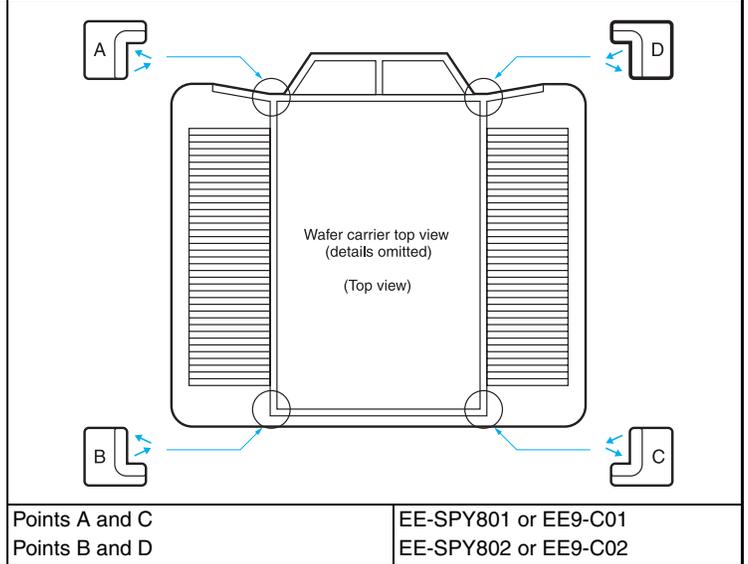
Appearance	Sensor type	Sensing distance	Dimensions H x W x D mm	Output form	Output type	Model
	Diffuse reflective	0-3 mm	15 x 32 x 30	Turns on when a wafer carrier is present	NPN	EE-SPY801
						EE-SPY802
	Pedestal (no sensor function)	—	15 x 32 x 30	Guides carrier for detection	—	EE9-C01
						EE9-C02

## Application

Mount sensors to detect the support rails along the bottom of the wafer carrier.



Install a Sensor or Pedestal at each of the four corners indicated by a circle in the following diagram.



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### Displacement

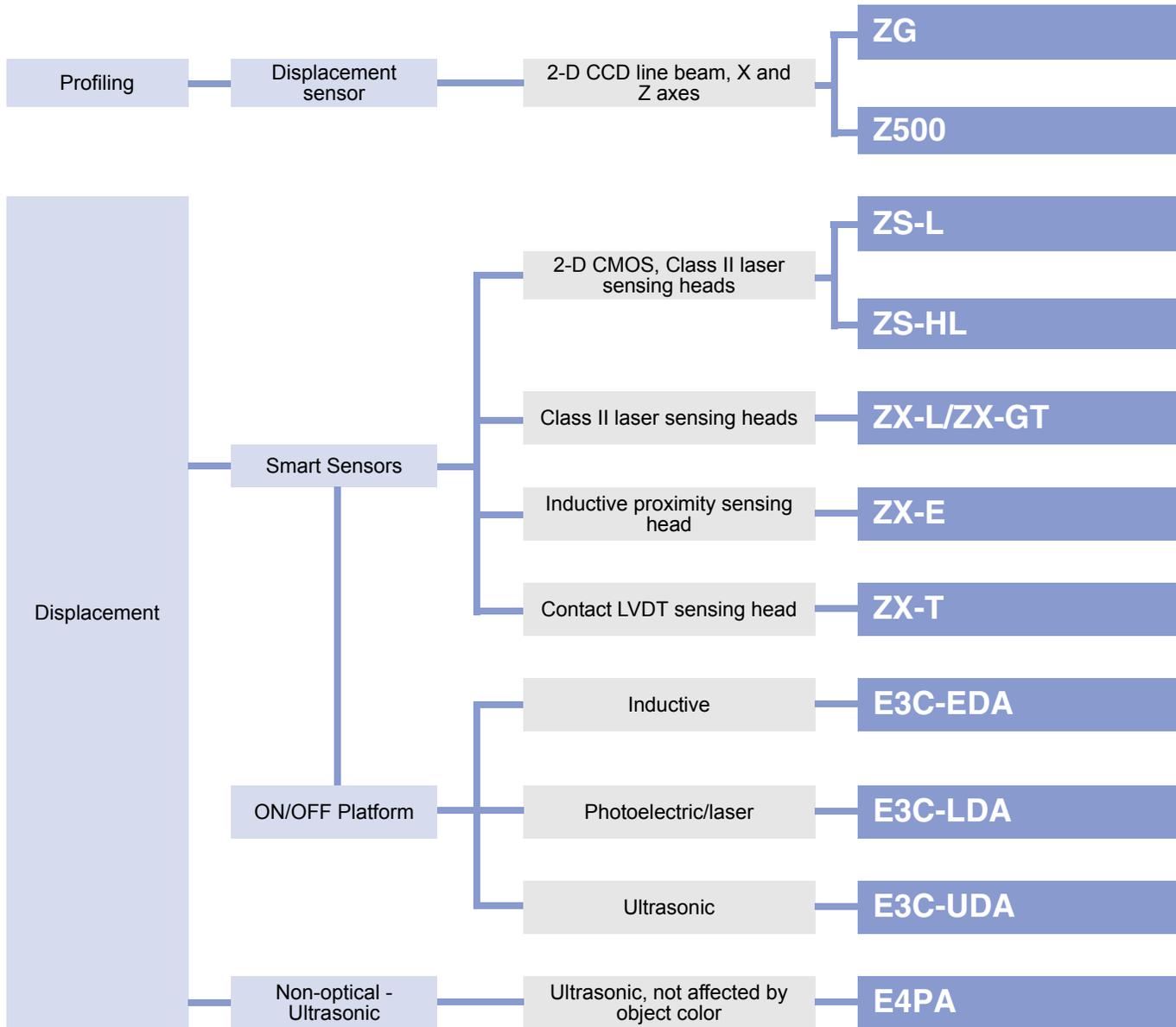
#### *Smart Amplifier Models*

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## Selection Guide



# 2D Laser Profiling Sensor ZG



## World's First 2D Measurement Sensor

The new ZG Series Profiling Sensor is Omron's newest addition to the Smart Sensor suite of advanced sensors. The ZG Sensor allows entire shapes, including both height and width to be measured simultaneously via a wide Laser beam and completes the measurement in parallel.

- All in one controller with Built-in LCD Display - no external monitor required
- Measure entire shapes in 2D, X and Z axis
- Immediate Live Feedback
- Fast - 5 mS sampling time
- Accurate - 0.2 μm resolution
- Wide measurement range up to 70 mm wide
- Optional Smart Monitor ZG Software for system setting, monitoring and logging



   
The ZG is an  
FDA Class IIIb  
Laser device

## Ordering Information

### Sensing Heads

Measurement mode	Measurement center distance	Measuring range [Sensing distance]	Beam size/ measuring region	Resolution X dir / Z dir	FDA laser class	Model
Regular reflective	20 mm	20 mm ± 0.5 mm	3 mm	5 μm / 0.25 μm	Class II	ZGWDS3T 0.5M
				5 μm / 0.2 μm		ZGWDS3T 2M
Diffuse reflective	50 mm	50 mm ± 3 mm	8 mm	13 μm / 1 μm	Class IIIb	ZGWDS8T 0.5M
						ZGWDS8T 2M
	100 mm	100 mm ± 12 mm	22 mm	33 μm / 3 μm		ZGWDS22 0.5M
						ZGWDS22 2M
	210 mm	210 mm ± 30 mm	70 mm	111 μm / 10 μm		ZGWDS70 0.5M
						ZGWDS70 2M

### Controller

Description	Power supply	Analog output (Switch selectable)	Discrimination output function	Output type	Model
Controller	24 VDC	4 to 20 mA, -10 to 10 VDC	All Pass/NG/Error	NPN	ZG-WDC11
				PNP	ZG-WDC41
				NPN	ZG-WDC11A
				PNP	ZG-WDC41A

**Note:** Models with 'A' suffix includes Smart Monitor ZG Set-up Software.

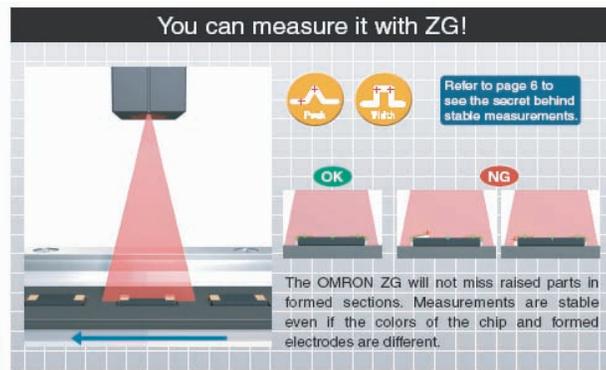
## Accessories

Description	Output Type	Model
Parallel Output Unit	NPN	ZG-RPD-11
	PNP	ZG-RPD-41
RS232 Cable (2 m for PC)	—	ZS-XRS2
RS232 Cable (2 m for PLC/HMI)		ZS-XPT2
Sensor Head Extension Cable - 3 m		ZG-XC3CR
Sensor Head Extension Cable - 8 m		ZG-XC8CR
Sensor Head Extension Cable - 15 m		ZG-XC15CR
Sensor Head Extension Cable - 25 m		ZG-XC25CR
Digital Equalizer		ZG-XEQ
Digital Equalizer Connection Cable - 0.2 m		ZG-XC02D
Parallel Mounting Adaptor (for 1 unit)		ZS-XPM1
Parallel Mounting Adaptor (for 2 or more units)		ZS-XPM2

## Applications

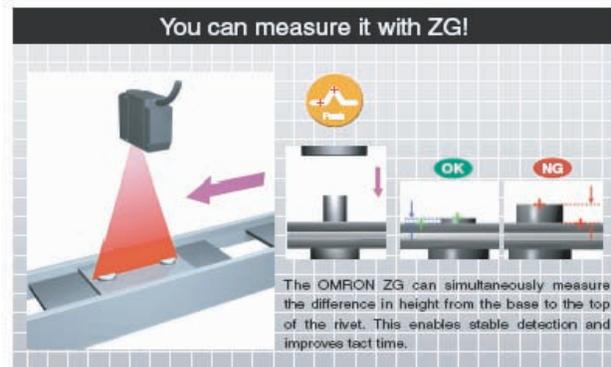
### Chip Profile Measurement

Inspect imperfections of the chip surface and profile



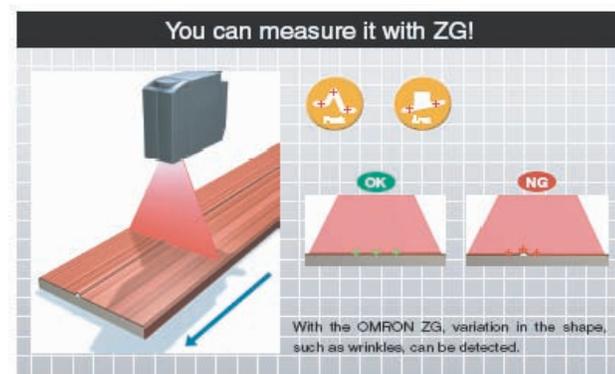
### Rivet Height Profile

Confirm proper rivet installation



### Wrinkle Surface Detection

Detect imperfections on a layer adhered to a substrate



## Specifications

### Sensor Heads

Item	Model	ZG-WDS70	ZG-WDS22	ZG-WDS8T	ZG-WDS3T			
<b>Optical system</b>		Diffuse reflective	Diffuse reflective	Regular reflective	Diffuse reflective			
<b>Measurement range</b>	<b>Height direction (in standard mode)</b>	210 ±30 mm	100 ±12 mm	94 ±10 mm	50 ±3 mm	44 ±2 mm	20 ±0.5 mm	5.2 ±0.4 mm
	<b>Width direction</b>	70 mm (typical)	22 mm (typical)	8 mm (typical)	3 mm (typical)			
<b>Resolution</b>	<b>Height direction (See note 1)</b>	10 μm	3 μm	1 μm	0.25 μm			
	<b>Width direction</b>	70 mm/631 pixels	22 mm/631 pixels	8 mm/631 pixels	3 mm/631 pixels			
<b>Linearity (in the height direction (See note 2))</b>		±0.5% FS						
<b>Temperature characteristic (See note 3)</b>		0.1% FS/°C						
<b>Light Source</b>	<b>Type</b>	Visible semiconductor laser						
	<b>Wavelength</b>	658 nm				650 nm		
	<b>Output</b>	5 mW max. output, 1 mW max. exposure (without using optical instruments)					1 mW max.	
	<b>Laser class</b>	Class 2M (JIS C 6802 2005)				Class 2 (JIS C 6802 2005)		
<b>Beam shape (at measurement center distance) (See note 4)</b>		120 μm x 75 mm (typical)	60 μm x 45 mm (typical)	30 μm x 24 mm (typical)	25 μm x 4 mm (typical)			
<b>LED</b>		STANDBY: Lights when laser irradiation preparation is complete (indication color: green) LD_ON: Lights when the laser is irradiating (indication color: red)						
<b>Measurement object</b>		Opaque material						
<b>Environment resistance</b>	<b>Ambient light intensity</b>	Incandescent lamp: 1,000 lx max. (light intensity on the receiver surface)						
	<b>Ambient temperature</b>	Operating: 0° to 50° C, Storage: -15° to 60° C (with no icing or condensation)						
	<b>Ambient humidity</b>	Operating and storage: 35 to 85% (with no condensation)						
	<b>Degree of protection</b>	IP66 (IEC 60529)				IP64 (IEC 60529)		
	<b>Vibration resistance (destruction)</b>	10 to 150 Hz with 0.35 mm single amplitude for 80 min each in X, Y, and Z directions						
	<b>Shock resistance (destruction)</b>	150 m/s <sup>2</sup> , 3 times each in 6 directions (up/down, right/left, forward/backward)						
<b>Materials</b>		Case: Aluminum diecast, Front cover: Glass, Cable insulation: Heat-resistive polyvinyl chloride (PVC), Connector: Zinc alloy or brass						
<b>Cable length</b>		0.5 m, 2 m						
<b>Minimum bending radius</b>		68 mm						
<b>Weight</b>		Approx. 650 g	Approx. 500 g	Approx. 500 g	Approx. 300 g			
<b>Accessories</b>		Laser Labels (EN, 2 labels), Ferrite Core (1), Instruction Manual						

**Note 1.** Obtained by setting an OMRON standard measurement object at the measurement center distance and determining the average height of the beam line. The conditions are given in the table below. However, satisfactory resolution cannot be attained in strong electromagnetic fields.

Model	CCD Mode	Average no. of operations	Measurement object	
			Regular reflective	Diffuse reflective
ZG-WDS70/ WDS22/ WDS8T	Standard mode	16	OMRON standard white alumina ceramic object	
ZG-WDS3T	Standard mode	32	OMRON standard mirrored object	OMRON standard diffuse reflective object

**2.** The tolerance for an ideal straight line obtained by determining the average height of an OMRON standard measurement object for the beam line. The CCD standard mode is used. Linearity varies depending on the measurement object.

Model	Measurement object	
	Regular reflective	Diffuse reflective
ZG-WDS70/ WDS22/WDS8T	OMRON standard white alumina ceramic object	
ZG-WDS3T	OMRON standard mirrored object	OMRON standard diffuse reflective object

**3.** A value attained by using an aluminum jig to secure the distance between the Head and the measurement object. The CCD standard mode is used.

**4.** Defined as  $1/e^2$  (13.5%) of the center light intensity. This may be influenced when light leakage also exists outside the defined area and the reflectivity of the light around the measurement object is higher than that of the measurement object.

## Controller

## Sensor Controllers

Item	Model	ZG-WDC11/WDC11A	ZG-WDC41/WDC41A	
Input/output type		NPN	PNP	
No. of connectable Sensor Heads		1 per Controller		
Measurement cycle (See note 1)		16 ms (high-precision mode), 8 ms (standard mode), 5 ms (high-speed mode)		
Min. display unit		10 nm		
Display range		.999.99999 to 999.99999		
Display	LCD monitor	1.8-inch TFT color LCD (557 ~ 234 pixels)		
	LEDs	<ul style="list-style-type: none"> <li>Judgment indicators for each task (indication color: orange): T1, T2, T3, T4</li> <li>Laser indicator (indication color: green): LD_ON</li> <li>Zero reset indicator (indication color: green): ZERO</li> <li>Trigger indicators (indication color: green): TRIG</li> </ul>		
External interface	Input/output signal lines	Analog outputs	Select voltage or current (using the sliding switch on the bottom surface) <ul style="list-style-type: none"> <li>Voltage output: .10 to 10 V, output impedance: 40 Ω</li> <li>Current output: 4 to 20 mA, maximum load resistance: 300 Ω</li> </ul>	
		Judgment output (ALL-PASS/NG/ERROR)	NPN open collector 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open collector 50 mA max. Residual voltage: 1.2 V max.
		Trigger auxiliary output (ENABLE/GATE)		
		Laser stop input (LD-OFF)	ON: 0 V short or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	ON: Power supply voltage short or power supply voltage -1.5 V min. OFF: Open (leakage current 0.1 mA max.)
		Zero reset input (ZERO)		
		Measurement trigger input (TRIG)		
	Bank switching input (BANK A, B)			
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B	
	RS-232C	1 port, 115,200 bps max.		
Main functions	No. of setting banks	4		
	Sensitivity adjustment	Multi/auto/fixe		
	Measurement items	Height, 2-point Step, 3-point Step, Edge position, Edge width, Angle/Area/Calculation (up to four items can be measured simultaneously)		
	Trigger modes	External trigger/continuous		
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple current)		
	Current consumption	0.8 A max.		
	Insulation resistance	20 MΩ at 250 V between lead wires and Controller case		
	Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between lead wires and Controller case		
Environmental resistance	Ambient temperature	Operating: 0 to 50° C, Storage: -15 to 60° C (with no icing or condensation)		
	Ambient humidity	Operating and storage: 35 to 85%		
	Degree of protection	IP20 (IEC 60529)		
	Vibration resistance (destruction)	Vibration frequency: 10 to 150 Hz, single amplitude: 0.35 mm, acceleration: 50 m/s <sup>2</sup> , 10 times for 8 min each		
	Shock resistance (destruction)	150 m/s <sup>2</sup> , 3 times each in 6 directions (up/down, right/left, forward/backward)		
Materials		Case: Polycarbonate (PC), Cable insulation: Heat-resistive polyvinyl chloride (PVC)		
Cable length		2 m		
Weight		Approx. 300 g (including cable) (Packed state: Approx. 450 g)		
Accessories		Large Ferrite Core (1), Small Ferrite Core(2), Insulation lock (1), Instruction Manual, Smart Monitor ZG Setup Support Software (CD-ROM), USB Cable (1 m)		

**Note: 1.** The image input periods listed here are for fixed/auto sensitivity. The image input period will be longer for multi-sensitivity or other settings. Use the eco monitor in RUN mode to determine the actual image input period.

# Measurement Sensors

# Z500

Quick Link  
C423

## Fast Two-Dimensional Laser Gauging System

The Z500 laser measurement sensor solves the problem of how to measure a workpiece in-line for both width and height/depth at one time. Compared to single axis laser and vision systems, Z500 provides a unique advantage by measuring in X axis and Z axis simultaneously, improving accuracy and speed of the inspection.

- Performs simultaneous width and depth/height measurements in one cycle
- 8 measurement modes available, including a combination of step, width and edge position
- No work piece or sensor movement required: improves measurement precision and reduces measurement cycle time
- Z500 performs all data processing and calculations, eliminates need for other controllers
- 2-dimensional SW-CCD and multiple incident level control allow shape measurement of curved work pieces and a wide variety of other surfaces



- Visible red light source with FDA Class II and Class IIIb laser ratings
- Diffuse reflective & mirror reflective sensing capabilities in one sensor head
- Measurement Value & High/Pass/Low discrimination outputs in analog and NPN/PNP outputs
- One controller can operate two sensor heads
- Live visual monitor screen images of actual results for easy repair and setup

## Z500 Ordering Information

### Sensing Heads

Measurement mode	Measurement center distance	Measuring range	Beam size/ measuring region	Resolution	FDA laser class	Model
Diffuse reflective	5.2 mm	±0.8 mm	20 μm x 4 mm/ 2 mm region	0.25 μm	Class II	Z500-SW2T
Mirror reflective	20 mm					
Diffuse reflective	50 mm	±5 mm	30 μm x 24 mm/ 6 mm region	0.3 μm	Class IIIb	Z500-SW6
Mirror reflective	44 mm					±4 mm
Diffuse reflective	100 mm	±20 mm	60 μm x 45 mm/ 17 mm region	1 μm	Class II	Z500-SW17
Mirror reflective	94 mm					±16 mm

### Controller

Description	Power supply	Analog output (Switch selectable)	Discrimination output function	Output type	Model
Controller	21.6 to 26.4 VDC	4 to 20 mA, 1 to 5 VDC, 0 to 5 VDC, ±4 VDC, ±5 VDC	High, Pass, Low	NPN	Z500-MC10E
				PNP	Z500-MC15E

### Accessories

Description	Model
Monitor, 5.5" LCD	F150-M05L
Monitor cable, 2 m length	F150-VM
Teaching console	Z300-KP
Sensor extension cable, 3 m cable length	Z309-SC1R 3M
Sensor extension cable, 6 m cable length	Z309-SC1R 6M
Sensor extension cable, 8 m cable length	Z309-SC1R 8M
Sensor extension cable, 13 m cable length	Z309-SC1R 13M

## Applications

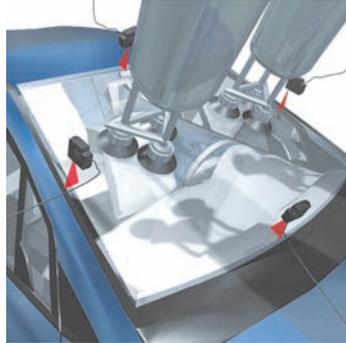
### Measure piston profile

Confirm proper seating of single and multi-part sealing rings.



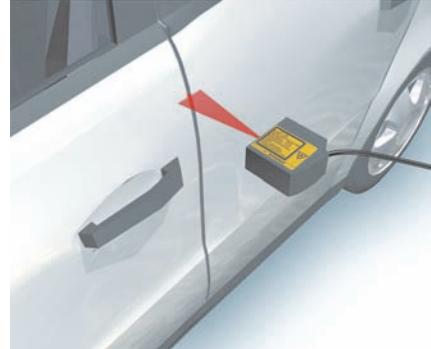
### Windshield glass placement

Inspect profile of windshield to confirm proper positioning and seating.



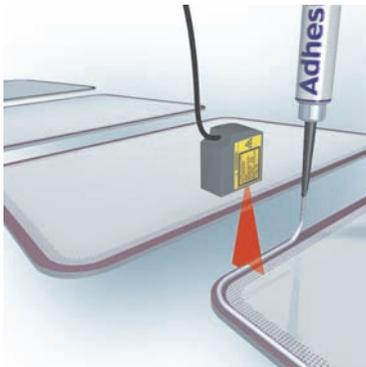
### Inspect auto door gap

Measure the gap between doors to verify correct installation.



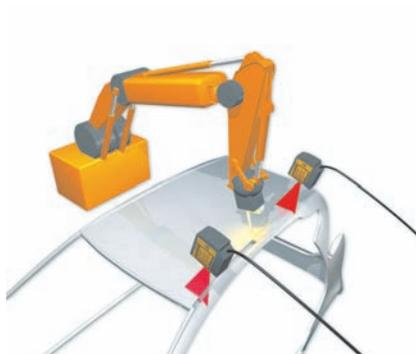
### Adhesive bead inspection

Verify that enough adhesive has been applied and it is seated properly.



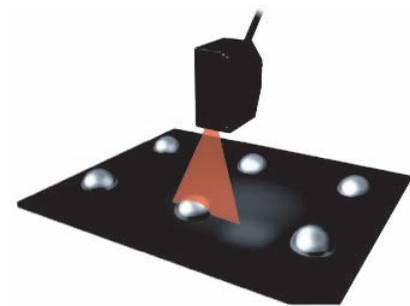
### Verify parts welding

Measure gap profile before and after welding to check for weld quality.



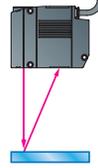
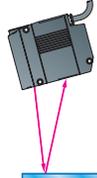
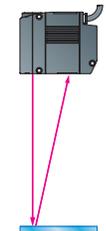
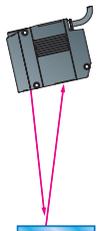
### Rivet height measurement

Confirm proper installation of rivets by measuring profile/height.



## Specifications

## Sensor Heads

Model		Z500-SW2		Z500-SW6		Z500-SW17	
		Diffuse reflection	Mirror reflection	Diffuse reflection	Mirror reflection	Diffuse reflection	Mirror reflection
Item	Measurement mode						
Distance to measurement center		5.2 mm	20 mm (with beam cover attached: 16 mm)	50 mm	44 mm	100 mm	94 mm
Measurement range		±0.8 mm		±5 mm	±4 mm	±20 mm	±16 mm
Light source		Visible-light semiconductor laser (Wavelength 650 nm, 1 mΩ max., Class 2)		Visible-light semiconductor laser (Wavelength 658 nm, 15 mΩ max., Class 3B)			
Beam dimensions		Reference distance: 20 μm × 4 mm TYP. (Measurement region: 2 mm)		Reference distance: 30 μm × 24 mm TYP. (Measurement region: 6 mm)		Reference distance: 60 μm × 45 mm TYP. (Measurement region: 17 mm)	
Linearity		±0.1% FS	±0.1% FS	±0.1% FS			
Resolution		0.25 μm		0.3 μm		1 μm	
Sampling cycle		9.94 ms					
LED indicators (LASER indicator)		Lit while laser is ON.					
Temperature characteristic		0.01 FS/°C					
Environment resistance	Degree of protection	IEC IP64		IEC IP66			
	Ambient operating illumination	Illumination at light-receiving surface: 3,000 lx max., incandescent light					
	Ambient temperature	Operating: 0° to +50° C, Storage: -15° to +60° C (with no icing or condensation)					
	Ambient humidity	Operating and storage: 35% to 85% RH (with no condensation)					
Vibration resistance		10 to 150 Hz (single amplitude: 0.35 mm) for 80 min. each in X, Y, and Z directions					
Materials		Unit: Die-cast aluminum Cable sheathing: Heat-resistant chlorinated vinyl Connector: zinc alloy and brass					
Cable length		2 m		0.5 m		2 m	

## Controller

Model		Z500-MC10E	Z500-MC15E
Item	Input/output type	NPN	PNP
Performance specifications	Number of sensors that can be mounted	2	
	Number of scenes	16	
	Light intensity tracking function	Automatic (The light intensity tracking range can be specified)/Fixed (Select from 31 stages) Multiple (The light intensity range can be specified)	
	Measurement item	Select from the following 8 types: Height, Step: 2 pts, Step: 3 pts, Edge position, With, Edge center, Peak/Bottom, Define	
	Region specification	Region specification of line beam and displacement direction is possible.	
	Number of data to be stored	2048 points max.	
	Trigger function	Free/External 1/External 2/Auto	
	Results output	<ul style="list-style-type: none"> <li>• Judgment output               <ul style="list-style-type: none"> <li>↳ RS-232C output</li> <li>↳ Terminal block output</li> </ul> </li> <li>• Measurement value output (measurement value)               <ul style="list-style-type: none"> <li>↳ RS-232C output</li> <li>↳ Analog output</li> </ul> </li> </ul>	
	Terminal block	11 input points: TRIGGER, LD-OFF, RESET, D10 to D17 21 output points: DO0 to DO19, GATE	
	Monitor interface	1CH (for pin jack or overscan monitor)	
Analog output resolution	The full scale for output can be divided into a maximum of 40,000 gradations. Resolution (See note): 0.25 mV ( $\pm 5$ V), 0.4 $\mu$ A (4 to 20 mA)		
General specifications	Power supply voltage	21.6 to 26.4 VDC	
	Current consumption	1 A max. (with 2 Sensors connected)	
	Leakage current	10 mA max.	
	Ambient temperature	Operating: 0° to +50° C, Storage: -15° to +60° C (with no icing or condensation)	
	Ambient humidity	Operating and storage: 35% to 85% RH (with no condensation)	
	Degree of protection	IEC IP20 (in-panel)	
	Material	Unit: ABS	

## Monitor

Monitor model	<b>F150-M05L</b>
Display size	5.5 inches
Type	LCD TFT
Resolution	320 x 240
Brightness	250 cd/m
Input signal	NTSC composite video (1.0V/75 $\Omega$ termination)
Power supply voltage	21.6 to 27.6 VDC
Current consumption	700 mA or less
Operating ambient	0° to 50° C, 35% to 85% RH
Storage ambient	-25° to 65° C, 35% to 85% RH
Dimensions	143 H x 185 W x 42.2 D mm
Weight	Approx. 1 kg

# Measurement Sensors ZS-L



## Scalable High-Precision Laser Measurement Sensor

Smart ZS-L sensor offers high-precision, high-speed and high sensitivity two-dimensional inspections. Sensing heads combine accurate laser measurement with high-stability CMOS imaging. The dynamic sensing range detects all surfaces, from black rubber to glass and mirror surfaces. Use ZS-L as a scalable solution for multiple inspection points with stackable amplifiers and units to support data collection and calculation from up to nine sensors.

- Solve tough inspection problems: Stably measure black rubber, black resin, glass and metal sheets, and printed circuit boards
- Sensitive enough to measure thickness of coating or sealer on glass
- One-touch teach function simplifies setup
- High resolution of 0.25 μm
- Modular and scalable platform for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110 μs for accurate measurements of moving workpieces
- Support software simplifies data logging, analysis and reporting using serial communications via USB port
- Safe Class 2 visible laser with stable line-beam makes alignment and setup easy
- Sensing heads rated up to IP67
- Programming instructions shown on message display built into controllers
- Scalable Platform Advantages
- Expandable up to 9 controllers to meet changing needs
- Perform advance calculations like evenness or flatness with Multi-calculation controller



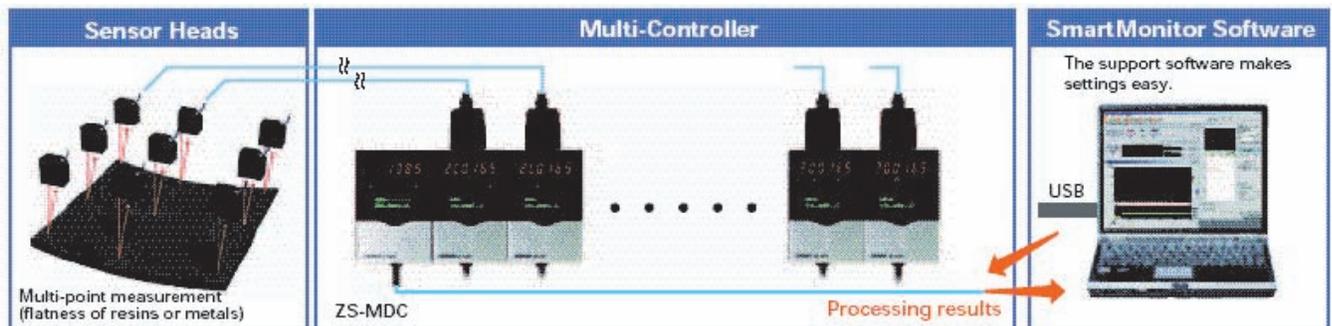
- Connect Data Storage Module for process data logging, traceability and SPC
- Use PC software for easy system setup and signal monitoring
- Sensor head with 2D-CMOS technology delivers high dynamic sensing range to measure black rubber, plastic, shiny glass and mirror surfaces
- Built-in setting for advanced applications
- Easy teaching and reconfiguration

### Measurement Tools

- Height measurement
- Step measurement
- Thickness measurement
- Flatness measurement
- Average measurement
- Eccentricity
- Warpage/Evenness

## ZS-L Sensor Ordering Information

### Typical Configuration



## Sensing Heads

Optical system	Measurement center distance	Measurement range	Beam diameter	Resolution*	Model
Diffuse reflective	50 mm	±5 mm	900 x 60 µm	0.8 µm	ZS-LD50
	80 mm	±15 mm		2 µm	ZS-LD80
	130 mm	±50 mm	900 x 70 µm	3 µm	ZS-LD130
	200 mm		900 x 100 µm	5 µm	ZS-LD200
	350 mm		±135 mm	240 µm dia.	20 µm
Regular reflective	20 mm	±1 mm	900 x 25 µm	0.25 µm	ZS-LD20T
	40 mm	±2.5 mm	2000 x 35 µm	0.4 µm	ZS-LD40T

\* Resolution is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode, when the number of samples to average is set to 128, and the measuring mode is set to high-resolution mode. The standard workpiece is white aluminum ceramic for diffuse reflection heads and glass in the regular reflection heads.

## Controllers

Description	Supply voltage	Control outputs	Model
Sensor Controllers	24 VDC	NPN outputs	ZS-LDC11
		PNP outputs	ZS-LDC41
Multi-Controllers for Calculation	24 VDC	NPN outputs	ZS-MDC11
		PNP outputs	ZS-MDC41
Data Storage Units Support Data Logging	24 VDC	NPN outputs	ZS-DSU11
		PNP outputs	ZS-DSU41

## Accessories

Description	Specification	Model
Data logging software	Smart Monitor Professional	ZS-SW11E
Memory Card	64 MB capacity	F160-N64S(S)
	128 MB capacity	QM300-N128S
	256 MB capacity	F160-N256S
RS-232C Cable	Connects ZS to a Personal Computer	ZS-XRS2
Controller link unit	Connects two ZS controllers	ZS-XCN
Sensor Extension Cables (max. 22 m with ZX-XC_B)	1 m length	ZS-XC1A
	4 m length	ZS-XC4A
	5 m length, robotic cable	ZS-XC5BR
	5 m length	ZS-XC5B
	8 m length	ZS-XC8A
	10 m length	ZS-XC10B
Panel Mount Adapters	For 1st Controller	ZS-XPM1
	For expansion (from 2nd Controller on)	ZS-XPM2

## Specifications

### Sensor Heads

Model		ZS-LD20T	ZS-LD40T	ZS-LD50	ZS-LD80	ZS-LD130	ZS-LD200	ZS-350S
Applicable controllers		ZS-LDC						
Regular reflection	Measuring center distance	20 mm	40 mm	47 mm	78 mm	130 mm	200 mm	—
	Measuring range	±1 mm	±2.5 mm	±4 mm	±14 mm	±15 mm	±48 mm	—
	Linearity	±0.1% FS	±0.1% FS	±0.1% FS	±0.1% FS	±0.25% FS	±0.25% FS	—
Diffuse reflection	Measuring center distance	6.3 mm	30 mm	50 mm	80 mm	130 mm	200 mm	350
	Measuring range	±1 mm	±2 mm	±5 mm	±15 mm	±12 mm	±50 mm	±135 mm
	Linearity	±0.1% FS	±0.1% FS	±0.1% FS	±0.1% FS	±0.25% FS	±0.1% FS	±0.1% FS
Light source		Class 2 visible semiconductor laser (wavelength: 650 nm, 1 mW max.)						

## Sensor Heads (Continued)

Model	ZS-LD20T	ZS-LD40T	ZS-LD50	ZS-LD80	ZS-LD130	ZS-LD200	ZS-350S
Beam diameter	900 x 25 µm	2000 x 35 µm	900 x 60 µm	900 x 60 µm	600 x 70 µm	900 x 100 µm	240 µm dia.
Resolution	0.25 µm	0.4 µm	0.8 µm	2 µm	3 µm	5 µm	20 µm
Temperature characteristic	0.04% FS/°C	0.02% FS/°C	0.02% FS/°C	0.01% FS/°C	0.02% FS/°C	0.02% FS/°C	0.04% FS/°C
Sampling cycle	110 µs						
Degree of protection	IP66 (cable length of 0.5 m); IP67 (cable length of 2 m)						
Dimensions	65 H x 65 W x 35 D mm						

## Controllers

Model		ZS-LDC11	ZS-LDC41	
Number of samples to average		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096		
Number of sensors mounted		1 sensor per controller		
External interface	Connection method	Serial I/O	Connector	
		Other	Pre-wired (standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
	Outputs	Judgment outputs	3 outputs: HIGH, PASS and LOW NPN open collector, 50 mA max., 30 VDC, residual voltage: 1.2 V max.	3 outputs: HIGH, PASS and LOW PNP open collector, 50 mA max., 30 VDC, residual voltage: 1.2 V max.
		Linear outputs	Voltage or current (selected by slide switch on base). Voltage output: -10 to 10 V, output impedance 40 Ω Current output: 4 to 20 mA, maximum load resistance: 300 Ω	
Inputs	Type	Laser OFF, ZERO reset timing, RESET		
	Ratings	ON: Short circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short circuited to supply voltage or within 1.5 V of supply voltage OFF: Open (leakage current 0.1 mA max.)	
Functions		Display	Measured value, threshold value, voltage/current, received light amount and resolution	
		Sensing	Mode, gain, measurement object, head installation	
		Filter	Smooth, average, and differentiation	
		Outputs	Scaling, various hold values, and zero reset	
		I/O settings	Linear (focus/correction), judgments (hysteresis and timer), non-measurement, and bank (switching and clear)	
		System	Save, initialization, measurement information display, communications settings, key lock, language, and data load	
Status indicators		HIGH: orange, PASS (green), LOW (orange), LDON (green), ZERO (orange), ENABLE (green)		
Segment display	Main display	8-segment red LED, 6 digits		
	Sub-display	8 segment green LED, 6 digits		
Message display		16 characters x 2 rows, green LCD dot matrix 5 x 8 pixels		
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)		
	Slide switch	Threshold switch (High/Low), mode switch (FUN, TEACH and RUN)		
Power supply voltage		21.6 to 26.4 VDC (including ripple)		
Current consumption		0.5 A max. when sensing head connected		
Degree of protection		IP40		
Dimensions		90 H x 60 W x 52.5 D mm		

# Measurement Sensors ZS-HL



## Scalable Very High-Precision and Distance Laser Measurement Sensors

Very High Performance Sensors that Support the Core Quality from very Long-Range to Extremely Precise Measurements

- Range of Sensor Head models with measuring center distance from 20 to 1,500 mm.
- Achieves a maximum high resolution of 0.25µm
- Wide lineup of products from 0.25 µm high-resolution models to 1,500 mm long-range models
- Solve tough inspection problems: Stably measure black rubber, black resin, glass and metal sheets, and printed circuit boards
- Sensitive enough to measure thickness of coating or sealer on glass
- One-touch teach function simplifies setup
- High resolution of 0.25 µm
- Modular and scalable platform for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110 µs for accurate measurements of moving work pieces
- Support software simplifies data logging, analysis and reporting using serial communications via USB port
- Safe FDA Class 2 visible laser with stable line-beam makes alignment and setup easy
- Sensing heads rated up to IP67
- Programming instructions shown on message display built into controllers



- Scalable Platform Advantages
- Expandable up to 9 controllers to meet changing needs
- Perform advance calculations like evenness or flatness with Multi-calculation controller
- Connect Data Storage Module for process data logging, traceability and SPC
- Use PC software for easy system setup and signal monitoring
- Sensor head with 2D-CMOS technology delivers high dynamic sensing range to measure black rubber, plastic, shiny glass and mirror surfaces
- Built-in setting for advanced applications
- Easy teaching and reconfiguration

## Ordering Information

### Sensing Heads

Measurement mode	Measurement center distance	Measuring range [Sensing distance]	Beam size/measuring region	Resolution	FDA laser class	Model
Regular	20 mm	20 mm ± 1 mm	1.0 mm x 20 µm	0.25 µm	Class II	ZS-HLDS2T 2M
Diffuse	5.2 mm	5.2 mm ± 1 mm				
Regular	50 mm	50 mm ± 5 mm	1.0 mm x 30 µm	1.0 µm		ZS-HLDS5T 2M
Diffuse	44 mm	44 mm ± 4 mm				
Regular	100 mm	100 mm ± 20 mm	3.5 mm x 60 µm	1.0 µm		ZS-HLDS10 2M
Diffuse	5.2 mm	94 mm ± 16 mm				
Regular	600 mm	600 mm ± 350 mm	16 mm x 0.3 mm	8 µm @ 250 mm, 40 µm @ 600 mm	ZS-HLDS60	
	1500 mm	1500 mm ± 500 mm	40 mm x 1.5 mm	500 µm	ZS-HLDS150	

### ZS-HL Series Sensor Heads (for Nozzle Gaps)

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution	Model
Regular Reflective Models	10 ± 0.5 mm	Line beam	900 x 25 µm	0.25 µm	ZS-LD10GT
	15 ± 0.75 mm				ZS-LD15GT

## Controllers

### ZS-HL-Series Sensor Controllers

Shape	Supply voltage	Control outputs	Model
	24 VDC	NPN outputs	ZS-HLDC11
		PNP outputs	ZS-HLDC41

### Multi-Controllers

Shape	Supply voltage	Control outputs	Model
	24 VDC	NPN outputs	ZS-MDC11
		PNP outputs	ZS-MDC41

### Data Storage Units

Shape	Supply voltage	Control outputs	Model
	24 VDC	NPN outputs	ZS-DSU11
		PNP outputs	ZS-DSU41

### Accessories

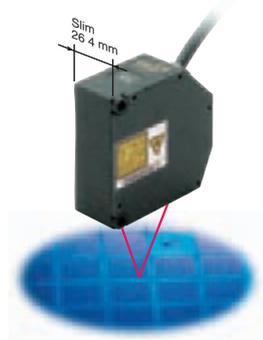
Description	Specification	Model
Data logging software	Smart Monitor Professional	ZS-SW11V3E
Memory Card	64 MB capacity	F160-N64S(S)
	128 MB capacity	QM300-N128S
	256 MB capacity	F160-N256S
RS-232C Cable	Connects ZS to a Personal Computer	ZS-XRS2
	Digital equalizer (relay)	ZS-XEQ
	Extension cable (long distance, flexible 15 m cable)	ZS-XC15CR
	Extension cable (long distance, flexible 25 m cable)	ZS-XC25CR
	Digital equalizer (connection cable 0.2 m)	ZS-XC02D
Controller link unit	Connects two ZS controllers	ZS-XCN
Sensor Extension Cables (max. 22 m with ZX-XC_B)	1 m length	ZS-XC1A
	4 m length	ZS-XC4A
	5 m length, robotic cable	ZS-XC5BR
	5 m length	ZS-XC5B
	8 m length	ZS-XC8A
	10 m length	ZS-XC10B
Panel Mount Adapters	For 1st Controller	ZS-XPM1
	For expansion (from 2nd Controller on)	ZS-XPM2

# Applications

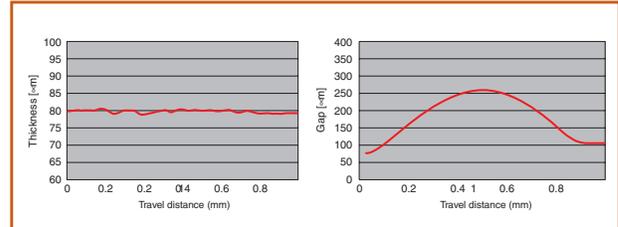
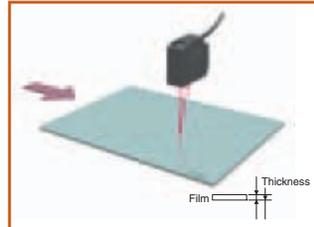
## ZS-HLDS2T/ZS-LD10GT/LD15GT

### The Only Way to Very High-Precision Measurements

Superior Features for Semiconductor Wafer, Glass, and Other Measurements Requiring Precision



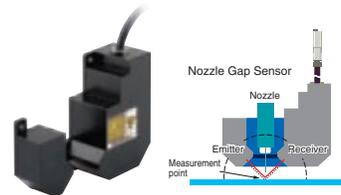
#### Simultaneous Measuring of Touch Panel Film Thickness and Gap



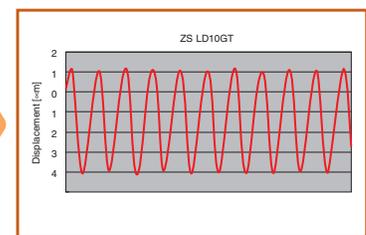
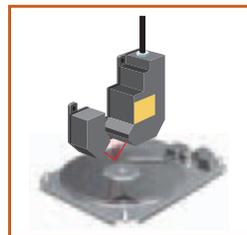
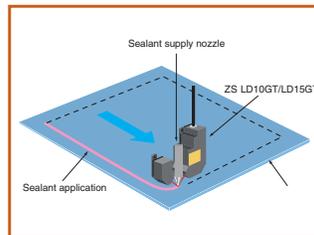
Simultaneous measurement of transparent object thickness and gap

<b>Model</b>	<b>ZS-HLDS2T</b>
<b>Measuring center distance</b>	20±1 mm
<b>Resolution</b>	0.25 μm
<b>Linearity</b>	±0.05% FS
<b>Beam shape</b>	20 μm x 1 mm

An unbelievable stationary measurement precision of 0.25 μm, the highest in this product class.



#### Height Control of Sealant Dispensers Inspection of Disk Play on HDD Motor Rotating Plate



Measures amplitude undulations of 5 μm.

#### Ideal for Measuring Nozzle Gaps!

- Reduced pattern influence for moving measurement, the best in the moving resolution industry.
- Possible to match nozzle drip point and measurement point then measure.
- Sensor Head with separate light emission and reception in one unit to create nozzle space.

<b>Model</b>	<b>ZS-LD10GT/LD15GT</b>
<b>Measuring center distance</b>	10±0.5 mm/15±0.75 mm
<b>Resolution</b>	0.25 μm
<b>Linearity</b>	±0.1% FS
<b>Beam shape</b>	25 x 900 μm

## Specifications

### Sensor Controllers

Item	Model	ZS-HLDC11	ZS-HLDC41	
No. of samples to average		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096		
Number of mounted Sensors		1 per Sensor Controller		
External interface	Connection method		Serial I/O: connector, Other: pre-wired (Standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, Full Speed (12 Mbps max.), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
	Output	Judgment output	HIGH/PASS/LOW 3 outputs NPN open collector, 30 VDC, 50 mA max., residual voltage 1.2 V max.	HIGH/PASS/LOW: 3 outputs PNP open collector, 50 mA max., residual voltage 1.2 V max.
		Linear output	Selectable from 2 types of output, voltage or current (selected by slide switch on bottom). • Voltage output: .10 to 10 V, output impedance: 40 Ω • Current output: 4 to 20 mA, maximum load resistance: 300 Ω	
Inputs	Laser OFF, ZERO reset timing, RESET	ON: Short-circuited with 0 V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short-circuited to supply voltage or within 1.5 V of supply voltage. OFF: Open (leakage current: 0.1 mA max.)	
Functions		Display: Measured value, threshold value, voltage/current, received light amount, and resolution/terminal block output ±2 Sensing: Mode, gain, measurement object, head installation Measurement point ±1: Average, peak, bottom, thickness, step, and calculations Filter: Smooth, average, and differentiation Outputs: Scaling, various hold values, and zero reset I/O settings: Linear (focus/correction), judgments (hysteresis and timer), non-measurement, and bank (switching and clear) ±2 System: Save, initialization, measurement information display, communications settings, key lock, language, and data load Task: ZS-HLDC□1: Single task or multitask (up to 4) ZS-LDC□1: Single task		
Status indicators		HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (orange), and ENABLE (green)		
Segment display	Main digital	8-segment red LED, 6 digits		
	Sub-digital	8-segment green LEDs, 6 digits		
LCD		16 digits x 2 rows, Color of characters: green, Resolution per character: 5 x 8 pixel matrix		
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)		
	Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)		
Power supply voltage		21.6 V to 26.4 VDC (including ripple)		
Current consumption		0.5 A max. (when Sensor Head is connected)		
Ambient temperature		Operating: 0° to 50° C, Storage: -15° to +60° C (with no icing or condensation)		
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)		
Materials		Case: Polycarbonate (PC)		
Weight		Approx. 280 g (excluding packing materials and accessories)		
Accessories		Ferrite core (1), instruction sheet		

- Note:** 1. Can be used with ZS-HLDC□1 when Multitask Mode selected.  
2. Terminal block output is a function of the ZS-HLDC□1.

## Sensing Heads

Item	Model	ZS-HLDS2T	ZS-HLDS5T	ZS-HLDS10	ZS-HLDS60	ZS-HLDS150
Applicable Controllers	ZS-HLDC series					
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection
Measuring center distance	20 mm	5.2 mm	50 mm	44 mm	100 mm	94 mm
Measuring range	±1 mm	±1 mm	±5 mm	±4 mm	±20 mm	±16 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)			Visible semiconductor laser (wavelength: 658 nm, 1 mW max., JIS Class 2)		
Beam shape	Line beam					
Beam diameter (See note 1)	1.0 mm x 20 μm		1.0 mm x 30 μm		3.5 mm x 60 μm	
Linearity (See note 2)	±0.05% FS		±0.1% FS		±0.07% FS (250 to 750 mm)	
Resolution (See note 3)	0.25 μm (No. of samples to average: 258)		0.25 μm (No. of samples to average: 512)		1 μm (No. of samples to average: 64)	
Temperature characteristic (See note 4)	0.01% FS/°C					
Sampling cycle	110 μs (High-speed Mode), 500 μs (Standard Mode), 2.2 μs (High-precision Mode), 4.4 μs (High-sensitivity Mode)					
LED Indicators	NEAR indicator	Lights near the measuring center distance, and closer than the measuring center distance inside the measuring range.				
	FAR indicator	Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
Operating ambient illumination	Illumination on received light surface: 3000 lx or less (incandescent light)			Illumination on received light surface: 1000 lx or less (incandescent light)		Illumination on received light surface: 500 lx or less (incandescent light)
Ambient temperature	Operating: 0° to 50°C, Storage: -15° to 60°C (with no icing or condensation)					
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)					
Degree of protection	IP64		Cable length 0.5 m: IP66, cable length 2 m: IP67		IP66	
Materials	Case: Aluminum die-cast, Front cover: Glass					
Cable length	0.5 m, 2 m					
Weight	Approx. 350 g		Approx. 600 g		Approx. 800 g	
Accessories	Laser labels (1 each for JIS/EN), ferrite cores (2), insure locks (2), instruction sheet					

**Note: 1.** Defined as  $1/e^2$  (13.5%) of the center optical intensity at the actual measuring center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.

**2.** This is the error in the measured value with respect to an ideal straight line. Linearity may change according to the workpiece. The following options are available.

Model	Diffuse reflection	Regular reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T/HLDS10	White aluminum ceramic	—
ZS-HLDS60/HLDS150		

**3.** This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to within the graph. The maximum resolution at 250 mm is also shown for the ZS-HLDS60. The following options are available.

Model	Diffuse reflection	Regular reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T	White aluminum ceramic	
ZS-HLDS10/HLDS60/HLDS150		

**4.** This is the value obtained at the measuring center distance when the Sensor and workpiece are fixed by an aluminum jig.

# Measurement Sensors ZX-L



## Smart, Fast Laser Measurement Sensor

Smart ZX-L offers simple setup and measurement for applications where high resolution and fast response time are required. A wide range of interchangeable sensor heads provides great flexibility in solving demanding applications.

- Small and light sensor heads for easy integration
- High speed response time of 150  $\mu$ s
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors
- Amplifier displays achieved resolution of application
- PC interface for setup, monitoring, direct data logging



## ZX-L Sensor Ordering Information

### Reflective Sensing Heads

Optical system	Sensing distance	Beam shape	Resolution	Dimensions (H x W x D mm)	Model
Diffuse reflective	40 $\pm$ 10 mm	Spot, 50 mm dia.	2 $\mu$ m	39 x 33 x 17	ZX-LD40
	100 $\pm$ 40 mm	Spot, 100 mm dia.	16 $\mu$ m		ZX-LD100
	300 $\pm$ 200 mm	Spot, 300 mm dia.	300 $\mu$ m		ZX-LD300
	40 $\pm$ 10 mm	Line, 75 $\mu$ m x 2 mm	2 $\mu$ m		ZX-LD40L
	100 $\pm$ 40 mm	Line, 150 $\mu$ m x 2 mm	16 $\mu$ m		ZX-LD100L
	300 $\pm$ 200 mm	Line, 450 $\mu$ m x 2 mm	300 $\mu$ m		ZX-LD300L
Regular reflective	30 $\pm$ 2 mm	Spot, 75 mm dia.	0.25 $\mu$ m	45 x 55 x 25	ZX-LD30V
		Line, 100 $\mu$ m x 1.8 mm			ZX-LD30VL

### Through-beam Sensing Heads

Optical system	Sensing distance	Measuring width	Resolution	Dimensions (H x W x D mm)	Model
Through-beam	0 to 2000 mm	1 mm dia.	4 $\mu$ m	15 x 15 x 34 emitter; 15 x 15 x 19 receiver	ZX-LT001
	0 to 500 mm	5 mm dia.		ZX-LT005	
		10 mm dia.		ZX-LT010	
		30 mm dia.	12 $\mu$ m	20 x 20 x 42 emitter; 20 x 20 x 25 receiver	ZX-LT030
				20 x 64 x 68 emitter; 20 x 64 x 58 receiver	

### Amplifiers

Description	Power supply	Analog output (Switch selectable)	Discrimination output function	Output type	Model
Amplifier with 2 m cable	12 to 24 VDC	4 to 20 mA, 1 to 5 VDC, 0 to 5 VDC, $\pm$ 4 VDC, $\pm$ 5 VDC	High, Pass, Low	NPN	ZX-LDA11N 2M
				PNP	ZX-LDA41N 2M

## Accessories

Description	Model
Calculating unit; attaches between two amplifiers	ZX-CAL2
Communications interface unit for sensor setup software	ZX-SF11-02
SmartMonitor sensor setup and monitoring software, English edition	ZX-SW11-EV3
Extension cable, 1 m cable length	ZX-XC1A 1M
Extension cable, 4 m cable length	ZX-XC4A 4M
Extension cable, 8 m cable length	ZX-XC8A 8M
Extension cable, 9 m cable length	ZX-XC9A 9M
Side-view attachment for ZX-LT001 and ZX-LT005	ZX-XF12

## Specifications

### Reflective Sensor Heads

Model	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
<b>Optical system</b>	Diffuse reflective			Regular reflective	Diffuse reflective			Regular reflective
<b>Light source</b>	Class 2 visible-light semiconductor laser; 650 nm wavelength; 1 mW max. output							
<b>Measurement point</b>	40 mm	100 mm	300 mm	30 mm	40 mm	100 mm	300 mm	30 mm
<b>Measurement range</b>	±10 mm	±40 mm	±200 mm	±2 mm	±10 mm	±40 mm	±200 mm	±2 mm
<b>Beam shape</b>	Spot			Line				
<b>Beam size</b>	50-µm dia.	100-µm dia.	300-µm dia.	75-µm dia.	75 µm x 2 mm	150 µm x 2 mm	450 µm x 2 mm	100 µm x 1.8 mm
<b>Resolution</b>	2 µm	16 µm	300 µm	0.25 µm	2 µm	16 µm	300 µm	0.25 µm
<b>Linearity</b>	±0.2% FS (entire range)	±0.2% FS (80 to 120 mm)	±2% FS (200 to 400 mm)	±0.2% FS (entire range)	±0.2% FS (32 to 48 mm)	±0.2% FS (80 to 120 mm)	±2% FS (200 to 400 mm)	±0.2% FS (entire range)
<b>Temperature characteristic</b>	±0.03% FS/°C (Except for ZX-LD300 and ZX-LD300L, which are ±0.1% FS/°C)							
<b>Operating ambient</b>	0 to 50°C, 35% to 85% RH (with no condensation)							
<b>Storage ambient</b>	-15° to 60°C, 35% to 85% (with no condensation)							
<b>Degree of protection</b>	IP50			IP40	IP50			IP40
<b>Connection method</b>	Connector relay (standard cable length: 0.5 mm)							
<b>Weight</b>	Approx. 150 g			Approx. 250 g	Approx. 150 g			Approx. 250 g
<b>Materials</b>	Case: PBT Cover: Aluminum, Lens: Glass			Case and cover: Aluminum, Lens: Glass	Case: PBT Cover: Aluminum, Lens: Glass			Case and cover: Aluminum, Lens: Glass

### Through-beam Sensor Heads

Model	ZX-LT001	ZX-LT005	ZX-LT010	ZX-LT030
<b>Optical system</b>	Through-beam			
<b>Light source</b>	Class I visible-light semiconductor laser; 650 nm wavelength; 0.35 mW max. output			
<b>Measurement width</b>	1 mm dia.	1 to 2.5 mm dia.	5 mm	10 mm
<b>Measurement distance</b>	0 to 500 mm	500 to 2,000 mm	0 to 500 mm	
<b>Minimum target</b>	8 µm dia. (opaque)	8 to 50 µm dia. (opaque)	0.05 mm dia. (opaque)	0.1 mm dia. (opaque)
<b>Resolution</b>	4 µm	—	4 µm	12 µm
<b>Temperature characteristic</b>	0.2% FS max.			0.2% FS max.
<b>Ambient temperature</b>	Operating: 0 to 50°C, Storage: -25 to 70°C (with no icing or condensation)			
<b>Degree of protection</b>	IP40			
<b>Cable length</b>	Extendable up to 10 m with optional extension cables			
<b>Case Materials</b>	Case: Polyether imide, Case cover: Polycarbonate, Lens: Glass			Zinc die cast
<b>Lens</b>	Glass			

## Controllers

Model		ZX-LDA11N	ZS-LDA41N
Number of samples to average		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096	
Number of sensors mounted		1 sensor per amplifier	
External interface	Connection method	Pre-wired (standard cable length: 2 m)	
	Outputs	Judgment outputs	3 outputs: HIGH, PASS and LOW NPN open collector, 50 mA max., 30 VDC, residual voltage: 1.2 V max.
		Linear outputs	Voltage or current (selected by menu) Voltage output: $\pm 4$ V $\pm 5$ V, 1 to 5, 0 to 5 VDC, Output impedance: 100 $\Omega$ Current output: 4 to 20 mA/FS, maximum load resistance: 300 $\Omega$
	Inputs	Type	Laser OFF, ZERO reset timing, RESET
Ratings		ON: Short circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	
Measurement period		150 $\mu$ s	
Functions		Display	Measurement value, threshold value, received light amount and resolution, ECO mode, display OFF mode, number of display digit changes
		Sensing	Mode, gain, measurement object, head installation
		Filter	Deviation/sensitivity adjustment, keep/clamp switch, direct threshold value setting
		Outputs	Scaling, sample hold, peak hold, bottom hold, peak-to-peak hold, self-peak hold, self-bottom hold, and zero reset, initial reset
		I/O settings	Linear (focus/correction), judgments (hysteresis and timer)
		Timer	ON-delay, OFF-delay, one-shot
		Teaching	Position teaching, 2-point teaching, automatic teaching
		System	Measurement information display, laser deterioration detection, key lock
Status indicators		HIGH: orange, PASS (green), LOW (yellow); Laser ON (green), ZERO reset (green), ENABLE display (green)	
Segment display		Main display	7-segment red LED, 5 digits
		Sub-display	7 segment yellow LED, 5 digits
Setting inputs		Setting keys	
Power supply voltage		12 to 24 VDC, $\pm 10\%$ ; ripple (p-p) 10% max.	
Current consumption		200 mA max. when sensing head connected	
Degree of protection		IP40	
Dimensions		31.5 H x 30 W x 72.7 D mm; 100 mm input cable; 2 m output cable	

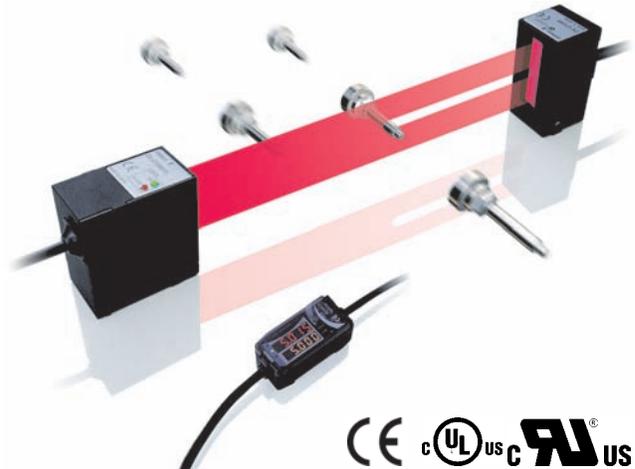
# Measurement Sensors ZX-GT



## Wide Laser Beam CCD Measurement Sensor

Now you can accurately and reliably get precision measurements of 10µm at a distance of up to 500mm by using the newest member of Omron's Smart Sensor Suite of products - the ZX-GT. The ZX-GT takes advantage of a CCD measurement sensor and Omron's unique TRIO (triple parallel processing) algorithm to provide unparalleled measurement precision with high-speed measurement of 2000 samples per second. Combine that with the ZX-GT's ability to measure glass and mirror surfaces along with its "Smart Recipe" PC software, makes the ZX-GT the most powerful and easy to use measurement sensor in its class.

- 10 µm Accuracy by 500 mm range
- CCD Measurement sensor and processing algorithm
- Dedicated glass function
- Smart Recipe Software, makes set-up easy
- Strong temperature compensation (error rate as low as 0.01%)
- Uses Omron's Collimate optical technology
- 3-Way optical adjustment. Using the PC, the direction of the sensor's head adjustment is graphically displayed



## Ordering Information

### Sensor

Appearance	Optical system	Measuring width	Sensing distance	Resolution	Output type	Model
Separate type 	Through-beam	28 mm	0 to 500 mm	10 µm	NPN	ZX-GT28S11
					PNP	ZX-GT28S41
Integrated type 		40 mm	NPN		ZX-GT2840S11	
			PNP		ZX-GT2840S41	

### Controller

Appearance	Power supply	Output type	Model
	DC	NPN	ZX-GTC11
		PNP	ZX-GTC41

## Accessories (Order Separately)

Set of Interface Unit and Setup software PCs

Output type	Model
NPN	ZX-GIF11A
PNP	ZX-GIF41A

Interface Unit (RS-232C/Binary output)

Appearance	Power supply	Output type	Model
	DC	NPN	ZX-GIF11
		PNP	ZX-GIF41

Setup Software PCs

Name	Model
Smart Monitor GT	ZX-GSW11

Calculating Units

Appearance	Model
	ZX-CAL2

Receiver-Controller Extension Cable

Cable length	Model		Quantity
	Standard cable	Flexible cable	
1 m	ZX-XGC1A	ZX-XGC1R	1
2 m	ZX-XGC2A	ZX-XGC2R	
5 m	ZX-XGC5A	ZX-XGC5R	
8 m	ZX-XGC8A	ZX-XGC8R	
20 m	ZX-XGC20A	ZX-XGC20R	

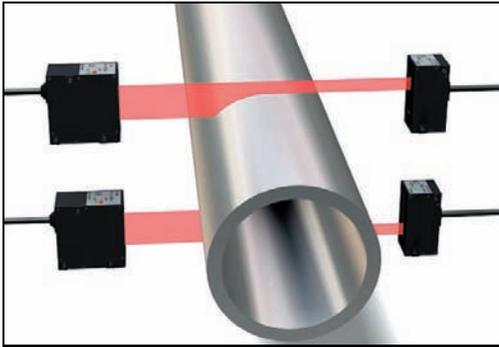
Up to two extension cables can be connected. However, be sure to limit the total extension cable length between the receiver and the Controller to 30 meters (including receiver cable).

**Automotive & Automotive-components**

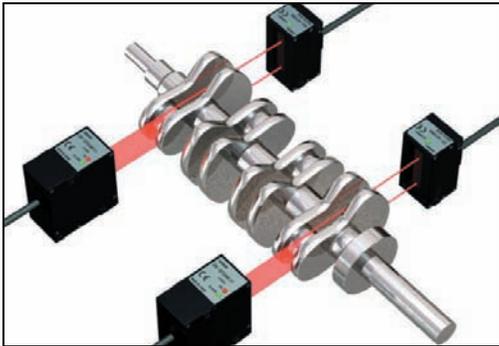
<outer diameter measurement>



Diameter measurement of metal objects



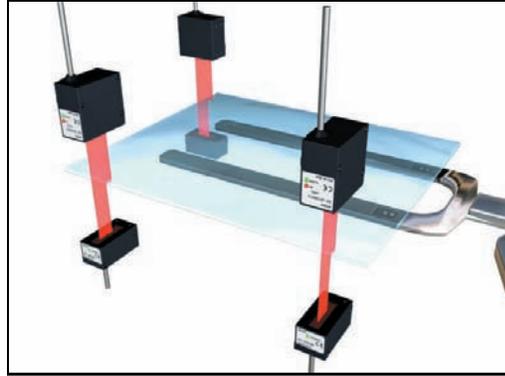
Diameter measurement of large-scale pipe



Diameter measurement of crank shaft

**LCD & PDP**

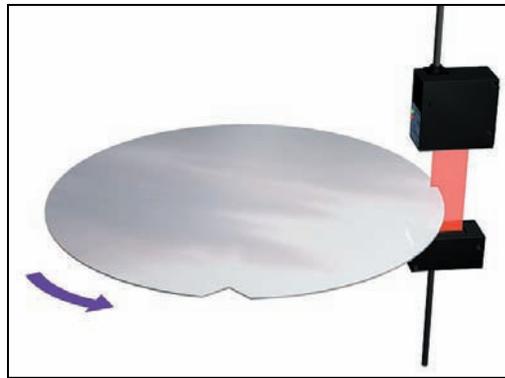
<glass-edge measurement>



Glass alignment for the FPD industry

**Semiconductor**

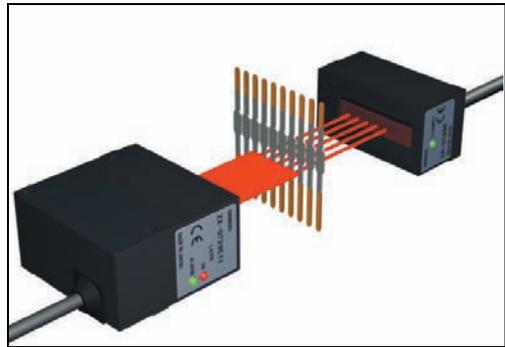
<insertion-amount measurement>



Notch position detector of glass wafer

**Electronic Components**

<Lead-pitch and diameter measurement>



Width and spacing inspection of leadframe

## Specifications

### Sensor

Item	ZX-GT28S11	ZX-GT2840S11	ZX-GT28S41	ZX-GT2840S41
Output type	NPN		PNP	
Appearance	Separate type	Integrated type	Separate type	Integrated type
Light Source	Visible semiconductor laser diode (wavelength 650 nm, CLASS 1 of EN60825-1/IEC60825-1, CLASS II, of FDA (21CFR 1040.10 and 1040.11))			
Measuring width	28 mm			
Sensing distance	0 to 500 mm	40 mm	0 to 500 mm	40 mm
Minimum sensing object	0.5 mm dia. (See note 1)	0.2 mm dia.	0.5 mm dia. (See note 1)	0.2 mm dia.
Linearity	±0.1% FS (See note 2)			
Resolution	10 μm (number of process values to average: 16)(See note 3)			
Temperature characteristic	±0.1% FS/°C (See note 4)			
Indicator (emitter)	Laser ON indicator (green), laser alarm indicator (red)			
Indicator (receiver)	Optical axis setting indicator (green)			
Laser OFF input/sync input	ON: Short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)		ON: Short-circuited with power supply voltage or power supply voltage - 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	
Laser deterioration alarm output	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.		PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.	
Power consumption (emitter)	30 mA max.			
Power supply voltage (emitter)	24 VDC +10%, -15% ripple (p-p) 10% max.			
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min.			
Insulation resistance	20 MΩ (at 500 VDC megger)			
Operating ambient illumination (emitter)	3,000 lx (incandescent light)			
Operating ambient illumination (receiver)	1,000 lx (incandescent light) (See note 5)			
Ambient temperature	Operating 0 to +40°C Storage: -15° to +50° C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)			
Vibration resistance (durability)	10 to 150 Hz Single-amplitude: 0.75 mm for 80 min. each in X, Y, and Z directions			
Degree of protection	IEC60529 IP40			
Cable length	2 m			
Material	Case: aluminum die-case, Lens: glass			
Weight (packed state)	Approx. 550 g	Approx. 570 g	Approx. 550 g	Approx. 570 g
Accessories	Laser warning labels, Instruction Sheet			

FS: 28 mm measuring range of receiver

- Note:**
- Distance between emitter and receiver: 500 mm, measurement object at 250 mm from receiver. Glass ends of chamfer 0.1 mm or more can be detected in glass edge measurement mode. (at binary level 70%)
  - Linearity is given to be a typical error with respect to an ideal straight line when the distance between the emitter and receiver is 100 mm and light is blocked at a distance of 50 mm from the receiver. (On the ZX-GT2480□□, the measurement object is measured at a distance of 20 mm from the receiver.)

- The amount of fluctuation (±3σ) in the analog output when the distance between the emitter and receiver is 100 mm and a ZX-GTC□□ is connected.
- Change in the light cutoff value on one side when the distance between the emitter and receiver is 100 mm and the light is half-cutoff at a distance of 50 mm from the receiver. (On the ZX-GT2480□□, the measurement object is measured at a distance of 20 mm from the receiver.)
- Standard mode (NORM) used.

### Controllers

Item	ZX-GTC11	ZX-GTC41
Output type	NPN	PNP
Measurement cycle (See note 1)	1.5 ms (standard mode (NORM)) 0.5 ms (high-speed mode (FAST)) (See note 2)	
Samples to average	1/2/4/8/16/32/64/128/256/512/1024/2048/4096	
Analog output (See note 3)	For current output: 4 to 20mA/FS, max. load resistance 300 Ω For voltage output ±4V, (±5V, 1 to 5 V, (See note 4), output impedance 100 Ω	
Timing Input bank switching Input, zero reset input, reset input	ON: short-circuited with DV or 1.5V max. OFF: Open (leakage current: 0.1 mA max.)	ON: short-circuited with power supply voltage or power supply voltage -1.5V max. OFF: Open (leakage current: 0.1 mA max.)
HIGH/PASS/LOW Judgement output (See note 5)	NPN open-collector output 30 VDC 50 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 50 mA max. Residual voltage 2V max.
Sync output (See note 6)		
Indicator	Judgement output indicator: HIGH (orange), PASS (green), LOW (orange) Main display (red) Sub-display (yellow) Bank 1/2 (orange), zero reset (green)	

## Controllers (Continued)

Item	ZX-GTC11	ZX-GTC41
Main functions	Number of registered setups	2 banks
	Measurement Mode	Interrupted beam width measurement, incident beam width measurement, outer diameter measurement, center position measurement, IC lead pitch, IC lead width judgment, specified edge measurement, wire position measurement, glass edge position measurement
	Display during measurement	Measured value, resolution, threshold, voltage output value, current output value (number of display digits can be changed)
	Zero reset functions	Offset setting of zero reset value, zero reset value memory
	Hold	Sample hold, peak hold, bottom hold, peak-to-peak hold, average hold, delay hold
	Timer functions	ON delay, OFF delay, one-shot
	Adjustment functions	Optical Axis adjust mode/light intensity writing mode, variable binary level, variable edge filter, analog output scaling
	Calculation	2 Possible on up to two Controllers (Calculation Unit ZX-CAL2 is required for connecting controllers to each other.) A-B, A+B, width
Other	Measurement cycle setting, threshold setting, hysteresis setting, initialization, key lock	
Temperature characteristic	±0.005% FS/ °C	
Current consumption	150 mA max. (including receiver)	
Power supply voltage	24 VDC + 10%, -15% ripple (p-p) 10% max.	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Insulation resistance	20 Ω (at 500 VDC megger)	
Ambient temperature	Operating: 0° to +50° C Storage: -15° to +60° C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)	
Vibration resistance (durability)	10 to 150 Hz Single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	2 m	
Material	Case: PBT (polybutylene terephthalate), Cover: Polycarbonate	
Weight (packed state)	Approx. 330 g	
Accessories	Instruction Sheet	

- Note:**
- The first response time is "measurement cycle X (number of samples to average setting + 1) + 1 ms" max. For the second response time onwards, the specified measurement cycle time is output.
  - The response time in the high-speed mode (FAST) for the IC lead pitch and IC lead width judgement modes is 1 ms.
  - Current/voltage can be switched using the switch provided on the rear of the Controller.
  - Can be set by the analog output scaling function.

- The error (ERR) state is displayed when all HIGH/PASS/LOW outputs turn OFF.
- Normally, wire the sync output wire directly to the emitter's sync input wire and run the Controller in the standard mode. On an NPN type Controller, use an NPN type emitter, and on a PNP type Controller, use a PNP type emitter. Wiring of the sync wires is not required when the Controller is run in the high-speed mode. (Note, however, that the Controller becomes more susceptible to the influence of ambient light in this case.)

## Interface Unit

Item	ZX-GIG11/GIF11A	ZX-GIF41/GIF41A
Compatible Controller	ZX-GTC11	ZX-GTC41
Indicator	Power ON (green), Controller communications (orange), Controller communications error (red), RS-232C communications (orange), RS-232C communications error (red), binary output (orange)	
Communications port	RS-232C (9-pin D-sub connector)	
12-bit binary output (D11 to D0, GATE)	NPN open-controller output 30 VDC 20 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.
Power supply voltage	Supplied from Controller (power consumption: 60 mA max.)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
Ambient temperature	Operating: 0° to +50° C Storage: -15° to +60° C (with no condensation)	
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)	
Vibration resistance (durability)	10 to 150 Hz Single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	RS-232C 0.5 m, binary output 2 m	
Material	Case: PBT (polybutylene terephthalate), Cover: Polycarbonate	
Weight (packed state)	ZX-GIF□1A: Approx. 550g ZX-GIF□1: Approx. 330g	
Accessories	ZX-GIF□1A: Setup Software (CD-ROM), 2 clamps, Instruction Sheet ZX-GIF□1: 2 clamps, Instruction Sheet	

# Measurement Sensors ZX-E



## Smart Inductive Displacement Sensor

Smart ZX-E offers simple setup for applications requiring non-contact displacement measurements of metal objects. A wide range of interchangeable sensor heads provides great flexibility in solving demanding applications.

- Compact inductive sensor heads for easy integration
- High speed response time of 150  $\mu$ s
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors
- Amplifier displays achieved resolution of application
- PC interface for setup, monitoring, direct data logging



## ZX-E Sensor Ordering Information

### Inductive Sensing Heads

Shape	Dimensions	Sensing distance	Resolution	Model
Unthreaded cylindrical	3 dia. x 18 mm	0.5 mm	1 $\mu$ m	ZX-EDR5T
	5.4 dia. x 18 mm	1 mm		ZX-ED01T
	8 dia. x 22 mm	2 mm		ZX-ED02T
Threaded cylindrical	M10 x 22 mm	2 mm	ZX-EM02T	
	M18 x 46.3 mm	7 mm	ZX-EM07MT	
Flat	30 x 14 x 4.8 mm	4 mm	ZX-EV04T	
Heat-resistant, cylindrical	M12 x 22 mm	2 mm	ZX-EM02HT	

### Amplifiers

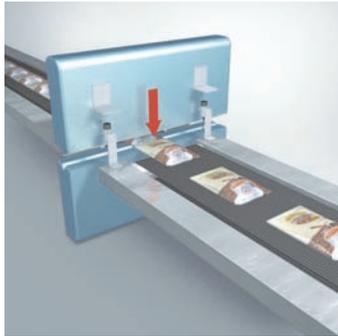
Description	Power supply	Analog output (Switch selectable)	Discrimination output function	Output type	Model
Amplifier with 2 m cable	12 to 24 VDC	4 to 20 mA, 1 to 5 VDC, 0 to 5 VDC, $\pm$ 4 VDC, $\pm$ 5 VDC	High, Pass, Low	NPN	ZX-EDA11 2M
				PNP	ZX-EDA41 2M

### Accessories

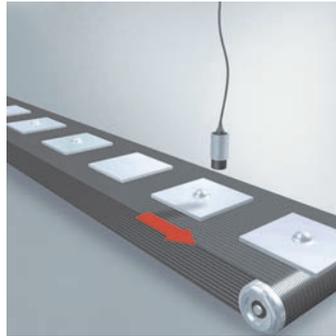
Description	Model
Calculating unit; attaches between two amplifiers	ZX-CAL2
Communications interface unit for sensor setup software	ZX-SF11-02
SmartMonitor sensor setup and monitoring software, English edition	ZX-SW11-EV3
Extension cable, 1 m cable length	ZX-XC1A 1M
Extension cable, 4 m cable length	ZX-XC4A 4M
Extension cable, 8 m cable length	ZX-XC8A 8M

## Applications

### Minute gap detection    Height and step detection    Eccentricity and vibration



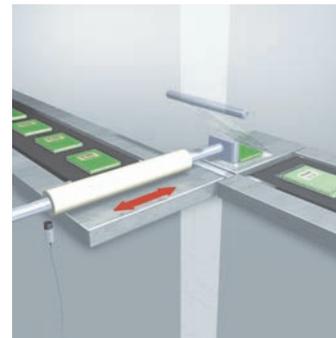
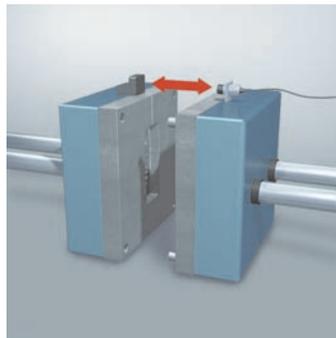
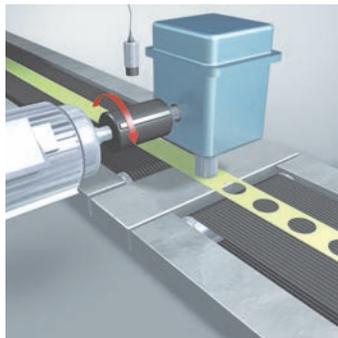
Cutter control



Injection molding



Vertical packaging



## Specifications

### Sensor Heads

Model		ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02H
Measurement range		0 to 0.5 mm	0 to 1 mm	0 to 2 mm	0 to 7 mm	0 to 4 mm	0 to 2 mm
Sensing object		Magnetic metals (Measurement ranges and linearities are different for non-magnetic metals)					
Standard reference object		18×18×3 mm		30×30×3 mm	60×60×3 mm		45×45×3 mm
		Material: ferrous (S50C)					
Resolution		1 μm					
Linearity		±0.5% FS					±1.0% FS
Linear output range		Same as measurement range.					
Temperature characteristic (including Amplifier Unit)		0.15% FS/°C		0.07% FS/°C		0.1% FS/°C	
Ambient temperature	Operating	0° to 50° C (with no icing or condensation)		-10° to 60° C (with no icing or condensation)		-10° to 200° C	
	Storage			-20° to 70° C (with no icing or condensation)		-20° to 200° C	
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)					
Insulation resistance		50 MΩ min. at 500 VDC					
Dielectric strength		1,000 VAC, 50/60 Hz for 1 minute between charged parts and case					
Vibration resistance		10 to 55 Hz with 1.5-mm double amplitude for 2 h each in X, Y, and Z directions					
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions					
Degree of protection		IP65		IP67			IP60
Weight (packed state)		Approx. 120 g		Approx. 140 g		Approx. 160 g	Approx. 130 g
Materials	Sensor head	Brass		Stainless steel		Brass	
	Case					Zinc (nickel-plated)	
	Sensing surface	Heat-resistant ABS					PEEK
	Preamplifier	PES					

## Controllers

Model		ZX-EDA11	ZS-EDA41
<b>Number of samples to average</b>		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096	
<b>Number of sensors mounted</b>		1 sensor per amplifier	
<b>External interface</b>	<b>Connection method</b>	Pre-wired (standard cable length: 2 m)	
	<b>Outputs</b>	<b>Judgment outputs</b>	3 outputs: HIGH, PASS and LOW NPN open collector, 50 mA max., 30 VDC, residual voltage: 1.2 V max.
		<b>Linear outputs</b>	Voltage or current (selected by menu) Voltage output: $\pm 4\text{ V} \pm 5\text{ V}$ , 1 to 5, 0 to 5 VDC, Output impedance: 100 $\Omega$ Current output: 4 to 20 mA/FS, maximum load resistance: 300 $\Omega$
	<b>Inputs</b>	<b>Type</b>	Zero reset input, timing input, reset input, judgment output hold input
<b>Ratings</b>		ON: Short circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short circuited to supply voltage or within 1.5 V of supply voltage OFF: Open (leakage current 0.1 mA max.)
<b>Measurement period</b>		150 $\mu\text{s}$	
<b>Functions</b>	<b>Display</b>	Measurement value, set value/output value/resolution, ECO mode, display OFF mode, number of display digit changes, zero reset indicator	
	<b>Sensing</b>	Mode, gain, measurement object, sensing head connection, scaling	
	<b>Filter</b>	Linearity adjustment (materials selection), keep/clamp switch, direct threshold value setting	
	<b>Outputs</b>	Sample hold, peak hold, bottom hold, peak-to-peak hold, delay hold, average hold, previous value comparison	
	<b>I/O settings</b>	Hysteresis width setting, timing inputs, judgment output hold input, monitor focus, reset input	
	<b>Timer</b>	ON-delay, OFF-delay, one-shot	
	<b>Teaching</b>	Position teaching, automatic teaching, non-measurement setting, direct threshold value setting	
	<b>System</b>	Measurement information display, linearity initialization, linearity output correction, key lock, zero reset, initial reset	
<b>Calculations</b>	(A - B) calculations, (A + B) calculations, K -(A + B) calculations, mutual interference requires ZX-CAL2 calculation unit		
<b>Status indicators</b>		HIGH: orange, PASS (green), LOW (yellow); Laser ON (green), ZERO reset (green), ENABLE display (green)	
<b>Segment display</b>	<b>Main display</b>	7-segment red LED, 5 digits	
	<b>Sub-display</b>	7 segment yellow LED, 5 digits	
<b>Setting inputs</b>	<b>Setting keys</b>	Direction keys (UP, DOWN, LEFT and RIGHT), SET key	
<b>Power supply voltage</b>		12 to 24 VDC, $\pm 10\%$ ; ripple (p-p) 10% max.	
<b>Current consumption</b>		140 mA max. when sensing head connected	
<b>Degree of protection</b>		IP40	
<b>Dimensions</b>		31.5 H x 30 W x 72.7 D mm; 100 mm input cable; 2 m output cable	

# Measurement Sensors ZX-T



## Smart Contact Displacement Sensor

Smart ZX-T offers simple setup for applications requiring high-precision contact displacement measurements to verify part shape and orientation. Interchangeable sensor heads provide great flexibility in solving demanding positioning applications.

- Slim sensor heads make it easy to integrate
- Fast response time of 1 ms
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 7 sensors
- Amplifier displays achieved resolution of application
- PC interface for setup, monitoring, direct data logging
- No need to calculate or reset the origin position at the start of each operation
- Auto-scaling function sets correct range when sensor head is connected
- Warm-up display indicates sensing head readiness for measurement



- Dust-tight linear ball bearing construction assures long service life: 10 million mechanical operations minimum
- Built-in excessive pressing force alarm provides advance warning to prevent malfunction
- Sensing heads include preamplifier with mounting bracket

## ZX-T Sensor Ordering Information

### Contact Sensing Heads

Type	Sensing distance	Resolution	Tip size	Dimensions (sensing head)	Model	
Short type	1 mm	0.1 µm	4.5 dia. mm	57.1 L x 6 dia. mm	ZX-TDS01T	
Standard type	4 mm			86 L x 6 dia. mm	ZX-TDS04T	
Low-load type				ZX-TDS04T-L		
Standard type	10 mm	0.4 µm	5 dia. mm	123 L x 8 dia. mm	ZX-TDS10T	
Ultra-low-load type				7.5 dia. mm	132.15 L x 8 dia. mm	ZX-TDS10T-L
Vacuum retracting type				5 dia. mm	129.5 L x 8 dia. mm	ZX-TDS10T-V
Vacuum retracting/Air push type				7 dia. mm	124.5 L x 8 dia. mm	ZX-TDS10T-VL

### Amplifiers

Description	Power supply	Analog output (Switch selectable)	Discrimination output function	Output type	Model
Amplifier with 2 m cable	12 to 24 VDC	4 to 20 mA, 1 to 5 VDC, 0 to 5 VDC, ±4 VDC, ±5 VDC	High, Pass, Low	NPN	ZX-TDA11 2M
				PNP	ZX-TDA41 2M

### Accessories

Description	Model
Calculating unit; attaches between two amplifiers	ZX-CAL2
Communications interface unit for sensor setup software	ZX-SF11-02
SmartMonitor sensor setup and monitoring software, English edition	ZX-SW11-EV3
Extension cable, 1 m cable length	ZX-XC1A 1M
Extension cable, 4 m cable length	ZX-XC4A 4M
Extension cable, 8 m cable length	ZX-XC8A 8M

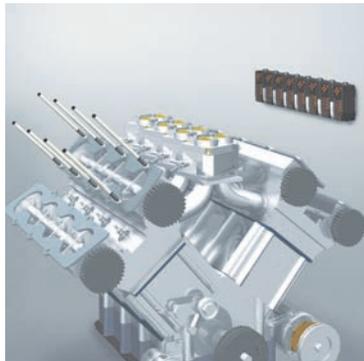
## Optional Actuators

Type/material	Appearance	Application	Screw section	Adapter required	Model
Ball type (steel)		Measuring ordinary flat surfaces (standard actuator supplied with the ZX-TDS series)	Female screw, M2.5 x 0.45	No	D5SN-TB1
Ball type (carbide steel)		Measurements where abrasion resistance is critical. Measured objects: Carbide HR90 or lower			D5SN-TB2
Ball type (ruby)		Measurements where abrasion resistance is critical. Measured objects: Carbide HR90 or higher			D5SN-TB3
Needle type (carbide steel)		Measuring the bottom of grooves and holes	Male screw, M2.5 x 0.45	Yes, use D5SN-TA	D5SN-TN1
Flat (carbide steel)		Measuring spherical objects			D5SN-TF1
Conversion adapter (stainless steel)		Mounting D5SN-TN1/TF1 or commercially available actuators on ZX-TDS-series sensors	Through-hole female screw, M2.5 x 0.45	No	D5SN-TA

## Applications

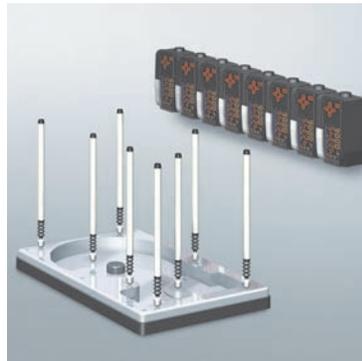
### Measure parts height for assembly inspection

Confirm proper seating of components and tightness of fasteners.



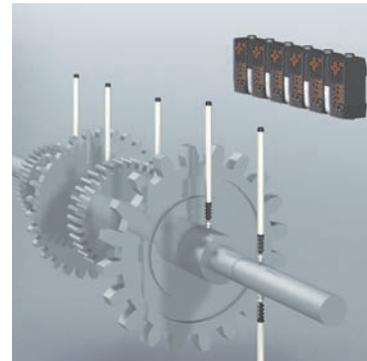
### Measure warp in hard disk drive chassis

Greatly reduce inspection time by using multi-point measurement function.



### Measure processing dimensions of engine parts

IP67-rated sensing heads measure in processes exposed to splashing water.



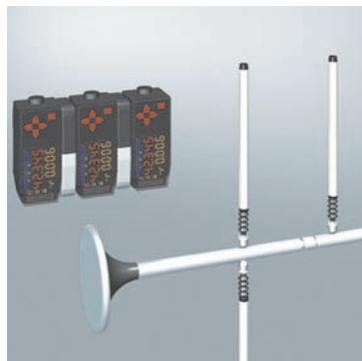
### Glass thickness measurement

Low measurement force sensor heads make high-precision measurements without damaging products.



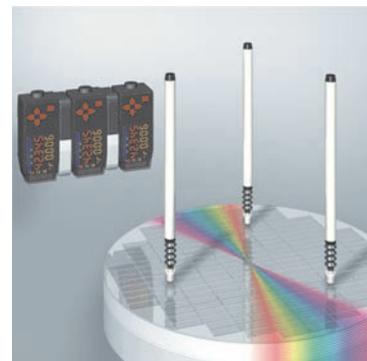
### Precise product measurement

Vacuum-retracting sensor heads enable post-processing measurements to be automated.



### Measure wafer warpage

Verify wafer flatness with multiple sensing heads before division into chips.



## Specifications

### Short Range Sensor Heads

Model		ZX-TDS01T	ZX-TDS04T	ZX-TDS04T-L
Measurement range		1 mm	4 mm	
Maximum actuator travel distance		Approx. 1.5 mm	Approx. 5 mm	
Resolution		0.1 μm		
Linearity		±0.3% FS		
Operating force		Approx. 0.7 N		Approx. 0.25 N
Degree of protection		IP67		
Mechanical durability		10,000,000 operations minimum		
Ambient temperature	Operating	0 to 50°C (with no icing or condensation)		
	Storage	-15 to 60°C (with no icing or condensation)		
Ambient humidity		Operating and storage: 35% to 85% (with no icing or condensation)		
Temperature characteristic	Sensor Head	0.03% FS/°C	0.01% FS/°C	
	Preamplifier	0.01% FS/°C		
Weight (packed state)		Approx. 100 g		
Materials	Sensor Head	Stainless steel		
	Preamplifier	Polycarbonate		

### Long Range Sensor Heads

Model		ZX-TDS10T	ZX-TDS10T-L	ZX-TDS10T-V	ZX-TDS10T-VL
Vacuum retract (VR) and Air push (AP) type		No	No	VR	VR/AP
Measurement range		10 mm			
Maximum actuator travel distance		10.5 mm			
Resolution		0.4 μm			
Linearity		±0.5% FS			
Operating force		Approx. 0.7 N	Approx. 0.065 N	Approx. 0.6 N	0.09 to 1.41 N
Air pressure	Vacuum retracting	—	—	-0.55 to -0.70 bar	-0.05 to -0.22 bar
	Air push	—	—	—	0.125 to 2 bar
Degree of protection	Sensing head	IP65	IP50	IP65	IP50
	Preamplifier	IP40			
Mechanical durability		10,000,000 operations minimum			
Ambient temperature	Operating	0° to 50° C (with no icing or condensation)			
	Storage	-10° to 60° C (with no icing or condensation)			
Ambient humidity		35% to 85% (with no icing or condensation)			
Temperature characteristic	Sensor head	0.01% FS/°C			
	Preamplifier	0.01% FS/°C			
Weight (packed state)		Approx. 100 g			
Materials	Sensor Head	Stainless steel			
	Rubber sleeve	Viton resin	None	Viton resin	None
	Preamplifier	Polycarbonate			

### Controllers

Model	ZX-TDA11	ZX-TDA41
Measurement period	1 ms	
Possible average count settings	1, 16, 32, 64, 128, 256, 512, or 1,024	
Linear output	Current output: 4 to 20 mA/FS, Max. load resistance: 300 Ω	
	Voltage output: ±4 V, ±5 V, (1 to 5 V), Output impedance: 100 Ω	
Judgment outputs (3 outputs: HIGH/PASS/ LOW)	NPN open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 2 V max.
Zero reset input, timing in-put, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage of 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)

## Controllers (Continued)

Model	ZX-TDA11	ZX-TDA41
<b>Function</b>	Measurement value display, Present value/set value/output value display Display reverse, ECO mode, Number of display digit changes Sample hold, Peak hold, Bottom hold, peak-to-peak hold Self-peak hold, Self-bottom hold, Zero reset Initial reset, Direct threshold value setting, Position teaching Hysteresis width setting, Timing inputs, Reset input Judgment output hold input, Monitor focus, Sensor disconnection detection (A-B) calculations, (A+B) calculations requires ZX-CAL2 calculation unit Zero reset memory, Function lock, Non-measurement setting Clamp value setting, Scale inversion, Zero reset indicator Span adjustment, Warming-up display, Pressing force alarm	
<b>Indicators</b>	Judgment indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
<b>Power supply voltage</b>	12 to 24 VDC ±10%, Ripple (p-p): 10% max.	
<b>Current consumption</b>	140 mA max. (with Sensor connected), for 24 VDC power supply voltage: 140 mA max. (with Sensor connected)	
<b>Ambient temperature</b>	Operating and storage: 0° to 50° C (with no icing or condensation)	
<b>Temperature characteristic</b>	0.03% FS/° C	
<b>Connection method</b>	Pre-wired (standard cable length: 2 m)	
<b>Weight (packed state)</b>	Approx. 350 g	
<b>Materials</b>	Case: PBT (polybutylene terephthalate), Cover: Polycarbonate	

# Measurement Sensors

# E2C-EDA



## High Resolution, Digital Proximity Sensor with Separate Amplifier

Finally, a Digital Proximity Sensor that picks up where standard proximity sensors leave off. With tools available that enable increased resolution, linearity and repeatability the E2C-EDA fills the need between a standard proximity switch and an extreme high precision style proximity switch. The slim-body, DIN rail mount amplifier offers discrete outputs for high-speed positioning and screening applications. Twin output and external input amplifier models are available with discrete NPN or PNP outputs.

- Simple and reliable measurements with micron-level resolution
- Dual Digital display on the amplifier simplifies setup and monitoring
- One-touch High resolution positioning using the fine positioning function that maximizes changes in the digital value as you approach the sensing target
- High-resolution sensing unaffected by environmental swings
- Two clear, large, and easy-to-read digital displays
- Large array of sensing heads including thin, flat, harsh environment and heat resistant types



- Flexible cables provided as standard
- Simple wiring via press-fit connectors allows easy repeat connections, wiring and head replacement in only seconds
- Mutual interference function enables up to 5 sensor to be mounted very closely together

## Ordering Information

### Sensor Heads

Type	Appearance	Sensing distance	Repeat accuracy	Model	
Shielded	 Cylindrical	3 dia. × 18 mm	0.6 mm	1 μm	E2C-EDR6-F (See note 2)
		5.4 dia. × 18 mm	1 mm		E2C-ED01-□ (See note 1,2,3)
		8 dia. × 22 mm	2 mm	2 μm	E2C-ED02-□ (See note 1,2,3)
	 Screw	M10 × 22 mm	2 mm		E2C-EM02-□ (See note 1,2,3)
	 Flat	30 × 14 × 4.8 mm	5 mm		E2C-EV05-□ (See note 1,2,3)

## Sensors Heads (continued)

Type	Appearance	Sensing distance	Repeat accuracy	Model
Unshielded	Screw 	M18 × 46.3 mm 	5 μm	E2C-EM07M-□ (See note 1,2,3)
Heat-resistant	Screw 	M12 × 22 mm 	2 μm	E2C-EM02H (See note 2)

**Note: 1.** A Protective Spiral Tube is provided with models ending in the suffix -S (example: E2C-ED01-S).

**2.** Two cable lengths are available. (3-dia.: Free-cut, Heat-resistant Models: Standard-length only) Overall length of the Standard-length Models: 2.5 m, Length from the Sensor Head to the Preamplifier: 2.0 m (example: E2C-ED01). Overall length of Free-cut Models: 3.5 m, Length from the Sensor Head to the Preamplifier: 0.5 m for models ending in the suffix -F (example: E2C-ED01-F).

**3.** Models ending in the suffix -S that come with Protective Spiral Tubes and Free-cut Models ending in the suffix -F are made-to-order products.

## Amplifier Units

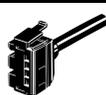
### Pre-wired Models

Type	Appearance	Functions	Model		
			NPN output	PNP output	
Advanced models	Twin-output models		Area output, open circuit detection, differential operation	E2C-EDA11	E2C-EDA41
	External-input models			E2C-EDA21	E2C-EDA51

### Connector Models

Type	Appearance	Functions	Model		
			NPN output	PNP output	
Advanced models	Twin-output models		Area output, open circuit detection, differential operation	E2C-EDA6	E2C-EDA8
	External-input models			E2C-EDA7	E2C-EDA9

## Amplifier Unit Connectors (Order Separately)

Name	Appearance	Cable length	No. of conductors	Model
Master Connector		2 m	4	E3X-CN21
Slave Connector			2	E3X-CN22

## Connector Ordering Precaution

Amplifier Units and Connectors are sold separately. Refer to the following tables when placing an order.

Amplifier Unit			Applicable connector (order separately)	
Model	NPN output	PNP output	Master connector	Slave connector
Advanced models	E2C-EDA6	E2C-EDA8	E3X-CN21	E3X-CN22
	E2C-EDA7	E2C-EDA9		

## When Using 5 Amplifier Units

5 Amplifier Units	+	1 Master Connector	4 Slave Connectors
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## Mobile Console (Order Separately)

Appearance	Model	Remarks
	E3X-MC11-SV2 (model number of set)	Mobile Console with Head, Cable, and AC adapter provided as accessories
	E3X-MC11-C1-SV2	Mobile Console
	E3X-MC11-H1	Head
	E39-Z12-1	Cable (1.5 m)

**Note:** Use the E3X-MC11-SV2 Mobile Console with E2C-EDA-series Amplifier Units. If you use a Mobile Console like the E3X-MC11-S, some functions may not operate. Refer to *Ratings/Characteristics* for the E3X-DA-S/MDA on page 69 for Amplifier Unit specifications.

## Accessories (Order Separately)

### Mounting Bracket

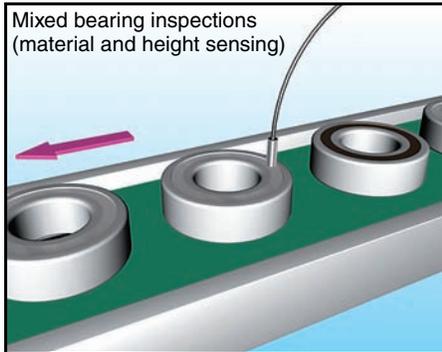
Appearance	Model	Quantity
	E39-L143	1

### End Plate

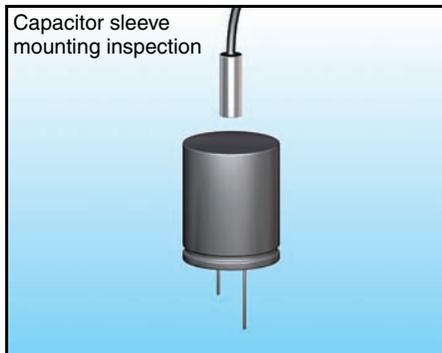
Appearance	Model	Quantity
	PFP-M	1

## Applications

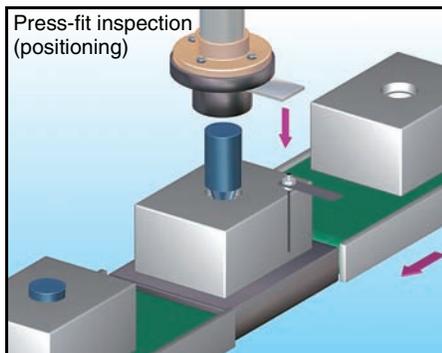
### Screening



### Height Inspection

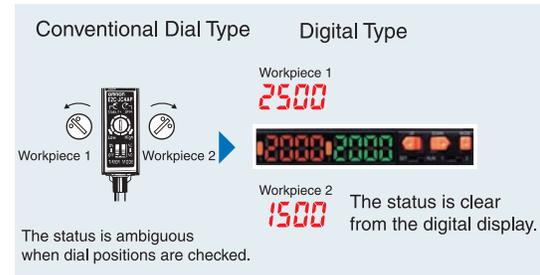


### Positioning



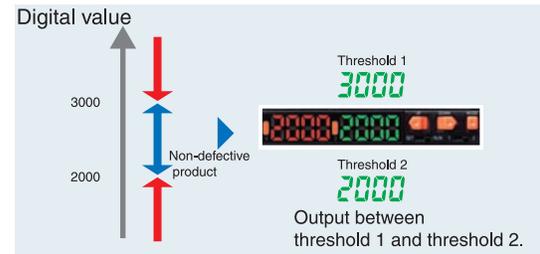
### Digital Display

The E2C-EDA can visually recognize height and material difference simply and reliably even with the most demanding settings.



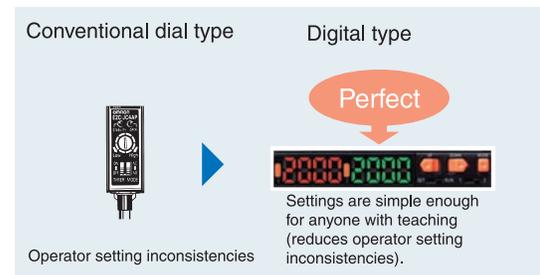
### Area Output (Twin-output type)

An OK/NG result is easily obtained because the E2C-EDA outputs a signal between two threshold values.



### Teaching

Positioning teaching yields consistent settings that cannot be matched by operator settings.



## Ratings and Specifications

### Sensor Heads

Model		E2C-EDR6-F	E2C-ED01 (-□)	E2C-ED02 (-□)	E2C-EM02 (-□)	E2C-EM07M (-□)	E2C-EV05 (-□)	E2C-EM02H	
Item		3 dia. × 18 mm	5.4 dia. × 18 mm	8 dia. × 22 mm	M10 × 22 mm	M18 × 46.3 mm	30 × 14 × 4.8 mm	M12 × 22 mm	
Sensing distance		0.6 mm	1 mm	2 mm		7 mm	5 mm	2 mm	
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to <i>Engineering Data</i> on pages 854 and 855.)							
Standard sensing object		5 × 5 × 3 mm		10 × 10 × 3 mm		22 × 22 × 3 mm	15 × 15 × 3 mm	20 × 20 × 3 mm	
		Material: Iron (S50C)							
Repeat accuracy (See note 1)		1 μm		2 μm		5 μm	2 μm		
Differential travel		Variable							
Temperature characteristic (See note 1)	Sensor Head	0.3%/°C		0.08%/°C			0.04%/°C		0.2%/°C
	Preamplifier and Amplifier	0.08%/°C							
Ambient temperature (See note 2)	Operating	-10 to 60°C (with no icing or condensation)							-10 to 200°C (See note 3)
	Storage	-10 to 60°C (with no icing or condensation)	-20 to 70°C (with no icing or condensation)						
Ambient humidity		Operating/Storage: 35% to 85% (with no condensation)							
Insulation resistance		50 MΩ min. at 500 VDC							
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min. between current-carrying parts and case							
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		Destruction: 500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions							
Degree of protection		IEC 60529 IP67						IEC 60529 IP60 (See note 4)	
Connection method		Connector (Standard cable length: 2.5 m (2 m between Head and Preamplifier), “-F” model cable length: 3.5 m (0.5 m between Head and Preamplifier))							
Weight (packed state)		Approx. 120 g (Models with protective spiral tube (-S models) are approx. 90 g heavier.)							
Materials	Sensor Head	Case	Brass	Stainless steel	Brass		Zinc	Brass	
		Sensing surface	Heat-resistant ABS						PEEK
		Clamping nuts	—			Brass, nickel-plated		—	Brass, nickel-plated
		Toothed washer	—			Zinc-plated iron		—	Zinc-plated iron
	Preamplifier	PES							
Accessories		Preamplifier Mounting Brackets, instruction manual							

**Note:** 1. The repeat accuracy and temperature characteristic are for a standard sensing object positioned midway through the rated sensing distance.

2. A sudden temperature rise even within the rated temperature range may degrade characteristics.
3. For the Sensor Head only without the preamplifier (-10 to 60°C). With no icing or condensation.
4. Do not operate the Sensor in areas exposed to water vapor because the enclosure is not waterproof.

## Amplifier Units

Model		Advanced Models with Twin Outputs		Advanced Models with External Inputs	
Model	NPN output	E2C-EDA11	E2C-EDA6	E2C-EDA21	E2C-EDA7
Item	PNP output	E2C-EDA41	E2C-EDA8	E2C-EDA51	E2C-EDA9
<b>Power supply voltage</b>		12 to 24 VDC $\pm$ 10%, ripple (p-p): 10% max.			
<b>Power consumption</b>		1,080 mW max. (Current consumption: 45 mA at power supply voltage of 24 VDC)			
<b>Control output</b>		Load power supply voltage: 26.4 VDC max., Open-collector output (NPN or PNP depending on model), Load current: 50 mA max. (Residual voltage: 1 V max.)			
<b>Response time</b>	<b>Super-high-speed mode (See note 1)</b>	Operate or reset: 150 $\mu$ s max.			
	<b>High-speed mode</b>	Operate or reset: 300 $\mu$ s max.			
	<b>Standard mode</b>	Operate or reset: 1 ms max.			
	<b>High-resolution mode</b>	Operate or reset: 4 ms max.			
<b>Functions</b>	<b>Differential detection</b>	Switchable between single edge and double edge detection mode. Single edge: Can be set to 300 $\mu$ s, 500 $\mu$ s, 1 ms, 10 ms, or 100 ms. Double edge: Can be set to 500 $\mu$ s, 1 ms, 2 ms, 20 ms, or 200 ms.			
	<b>Timer</b>	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)			
	<b>Zero-reset</b>	Negative values can be displayed. (Threshold is not shifted.)			
	<b>Initial reset</b>	Settings can be returned to defaults as required.			
	<b>Mutual interference prevention</b>	Possible for up to 5 Units. (See note 1) Intermittent oscillation method [Response time = (number of Units connected + 1) $\times$ 15 ms]			
	<b>Hysteresis setting</b>	Setting range: 10 to 4,000			
	<b>I/O settings</b>	Output setting (Select from channel 2 output, area output, self-diagnosis, or open circuit detection.)		Input setting (Select from teaching, fine positioning, zero-reset, synchronous detection.)	
<b>Digital display</b>		Select from the following: Incident level + threshold, incident level percentage +threshold, incident light peak level + incident light bottom level (updated with output), long bar display, incident level + peak hold, incident level + channel			
<b>Display orientation</b>		Switching between normal/reversed display is possible.			
<b>Ambient temperature</b>		Operating: When connecting 1 to 2 Units: -10°C to 55°C, When connecting 3 to 5 Units: -10°C to 50°C, When connecting 6 to 16 Units: -10°C to 45°C When used in combination with an EDR6-F When connecting 3 to 4 Units: -10°C to 50°C, When connecting 5 to 8 Units: -10°C to 45°C, When connecting 9 to 16 Units: -10°C to 40°C Storage: -20 to 70°C (with no icing)			
<b>Ambient humidity</b>		Operating/storage: 35% to 85% (with no condensation)			
<b>Insulation resistance</b>		20 M $\Omega$ min. at 500 VDC			
<b>Dielectric strength</b>		1,000 VAC, 50/60 Hz for 1 min.			
<b>Vibration resistance</b>		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
<b>Shock resistance</b>		Destruction: 500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions			
<b>Degree of protection</b>		IEC 60529 IP50			
<b>Connection method</b>		Pre-wired Models	Connector Models	Pre-wired Models	Connector Models
<b>Weight (packed state)</b>		Approx. 100 g	Approx. 55 g	Approx. 100 g	Approx. 55 g
<b>Materials</b>	<b>Case</b>	PBT			
	<b>Cover</b>	Polycarbonate			

**Note: 1.** Communications are disabled if the super-high-speed sensing mode is selected, and the mutual interference prevention function and the communications functions for the Mobile Console will not function.

# Measurement Sensors

# E3C-LDA

Quick Link

C429

## Variable Laser Beam Sensors

The E3C-LDA sensors combine compact Class II laser sensing heads with slim, track-mount amplifiers. They provide both analog and discrete outputs for high-speed gauging applications. Area beam and line beam sensing heads perform measurement tasks best. Amplifiers are also available with dual discrete outputs and external input and one discrete output for local control options.

- Area, spot and line beam sensing heads offer variable focus point and optical axis alignment
- Safe Class II lasers require no special protective hardware
- Dual digital display on the amplifier simplifies setup and monitoring
- Selectable detection modes with response speed as fast as 100  $\mu$ s
- One-touch sensitivity setting with Power Tuning function compensates for saturation
- Amplifier provides analog voltage and discrete outputs for position control, height measurement and other gauging applications



- Dual output amplifiers offer area output, differential operation and self-diagnostics
- External input amplifiers offer remote setting, built-in counter and differential operation
- Slim 10 mm wide amplifier designed for gang mounting multiple sensors

## E3C-LDA Sensor Ordering Information

### Sensing Heads

Sensing method	Beam shape	Sensing distance	Dimensions H x W x D mm	Model
Diffuse reflective	Spot, 0.8 mm max.	30 mm to 1 m	25 x 12.8 x 33	E3C-LD11
	Line, 33 mm L			E3C-LD21
	Area, 33 x 15 mm			E3C-LD31
Coaxial retroreflective with mirror surface rejection	Variable spot (0.8 mm dia.)	Up to 7 m with E39-R12	25 x 12.8 x 39	E3C-LR11
	Line, 28 mm L	Up to 1.7 m with E39-R12		E3C-LR11 + E39-P31
	Area, 28 x 16 mm	Up to 900 mm with E39-R12		E3C-LR11 + E39-P41
	Fixed spot (2 mm dia.)	Up to 7 m with E39-R12		E3C-LR12

### Pre-Wired Amplifiers

Type	Functions	Output type	Output ratings	Model	
				NPN output	PNP output
Analog + Discrete outputs	Area output, differential operation	Analog, discrete	1 to 5 VDC, 50 mA at 26.4 VDC	E3C-LDA11AN	E3C-LDA41AN
Dual discrete outputs	Area output, differential operation, self-diagnostics	Two open collector	50 mA at 26.4 VDC	E3C-LDA11	E3C-LDA41
External input + Discrete output	Built-in counter, differential operation, remote setting	One open collector		E3C-LDA21	E3C-LDA51

## Amplifiers with Wire-Saving Connectors

Type	Functions	Output type	Output ratings	Model	
				NPN output	PNP output
Dual discrete outputs	Area output, differential operation, self-diagnostics	Two open collector	50 mA at 26.4 VDC	E3C-LDA6	E3C-LDA8
External input + Discrete output	Built-in counter, differential operation, remote setting	One open collector		E3C-LDA7	E3C-LDA9

## Connectors

Description	Appearance	Compatible amplifiers	Cable length	Conductors	Model
Master connector (for first unit)		E3C-LDA6, E3C-LDA7, E3C-LDA8, E3C-LDA9	2 m	3	E3X-CN11
				4	E3X-CN21
Slave connector (for second and additional units)				1	E3X-CN12
				2	E3X-CN22

## Accessories

### Mobile Console

- Program and monitor sensor operation with the mobile console
- 1.5 m cable for remote setup connects console to the programming head
- Programming head track mounts flush against the leftmost amplifier
- AC adapter powers console

Description	Appearance/Dimensions	Model
Mobile console kit Includes console, programming head, cable and AC adapter		E3X-MC11-S
Mobile console (only)		E3X-MC11-C1-S
Programming head (only) Mounts on DIN rail		E3X-MC11-H1
Cable		E3X-Z12-1

### Beam Unit

Applicable sensor head	Appearance	Beam shape	Model
E3C-LD11		Line	E39-P11
		Area	E39-P21
E3C-LR11		Line	E39-P31
		Area	E39-P41

### Reflectors

Type	Appearance	Model
Standard Effective area: 23 x 23 mm		E39-R12
Standard Effective area: 7 x 7 mm		E39-R13
Transparent object detection Effective area: 23 x 23 mm		E39-R14
Sheet (cuttable) Effective area: 195 x 22 mm		E39-RS4
Sheet (cuttable) Effective area: 108 x 46 mm		E39-RS5

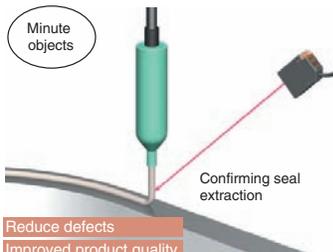
### Mounting Bracket and Track

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Surface mounting bracket		7.3 H x 35 W x 12 D	304 stainless steel; fits the DIN track holder	E39-L143
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	PFP-50N
		1000 L x 35 H x 7.3 D	1 m length	PFP-100N
		1000 L x 35 H x 16.0 D		PFP-100N2
End plate		50 x 10 x 10	Holds track-mounted devices in place	PFP-M

### Applications

**Adhesive and Seal Application Inspection**

Minute objects

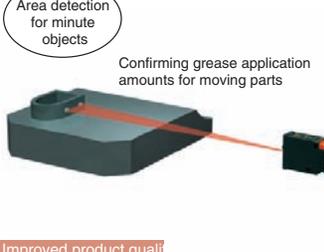


Confirming seal extraction

Reduce defects  
Improved product quality

**Grease Application Inspection**

Area detection for minute objects

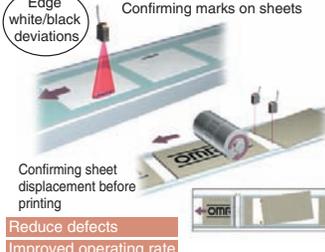


Confirming grease application amounts for moving parts

Improved product quality

**Sheet Displacement Inspection**

Edge white/black deviations



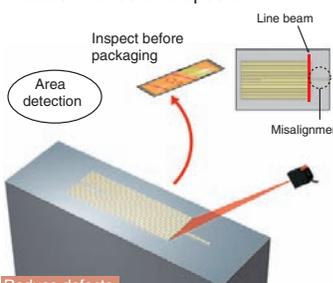
Confirming marks on sheets

Confirming sheet displacement before printing

Reduce defects  
Improved operating rate

**Noodle Protrusion Inspection**

Inspect before packaging



Line beam

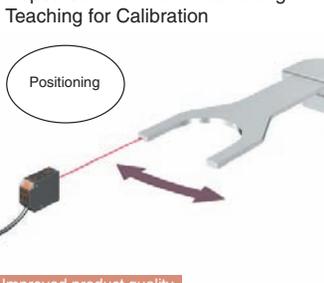
Area detection

Misalignment

Reduce defects

**Repeated Robot Arm Positioning Teaching for Calibration**

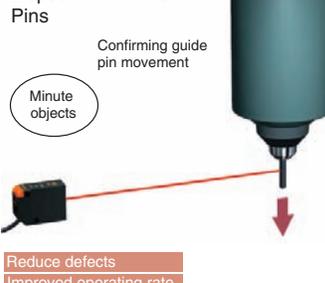
Positioning



Improved product quality

**Inspection for Fine Pins**

Confirming guide pin movement



Minute objects

Reduce defects  
Improved operating rate

## Specifications

### Sensing Heads

Item	Diffuse reflective			Coaxial retroreflective			
	E3C-LD11	E3C-LD21	E3C-LD31	E3C-LR11	E3C-LR11 + E39-P31	E3C-LR11 + E39-P41	E3C-LR12
Light source (emission wavelength)	Red semiconductor laser diode (650 nm), 2.5 mW max. (JIS standard: Class 2, FDA standard: Class II)						
Sensing distance	High-resolution mode: 30 to 1,000 mm Standard mode: 30 to 700 mm Super-high-speed mode: 30 to 250 mm (See note 1)			7 mm 5 mm 2 mm (See note 2)	1,700 mm 1,300 mm 700 mm (See note 2)	900 mm 700 mm 400 mm (See note 2)	7 m 5 m 2 m (See note 2)
Beam size (See note 3)	0.8 mm max. (at distances up to 300 mm)	33 mm (at 150 mm)	33 x 15 mm (at 150 mm)	0.8 mm max. (at distances up to 1,000 mm)	28 mm (at 150 mm)	28 x 16 mm (at 150 mm)	2.0 mm dia. (at distances up to 1,000 mm)
Functions	Variable focal point mechanism (beam size adjustment) (See note 4.), optical axis adjustment mechanism (axis adjustment)						
Indicators	LDON indicator: Green; Operation indicator: Orange						
Ambient illumination (receiver side)	3,000 lx (incandescent lamp)						
Ambient temperature	Operating: -10° to 55° C; Storage: -25° to 10° C (with no icing or condensation)						
Ambient humidity	Operating/storage: 35% to 85% (with no condensation)						
Vibration resistance (destruction)	10 to 150 Hz with double amplitude of 0.7 mm, in X, Y, and Z directions for 80 min each						
Enclosure rating	IEC 60529: IP40						
Materials	Case and cover: ABS Front surface filter: Acrylic resin			Case and cover: ABS Front surface filter: Glass			
Weight (packed)	Approx. 85 g			Approx. 100 g			

Note: 1. Values are sensed for white paper.

2. These values apply when a E39-R12 Reflector is used. The MSR function is built-in. The reflected light from the object being measured may affect the sensing accuracy, so adjust the threshold value before use.

3. The beam radius is the value for the middle measurement distance and indicates a typical value for the middle sensing distance. The radius is defined by light intensity of  $1/e^2$  (13.5%) of the central light intensity. Light will extend beyond the main beam and may be affected by conditions surrounding the object being measured.

4. The E3C-LR12 has a fixed beam size (the focus point cannot be changed).

### Analog Output Amplifiers

Model		E3C-LDA11AN	E3C-LDA41AN
Supply voltage		12 to 24 VDC $\pm$ 10%, ripple (p-p) 10% max.	
Power consumption		1080 mW max.	
Current consumption		45 mA max. at supply voltage of 24 VDC	
Analog output	Voltage output	1 to 5 VDC with connected load of 10 k $\Omega$ min.	
Discrete output	Type	NPN open collector	PNP open collector
	Rating	50 mA at 26.4 VDC	
	Residual voltage	1 V max.	
Response time	Super high-speed mode	100 $\mu$ s	
	High-speed mode	250 $\mu$ s	
	Standard mode	1 ms	
	High resolution mode	4 ms	
Repeatability	Super high-speed mode	4% FS	
	High-speed mode	4% FS	
	Standard mode	2% FS	
	High resolution mode	2% FS	
Temperature influence		0.3% FS/°C	
Connection method		Pre-wired with 2 m cable	
Dimensions		32 H x 10 W x 78.5 D mm	

## Discrete Output Amplifiers

Type		Advanced, twin-output models		Advanced, external-input models	
Model	NPN output	E3C-LDA11	E3C-LDA6	E3C-LDA21	E3C-LDA7
Item	PNP output	E3C-LDA41	E3C-LDA8	E3C-LDA51	E3C-LDA9
<b>Supply voltage</b>		12 to 24 VDC 10%, ripple (p-p) 10% max.			
<b>Power consumption</b>		1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)			
<b>Control output</b>		Load power supply voltage: 26.4 VDC max.; NPN/PNP (depends on model) open collector Load current: 50 mA max.; residual voltage: 1 V max.			
<b>Response time</b>	<b>Super-high-speed mode</b>	100 μs for operation and reset		80 μs for operation and reset	
	<b>Standard mode</b>	1 ms for operation and reset			
	<b>High-resolution mode</b>	4 ms for operation and reset			
<b>Functions</b>		Power tuning, differential detection, timer, zero-reset, initial reset, mutual interference prevention (See note 1), preset counter (See note 2), reversed display			
<b>I/O settings</b>		Output setting (Select from channel 2 output, area output, or self-diagnosis.)		External input setting (Select from teaching, power tuning, zero reset, light OFF, or counter reset.)	
<b>Display</b>		Operation indicator for channel 1 (orange), operation indicator for channel 2 (orange)		Operation indicator (orange), Power Tuning indicator (orange)	
<b>Digital display</b>		Select from the following: Incident level + threshold, incident level percentage + threshold, incident light peak level + no incident light bottom level, minimum incident light peak level + maximum no incident light bottom level, long bar display, incident level + peak hold, incident level + channel		Select from same displays as given at the left or a counter display.	
<b>Ambient illumination (receiver side)</b>		Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max.			
<b>Ambient temperature</b>		Operating: Groups of 1 to 2 Amplifiers: -25° C to 55° C Groups of 3 to 11 Amplifiers: -25° to 50° C Groups of 12 to 16 Amplifiers: -25° to 45° C (with no icing or condensation) Storage: 30° to 70° C (with no icing or condensation)			
<b>Ambient humidity</b>		Operating and storage: 35% to 85% (with no condensation)			
<b>Connection method</b>		Prewired cable	Separate connector	Prewired cable	Separate connector
<b>Weight (packed state)</b>		Approx. 100 g	Approx. 55 g	Approx. 100 g	Approx. 55 g
<b>Materials</b>	<b>Case</b>	Polybutylene terephthalate (PBT)			
	<b>Cover</b>	Polycarbonate			

**Note:** 1. Communications are disabled if super-high-speed mode is selected, and the mutual interference prevention function and the communications function for the Mobile Console will not function.

2. The preset counter is available only with advanced, external-input models.

# Measurement Sensors E4C-UDA



## Digital Amplifier Ultrasonic Sensor with Separate Amplifier

Omron's new reflective sensor using Ultrasonic technology that handles all types of sensing objects, colors, materials and patterns, the E4C-UDA enables reliable detection of a great variety of work pieces that are difficult or impossible to detect optically or inductively. The E4C-UDA includes range discrimination with two threshold values and analog output types for greater application flexibility. The slim-body (10 mm wide), DIN rail mount amplifier offers discrete outputs for detection and inspection applications. Twin and Analog output amplifier models are available with discrete NPN or PNP outputs.

- Simple and reliable detection of difficult work targets
- Dual Digital display on the amplifier simplifies setup and monitoring
- Twin output and analog type amplifiers available
- Two clear, large, and easy-to-read digital displays
- Three different sensing head options including side view types
- Yellow indicator light illuminates when sensor head is in target sensing range
- M18 short body, side view and long range sensing heads with up to 1000mm sensing distance

A reflective sensor that handles all types of sensing object colors and patterns



- Free-cut cables provided as standard
- Simple wiring via press-fit connectors allows easy repeat connections, wiring and head replacement in only seconds
- Side by side mounting possible with no mutual interference worries

## Ordering Information

### Sensor Heads

Shape	Model	Measuring range	Model
M18	Straight	50 to 300 mm	E4C-DS30
	Side view		E4C-DS30L
	Straight	70 to 800 mm	E4C-DS80
	Side view		E4C-DS80L
	Straight	90 to 1000 mm	E4C-DS100

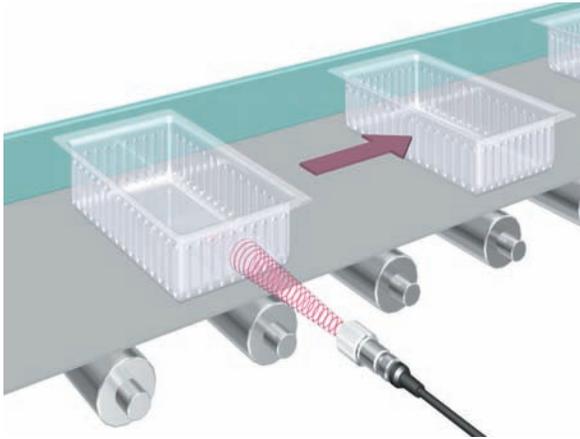
**Note:** Refer to the definition of resolution in the *Ratings and Specifications* tables for information on conditions required to achieve this resolution.

### Amplifiers

Shape	Power Supply	Output Specifications	Model
	DC	NPN output	E4C-UDA11
			E4C-UDA11AN
		PNP output	E4C-UDA41
			E4C-UDA41AN

## Applications

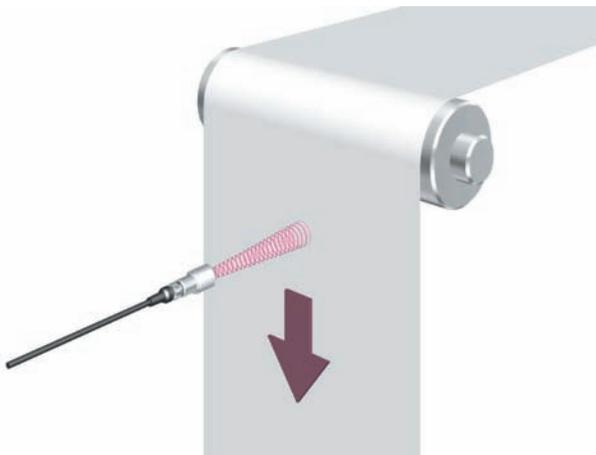
### Detection of Transparent Trays



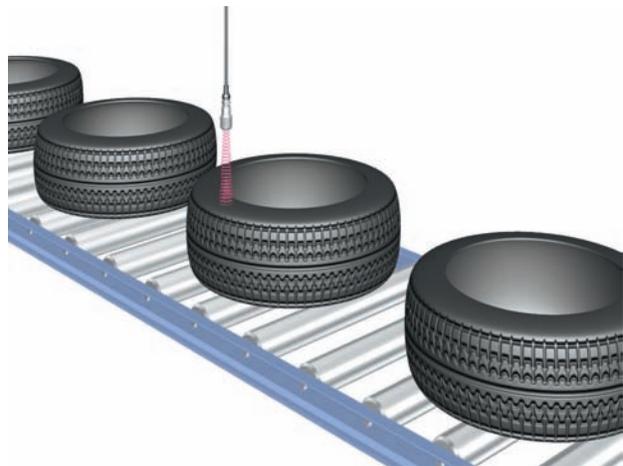
### Inspections of Solvent Tank Levels



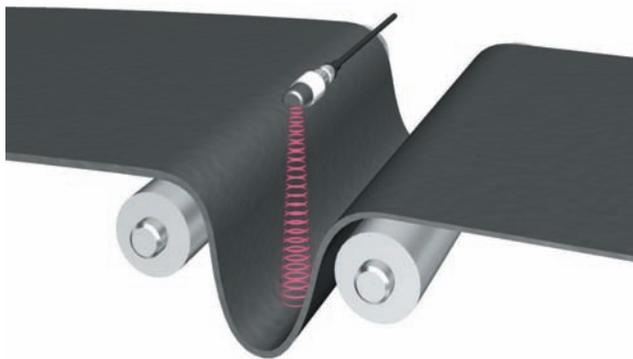
### Detection of Sheet Sag



### Detection of Tires



### Control of Rubber Sheet Tension



### Detection of Position of Remaining Glass Substrates in Cassettes



## Ratings and Specifications

### Sensor Heads

Item	Model				
	E4C-DS30	E4C-DS30L	E4C-DS80	E4C-DS80L	E4C-DS100
Measurement Range	50 to 300 MM		70 to 800 mm		90 to 1,000 mm
Standard sensing object	100 x 100 mm SUS flat plate				
Near distance dead band	0 to 50 mm		0 to 70 mm		0 to 90 mm
Transmission frequency	Approx. 390 kHz		Approx. 205 kHz		
Response speed	30 ms		100 ms		125 ms
Ambient temperature range	Operating: -25 to 70° C, Storage: -40 to 85° C (with no icing or condensation)				
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)				
Enclosure rating	IP65				
Indicator	(Yellow) Lit: Sensor within sensing range				
Weight	Approx. 150 g				Approx. 170 g

### Amplifiers

Model		Twin Output Models	Analog Output Models
		E4C-UDA11	E4C-UDA11AN
Connection method		Pre-wired	
Supply voltage		12 to 24 VDC±10%, ripple 10% max.	
Current consumption		80 mA max.	
Control output		NPN open collector (26.4 VDC max.), Load current: 50 mA max., Residual voltage: 1 V max.	
Analog output	Output form	—	Voltage output (1 to 5 VDC)
	Connected load	—	10 kΩ min.
	Temperature characteristics	—	0.3% F.S./° C
	Resolution	—	2.0% F.S.
Timer		OFF/OFF-delay/ON-delay/one-shot	
Timer time		1 ms to 5 s	
Linearity		±2% F.S.	
Resolution (see note)		1% F.S. max.	
Ambient temperature range		Operating: -25 to 55° C, Storage: -30 to 70° C (with no icing or condensation)	
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance		50 MΩ min. (at 500 VDC)	
Dialectic strength		1,000 VAC, 50/60 Hz for 1 min.	
Vibration resistance		10 to 150 Hz, 0.75-mm double amplitude, 80 min each in X, Y, and Z directions	
Shock resistance		500 mm/s <sup>2</sup> , 3 times each in X, Y, and Z directions	
Materials		Case: PBT (polybutylene terephthalate), Cover: Polycarbonate	
Weight		Approx. 150 g	
Accessories		Instruction Manual	

**Note:** Value one hour after the product is turned ON. External disturbances, however, sometimes cause minute outputs.

# Measurement Sensors

## E4PA

Quick Link  
C432

### Ultrasonic Displacement Sensors

Threaded cylindrical ultrasonic displacement sensors accurately measure objects regardless of color. They provide highly repeatable, highly linear measurements over long distances.

- Reliable repeatability of 0.1% FS max.
- Ultrasound detection is not affected by object color
- Long detection ranges, up to 6 meters
- Easy-to-install M30 threaded body
- M12 connector reduces maintenance time
- Simple to use setting plug adjusts settings for measurement range, analog outputs and temperature compensation



### E4PA Sensor Ordering Information

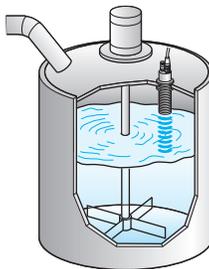
Measurement range	Applied frequency	Response time	Dimensions (mm)	Model
60 to 500 mm	Approx. 380 kHz	35 ms max.	M30 x 113 L (91 threaded)	E4PA-LS50-M1-N
200 mm to 2 m	Approx. 175 kHz	100 ms max.		E4PA-LS200-M1-N
0.5 to 4 m	Approx. 85 kHz	300 ms max.	40 dia. x 128 L (81 threaded)	E4PA-LS400-M1-N
0.8 to 6 m	Approx. 65 kHz	500 ms max.	75 dia. x 137 L (79 threaded)	E4PA-LS600-M1-N

### M12 Connector Cordsets

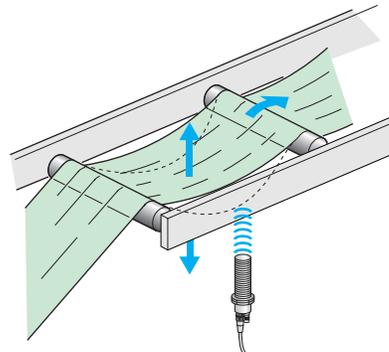
Connector type	Cable size	Length	Straight connector	Right angle connector
Female 5-pole single keyway DC connector	22 AWG	2 m (6.56 ft)	XS2F-D521-DG0-A	XS2F-D522-DG0-A
		5 m (16.4 ft)	XS2F-D521-GG0-A	XS2F-D522-GG0-A

### Applications

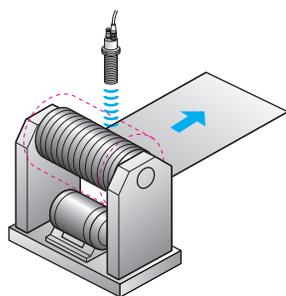
#### Measure liquid level



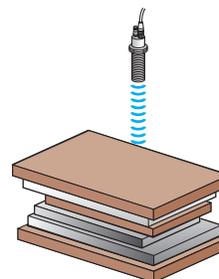
#### Measure the amount of slack in web materials



## Measure roll diameter to time replacement



## Detecting stack height of paper, board, tile, etc.



## Specifications

Model	E4PA-LS50-M1	E4PA-LS200-M1	E4PA-LS400-M1	E4PA-LS600-M1
<b>Sensing distance</b>	60 to 500 mm	200 to 2,000 mm	500 to 4,000 mm	800 to 6,000 mm
<b>Standard sensing object</b>	100 × 100 mm flat plate			
<b>Applied frequency</b>	Approx. 380 kHz	Approx. 175 kHz	Approx. 85 kHz	Approx. 65 kHz
<b>Resolution</b>	0.172 mm	Measurement range less than 705 mm: 0.172 mm Measurement range 705 mm or greater: Measurement range/4,096 mm		
<b>Linearity</b>	±1% FS			
<b>Repeatability</b>	0.1% FS max.			
<b>Response time</b>	35 ms max.	100 ms max.	300 ms max.	500 ms max.
<b>Analog output</b>	<b>Current output</b>	4 to 20 mA (permissible load resistance: 0 to 500 Ω)		
	<b>Voltage output</b>	0 to 10 V (1000 Ω or higher)		
<b>Ultrasonic directional angle</b>	Approx. 5° (3-dB attenuation)			
<b>Temperature influence</b>	±1% FS of output value at +23°C in -10° to +55°C range			
<b>Voltage influence</b>	0.5% FS max. within rated power supply voltage range			
<b>Operating ambient</b>	-10° to 55° C, 35% to 85% RH (with no icing or condensation)			
<b>Storage ambient</b>	-40° to 85° C, 35% to 85% RH (with no icing or condensation)			
<b>Power supply voltage</b>	10 to 30 VDC, ripple (p-p): 10% max.			
<b>Current consumption</b>	12 V: 170 mA max.; 24 V: 70 mA max.			
<b>Enclosure rating</b>	IP65			
<b>Connection method</b>	5-conductor cordset with M12 single keyway connector (order separately)			
<b>Weight (Packed state)</b>	Approx. 240 g		Approx. 320 g	Approx. 400 g
<b>Material</b>	<b>Case</b>	Stainless steel (SUS303)		
	<b>Sensing surface</b>	PBT resin, polyurethane, glass epoxy resin		



## Contents

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<b>Pressure Sensors Selection Guide</b>	M-ii

### Ultrasonic Sensors

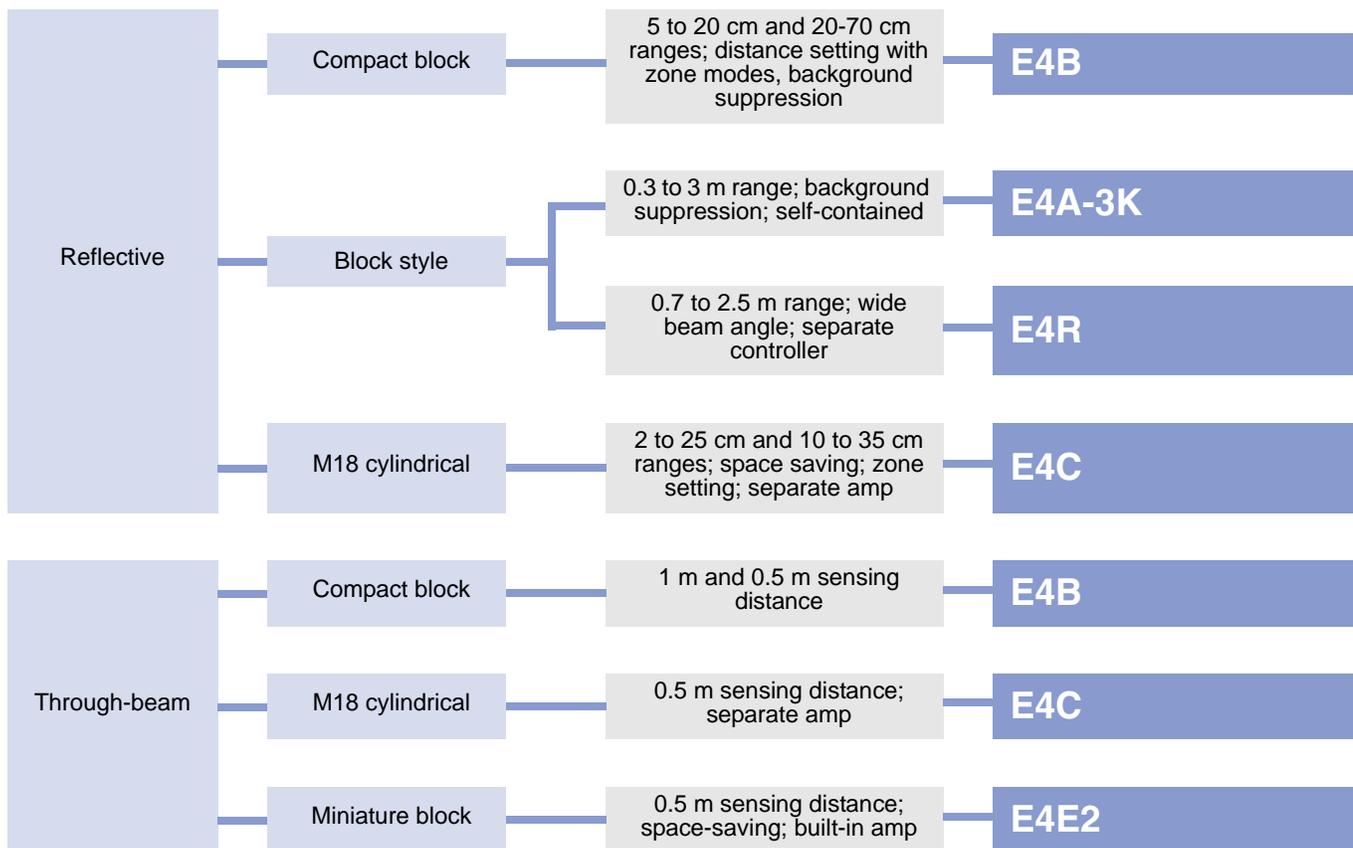
<b>E4A-3K</b>	Long-range reflective, block style	M-1
<b>E4B</b>	Compact block style, distance settable models	M-1
<b>E4C</b>	Cylindrical 18 mm sensor with separate amplifier	M-2
<b>E4E2</b>	Miniature through-beam with built-in amplifier	M-2
<b>E4R</b>	Long-range reflective block style, separate controller	M-3

### Pressure Sensors

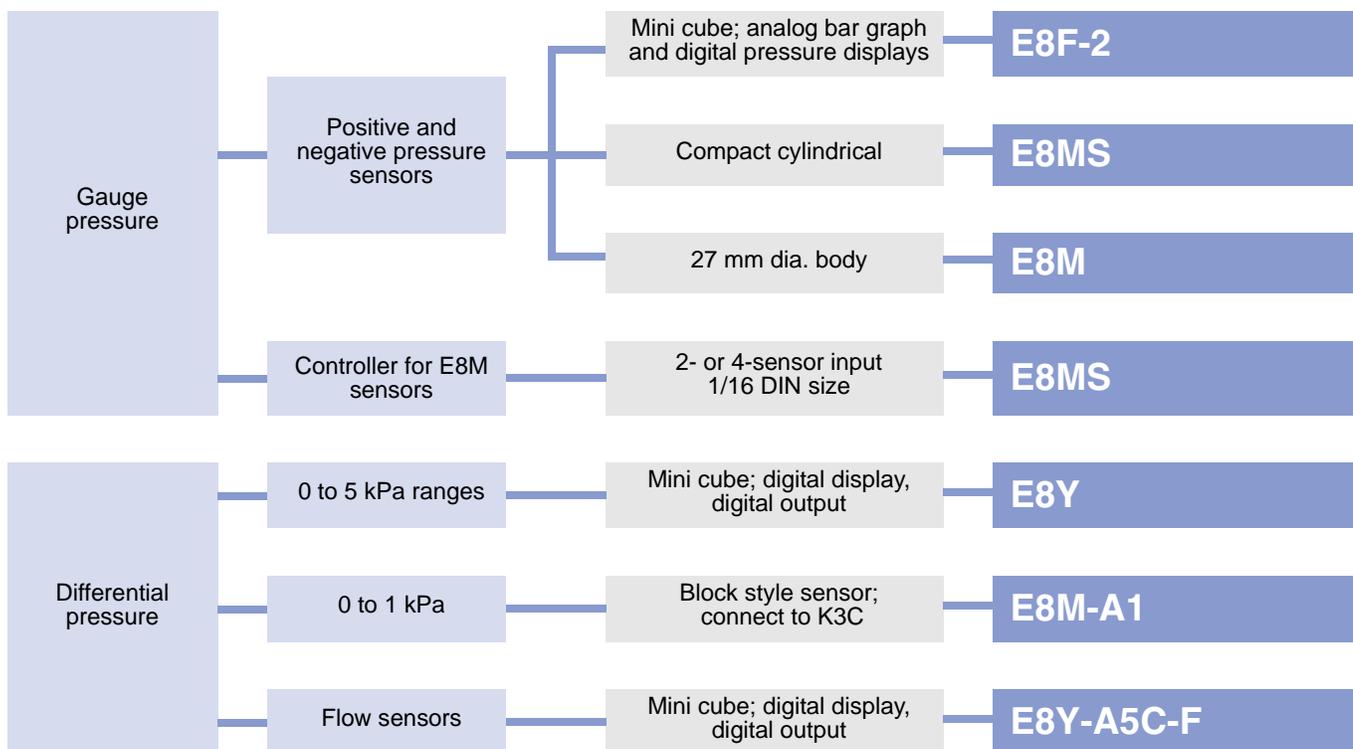
<b>E8F2</b>	Mini-cube gauge pressure sensor, large LED display	M-4
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## Selection Guide

### Ultrasonic Sensors



### Pressure Sensors



## Ultrasonic Sensors

# E4A-3K

Quick Link  
C522

### Long Range Ultrasonic Sensor

- Block style sensor uses reflective technique to detect clear materials and photosensitive film
- Long sensing distance: 0.3 to 3 m
- Background suppression for accurate sensing
- Relay output rated 3 A at 240 VAC/24 VDC
- Fast alignment troubleshooting with stable operation check function
- 250 ms response time
- Mutual interference protection built in
- Self-contained, no external power supply required
- Choose 12-24 VDC or 120/240 VAC models
- Enclosure rated IP60
- Measures 104 H x 50 W x 150 D mm



## Ultrasonic Sensors

# E4B

Quick Link  
C523

### Block Style Sensor with Settable Distance Models

- Through-beam models with 1 m and 0.5 m ranges for long-range applications
- Zone models detect objects at 20-70 cm while suppressing interference from background objects
- Distance setting models with 20-70 cm and 100 cm detection ranges
- Narrow beam angle of 8° detects objects as small as 2 x 2 cm, all models
- 200 kHz provides high immunity from environmental noise
- 10 ms response time
- NPN or PNP open collector output, 100 mA at 24 VDC
- Supply voltage: 12-24 VDC
- User-selectable normally open and normally closed operation
- Enclosure rated IP66
- Measures 61 H x 35 W x 79 D mm



## Ultrasonic Sensors

# E4C

Quick Link

C524

### Threaded Cylindrical Sensor with Remote Amplifier

- Ultrasonic 18 mm cylindrical sensor with remote amplifier simplifies installation in space-confined areas
- Long sensing distances:  
Through-beam: 0.5 m  
Distance settable reflective: 10 to 35 cm; zone setting provides background suppression within 2 to 25 cm
- NPN/PNP output, switch selectable, rated 100 mA at 24 VDC
- 10 ms response time
- Mutual interference protection for multiple units
- DIN-rail mountable remote amplifier
- Supply voltage: 12-24 VDC
- Enclosure rating: IP66 for sensor; IP40 for amplifier
- Sensor: M18 x 75 L mm with 2 m shielded cable
- Amplifier: 75 H x 22.5 W x 80 D mm



## Ultrasonic Sensors

# E4E2

Quick Link

C525

### Miniature Through-Beam Sensor Fits Tight Installation Sites

- Ideal for detecting transparent film, transparent bottles, and clear plastic containers
- Compact, vertical design with built-in amplifier allows easy mounting on small conveyor lines
- Through-beam sensor with built-in DC amplifier offers 50 cm sensing distance
- NPN open collector output rated 100 mA at 24 VDC; separate NO and NC models
- Fully potted to resist shock and vibration
- Easy-to-use sensitivity adjustment with stability indicator
- 25 ms response time
- Supply voltage: 12-24 VDC
- Control output: NPN-NO open collector, 100 mA at 26.4 VDC
- Enclosure rating: IP64
- Includes mounting hardware
- Compact size: 37 H x 13.4 W x 25 D mm



CE

# Ultrasonic Sensors

## E4R

Quick Link  
C526

### Long Range Reflective Sensor with Separate Controller

- Sensing distance adjustable to 0.7-2.5 m
- Wide beam angle ( $\pm 20^\circ$ ) ideal for detecting granular or high-viscosity materials
- SPDT relay output rated 4 A at 220 VAC/24 VDC
- Controller can be located up to 20 m from sensing head
- Mutual interference protection
- Response time: 150 ms ON, 500 ms OFF
- Compact sensing head 46 H x 80 W x 70 D mm
- Controller with socket: 87 H x 72 W x 112 D mm



## Pressure Sensors

# E8F2

Quick Link

C622

### Mini-Cube Gauge Pressure Sensor with Large LED Display

- Positive pressure volume ranges 0 to 14.5 psi and 0 to 145 psi
- Negative pressure volume range 0 to -14.6 psi
- Compact (28 x 28 x 29 mm) cube style saves mounting space
- Displays both analog bar and digital pressure values
- 2 independent discrete outputs plus 1 analog output
- User-defined normally open or normally closed configuration
- Pre-wired with 2 m cable
- Optional panel mounting bracket available



### Specifications

- Supply voltage: 12-24 VDC
- Applicable fluid: Non-corrosive gas and non-flammable gas
- Operating modes: Hysteresis, window, auto-teaching
- Control output: Two NPN open collector outputs (NO/NC), 30 A at 30 VDC
- Repeat accuracy (ON/OFF outputs):  $\pm 1\%$  FS max.
- Analog output: 1 to 5 V; output accuracy:  $\pm 5\%$  FS
- Display: 3.5 digit red LED, green LED bar graph indicator, orange LED indicator for 2 independent outputs, green power indicator

## Pressure Sensors

# E8MS/E8M

Quick Link

C623

### High Precision Sensors with Four-Channel Controller

- Positive pressure models: 0 to 1 MPa (0 to 145 psi)
- Negative pressure models: 0 to -101 kPa (0 to -14.6 psi)
- Requires sensor-to-controller cordset (3 m length), ordered separately
- Ideal for robot arms or other moving components
- Requires no wiring conduit
- Four-channel 1/6 DIN sized controller K3C-MP8-T1Z (optional) displays digital pressure values and sensor status, provides power to sensors
- Easy sensitivity adjustment using the teach function and channel-to-channel copy function



### Specifications

- Supply voltage: 12 VDC (sensor); 24 VDC (controller)
- Applicable fluid: Non-corrosive gas and non-flammable gas
- Pressure joint: 1/8 NPT and M5 female screw
  - M5 male screw for negative pressure sensor (E8M-N0)
- Sensor analog output: 1 to 5 V; linearity:  $\pm 1\%$  FS
- Display: 3.5 digit red LED for measurement/message; green LED for channel setting; sensor connected and output status indicators
- Dimensions: E8M-10/N0: 27.5 dia. x 31 L mm
  - E8MS-01/10/N0: 12 dia. x 29.7 L mm
  - Controller: 48 H x 48 W x 84 D mm

# Pressure Sensors

## E8Y

Quick Link  
C624

### Cube Type Differential Pressure Sensors

- Compact (31 x 30 x 30 mm) cube style saves mounting space
- Separate analog output makes data available for charting
- 1-touch programming for upper and lower limits
- User defined normally open or normally closed configuration
- Outputs available: 2 ON/OFF outputs or 2 discrete with 1 analog outputs
- Differential pressure flowmeter models available (E8Y-F) with vertical or horizontal gas connections
- Pre-wired with 2 m cable



### Specifications

- Supply voltage: 12 to 24 VDC
- Pressure range: 0 to 0.290 psi, 0 to 0.725 psi, 0 to 2.0 kPa, 0 to 5.0 kPa
- Flow range: 0.3 to 3 liter/min. or 2 to 20 liter/min.
- Accuracy:  $\pm 3\%$  FS max.
- Withstand pressure: 50 kPa
- Withstand volume: 5 liters/min.
- Applicable fluid: Non-corrosive gas and non-flammable gas
- Digital output: Two NPN open collector (NO/NC); 100 mA max.
- Analog output: 4 to 20 mA

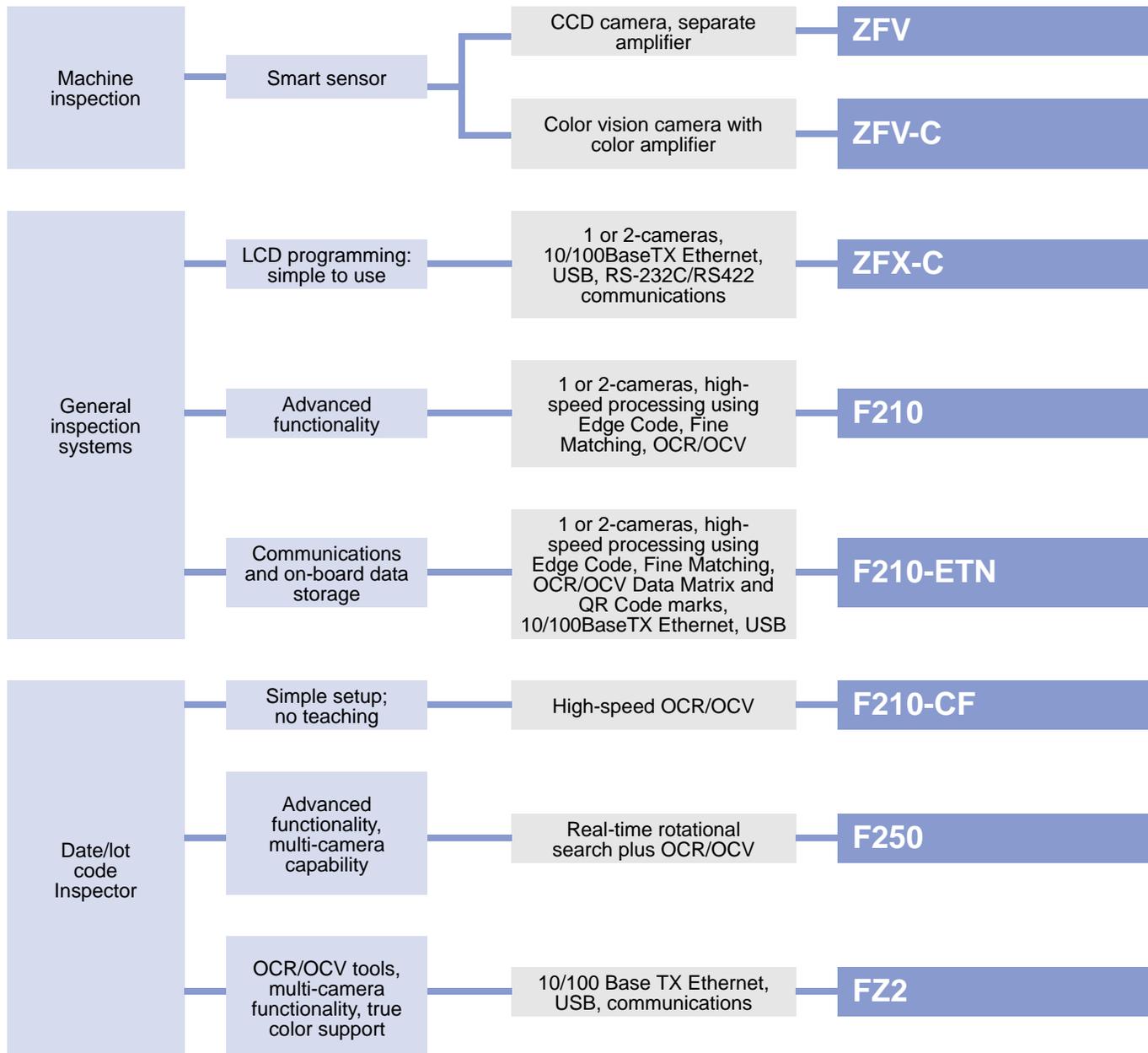


## Contents

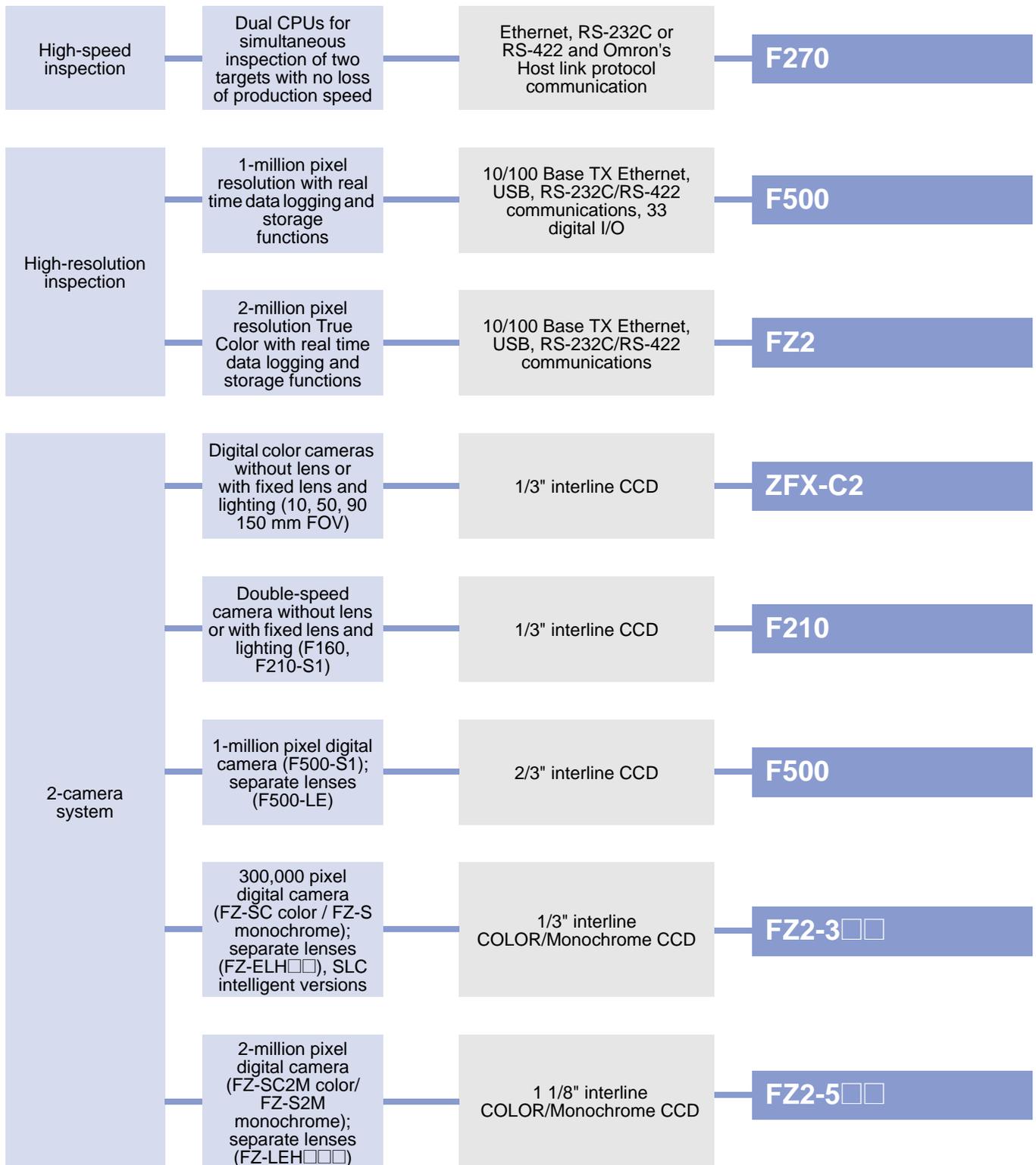
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<b>F500</b>	High-resolution 1-mega pixel, network ready digital vision sensor	N-33
<b>FZ2</b>	High-resolution, True Color 2-mega pixel, network ready digital vision sensor	N-36
<b>True Color Image System</b>		
<b>FZ2</b>	Advanced capabilities for high-speed 2 and 4 camera color applications, network ready digital vision, built-in monitor versions	N-36

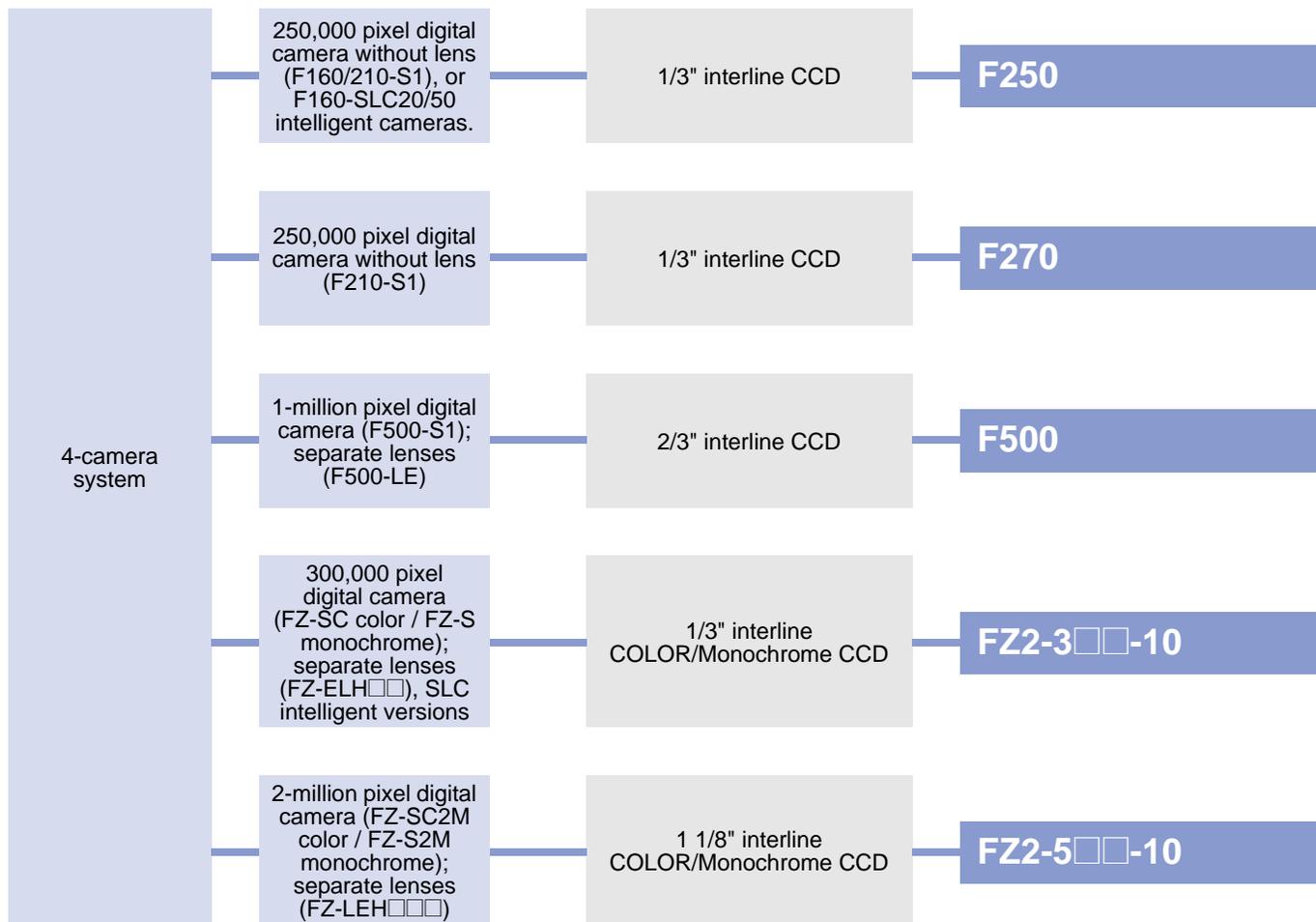
## Selection Guide



## Selection Guide



## Selection Guide



# Machine Vision Sensors ZFV



## Smart Pattern Matching and Inspection Sensor

The ZFV proves that vision inspection can be as simple as "target, teach and go." Parameter settings are available at the touch of a button. A smart user interface allows intuitive configuration using built-in color monitor. In Run mode, the display gives live feedback showing results and grayscale images in real time.

- Intuitive "target, teach and go" user interface
- Live LCD display for setup and live inspection feedback
- Versatile: up to seven inspection tools-pattern matching/ search, positioning, area, width, count, character match/ missing, brightness
- Scalable: add controllers for addition inspection functionality from a single camera
- Flexible: adjustable working distance and area



Target inspection area



One-touch teach



## ZFV Matching and Inspection Sensors

### Sets of Sensor Head and Amplifier Unit

Sensor head	Amplifier type	Output type	Model
Narrow view	Single function	NPN	ZFV-R1010
		PNP	ZFV-R1015
	Standard (multifunction)	NPN	ZFV-R1020
		PNP	ZFV-R1025
Wide view	Single function	NPN	ZFV-R5010
		PNP	ZFV-R5015
	Standard (multifunction)	NPN	ZFV-R5020
		PNP	ZFV-R5025

### Sensor Heads

Type	Working length	Output type	Model
Narrow view	34 to 49 mm (variable)	5 x 4.6 mm (H x V) to 9 x 8.3 mm (H x V)	ZFV-R10
Wide view	38 to 194 mm (variable)	10 x 9.2 mm (H x V) to 50 x 46 mm (H x V)	ZFV-R50

### Amplifier Units

Type	Power supply	Output type	Model
Single function	24 VDC ±10%	NPN	ZFV-A10
		PNP	ZFV-A15
Standard (multifunction)		NPN	ZFV-A20
		PNP	ZFV-A25

## Accessories

Appearance	Type	Power supply	Output type	Model
	Data storage unit	24 VDC	NPN	ZS-DSU11
			PNP	ZS-DSU41
	Controller link unit	—	—	ZS-XCN
	Panel mounting adapter - first unit	—	—	ZS-XPM1
	Panel mounting adapter - additional units			ZS-XPM2
—	Narrow camera mounting bracket			ZFV-XMF (See note 1)
	Wide camera mounting bracket			ZFV-XMF2 (See note 2)

- Note:** 1. Replacement bracket for sensor head ZFV-R10  
2. Replacement bracket for sensor head ZFV-R50

## Sensor Head Extension Cable

Description	Cable length	Model
Standard cable	3 m	ZFV-XC3BV2
Robotic cable		ZFV-XC3BRV2
Standard cable for ZFV-SC10/SC50/SC50W	8 m	ZFV-XC8BV2

**Note:** A maximum of two extension cables can be connected; there are no restrictions on the combinations of the two Extension Cables to be used.

## RS-232C Cable

Description	Cable length	Model
Cable for connecting a PC	2 m	ZS-XRS2

## Specifications

### Sensor Heads (Camera with Built-In Smart Lighting)

Model	ZFV-SR10 (narrow view)	ZFV-SR50 (wide view)
Setting distance (L)	34 to 49 mm	38 to 194 mm
Detection range (H x V)	5 x 4.6 mm to 9 x 8.3 mm	10 x 9.2 mm to 50 x 46 mm
Guide light	Provided (center, sensing area)	
Built-in lens	Focus: F15.65	
Object lighting method	Pulse lighting	
Object light source	Eight red LEDs	
Sensing element	1/3-inch CCD, partial scan	
Shutter speed	Electronic shutter, shutter speed: 1/1,000 to 1/4,000 second	
Degree of protection	IEC60529, IP65	

## Amplifier Units

Model	Single-function models		Multi-function models	
	ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Output method	NPN	PNP	NPN	PNP
Inspection functions	Pattern (PTRN), Brightness (BRGT)		Pattern (PTRN) match/search, Brightness (BRGT), Area (AREA), Width (WID), Position (POSI), Count (CNT), Character match/absence (CHAR)	
Teaching area	Rectangular, one area			
Teaching area size	Pattern, Brightness: any rectangular area (256 x 256 pixels max.) Area, Width, Position, Count, Character: any rectangular area (full screen max.)			
Sensing area	Full screen			
Resolution	468 x 432 (H x V) max. pixels			
Pixel Size				
Bank selection	Support for 8 banks of settings, externally selectable			
Response time	Pattern, Brightness: high-speed: 4 ms; Standard: 8 ms; High-precision: 12 ms (not using partial scan) Area, Width, Position Count, Character: 128 x 128: 15 ms max.			
Other functions	Control output switching: ON for OK or ON for NG ON delay/OFF delay, one-shot output, economy mode (ECO) reduces current consumption			
Output signals	Control output (OUTPUT) Enable output (ENABLE) Error output (ERROR)			
Input signals	Simultaneous measurement input (TRIG) or continuous measurement input (TRIG, switched by using menu) Bank selection inputs (BANK1 to BANK3) Workpiece still teaching (TEACH) or workpiece moving teaching (TEACH), switched by using menu			
Sensor head interface	Digital interface			
Image display	Compact TFT, 1.8 inch LCD (display pixels: 557 x 234)			
Indicators	Judgment result indicator (OUTPUT) Inspection mode indicator (RUN)			
Operation interface	Cursor keys (up, down, left, right); Setting key (SET); Escape key (ESC); Operating mode switching (slide switch); Menu switching (slide switch); Teaching/Display switching key (TEACH/VIEW)			
Power supply voltage	20.4 to 26.4 VDC (including ripple)			
Current consumption	600 mA max. with sensor head connected			

## Amplifier Interface with ZS-DSU Data Support Unit for Communications

Function	Description
Image logging trigger	Stores NG images or all images
Sampling rate	ZFV measurement cycle when logging images; to log measurement data only, use ZS-DSU settings
Number of logged images	Logs up to 128 images in series
Number of amplifiers	Connect a maximum of 5 ZFV units to ZS-DSU; 9 ZS-LDC laser inspection sensors can be combined in the same system; 1 ZS-MDC multiple device controller unit can be combined but image logging is not possible
External bank function	ZFV amplifier unit setting data can be saved to the memory card as bank data Reading bank data enables bank switching

# Vision Sensors ZFV-C



## Easy Color Vision System

The new color version of the Omron Electronics Smart Sensor, the ZFV-C, offers sensing capabilities close to human vision, including the ability to distinguish shapes and colors. Color sensing enables the ZFV-C to “see” images invisible to monochromatic sensors. It also makes the sensor more reliable when inspecting complex targets. Integrated color filters enable sensing of only selected colors when necessary to get a better image.

## Key Features and Benefits

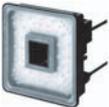
- Color digital camera with built-in LED light source
- Eight inspection tools operating in color: including counting, pattern recognition, size verification, position, brightness, width, text verification and hue (comparing sensed color to a reference color)
- Automatic filter selection for high contrast
- Ultra-fast response: data is processed while being captured
- One-touch “hue” tool for actual color measurement
- “Teach and Go” setup: uses a color LCD screen and simple menu to reduce setup for inspections to a few simple steps



- The screen shows a live image for instant feedback during both setup and inspection operations
- Expandable: up to five sensors can be connected to one controller bus through a snap-on system, allowing five different inspections in one pass to greatly increase productivity

## Ordering Information

### Sensor Heads

Appearance	Type	Setting distance	Sensing area	Enclosure rating	Model
	Narrow view	34 to 49 mm (variable)	5 x 4.6 mm to 9 x 8.3 mm (variable)	IP65	ZFV-SC10
	Standard	31 to 187 mm (variable)	10 x 9.2 mm to 50 x 46 mm (variable)	IP65	ZFV-SC50
				IP67	ZFV-SC50W
	Wide view	66 to 141 mm (variable)	50 x 46 mm to 90 x 83 mm (H x V)	IP65	ZFV-SC90
				IP67	ZFV-SC90W
	Ultra wide view	114 to 226 mm (variable)	90 x 83 mm to 150 x 138 mm (H x V)	IP65	ZFV-SC150
				IP67	ZFV-SC150W

## Amplifier Units

Appearance	Power supply	Output type	Model
	20.4 to 26.4 VDC (including ripple)	NPN	ZFV-CA40
		PNP	ZFV-CA45

## Accessories

Appearance	Type	Power supply	Output type	Model
	Data storage unit	24 VDC	NPN	ZS-DSU11
			PNP	ZS-DSU41
	Controller Link Unit	—	—	ZS-XCN
	Panel mounting adapter - first unit	—	—	ZS-XPM1
	Panel mounting adapter - additional units			ZS-XPM2
—	Narrow camera mounting bracket			ZFV-XMF (See note 1)
—	Wide camera mounting bracket			ZFV-XMF2 (See note 2)

- Note:** 1. Replacement bracket for sensor head ZFV-SC10/SC50  
2. Replacement bracket for sensor head ZFV-SC90/SC150

## Sensor Head Extension Cable

Description	Cable length	Model
Standard cable	3 m	ZFV-XC3BV2
Robotic cable		ZFV-XC3BRV2
Standard cable for ZFV-SC10/SC50/SC50W	8 m	ZFV-XC8BV2

**Note:** A maximum of two extension cables can be connected; there are no restrictions on the combinations of the two extension cables to be used.

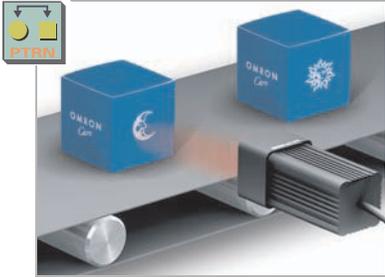
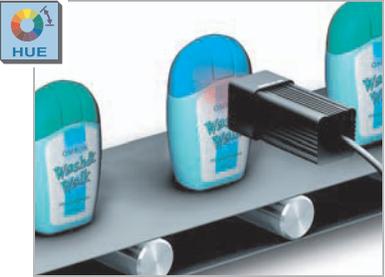
## External Lighting

Appearance	Type	Model
	Bar lighting	ZFV-LTL01
	Double bar lighting	ZFV-LTL02
	Low angle bar lighting	ZFV-LTL04
	Back light source	ZFV-LTF01

## Applications

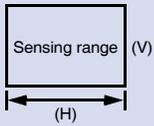
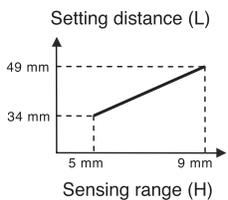
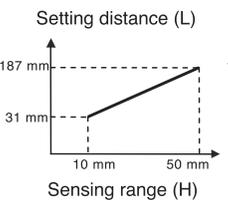
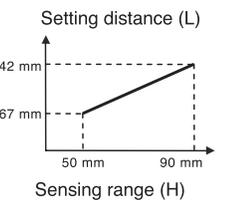
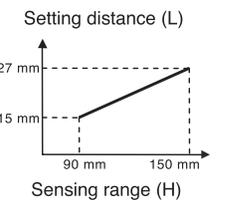
The ZFV-C sensor is ideal for many industrial applications where quick, easy setup and the added discrimination delivered by color sensing are critical.

- Manufacturing
- Assembly- Automotive component assembly
- Packaging lines - Food & Beverage, Cosmetics, and Pharmaceutical

Pattern recognition	Hue verification	Width inspection
		
Verify if a symbol printed on a package is present	The Hue tool inspects for caps that do not match the model	The Width tool measures labels to verify none are folded or cut

## Specifications

### Sensor Heads

Model	ZFV-SC10	ZFV-SC50/-SC50W	ZFV-SC90/-SC90W	ZFV-SC150/-SC150W
<b>Type</b>	Narrow view	Standard view	Wide view	Ultra wide view
<b>Setting distance (L)</b>	34 to 49 mm (variable)	31 to 187 mm (variable)	67 to 142 mm (variable)	115 to 227 mm (variable)
<b>Sensing range (H x V)</b> 	5 x 4.6 mm to 9 x 8.3 mm (variable)	10 x 9.2 mm to 50 x 46 mm (variable)	50 x 46 mm to 90 x 83 mm (variable)	90 x 83 mm to 150 x 138 mm (variable)
<b>Relation between setting distance (L) and sensing range (H)</b>				
<b>Built-in lens</b>	Focus: f15.65	Focus: f13.47	Focus: f6.1	Focus: f6.1
<b>Built-in light source</b>	8 white LEDs	36 white LEDs	20 white LEDs	72 white LEDs
<b>Optional external lighting interface</b>	No	Yes	Yes	No
<b>Object lighting method</b>	Pulse lighting synchronized with shutter speed			
<b>Sensing element</b>	1/3 inch CCD			
<b>Shutter</b>	Electronic shutter; shutter time: 1/500 to 1/8,000			
<b>Power supply voltage</b>	15 VDC (supplied from amplifier unit)	15 VDC, 48 VDC (supplied from amplifier unit)		
<b>Current consumption</b>	Approx. 200 mA	Approx. 350 mA; (150 mA at 15 VDC, 200 mA at 48 VDC, including current when external light is connected)		
<b>Operating ambient</b>	0 to 40 C, 35% to 85% RH (with no icing or condensation)			
<b>Storage ambient</b>	-20 to 65 C, 35% to 85% RH (with no icing or condensation)			
<b>Connection method</b>	Pre-wired, standard cable length, 2 m			
<b>Enclosure rating (IEC 60529 standard)</b>	IP65	ZFV-SC□□□: IP65 ZFV-SC□□□W: IP67		
<b>Weight</b>	Approx. 200 g (including mounting bracket and cord)	Approx. 270 g (including mounting bracket and cord)	Approx. 300 g (including mounting bracket and cord)	Approx. 600 g (including cord)
<b>Accessories included</b>	Mounting bracket	Mounting bracket	Mounting bracket	—

## Amplifier Units

Model	ZFV-CA40	ZFV-CA45
Output type	NPN open collector; 50 mA at 30 VDC max.; residual voltage 1.2 V max.	PNP open collector; 50 mA at 30 VDC max.; residual voltage 1.2 V max.
Serial I/O	USB 2.0: 1 port, full speed (12 Mbps) MINI B connector RS-232C: 1 port, 115,200 bps max.	
Inspection items	Pattern search or match (PTRN); Color inspection (HUE); Shape area (AREA); Edge to edge width measurement (WID); Position (POSI); Count elements (CNT), Color brightness density, and scratch/dirt detection (BRGT); Character string presence or missing character (CHAR)	
Teaching area size	Patterns (PTRN), Brightness (BRGT): any rectangular area (256 x 256 pixels max.) Area (AREA), Width (WID); Position (POSI), Count (CNT), Color (HUE), Character (CHAR): any rectangular area (full screen max.)	
Sensing area	Full screen	
Resolution	468 x 432 (H x V) max.	
Bank selection	Support for 8 banks of settings, selected by external signal	
Image input cycle	13 ms (Standard mode), 8 ms (FAST mode), 5 ms (MAX mode)	
Other functions	Control output switching: ON for OK or ON for NG, ON-delay/OFF-delay, one-shot output, "ECO" power-saving mode	
Output signals	Control output (OUTPUT), enable output (ENABLE), error output (ERROR)	
Input signals	Sync measurement input (TRIG)/continuous measurement (TRIG); switched from menu Bank selection input (BANK1-3) Object stationary teaching (TEACH)/object motion teaching (TEACH); switched from menu	
Sensor head interface	Digital interface	
Image display	TFT color 1.8 inch LCD (Display pixels: 557 x 234)	
Indicators	Judgment result indicator (OUTPUT, color: orange) Inspection mode indicator (RUN, color: green) Error indicator (ERR, color: red) Ready status indicator (READY, color: blue)	
Operation interface	Cursor keys (up, down, left, right) Set key (SET) Escape key (ESC) Operating mode switching (slide switch) Menu switching (slide switch) Teaching/Display switching key (TEACH/VIEW) Function keys (A to D, 4 inputs)	
Connecting to data storage unit ZS-DSU	Image logging trigger: stores NG images or all images Sampling rate for images: ZFV measurement cycle Number of logged images: logs up to 128 images in series Number of connected units: 5 ZFV units max. External bank function: amplifier unit setting data can be saved to the memory card as bank data. Reading bank data enables bank switching	
Power supply voltage	20.4 to 26.4 VDC (including ripple)	
Current consumption	800 mA max. with sensor head connected	
Operating ambient	0° to 50°C, 35% to 85% RH (with no icing or condensation)	
Storage ambient	-25° to 65°C, 35% to 85% RH (with no icing or condensation)	
Enclosure rating	IP20, IEC 60529	
Materials	Polycarbonate	
Weight	Approx. 300 g including cord	

# Machine Vision Sensors ZFX



## Vision Sensor with Built-In LCD Monitor

- The Omron's new ZFX-C Smart Vision Sensor is a total Image Processing system that includes everything from a camera with an integrated light source to an image-processing unit.
- With Omron's newly developed proprietary measurement algorithms, and intuitive programming tools, inspection regions, process and parameter data is easily set with a few steps involving the operation of the touch-color monitor.
- This "Smart" user interface delivers an advanced programming environment, with direct visualization of the inspection process, simplified parameter adjustment are facilitated in a compact, easy to use Color-HMI programming environment.
- The new technology and style of the ZFX-C paves the way to a new era of vision sensors.

## System Ordering Information

Appearance	Number of cameras	Power supply	Output type	Model
	1	21.6 ~ 26.4 VDC	NPN	ZFX-C10
			PNP	ZFX-C15
	2		NPN	ZFX-C20
			PNP	ZFX-C25

## Cameras

Appearance	Type	Setting distance	Sensing area	Model	Remarks
	Monochrome	34 mm to 49 mm	5 mm x 4.9 mm to 9 mm x 8.9 mm (variable)	ZFX-SR10 ZFX-SR10R	Cable length: 2 m
		38 mm to 194 mm	10 mm x 9.8 mm to 50 mm x 49 mm (variable)	ZFX-SR50 ZFX-SR50R	
	Color	34 mm to 49 mm	5 mm x 4.9 mm to 9 mm x 8.9 mm (variable)	ZFX-SC10 ZFX-SC10R	
		31 mm to 187 mm	10 mm x 9.8 mm to 50 mm x 49 mm (variable)	ZFX-SC50 ZFX-SC50R ZFX-SC50W(IP67)	
	Color	67 mm to 142 mm	50 mm x 49 mm to 90 mm x 89 mm (variable)	ZFX-SC90 ZFX-SC90R ZFX-SC90W(IP67)	
		115 mm to 227 mm	90 mm x 89 mm to 150 mm x 148 mm (variable)	ZFX-SC150 ZFX-SC150R ZFX-SC150W(IP67)	
	Monochrome	The CCTV lens is selected according to the range of detection and the installation distance		ZFX-S	—
	Color			ZFX-SC	

## CCTV Lens

Model	3Z4S-LE ML-0614	3Z4S-LE ML-0813	3Z4S-LE ML-1214	3Z4S-LE ML-1614	3Z4S-LE ML-2514	3Z4S-LE ML-3519	3Z4S-LE ML-5018	3Z4S-LE ML-7527	3Z4S-LE ML-10035
Appearance									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.3	F1.4	F1.4	F1.4	F1.9	F1.8	F2.7	F3.5
Filter size	M27 P0.5	M25 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5

## Extension Tubes

Model	Contents
3Z4S-LE ML-EXR	Thickness: 40 mm 20 mm 10 mm 5 mm 2.0 mm 1.0 mm 0.5 mm  Set of 7 tubes Maximum outer diameter: 30 mm dia.

**Note:** Do not use the 0.5-mm, 1.0-mm, and 2.0-mm extension tubes attached to each other. Since these extension tubes are placed over the threaded section of the lens or other extension tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm extension tube are used together. Reinforcement may be required for combinations of extension tubes exceeding 30 mm if the camera is subject to vibration.

## Cables

Type		Cable length	Model
Camera cable (See note 1)	Normal type	3 m, 8 m	ZFX-VS
	Robotic cable type	3 m	ZFX-VSR
Camera extension cable	Normal type		ZFX-XC3A (See note 2)
		8 m	ZFX-XC8A (See note 2)
	Robotic cable type	3 m	ZFX-XC3AR (See note 2)
Parallel I/O cable		2 m, 5 m	ZFX-VP
RS-232C cable		2 m	ZFX-XPT2A
RS-422 cable			ZFX-XPT2B
Monitor cable		2 m, 5 m	FZ-VM
Special USB cable		1.8 m	ZFX-XUSB
Camera cable, right (toward face) angle controller connector, right (toward mount) angle camera connector, standard cable 3/8 m		3 m, 8 m	ZFX-VSLA
Camera cable, right (toward face) angle controller connector, right (toward mount) angle camera connector, hi-flex cable 3 m		3 m	ZFX-VSRLA 3M
Camera cable, right (toward rear) angle controller connector, right (away from mount) angle camera connector, standard cable 3/8 m		3 m, 8 m	ZFX-VSLB
Camera cable, right (toward rear) angle controller connector, right (away from mount) angle camera connector, hi-flex cable 3 m		3 m	ZFX-VSRLB 3M
Camera cable, straight-flat connector, round (male, flat blade) connector standard cable 3 m		3 m, 7 m	ZFX-VSM
Camera cable, straight-flat connector, round (male) connector standard cable 1 m		1 m	ZFX-VSN 1M
Camera cable, right angle (toward face) connector, round (male) connector standard cable 1 m			ZFX-VSNLA 1M
Camera cable, right angle (toward rear) connector, round (male) connector standard cable 1 m			ZFX-VSNLB 1M
Camera cable, right (toward rear) angle controller connector, right (away from mount) angle camera connector, standard cable 3/8 m		3 m, 8 m	ZFX-VSLB

**Note:** 1. When using ZFX-S and ZFX-SC, an extension cable is required, specify ZFX-VS□□.

2. Up to two camera (ZFX-XC□□) extension cables can be connected to the camera cable, maximum total cable length between the controller and the camera is 19 m.

## Accessories

Type		Model
Console		ZFX-KP (2 m/5 m)
Power terminal block		ZFX-XTB (See note 3)
Touch pen		ZFX-TP (See note 3)
Pen holder		ZFX-EU (See note 3)
Power connector		ZFX-CN (See note 3)
LCD monitor		FZ-M08
Panel mount adapters		ZFX-XPM
External optional lighting (See note 1)	Bar lighting	ZFV-LTL01
	Bar double-lighting	ZFV-LTL02
	Bar low-angle lighting	ZFV-LTL04
	Back light	ZFV-LTF01
CCTV Lenses /extension tubes		3Z4S-LE series
Strobe controller (See note 2)		Manufactured by MORITEX Corp. 3Z4S-LT MLEK-C100E1TSX

**Note:** 1. The strobe rate of external lighting is synched to the shutter speed through the controller, via the control port in the camera.

2. ZFX-S and ZFX-SC cameras require an external strobe controller to sync external lighting to the camera shutter rate.

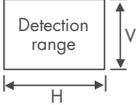
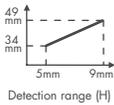
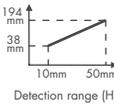
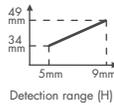
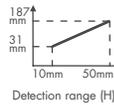
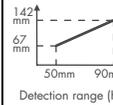
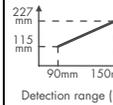
3. These parts are included with the ZFX-C10/15/20/25 controllers.

## Specifications

### Controllers

Item		ZFX-C10	ZFX-C15	ZFX-C20	ZFX-C25	
Number of connected cameras		1	2	1	2	
Connectable camera		ZFX-SR□□/SC□□/□/SC				
Processing resolution		When ZFX-SR□□/SC□□ is connected: 464 (H) x 464 (V) When ZFX-S/SC is connected: 608 (H) x 464 (V)				
Display	LCD monitor	3.5" TFT color LCD (320 x 240 pixels)				
	Indicator	"Measuring" indicator (color: green): RUN "Trigger" indicator (color: blue): ENABLE "Judgment" indicator (color: orange): OUTPUT "Error" indicator (color: red): ERROR				
External I/F	Parallel interface	Input	12 points (RESET, DSA, DI0 to 8, TRIG)			
		Output	22 points (OR, ERROR, RUN, ENABLE, GATE, STGOUT0, DO0 to 15)	23 points (OR, ERROR, RUN, ENABLE, GATE, STGOUT0, DO0 to 15)		
		Circuit type	NPN	PNP	NPN	PNP
	Serial interface	USB2.0	1 port, FULL SPEED, MINI-B connector			
		RS-232C	1 port, max. 115200 bps (cannot be used simultaneously with RS-422 interface)			
		RS-422	1 port, max. 115200 bps (cannot be used simultaneously with RS-232C interface)			
	Network communications	Ethernet	1 port, 100BASE-TX/10BASE-T			
	Monitor output	Analog RGB output, 1 channel (resolution VGA: 640 x 480)				
Memory card I/F	SD card slot 1 channel, 2-gig maximum					
Operation interface		Touch panel, key operation, console connection				
Main functions	Number of registered banks		32 banks (bank 0 internally stored, 1~31 stored on the SD memory card. 1024 bank groups maximum)			
	Number of setup items		32 items/1 bank	128 items/1 bank		
	Measurement items	Shape inspection	Pattern search, sensitive search		Pattern search, sensitive search, graphic search, flexible search	
		Size inspection	Area		Area, labeling	
		Edge inspection	Position, width, count			
		Brightness/color inspection	Brightness, HUE			
	Application-based inspection	Defects		Defect, grouping		
Position correction		1 model search, 2 model search, position, area	1 model search, 2 model search, position, area, labeling			
Support	Image memory function		Max. 100 images	Max. 100 images (when 2 cameras are connected, 50 images/camera)		
	Analysis function		—	Logging monitor		
Menu language		English /Japanese/ (can be switched)				
Ratings	Power supply voltage		21.6 to 26.4 VDC (including ripple)			
	Current consumption		1.5 A max.	1.5 A min.		
	Insulation resistance		Across all lead wires and controller case: 20 M $\Omega$ (by 250 V megger)			
	Dielectric strength		Across all lead wires and controller case, 1000 VAC, 50/60 Hz, 1 min.			
Operation environment robustness	Ambient temperature range		Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)			
	Ambient humidity range		Operating and Storage: 35% to 85% (with no condensation)			
	Ambient atmosphere		No corrosive gases allowed			
	Degree of protection		IP20 (IEC60529)			
	Vibration resistance (durability)		Vibration frequency: 10 to 150 Hz, Single-amplitude: 0.35 mm, Acceleration: 50 m/s <sup>2</sup> 10 times for 8 minutes			
	Shock resistance (destructive)		150 m/s <sup>2</sup> 3 times each in 6 directions (up/down, left/right, forward/backward)			
Material		Case: Polycarbonate (PC), Plate face: PMMA				
Weight		Approx. 620 g		Approx. 650 g		
Accessories		Touch pen (ZFX-TP), Exhaust unit (ZFX-EU), Terminal block adapter (ZFX-XTB), Terminal block adapter mounting screws (4 pieces), Ferrite core (2 pieces), Instruction sheet, Power connector				

## Cameras

Item	ZFX-SR10	ZFX-SR50	ZFX-SC10	ZFX-SC50/ SC50W	ZFX-SC90/ SC90W	ZFX-SC150/ SC150W	ZFX-S (monochrome)	ZFX-SC (color)	
Detection range (H x V) 	5 x 4.9 mm ~ 9 x 8.9 mm (variable)	10 x 9.8 mm ~ 50 x 49 mm (variable)	5 x 4.9 mm ~ 9 x 8.9 mm (variable)	10 x 9.8 mm ~ 50 x 49 mm (variable)	50 x 49 mm ~ 90 x 89 mm (variable)	90 x 89 mm ~ 150 x 148 mm (variable)	The CCTV lens is selected according to the detection range and the setting distance.		
Setting distance (L)	34 ~ 49 mm	38 ~ 194 mm	34 ~ 49 mm	31 ~ 187 mm	67 ~ 142 mm	115 ~ 227 mm			
Relationship between setting distance and detection range									
Image capture element	All-pixel capture inter-line transfer type 1/3" CCD (monochrome)		All-pixel capture inter-line transfer type 1/3" CCD (color)			All-pixel capture inter-line transfer type 1/3" CCD (monochrome)	All-pixel capture inter-line transfer type 1/3" CCD (color)		
Effective number of pixels	659(H) x 494 (V)								
Pixel size	7.4 μm (H) x 7.4 μm (V)								
Shutter speed	1/170 s to 1/20000 s								
Partial function (partial capture)	off		1/2 partial, 1/4 partial			Not available	1/2 partial, 1/4 partial		
Image rate function	Fine, normal, high-speed		Not available			Fine, normal, high-speed	Not available		
Frame rate (at capture of entire screen)	96 fps					90 fps			
Lens mount	— (with Lens)					C mount			
Lighting	Lighting method	Pulse lighting							
	LED	Red LED		White LED				—	
	Guide light	Available (center, measurement region)		Not available					
	Optional lighting I/F	Not available			Available (ZFV-LT Series)		Not available	Available External lighting: 3Z4S-LT Series Strobe controller: made by Moritex 3Z4S-LT MLEK-C100E1TSX	
	Indicator class (See note)	—		Class 1	Class 2	Class 2	Class 1	—	
Ratings	Power supply voltage (supplied from controller)	15 VDC			15 VDC, 48 VDC				
	Current consumption	Approx. 200 mA			Approx. 350 mA (15 VDC: approx. 150 mA, 48 VDC: approx. 200 mA) (including current consumption when optional lighting is connected)			Approx. 100 mA	

Item		ZFX-SR10	ZFX-SR50	ZFX-SC10	ZFX-SC50/ SC50W	ZFX-SC90/ SC90W	ZFX-SC150/ SC150W	ZFX-S (monochrome)	ZFX-SC (color)
Operation environment robustness	Ambient temperature range	Operating: 0 to + 40°C, Storage: -20 to +65°C (with no icing or condensation)						Operating: 0 to + 50°C, Storage: -20 to +65°C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)							
	Ambient atmosphere	No corrosive gases allowed							
	Degree of protection	IP65 (IEC60529)			ZFX-SC□□: IP65 (IEC60529), ZFX-SC□□W: IP67 (IEC60529)			IP20 (IEC60529)	
	Dielectric strength	1000 VAC 50 Hz/60 Hz 1 min.						500 VAC 50 Hz/60Hz 1 min.	
	Vibration resistance (durability)	10 to 150 Hz single-amplitude 0.35 mm 10 times for 8 min. each in X, Y, and Z directions							
	Shock resistance (destructive)	150 m/s <sup>2</sup> 3 times each in 6 directions (up/down, left/right, forward/backward)							
Connection method	Cable built-in type (cable length: 2 m)						Connector connection type (camera cable ZFX-VS/VSR required)		
Material	Case: ABS, mounting fixture: PBT						Case: Aluminum die-cast, Cover: Zinc-plated copper plate 0.5 mm thick, Camera mounting base: ABS		
Weight	Approx. 200 g (including mounting fixture and cable)			Approx. 270 g (including mounting fixture and cable)	Approx. 300 g (including mounting fixture and cable)	Approx. 600 g (including mounting fixture and cable)	Approx. 80 g		
Accessories	Mounting fixture (ZFV-XMF) 1 piece, Ferrite core 2 piece, Instruction Sheet		Mounting fixture (ZFV-XMF) 1 piece, Ferrite core 2 piece, Instruction sheet	Mounting fixture (ZFV-XMF2) 1 piece, Ferrite core 2 pieces, Warning label 1, Instruction sheet	Mounting fixture (ZFV-XMF2) 1 piece, Ferrite core 2 pieces, Warning label 1, Instruction sheet	Ferrite core 2 pieces, Instruction Sheet	Instruction sheet		

**Note:** Applicable standards IEC60825-1:1993 +A1:1997 +A2:2001, EN60825-1:1994 +A2:2001

## Monitor

Monitor model	FZ-M08
Display size	8.4 inches
Type	Liquid crystal color TFT
Resolution	1,024 × 768 dots
Input signal	Analog RGB video input, 1 channel
Power supply voltage	21.6 to 26.4 VDC
Current consumption	Approx. 0.7 A max.
Ambient temperature range	Operating: 0 to 50°C, Storage: -20 to 60°C (with no icing or condensation)
Ambient humidity range	Operating and storage: 20% to 85% (with no icing or condensation)
Weight	Approx. 1.2 kg
Accessories	Instruction sheet and 4 mounting brackets

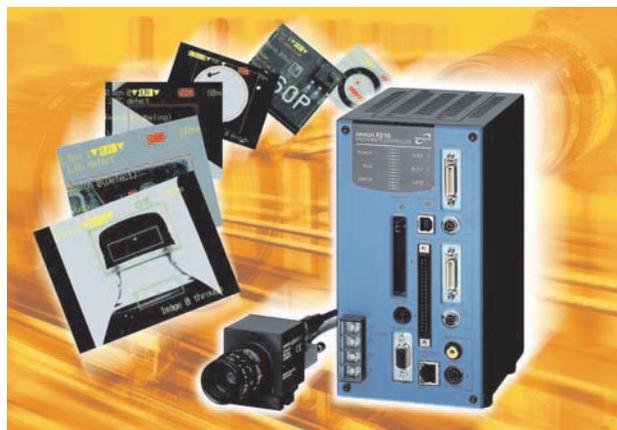
# Vision Sensors F210-ETN



## High-Speed Inspection Plus Ethernet and Data Storage

Access production data, operating status, and images via Ethernet to configure a production and quality control system that delivers real-time data for operation-critical results. The high-speed inspection system uses 250,000-pixel digital cameras. Optional Vision Composer Net software supports real-time data logging and storage functions.

- **Uninterrupted vision inspection** and data collection using separate parallel processors for measurement functions and communications
- View real-time video images, measurement values and judgment results from a PC located anywhere
- **Digital camera interface** delivers clear images reducing noise in the video signal that can obscure measuring accuracy
- **Coordinate 2-camera inspections** with one controller
- **Almost 80 built-in measurement tools** condense Omron's expert vision inspection know-how into simple to use preprogrammed algorithms that reduce start up time



- **View real-time production images** using Omron's built-in streaming video capabilities
- Vision Composer Net software allows users to do remote configuration and maintenance
- 10/100 Base TX Ethernet port, USB, RS-232C/RS-422

## F210-ETN System Ordering Information

Description	Comments	Dimensions	Model
Controllers	NPN input/output with Ethernet	198 H x 100 W x 134 D mm	F210-C10-ETN
	PNP input/output with Ethernet		F210-C15-ETN
Digital camera	250,000-pixel camera only order lens and light source separately	54 H x 43 W x 55.3 D mm	F210-S1
Color LCD monitor	10.4 inch TFT, 640 x 480 resolution	225 H x 285 W x 49 D mm	F500-M10L
Teaching console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
	Simplified keypad	87 H x 50 W x 14.5 D mm	F150-KP
Memory cards	64 Mbytes	—	F160-N64S(S)
	256 Mbytes		F160-N256S
	128 Mbytes		QM300-N128S
PC software	Vision Composer Net v.3 English		F500-CD3E
Application software	Basic operations		F500-UM3FE
	Macro function		F500-UM3ME
High precision lenses	F500 16mm Lens		F500-LE16
	F500 25mm Lens		F500-LE25
	F500 50mm Lens		F500-LE50
Camera cables	Set includes Power and Video Link cables	Cable length: 2 m	F500-VS 2M
		Cable length: 5 m	F500-VS 5M
		Cable length: 10 m	F500-VS 10M
Monitor cable	Connects monitor to controller	Cable length: 2 m	F150-VM 2M
Parallel cable	Loose-wire cable for parallel I/O connectors		F160-VP

## Lenses and Lighting

Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## Specifications

### Controllers

Vision controller models	F210-C10-ETN, F210-C15-ETN
Camera connected	F210-S1
No. of cameras connectable	2
Processing resolution	512 H x 484 V
No. of scenes	32; can be increased using optional memory cards
Image memory function	35 images max.
Data storage on-board	64 MB non-volatile memory
Operation and settings	Measurement items installed using Applications Software Menu operations used to combine measurement items Vision Composer Net can be used for operation and settings
Menu languages	English or Japanese (switchable)
Serial communications	USB series B: 1 channel RS-232C/RS-422: 1 channel
Network communications	Ethernet 100 Base-TX/10 Base-T
Parallel I/O	11 inputs, 22 outputs
Monitor interface	Composite video output: 1 channel S-Video output: 1 channel
Memory Card interface	Compact Flash card slot, 1 channel
Power supply voltage	20.4 to 26.4 VDC
Current consumption	2.1 A max. (with two F210-S1 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	198 H x 100 W x 134 D mm (without connectors and other protrusions)
Weight	Approx. 1.6 kg (controller only)

### Camera

Camera for vision system	F210-S1
Imaging device	1/3-inch CCD
Pixel size	7.4 $\mu\text{m}$ H x 7.4 $\mu\text{m}$ W
Shutter	Electronic shutter, 1/60 to 1/12,000 shutter speeds, change via menu
Partial scan function	7 settings
Communications interface	Conforms to Camera Link
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 60 C with 35% to 85% RH with no condensation
Dimensions	43 H x 43 W x 49 D mm (without connections and other protrusions)
Weight	Approx. 110 g

### Monitor

Monitor model	F500-M10L
Display size	10.4 inches
Type	LCD TFT
Resolution	640 x 480
Brightness	350 cd/m (typical)
Input signal	NTSC composite video (1.0 V/75 $\Omega$ termination), S-Video
Power supply voltage	20.4 to 26.4 VDC
Current consumption	1.0 A max.
Operating ambient	0 to 50 C, 30% to 80% RH
Storage ambient	-20 to 65 C, 30% to 80% RH
Dimensions	225 H x 285 W x 49 D mm
Weight	Approx. 1.8 kg

## Vision Composer Net Software System Requirements

Software model	F500-CD3E Vision Composer Net
CPU	Pentium III 600 MHz min. (Pentium III 1 GHz min. recommended)
OS	Windows 2000 Professional, Service Pack 4 or higher Windows XP Home Edition, Service Pack 2 or higher Windows XP Professional, Service Pack 2 or higher
Memory	192 MB min. (256 MB min. recommended)
Hard disk	300 MB min. available space
Monitor	Resolution: 1,024 x 768 min. Display colors: 16-bit High Color min.; (32-bit True Color min. recommended)
Network	10 BaseT-compliant network (100 Base-TX recommended)
Omron Vision applications software	F500-UM Version 3.00 or later

# Vision Sensors F210



## Advanced Capability for High-Speed, Two-Camera Applications

The F210 contains powerful algorithms for Edge Code, Fine Matching, OCR/OCV and more. Compared to PC-based vision solutions, F210 provides a lower-cost integrated and compact, inspection solution for complex quality, motion and process control applications. A Macro Function allows OEMs and systems integrators to customize nearly every system function that can be manipulated.

- Captures images as fast as 8.3 ms in field capture mode or 16.7 ms for frame capture mode
- Individual measurement rates up to 5000 parts/minute
- QUEST OCR/OCV algorithm up to 160 characters per each measurement
- Edge Code technology detects blemishes, defects and high accuracy positioning
- Fine Matching for accurate detection of differences between a user-taught model and a live image; identifies fine defects on printed character edges or label graphics
- Up to 2-camera capability for multi-angle inspections
- A flexible, easy-to-load tool set and flow-chart style drop down menu system simplifies configuring the inspection process



## F210 System Ordering Information

Description	Comments	Dimensions	Model
Controllers	NPN input/output	198 H x 100 W x 134 D mm	F210-C10
	PNP input/output		F210-C15
Double speed cameras with fixed lens and intelligent lighting	20 mm field of view	70 H x 70 W x 119.5 D mm	F160-SLC20
	50 mm field of view	90 H x 90 W x 126.5 D mm	F160-SLC50
Double speed cameras, partial scan capability	Camera only, without lens or light source	39 H x 31 W x 54.5 D mm	F160-S2
Teaching console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
Color LCD monitor	5.5 inch TFT, 320 x 240 resolution	143 H x 185 W x 51.5 D mm	F150-M05L
Memory cards	64 Mbytes	—	F160-N64S(S)
	128 Mbytes		QM300-N128S
Application software	Flow Menu format for basic operations	Cable length: 2 m	F500-UM3FE
Camera cable	Set includes Power and Video Link cables		F150-VS 2M
Monitor cable	Connects monitor to controller		F150-VM 2M
Parallel cable	Loose-wire cable for parallel I/O connectors		F160-VP

## Lenses and Lighting

Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## Protect Your Process and Supply Chain from Defective Product

Food and beverage products as well as health and beauty aids rely on the shelf appeal of labels and packaging to attract consumers. The F210 vision system helps protect your profits and improve productivity as part of a Continuous Improvement™ solution engineered by Omron.

- 100% inspection of product for damaged closure threads before the capping operation prevents wasted product and lost manufacturing time cleaning up a jam or spill.
- Fast processing speed allows a second, 100% inspection for proper label positioning.
- F210 easily integrates into your existing control scheme.
- Omron can design and deliver a ready-to-install, stand-alone inspection station that combines HMI, PLC and motion control for a complete automation solution.



## Specifications

### Controllers

Vision controller models	F210-C10-E, F210-C15-E
Camera connected	F160-S2, F160-SLC20, F160-SLC50
Number of cameras connectable	2
Processing resolution	512 H x 484 V
Number of scenes	32; can be increased using optional memory cards
Image storage function	35 images max.
Image filtering	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Operation and settings	Measurement items installed using Applications Software Menu operations used to combine and set measurement items
Trend monitor	Function supported
Serial communications	RS-232C/RS-422: 1 channel
Parallel I/O	13 inputs, 22 outputs
Monitor interface	Composite video output: 1 channel S-Video output: 1 channel
Memory card interface	Compact Flash card slot, 1 channel
Power supply voltage	20.4 to 26.4 VDC
Current consumption	1.6 A max. (with two F160-SLC50 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	160 H x 56 W x 110 D mm (without connectors and other protrusions)
Weight	Approx. 570 g (controller only)

## Cameras

Camera model	F160-S2	F160-SLC20	F160-SLC50
Description	Double speed camera, no lens	Double speed camera with intelligent lighting	Double speed camera with intelligent lighting
Power supply	13 VDC		
Current consumption	130 mA max.	260 mA max.	310 mA max.
Imaging device	1/3" interline CCD (reading all pixels)		
Effective pixels	659 H x 494 V		
Shutter	Electronic shutter: 1/120 s, 1/200 s, 1/500 s, 1/1,000 s, 1/2,000 s, 1/4,000 s, 1/8,000 s, 1/20,000 s shutter speeds, change via menu		
Lens mounting	C mount		
Lens type	Lens ordered separately	Fixed focal point, fixed iris (supplied)	Fixed focal point, fixed iris (supplied)
Partial scan function	Frame capture mode: 16 partial scan settings from 484 to 12 lines Field capture mode: 9 partial scan settings from 484 to 24 lines	Not available	Not available
Brightness	—	F2.8	F2.8
Focal point distance		13 mm	6.1 mm
Built-in light source		Red and green LED combination (Peak emission wavelengths: 660 nm and 570 nm)	
Mounting distance	Depends on lens being used	15 to 25 mm	16.5 to 26.5 mm
Field of vision	Depends on lens being used	20 x 20 mm	50 x 50 mm
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation		
Storage ambient	-25 to 60 C with 35% to 85% RH with no condensation		
Dimensions	40 H x 31 W x 54.5 D mm (without connections)	70 H x 70 W x 119.5 D mm (without connections)	90 H x 90 W x 126.5 D mm (without connections)
Weight	Approx. 85 g	Approx. 285 g	Approx. 375 g

## Monitor

Monitor model	F150-M05L
Display size	5.5 inches
Type	LCD TFT
Resolution	320 x 240
Brightness	250 cd/m
Input signal	NTSC composite video (1.0 V/75 Ω termination)
Power supply voltage	21.6 to 27.6 VDC
Current consumption	700 mA or less
Operating ambient	0 to 50 C, 35% to 85% RH
Storage ambient	-25 to 65 C, 35% to 85% RH
Dimensions	143 H x 185 W x 42.2 D mm
Weight	Approx. 1 kg

# Vision Sensors F160



## Simple-to-Use Sensor with High-Speed Image Processing

Omron's F160 vision sensor dramatically reduces total inspection time for complex applications, allowing time for additional inspections that may not have been possible before. Image capture and processing are accelerated many times to handle 5,000 gray search inspections per minute. Functions include OCR, rotation search, customizable display and much more. F160 offers quick start-up, simple operation and an excellent price/value ratio.

- High-speed vision performance allows a greater range of inspections within the required tact time contributing greatly to improvement in quality
- 2-camera capability handles multi-angle inspection needs
- No teaching required for QUEST OCR
- Flexible defect detection and pattern matching
- User-friendly color menus
- Intelligent lighting source built into F160 cameras simplifies setup and changeover
- Flash-RAM memory storage for images and setup file transfers



## F160 Vision System

Description	Comments	Dimensions	Model
Controllers	NPN input/output	160 H x 56 W x 110 D mm	F160-C10E-2
	PNP input/output		F160-C15E-2
Double speed cameras with fixed lens and intelligent lighting	20 mm field of view	70 H x 70 W x 119.5 D mm	F160-SLC20
	50 mm field of view	90 H x 90 W x 126.5 D mm	F160-SLC50
Double speed cameras, partial scan capability	Camera only, without lens or light source	39 H x 31 W x 54.5 D mm	F160-S2
Console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
Color LCD monitor	5.5 inch TFT, 320 x 240 resolution	143 H x 185 W x 51.5 D mm	F150-M05L
Memory cards	Memory capacity: 64 Mbytes	—	F160-N64S(S)
Camera cables	Set includes Power and Video Link cables	Cable length: 2 m	F150-VS 2M
Monitor cable	Connects monitor to controller		F150-VM 2M
Parallel cable	Loose-wire cable for parallel I/O connectors		F160-VP

## Lenses and Lighting

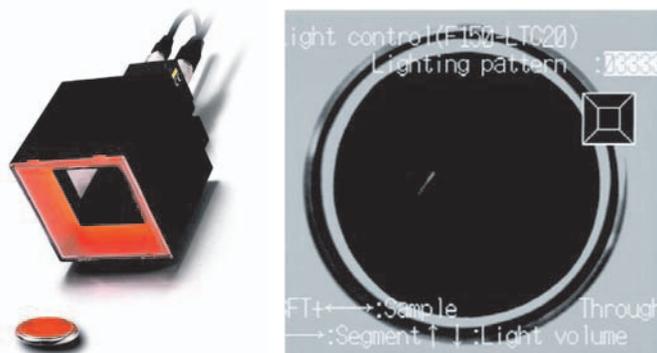
Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## Specifications

### Controllers

Vision controller models	F160-C10E-2 (NPN input/output), F160-C15E-2 (PNP input/output)
Connectable camera	F160-S2, F160-SLC20, F160-SLC50
Number of cameras	1
Number of pixels	512 H x 484 V
Number of scenes	32; can be increased using optional memory cards
Image storage function	35 images stored, max.
Image filtering	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Position displacement compensation	Compensation directions: X, Y, and $\theta$ (360 ) Detection methods: Binary center of gravity, axis angle, labeling, rotation search, gray search, edge position
Number of measurement regions	32 regions per scene
Measurement data	Gravity and area, gravity and axis, gray search, precise search, rotation search, flexible search, relative search, defect area (visible box), edge position, edge pitch, edge width, density average, labeling, OCR for 1 character, classification
Data operation functions	Number: 32 expressions can be set for judgments, data and variables used in other expressions Operations: Arithmetic operations, square root, absolute value, remainder, distance, angle, maximum, minimum, SIN, COS, ATAN, AND, OR, NOT
Functions for customizing operation	Menu masking, password setting, shortcut keys
Functions for customizing screens	Display items: character strings (measurement values, judgment results, times, user-specified characters, measurement region names); Figures (lines, boxes, circles, cross cursors); Specified parameters (display color, position, size)
Memory Card slots	1 slot
Monitor interface	Composite video output: 1 channel (color, monochrome)
Serial communications	RS-232C/RS-422: 1 channel
Parallel I/O	13 inputs, 22 outputs
Power supply voltage	20.4 to 26.4 VDC
Current consumption	1.6 A max. (with two F160-SLC50 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	160 H x 56 W x 110 D mm (without connectors and other protrusions)
Weight	Approx. 570 g (controller only)

### Cameras with Intelligent Light Sources

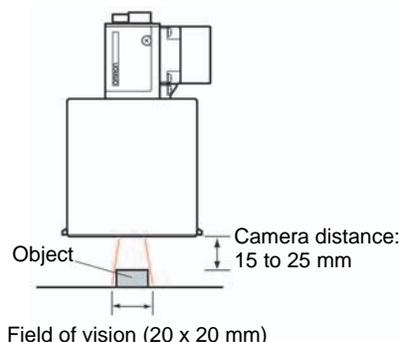


## Take the Guesswork Out of Proper Lighting

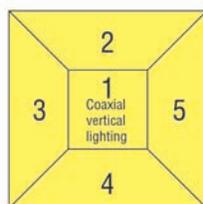
- Intelligent light sources simplify setup and changeover
- Ring light mounted to camera offers adjustable brightness and light direction
- Lighting hood contains both red and green LEDs to detect a wide range of objects
- Adjustable coaxial vertical lighting available
- Set illuminated area and light intensity from controller menus
- Makes changes without direct contact with the light source
- Store light positioning with scene data so lighting conditions match known operating environments
- Easily recreate lighting conditions from machine to machine

## Camera Sensing Distance & Field of Vision

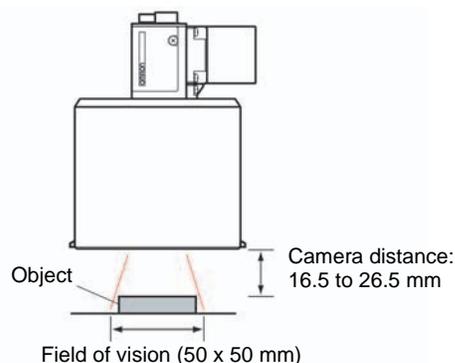
F160-SLC20



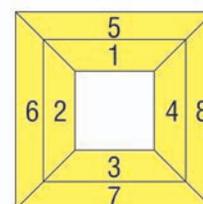
Field of vision: 20 mm  
Light intensity can be set separately to one of 8 levels for 5 illuminated areas.



F160-SLC50



Field of vision: 50 mm  
Light sensitivity can be set separately to one of 8 levels for 8 illuminated areas.



Camera model	F160-S2	F160-SLC20	F160-SLC50
<b>Description</b>	Double speed camera, no lens	Double speed camera with intelligent lighting	Double speed camera with intelligent lighting
<b>Power supply</b>	13 VDC		
<b>Current consumption</b>	130 mA max.	260 mA max.	310 mA max.
<b>Imaging device</b>	1/3" interline CCD (reading all pixels)		
<b>Effective pixels</b>	659 H x 494 V		
<b>Shutter</b>	Electronic shutter: 1/120 s, 1/200 s, 1/500 s, 1/1,000 s, 1/2,000 s, 1/4,000 s, 1/8,000 s, 1/20,000 s shutter speeds, change via menu		
<b>Lens mounting</b>	C mount		
<b>Lens type</b>	Lens ordered separately	Fixed focal point, fixed iris (supplied)	
<b>Partial scan function</b>	Frame capture mode: 16 partial scan settings from 484 to 12 lines Field capture mode: 9 partial scan settings from 484 to 24 lines	Not available	
<b>Brightness</b>	—	F2.8	F2.8
<b>Focal point distance</b>		13 mm	6.1 mm
<b>Built-in light source</b>		Red and green LED combination (Peak emission wavelengths: 660 nm and 570 nm)	
<b>Mounting distance</b>	Depends on lens being used	15 to 25 mm	16.5 to 26.5 mm
<b>Field of vision</b>	Depends on lens being used	20 x 20 mm	50 x 50 mm
<b>Operating ambient</b>	0 to 50 C, 35% to 85% RH with no condensation		
<b>Storage ambient</b>	-25 to 60 C with 35% to 85% RH with no condensation		
<b>Dimensions</b>	40 H x 31 W x 54.5 D mm (without connections)	70 H x 70 W x 119.5 D mm (without connections)	90 H x 90 W x 126.5 D mm (without connections)
<b>Weight</b>	Approx. 85 g	Approx. 285 g	Approx. 375 g

## Monitor

Monitor model	F150-M05L
Display size	5.5 inches
Type	LCD TFT
Resolution	320 x 240
Brightness	250 cd/m
Input signal	NTSC composite video (1.0 V/75 $\Omega$ termination)
Power supply voltage	21.6 to 27.6 VDC
Current consumption	700 mA or less
Operating ambient	0 to 50 C, 35% to 85% RH
Storage ambient	-25 to 65 C, 35% to 85% RH
Dimensions	143 H x 185 W x 42.2 D mm
Weight	Approx. 1 kg

# Vision Sensors

## F210-CF

Quick Link

G356

### Date/Lot Code Inspector Offers Simple Guided Setup and Operation

- Detect when ink jet and other marking systems fail to apply a complete date code
- Simple setup with no teaching required
- Built-in character and font libraries eliminate the need to manually teach any characters, saving time during setup
- Set just one detection region to detect an entire line of code
- Easy-to-use menu setup interface simplifies parameter setting
- Automatically updating date code feature eliminates operator intervention for manual updates to date reference values
- Preconfigured standard date templates shorten setup for frequently used code patterns like “Manufactured on” date, “Best before” date, and “Expires on” date
- F210 CF easily integrates into your existing control scheme
- Omron can design and deliver a ready-to-install, stand-alone inspection station that combines HMI, PLC and motion control for a complete automation solution



## Ordering Information

Description	Comments	Dimensions	Model
Controllers	NPN input/output, direct video output	198 H x 100 W x 134 D mm	F210-C10E-CF
	PNP input/output with Ethernet		F210-C15E-CF
Double speed cameras with fixed lens and intelligent lighting	20 mm field of view	70 H x 70 W x 119.5 D mm	F160-SLC20
	50 mm field of view	90 H x 90 W x 126.5 D mm	F160-SLC50
Double speed cameras, partial scan capability	Camera only, without lens or light source	39 H x 31 W x 54.5 D mm	F160-S2
Teaching console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
Color LCD monitor	5.5 inch TFT, 320 x 240 resolution	143 H x 185 W x 51.5 D mm	F150-M05L
Memory cards	64 Mbytes	—	F160-N64S(S)
Camera cable	—	Cable length: 2 m	F150-VS 2M
Monitor cable	Connects monitor to controller		F150-VM 2M
Parallel cable	Cable for parallel I/O connection to a PLC		F160-VP

## Lenses and Lighting

Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## 100% Code Inspection Reduces Waste

Accurate and readable date codes, lot codes, and other text information printed on most packaged items provide vital expiration and traceability information. Products with unreadable codes become defective even if the product inside is good because retailers and consumers cannot verify the product quality. This results in wasted product, costly returns and loss of consumer confidence in the brand. 100% inspection is required to ensure the codes are accurate, complete and legible, as well as to monitor the operation of the marking equipment. Use Omron's F210 CF for these important functions to reduce waste and keep product within regulatory compliance:

- Identify and remove imperfectly marked product before it reaches the supply chain
- Alert operators to take immediate corrective action and service the marking device



## Focused Inspection Capabilities

Omron's F210 CF focuses vision inspection techniques to the exclusive inspection of date codes. This application specific functionality makes it the easiest-to-apply date code inspection system on the market.

## Simple Setup

- **Set just one detection region** to detect an entire line of code
- **Easy-to-use menu setup interface** simplifies parameter setting
- **Automatically updating date code feature** eliminates operator intervention for manual updates to date reference values
- **Preconfigured standard date templates** shorten setup for frequently used code patterns like "manufactured on" date, "best before" date, and "expires on" date

## Specifications

### Controllers

Vision controller models	F210-C10E-CF, F210-C15E-CF
Camera connected	F160-S2, F160-SLC20, F160-SLC50
Number of cameras connectable	1
Processing resolution	512 H x 484 V
Number of scenes	32; can be increased using optional memory cards
Image memory function	35 images max.
Image filtering	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Operation and settings	Measurement items installed using Applications Software Menu operations used to combine and set measurement items
Parallel I/O	13 inputs, 22 outputs
Monitor interface	Composite video output: 1 channel
Memory Card interface	Compact Flash card slot, 1 channel
Power supply voltage	20.4 to 26.4 VDC
Current consumption	1.6 A max. (with two F160-SLC50 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	160 H x 56 W x 110 D mm (without connectors and other protrusions)
Weight	Approx. 570 g (controller only)

## Cameras

Camera model	F160-S2	F160-SLC20	F160-SLC50
Description	Double speed camera, no lens	Double speed camera with intelligent lighting	Double speed camera with intelligent lighting
Power supply	13 VDC		
Current consumption	130 mA max.	260 mA max.	310 mA max.
Imaging device	1/3" interline CCD (reading all pixels)		
Effective pixels	659 H x 494 V		
Shutter	Electronic shutter: 1/120 s, 1/200 s, 1/500 s, 1/1,000 s, 1/2,000 s, 1/4,000 s, 1/8,000 s, 1/20,000 s shutter speeds, change via menu		
Lens mounting	C mount		
Lens type	Lens ordered separately	Fixed focal point, fixed iris (supplied)	
Partial scan function	Frame capture mode: 16 partial scan settings from 484 to 12 lines Field capture mode: 9 partial scan settings from 484 to 24 lines	Not available	Not available
Brightness	—	F2.8	F2.8
Focal point distance		13 mm	6.1 mm
Built-in light source		Red and green LED combination (Peak emission wavelengths: 660 nm and 570 nm)	
Mounting distance	Depends on lens being used	15 to 25 mm	16.5 to 26.5 mm
Field of vision	Depends on lens being used	20 x 20 mm	50 x 50 mm
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation		
Storage ambient	-25 to 60 C with 35% to 85% RH with no condensation		
Dimensions	40 H x 31 W x 54.5 D mm (without connections)	70 H x 70 W x 119.5 D mm (without connections)	90 H x 90 W x 126.5 D mm (without connections)
Weight	Approx. 85 g	Approx. 285 g	Approx. 375 g

## Monitor

Monitor model	F150-M05L
Display size	5.5 inches
Type	LCD TFT
Resolution	320 x 240
Brightness	250 cd/m
Input signal	NTSC composite video (1.0 V/75 Ω termination)
Power supply voltage	21.6 to 27.6 VDC
Current consumption	700 mA or less
Operating ambient	0 to 50 C, 35% to 85% RH
Storage ambient	-25 to 65 C, 35% to 85% RH
Dimensions	143 H x 185 W x 42.2 D mm
Weight	Approx. 1 kg

# Vision Sensors F250



## Multi-View Inspector with Real-Time Position Compensation

- Real-time rotational search - the industry's fastest 360° rotational model search processing capability
- QUEST OCR/OCV algorithm - up to 160 characters per each measurement
- Edge Code technology - features or objects defined by edges for advanced blemish, defect detection, high accuracy position detection
- Up to 4-camera capability for multi-angle inspections and multiple inspection stations within one system
- F250 easily integrates into your existing control scheme
- On-screen, pull-down menu system using an easy-to-understand, flow chart style setup menu
- On-line trending functions with definable limits
- Allows user-customized menus, "results" screen information and symbol and text colors
- Easily settable and repeatable light setting using cameras with intelligent lighting
- 2 expandable Flash RAM memory slots up to 120 MB each using memory cards
- Communicates via Ethernet, RS-232C/RS-422 and supports Omron's Hostlink protocol
- Omron can design and deliver a ready-to-install inspection station that combines HMI, PLC and motion control for a complete automation solution



## F250 System Ordering Information

Description	Comments	Dimensions	Model
Controllers	NPN input/output with Ethernet	73 H x 270 W x 197 D mm	F250-C50
	PNP input/output with Ethernet		F250-C55
Double speed cameras with fixed lens and intelligent lighting	20 mm field of view	70 H x 70 W x 119.5 D mm	F160-SLC20
	50 mm field of view	90 H x 90 W x 126.5 D mm	F160-SLC50
Double speed cameras, partial scan capability	Camera only, without lens or light source	39 H x 31 W x 54.5 D mm	F160-S2
Teaching console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
Color LCD monitor	5.5 inch TFT, 320 x 240 resolution	143 H x 185 W x 51.5 D mm	F150-M05L
Memory card	64 Mbytes	—	F160-N64S(S)
Application software	Flow Menu format for basic operations	—	F500-UM3FE
	Flow Menu format with Macro function		F500-UM3ME
Camera cable	—	Cable length: 2 m	F150-VS 2M
Monitor cable	Connects monitor to controller		F150-VM 2M
Parallel cable	Loose-wire cable for parallel I/O connectors		F160-VP

## Lenses and Lighting

Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## F250 Handles Complex, Multiple View Inspections

Overcome the challenge of automating quality inspection in applications that require multiple views and multiple inspections within each view. Omron's F250 vision system handles complex inspections using up to four cameras to perform fully integrated, overall product inspection. Use the F250 to provide both 100% quality inspection and high accuracy sortation in a small footprint where a variety of products share the same line. Let Omron engineer a Continuous Improvement™ solution that addresses your needs for quality inspection and increased productivity.



## Specifications

### Controllers

Vision controller models	F250-C50, F250-C55
Camera connected	F160-S2, F160-SLC20, F160-SLC50
Number of cameras connectable	Up to 4
Processing resolution	512 H x 484 V
Number of scenes	32; can be increased using optional memory cards
Image storage function	35 images max.
Image filtering (pre-processing)	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Operation and settings	Measurement items installed using Applications Software Menu operations used to combine and set measurement items
Operation customization functions	Menu masking, password setting, shortcut keys
Screen customization functions	Display items: Character string (measurement values, judgment results, times, user-specified characters, measurement region names), Figures (lines, boxes, circles, cross cursors) Specified parameters: display color, position and size
Trend monitor	Function supported
Serial communications	RS-232C/RS-422: 1 channel
Network communications	Ethernet; 10 Base-T: 1 channel
Parallel I/O	21 inputs, 46 outputs
Strobe interface	4 channels (included in parallel outputs)
Monitor interface	Composite video output: 1 channel S-Video output: 1 channel
Memory card interface	Compact Flash card slot, 2 channels
Power supply voltage	20.4 to 26.4 VDC
Current consumption	3.7 A max. (with four F160-SLC50 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	81 H x 270 W x 197 D mm (without connectors and other protrusions)
Weight	Approx. 2.7 kg (controller only)

## Cameras

Camera model	F160-S2	F160-SLC20	F160-SLC50
Description	Double speed camera, no lens	Double speed camera with intelligent lighting	Double speed camera with intelligent lighting
Power supply	13 VDC		
Current consumption	130 mA max.	260 mA max.	310 mA max.
Imaging device	1/3" interline CCD (reading all pixels)		
Effective pixels	659 H x 494 V		
Shutter	Electronic shutter: 1/120 s, 1/200 s, 1/500 s, 1/1,000 s, 1/2,000 s, 1/4,000 s, 1/8,000 s, 1/20,000 s shutter speeds, change via menu		
Lens mounting	C mount		
Lens type	Lens ordered separately	Fixed focal point, fixed iris (supplied)	Fixed focal point, fixed iris (supplied)
Partial scan function	Frame capture mode: 16 partial scan settings from 484 to 12 lines Field capture mode: 9 partial scan settings from 484 to 24 lines	Not available	Not available
Brightness	—	F2.8	F2.8
Focal point distance		13 mm	6.1 mm
Built-in light source		Red and green LED combination (Peak emission wavelengths: 660 nm and 570 nm)	
Mounting distance	Depends on lens being used	15 to 25 mm	16.5 to 26.5 mm
Field of vision		20 x 20 mm	50 x 50 mm
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation		
Storage ambient	-25 to 60 C with 35% to 85% RH with no condensation		
Dimensions	40 H x 31 W x 54.5 D mm (without connections)	70 H x 70 W x 119.5 D mm (without connections)	90 H x 90 W x 126.5 D mm (without connections)
Weight	Approx. 85 g	Approx. 285 g	Approx. 375 g

## Monitor

Monitor model	F500-M10L	F150-M05L
Display size	10.4 inches	5.5 inches
Type	LCD TFT	LCD TFT
Resolution	640 x 480	320 x 240
Brightness	350 cd/m (typical)	250 cd/m
Input signal	NTSC composite video (1.0 V/75 $\Omega$ termination), S-Video	NTSC composite video (1.0 V/75 $\Omega$ termination)
Power supply voltage	20.4 to 26.4 VDC	21.6 to 27.6 VDC
Current consumption	1.0 A max.	700 mA or less
Operating ambient	0 to 50 C, 30% to 80% RH	0 to 50 C, 35% to 85% RH
Storage ambient	-20 to 65 C, 30% to 80% RH	-25 to 65 C, 35% to 85% RH
Dimensions	225 H x 285 W x 49 D mm	143 H x 185 W x 42.2 D mm
Weight	Approx. 1.8 kg	Approx. 1 kg

# Vision Sensors F270

Quick Link

G358

## High-Speed Inspection with Real-Time Position Compensation

- High-speed, 4-camera capability—Omron's fastest solution for multi-angle inspections
- Dual CPUs allow inspection of two targets simultaneously with no reduction of production speed
- Real-time 360° rotational search capability—the industry's fastest
- Dual real-time position compensation ASICs capture images in 8-16 ms in either field or frame mode
- Completes more inspection items with higher precision in less time to reduce your number of inspection stations
- QUEST Character and Lot Number verification inspects up to 160 characters per each measurement
- Edge Code positioning provides advanced blemish and defect detection, high accuracy position detection
- F270 easily integrates into your existing control scheme
- On-screen, pull-down menu system using an easy-to-understand, flow chart style setup menu
- On-line trending functions with definable limits
- Allows user-customized menus, "results" screen information and symbol and text colors



- Easily settable and repeatable light setting using cameras with intelligent lighting
- 2 expandable Flash RAM memory slots up to 120 MB each using memory cards
- Communicates via Ethernet, RS-232C or RS-422 and supports Omron's Hostlink protocol
- Omron can design and deliver a ready-to-install inspection station that combines HMI, PLC and motion control for a complete automation solution

## F270 System Ordering Information

Description	Comments	Dimensions	Model
Controllers	NPN input/output with Ethernet	81 H x 270 W x 197 D mm	F270-C10
	PNP input/output with Ethernet		F270-C15
Double speed cameras with fixed lens and intelligent lighting	20 mm field of view	70 H x 70 W x 119.5 D mm	F160-SLC20
	50 mm field of view	90 H x 90 W x 126.5 D mm	F160-SLC50
Double speed cameras, partial scan capability	Camera only, without lens or light source	39 H x 31 W x 54.5 D mm	F160-S2
Teaching console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
Color LCD monitor	5.5 inch TFT, 320 x 240 resolution	143 H x 185 W x 51.5 D mm	F150-M05L
Memory card	64 Mbytes	—	F160-N64S(S)
Application software	Flow Menu format for basic operations	—	F500-UM3FE
	Flow Menu format with Macro function		F500-UM3ME
Camera cable	—	Cable length: 2 m	F150-VS 2M
Monitor cable	Connects monitor to controller		F150-VM 2M
Parallel cable	Loose-wire cable for parallel I/O connectors		F160-VP

## Lenses and Lighting

Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## Date Code Inspection Solution for High-Speed Bottling Lines

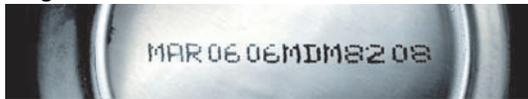
Omron's F270 vision sensor solves unique date/lot code verification problems presented by beverage and food cans with concave bottoms:

- Position compensation allows verification regardless of orientation
- QUEST OCR/OCV accurately reads codes within acceptable production variations in character height, width, slant, line thickness and blurriness
- Adaptable to complex geometry of can bottoms or bottle shapes
- Installed after the inkjet coder, F270 verifies correct codes (up to 15 characters) at 1600 cans per minute and ensures print quality of code characters
- Available as an inspection option built into Omron's Printer Control System for high-speed canning systems
- Fault output immediately alerts operator so corrective action can be taken
- Trend monitor function and stored fault images provide the basis for scheduling maintenance and optimizing machine performance



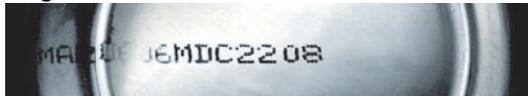
### Coding Issues Identified by F270

No good



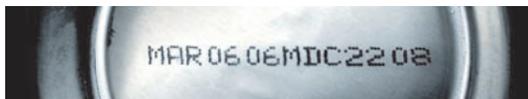
Incorrect product code entered manually.

No good



Partial, out-of-position product code.

Good



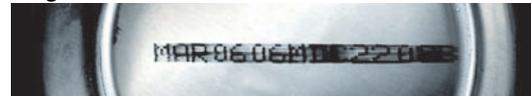
Product code is present, completely legible, and matches inspection model.

No good



Unacceptable slant in printed code.

No good



Smeared product code is illegible.

## Specifications

### Controllers

Vision controller models	F270-C10, F270-C15
Camera connected	F160-S2, F160-SLC20, F160-SLC50
Number of cameras connectable	Up to 4
Processing resolution	512 H x 484 V
Number of scenes	32; can be increased using optional memory cards
Image storage function	35 images max.
Image filtering	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Operation and settings	Measurement items installed using Applications Software Menu operations used to combine and set measurement items
Operation customization functions	Password setting, shortcut keys
Screen customization functions	Display items: Character string (measurement values, judgment results, times, user-specified characters, measurement region names), Figures (lines, boxes, circles, cross cursors) Specified parameters: display color, position and size

## Controllers (Continued)

Vision controller models	F270-C10, F270-C15
Mode selection	Select one-line high-speed mode, random trigger mode, or non-stop adjustment mode from the Setup Menu.
Trend monitor	Function supported
Serial communications	RS-232C/RS-422: 1 channel
Network communications	Ethernet; 10 Base-T: 1 channel
Parallel I/O	21 inputs, 46 outputs
Strobe interface	4 channels (included in parallel outputs)
Monitor interface	Composite video output: 1 channel S-Video output: 1 channel
Memory card interface	Compact Flash card slot, 2 channels
Power supply voltage	20.4 to 26.4 VDC
Current consumption	3.7 A max. (with four F160-SLC50 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	81 H x 270 W x 197 D mm (without connectors and other protrusions)
Weight	Approx. 4.0 kg (controller only)

## Cameras

Camera model	F160-S2	F160-SLC20	F160-SLC50
Description	Double speed camera, no lens	Double speed camera with intelligent lighting	Double speed camera with intelligent lighting
Power supply	13 VDC		
Current consumption	130 mA max.	260 mA max.	310 mA max.
Imaging device	1/3" interline CCD (reading all pixels)		
Effective pixels	659 H x 494 V		
Shutter	Electronic shutter: 1/120 s, 1/200 s, 1/500 s, 1/1,000 s, 1/2,000 s, 1/4,000 s, 1/8,000 s, 1/20,000 s shutter speeds, change via menu		
Lens mounting	C mount		
Lens type	Lens ordered separately	Fixed focal point, fixed iris (supplied)	Fixed focal point, fixed iris (supplied)
Partial scan function	Frame capture mode: 16 partial scan settings from 484 to 12 lines Field capture mode: 9 partial scan settings from 484 to 24 lines	Not available	Not available
Brightness	—	F2.8	F2.8
Focal point distance		13 mm	6.1 mm
Built-in light source		Red and green LED combination (Peak emission wavelengths: 660 nm and 570 nm)	
Mounting distance	Depends on lens being used	15 to 25 mm	16.5 to 26.5 mm
Field of vision		20 x 20 mm	50 x 50 mm
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation		
Storage ambient	-25 to 60 C with 35% to 85% RH with no condensation		
Dimensions	40 H x 31 W x 54.5 D mm (without connections)	70 H x 70 W x 119.5 D mm (without connections)	90 H x 90 W x 126.5 D mm (without connections)
Weight	Approx. 85 g	Approx. 285 g	Approx. 375 g

## Monitor

Monitor model	F150-M05L
Display size	5.5 inches
Type	LCD TFT
Resolution	320 x 240
Brightness	250 cd/m
Input signal	NTSC composite video (1.0 V/75 Ω termination)
Power supply voltage	21.6 to 27.6 VDC
Current consumption	700 mA or less
Operating ambient	0 to 50 C, 35% to 85% RH
Storage ambient	-25 to 65 C, 35% to 85% RH
Dimensions	143 H x 185 W x 42.2 D mm
Weight	Approx. 1 kg

# Vision Sensors F500



## High-Resolution, Network-Ready Digital Vision Sensor

The F500-ETN Digital Vision System supports quality control traceability and communications with Ethernet connectivity. Optional Vision Composer Net software allows remote configuration and maintenance of a vision network from a central PC. For documentation or later audits, the system provides tools for logging images and results for later analysis.

- Inspect high-value and high-liability products with 1-million pixel resolution and accurate digital image conversion
- Two digital camera ports, high resolution 1 K x 1 K
- Advanced real time data logging and storage functions
- Large onboard image and measurement data storage capacity (at least 200 images) supports more informative quality control reports with images
- Dedicated communications processor ensures the inspection process is never slowed or interrupted during remote data access
- 10/100 Base TX Ethernet Port, USB, RS-232C/RS-422, 33 digital I/O
- Off-load images to your local server at any time
- Security tools, audit trail creation for security sensitive environments



- Omron can design and deliver a ready-to-install inspection station that combines HMI, PLC and motion control for a complete automation solution

## F500 System Ordering Information

Description	Comments	Dimensions	Model
Controllers	NPN input/output with Ethernet	198 H x 100 W x 134 D mm	F500-C10-ETN
	PNP input/output with Ethernet		F500-C15-ETN
Camera	1 mega pixel resolution	70 H x 70 W x 119.5 D mm	F500-S1
Color LCD Monitor	10.4 inch TFT, 640 x 480 resolution	225 H x 285 W x 49 D mm	F500-M10L
Teaching console	Ergonomic keypad with shortcut buttons	135.5 H x 48 W x 29.7 D mm	F160-KP
Memory cards	Compact Flash Memory card, 64 MB	—	F160-N64S(S)
	Compact Flash Memory Card, 128 MB		F160-N128S
	Compact Flash Memory Card, 256 MB		F160-N256S
Application software	Flow Menu format for basic operations	—	F500-UM3FE
	Flow Menu format for basic operations plus Macro Function		F500-UM3ME
Networking software	Vision Composer Net Software	—	F500-CD3E
F500 Camera lenses	F500 16 mm Lens	—	F500-LE16
	F500 25 mm Lens		F500-LE25
	F500 50 mm Lens		F500-LE50
Camera cables	Set includes Power and Video Link cables	Cable length: 2 m	F500-VS 2M
		Cable length: 5 m	F500-VS 5M
		Cable length: 10 m	F500-VS 10M
Monitor cable	Connects monitor to controller	Cable length: 2 m	F150-VM 2M
Parallel cable	Loose-wire cable for parallel I/O connectors	—	F160-VP

## Lenses and Lighting

Omron vision specialists can recommend lenses and lighting to help you create a complete vision solution.

## High Resolution, High Precision Inspection Applications

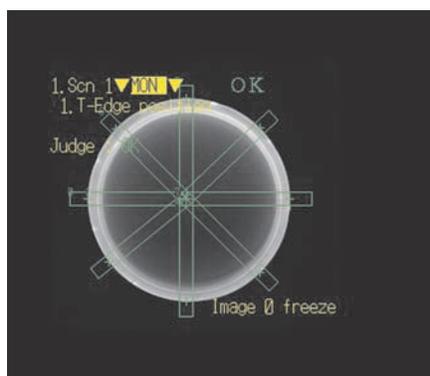
### Beverage and Pharmaceutical Packaging

Inspect PET bottles for critical dimensions to ensure proper cap fitting.



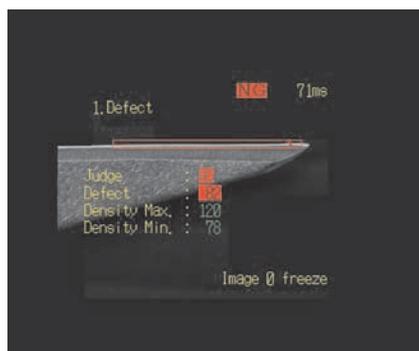
### Beverage and Pharmaceutical Packaging

Measure plastic bottle caps for external roundness and internal ovality to ensure proper fit and seal integrity of each cap shipped to bottling customers.



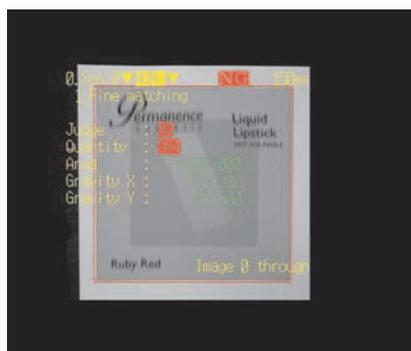
### Medical Device Manufacturing

Inspect scalpel surfaces for burrs and other defects that could cause unexpected injuries to ensure 100% acceptable product reaches users.



### Printing and Packaging

Detect smudging and other printing defects on sample cards or point-of-sale displays.



## Specifications

### Controllers

Vision controller models	F500-C10-ETN/F500-C15-ETN
Camera connected	F500-S1 1 megapixel camera
No. of cameras connectable	Up to 2
Processing resolution	1024 H x 1024 V
No. of scenes	32; can be increased using optional memory cards
Image memory function	35 images max.
Data storage on-board	256 MB non-volatile memory
Operation customization functions	Menu masking, password setting, shortcut keys
Serial communications	USB series B: 1 channel; RS-232C/RS-422: 1 channel
Network communications	Ethernet; 100 Base-TX/10 Base-T: 1 channel
Parallel I/O	11 inputs, 22 outputs
Monitor interface	Composite video output: 1 channel S-Video output: 1 channel
Memory Card interface	Compact Flash card slot, 1 channel
Power supply voltage	20.4 to 26.4 VDC
Current consumption	2.1 A max. (with two F500-S1 Cameras connected)
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 65 C, 35% to 85% RH with no condensation
Dimensions	198 H x 100 W x 134 D mm (without connectors and other protrusions)
Weight	Approx. 1.6 kg (controller only)

## Cameras

Camera model	F500-S1
Description	Double speed camera, no lens
Power supply	13 VDC
Current consumption	130 mA max.
Imaging device	2/3" interline CCD (reading all pixels)
Pixel size	6.45 μm (H) x 6.45 μm (W)
Shutter	Electronic shutter, 10 shutter speeds (1/24 to 1/10,000 s), changed via menu
Lens mounting	C mount
Lens type	Lens ordered separately
Partial scan function	4 partial scan settings
Mounting distance	Depends on lens being used
Field of vision	Depends on lens being used
Operating ambient	0 to 50 C, 35% to 85% RH with no condensation
Storage ambient	-25 to 60 C with 35% to 85% RH with no condensation
Dimensions	40 H x 50 W x 90 D mm (without connections)
Weight	Approx. 270 g

## Monitor

Monitor model	F500-M10L
Display size	10.4 inches
Type	LCD TFT
Resolution	640 x 480
Brightness	350 cd/m (typical)
Input signal	NTSC composite video (1.0 V/75 Ω termination), S-Video
Power supply voltage	20.4 to 26.4 VDC
Current consumption	1.0 A max.
Operating ambient	0 to 50 C, 30% to 80% RH
Storage ambient	-20 to 65 C, 30% to 80% RH
Dimensions	225 H x 285 W x 49 D mm
Weight	Approx. 1.8 kg

## Vision Composer Net Software System Requirements

Software model	F500-CD3E Vision Composer Net
CPU	Pentium III 600 MHz min. (Pentium III 1 GHz min. recommended)
OS	Windows 2000 Professional, Service Pack 4 or higher Windows XP Home Edition, Service Pack 2 or higher Windows XP Professional, Service Pack 2 or higher
Memory	192 MB min. (256 MB min. recommended)
Hard disk	300 MB min. available space
Monitor	Resolution: 1,024 x 768 min. Display colors: 16-bit High Color min.; (32-bit True Color min. recommended)
Network	10 BaseT-compliant network (100 Base-TX recommended)
Omron Vision applications software	F500-UM Version 3.00 or later

# Machine Vision Sensors FZ2



## “Real Color” Vision Sensor FZ2 Series

- Mega ARCS Engine — Advanced & stable sensing by "Real Color" technology. Sensing technology being close to the human eye, advanced & stable inspection/measurement by processing color information
- 80-fps ultra high-speed input, 300K-pixel camera high-speed recording at 80 fps-faster than conventional cameras
- 2-million pixel high-speed camera, image capture speed of 30 fps (33.3 ms)
- "Intelligent Camera" providing optimum lighting & optics in one integrated package. All-in-one camera with zoom-lens and pattern lighting, "Auto-focus" & "Auto-iris" contributing to reduction of process setup time (Auto-focus camera with illumination) patent pending
- New "Windows-like GUI" menu structure. "Easy-to-follow" operation structure by focusing on overview menu, testing (trial) and remote adjustment by "Simulation" software



## FZ2 System Ordering Information

Description	Comments	Dimensions	Model
Controllers (See note 7)	LCD-HMI built-in type, 2-camera, NPN	260 H x 308 W x 83 D	FZ2-300
	LCD-HMI built-in type, 2-camera, PNP		FZ2-305
	High-speed LCD-HMI built-in type, 2-camera, NPN		FZ2-500
	High-speed LCD-HMI built-in type, 2-camera, PNP		FZ2-505
	LCD-HMI built-in type, 4-camera, NPN	260 H x 308 W x 104 D	FZ2-300-10
	LCD-HMI built-in type, 4-camera, PNP		FZ2-305-10
	High-speed LCD-HMI built-in type, 4-camera, NPN		FZ2-500-10
	High-speed LCD-HMI built-in type, 4-camera, PNP		FZ2-505-10
	Book Shelf-type, 2-camera, NPN	190 H x 90 W x 165 D	FZ2-350
	Book Shelf-type, 2-camera, PNP		FZ2-355
	High-speed Book Shelf-type, 4-camera, NPN		FZ2-550
	High-speed Book Shelf-type, 4-camera, PNP		FZ2-555
	Book Shelf-type, 4-camera, NPN		FZ2-350-10
	Book Shelf-type, 4-camera, PNP		FZ2-355-10
	High-speed Book Shelf-type, 4-camera, NPN		FZ2-550-10
	High-speed Book Shelf-type, 4-camera, PNP		FZ2-555-10
Intelligent digital color cameras, intelligent lighting	Wide field of view	100 H x 100 W x 146.7 D mm (without connections)	FZ-SLC100
	Narrow field of view	95 H x 90 W x 151.7 D (without connections)	FZ-SLC15
Autofocus digital color cameras	Wide field of view	93 H x 72.2 W x 134 D (without connections)	FZ-SZC15
	Narrow field of view		FZ-SZC100

Description	Comments	Dimensions	Model
Digital camera, no lens (without connections)	Color - 300K pixel 1/3" interline CCD (reading all pixels)	28 H x 28 W x 46.3 D mm (without connections)	FZ-SC
	Color - 2-mega pixel 1 1/8" interline CCD (reading all pixels) (See note 1)	28 H x 28 W x 53.5 D mm (without connections)	FZ-SC2M
	Monochrome - 300K pixel 1/3" interline CCD (reading all pixels)	28 H x 28 W x 46.3 D mm (without connections)	FZ-S
	Monochrome - 2-meg pixel 1 1/8" interline CCD (reading all pixels) (See note 1)	28 H x 28 W x 53.5 D mm (without connections)	FZ-S2M
Digital monochrome camera, no lens (without connections)	1/3" interline CCD (reading all pixels)	28 H x 28 W x 46.3 D mm (without connections)	FZ-S
Camera cable	Standard camera cable	Cable length: 2 m, 5 m, 10 m (See note 2)	FZ-VS
	High-flex camera cable (5 m)	Cable length: 2 m, 5 m, 10 m (See note 3)	FZ-VSB
	Right-angle camera cable (See note 5)	Cable length: 2 m, 5 m, 10 m (See note 2)	FZ-VSL
	Long-distance camera cable	Cable length: 15 m (See note 4)	FZ-VS2
	Long-distance right-angle camera cable (See note 5)	Cable length: 15 m (See note 4)	FZ-VSL2
Cable extension unit	Up to two extension units and three cables can be connected. (Maximum cable length: 45 m (See note 6))		FZ-VSJ
Monitor cable	Monitor cable	Cable length: 2 m, 5 m	FZ-VM
Parallel cable	Parallel cable	Cable length: 2 m, 5 m	FZ-VP
Peripheral devices	Diffusion plate for intelligent cameras (FZ-SLC)	Narrow field of vision	FZ-SLC15-DL
		Wide field of vision	FZ-SLC100-DL
	Color LCD monitor	8.4" TFT-LCD monitor, VGA input, 24 VDC	FZ-M08
	Memory card	USB memory, 1 GB	FZ-MEM1G
	VESA attachment, adjustable arm mount	For installing LCD integrated type controller	FZ-VESA
	Desktop stand		FZ-DS
	Mouse (optical)	Recommended products: Microsoft Corporation U81 Series Compact Optical Mouse	—
Lenses	High-resolution, low-distortion lenses	Only for 2-million pixel cameras	FZ-LEH5 FZ-LEH8 FZ-LEH12 FZ-LEH16 FZ-LEH25 FZ-LEH35 FZ-LEH50 FZ-LEH75 FZ-LEH100
	CCTV lenses	Standard cameras	3Z4S-LE Series
External lighting		—	3Z4S-LT Series
Strobe controller	Required to control external lighting from a FZ-Series Vision Sensor Controller	Manufactured by MORITEX Corporation	3Z4S-LT MLEK-C100E1TS 2

- Note:**
1. The FZ-SC2M/FZ-S2M camera can be connected only to a FZ2-5□□/FZ2-5□□-10 controller.
  2. The 10-m cable cannot be connected to the FZ-SLC□□□□ or FZ-SZC□□□□ cameras.
  3. The 10-m cable cannot be connected to the FZ-S□2M, FZ-SLC□□□□, or FZ-SZC□□□□ cameras.
  4. The 15-m cable cannot be connected to the FZ-SLC□□□□ or FZ-SZC□□□□ cameras.
  5. This cable has an L-shaped connector on the camera end.
  6. The maximum cable length depends on the camera being connected, and the model and length of the cable being used.
  7. These controllers do not support 3-D vision measurements, refer to FZD section.

## High-resolution, Low-distortion Lenses

Lens Model	Dimensions	Focal length	Brightness	Filter size
FZ-LEH5	42 mm dia x 38.7 mm (L)	5 mm	F2.8	M40.5 P0.5
FZ-LEH8	34 mm dia x 41.6 mm (L)	8 mm	F1.4	M27.0 P0.5
FZ-LEH12	34 mm dia x 37.0 mm (L)	12.5 mm	F1.4	M27.0 P0.5
FZ-LEH16	34 mm dia x 36.5 mm (L)	16 mm	F1.4	M27.0 P0.5
FZ-LEH25	33 mm dia x 39.5 mm (L)	25 mm	F1.4	M27.0 P0.5
FZ-LEH35	34 mm dia x 36.5 mm (L)	35 mm	F2.0	M27.0 P0.5
FZ-LEH50	34 mm dia x 55.0 mm (L)	50 mm	F2.8	M27.0 P0.5
FZ-LEH75	36 mm dia x 51.0 mm (L)	75 mm	F2.5	M34.0 P0.5
FZ-LEH100	42 mm dia x 70.0 mm (L)	100 mm	F2.8	M40.5 P0.5

**Note:** The 5-mm Extension Tube (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

## CCTV Lens

Model	3Z4S-LE ML-0614	3Z4S-LE ML-0813	3Z4S-LE ML-1214	3Z4S-LE ML-1614	3Z4S-LE ML-2514	3Z4S-LE ML-3519	3Z4S-LE ML-5018	3Z4S-LE ML-7527	3Z4S-LE ML-10035
Appearance									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.3	F1.4	F1.4	F1.4	F1.9	F1.8	F2.7	F3.5
Filter size	M27 P0.5	M25 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5

## Extension tubes

Model	Contents
3Z4S-LE ML-EXR	Thickness: 40 mm 20 mm 10 mm 5 mm 2.0 mm 1.0 mm 0.5 mm  Set of 7 tubes Maximum outer diameter: 30 mm dia.

**Note:** Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm Extension Tube are used together. Reinforcement may be required for combinations of Extension Tubes exceeding 30 mm if the Camera is subject to vibration.

# Specifications

## Controllers

Controller models		NPN output	FZ2-300	FZ2-300-10	FZ2-500	FZ2-500-10	FZ2-350	FZ2-350-10	FZ2-550	FZ2-550-10		
		PNP output	FZ2-305	FZ2-305-10	FZ2-505	FZ2-500-10	FZ2-355	FZ2-355-10	FZ2-555	FZ2-555-10		
Camera connected		FZ-S, FZ-SC, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100		FZ-S, FZ-SC, FZ-SC2M, FZ-S2M, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100		FZ-S, FZ-SC, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100		FZ-S, FZ-SC, FZ-SLC15, FZ-SLC100, FZ-SZC15, FZ-SZC100				
Number of cameras		2      4		2      4		2      4		2      4				
Processing resolution		640 x 480 (H x V)		640 x 480 (H x V) 1600 x 1200 (H x V) (See note 1)		640 x 480 (H x V)		640 x 480 (H x V) 1600 x 1200 (H x V) (See note 1)				
Number of scenes		32										
Number of logged images (See note 2)	Connect- ed to a FZ-SC Camera	Connected to 1 camera	71		243		71		243			
		Connected to 2 cameras	35 x 2		121 x 2		35 x 2		121 x 2			
		Connected to 4 cameras	18 x 4		60 x 4		18 x 4		60 x 4			
	Connect- ed to a FZ-SC2M Camera	Connected to 1 camera	—		39		—		39			
		Connected to 2 cameras	—		19 x 2		—		19 x 2			
		Connected to 4 cameras	—		9 x 4		—		9 x 4			
Operation		Touch pen, mouse, etc.					Mouse or similar pointing device					
Settings		Create series of processing steps by editing the flowchart (help messages provided)										
Operation customization functions		Online edit functions, simulation software										
Screen customization functions		Text and graphic objects; Time, Text, Processing item names, Measurement values										
Trend monitor		Upper judgment limit, Lower judgment limit, Alarm range upper, Alarm range lower										
Serial communications		RS-232C/422A; 1 channel										
Network communications		Ethernet 100 Base-TX/10 Base-T										
Parallel I/O		11 inputs (RESET, STEP, DSA, and DI 0 to 7), 26 outputs (RUN, BUSY, GATE, OR, READY, ERROR, STGOUT 0 to 3, and DO 0 to 15)										
Monitor interface		Integrated controller and LCD HMI, 12.1" TFT color LCD, resolution: XGA 1,024 x 768 dip					Analog RGB video output, 1-channel					
USB Memory Interface		4-channels (supports USB 1.1 and 2.0)										
Power supply voltage		20.4 to 26.4 VDC										
Current consumption	Connected to FZ-SC□	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	
	Connected to FZ-S□C□□□□	5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 A max.	7.5 A max.	5 A max.	7.5 A max.	
	Connected to FZ-S□2M	—		3.7 A max.	4.9 A max.	—		3.7 A max.	4.9 A max.			
Ambient temperature range		Operating: 0 to 45 C, 0 to 50 C (See note 3), Storage: -20 to 65 C (with no icing or condensation)										
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)										
Weight (Approx.)		3.2 kg	3.4 kg	3.2 kg	3.4 kg	1.8 kg	1.9 kg	1.8 kg	1.9 kg			
Accessories		Touch pen (one, inside the front panel), Please Read First, Instruction Manual (Setup), 6 mounting brackets					Please read first, Instruction Manual (Setup)					

- Note:**
1. Connected to a 2-million pixel Camera.
  2. The number of logged images will vary when connecting multiple Cameras with different models.
  3. The operating mode can be switched from the Controller Menu settings.

## Cameras

	FZ-SLC100	FZ-SLC15	FZ-SZC100	FZ-SZC15	FZ-S	FZ-SC	FZ-S2M	FZ-SC2M
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements						Interline transfer reading all pixels, 1/1.8-inch CCD image elements	
Color/Monochrome	Color				Mono-chrome	Color	Monochrome	Color
Effective pixels	640 x 480 (H x V)						1600 x 1200 (H x V)	
Pixel size	7.4 x 7.4 μm						4.4 x 4.4 μm	
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s							
Partial function	12 to 480 lines						12 to 1200 lines	
Frame rate (image read time)	80 fps (12.5 ms)						30 fps (33.3 ms)	
Visual field	13 to 100 mm (See note 1)	2.9 to 14.9 mm (See note 1)	13 to 100 mm (See note 1)	2.9 to 14.9 mm (See note 1 and 2)	Select a lens according to the visual field and installation distance.			
Installation distance	70 to 190 mm (See note 1)	35 to 55 mm (See note 1)	77.5 to 197.5 mm (See note 1)	47.5 to 67.5 mm				
LED class (See note 3) (lighting)	Class 2		—					
Ambient temperature range	Operating: 0 to 50°C, Storage: -25 to 60°C (with no icing or condensation)						Operating: 0 to 40° Storage: -25 to 65°C (with no icing or condensation)	
Ambient humidity range	Operating and storage: 35% to 85% (with no icing or condensation)							
Weight	Approx. 670 g	Approx. 700 g	Approx. 500 g		Approx. 55 g		Approx. 76 g	
Accessories	Instruction Sheet and hexagonal wrench				Instruction Sheet			

**Note:** 1. Tolerance: ±5% max.

2. The length of the visual field is the lengths along the Y axis.

3. Applicable standards: IEC 60825-1: 1993 + A1: 1997 + A2: 2001, EN 60825-1: 1994 + A1: 2002 + A2: 2001.

## Monitor

Monitor model	FZ-M08
Display size	8.4 inches
Type	Liquid crystal color TFT
Resolution	1,024 × 768 dots
Input signal	Analog RGB video input, 1 channel
Power supply voltage	21.6 to 26.4 VDC
Current consumption	Approx. 0.7 A max.
Ambient temperature range	Operating: 0 to 50°C, storage: -20 to 60°C (with no icing or condensation)
Ambient humidity range	Operating and storage: 20% to 85% (with no icing or condensation)
Weight	Approx. 1.2 kg
Accessories	Instruction Sheet and 4 mounting brackets

## Camera Cable Extension Units

	FZ-VSJ
Power supply voltage (See note 1)	11.5 to 13.5 VDC
Current consumption (See note 2)	1.5 A max.
Ambient temperature range	Operating: 0 to 50°C, Storage: -25 to 60°C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
Maximum Units connectable	2 units per Camera
Weight	Approx. 240 g
Accessories	Instruction Sheet and 4 mounting screws

**Note:** 1. A power supply must be connected to the Strobe Controller and Camera when connecting a FZ-SLC100/SLC15/SZC100/SZC15 and using a Strobe Controller (3Z4S-LT MLEK-C100E1TS2).

2. The current consumption is when every Camera and Strobe Controller is connected to a power supply.

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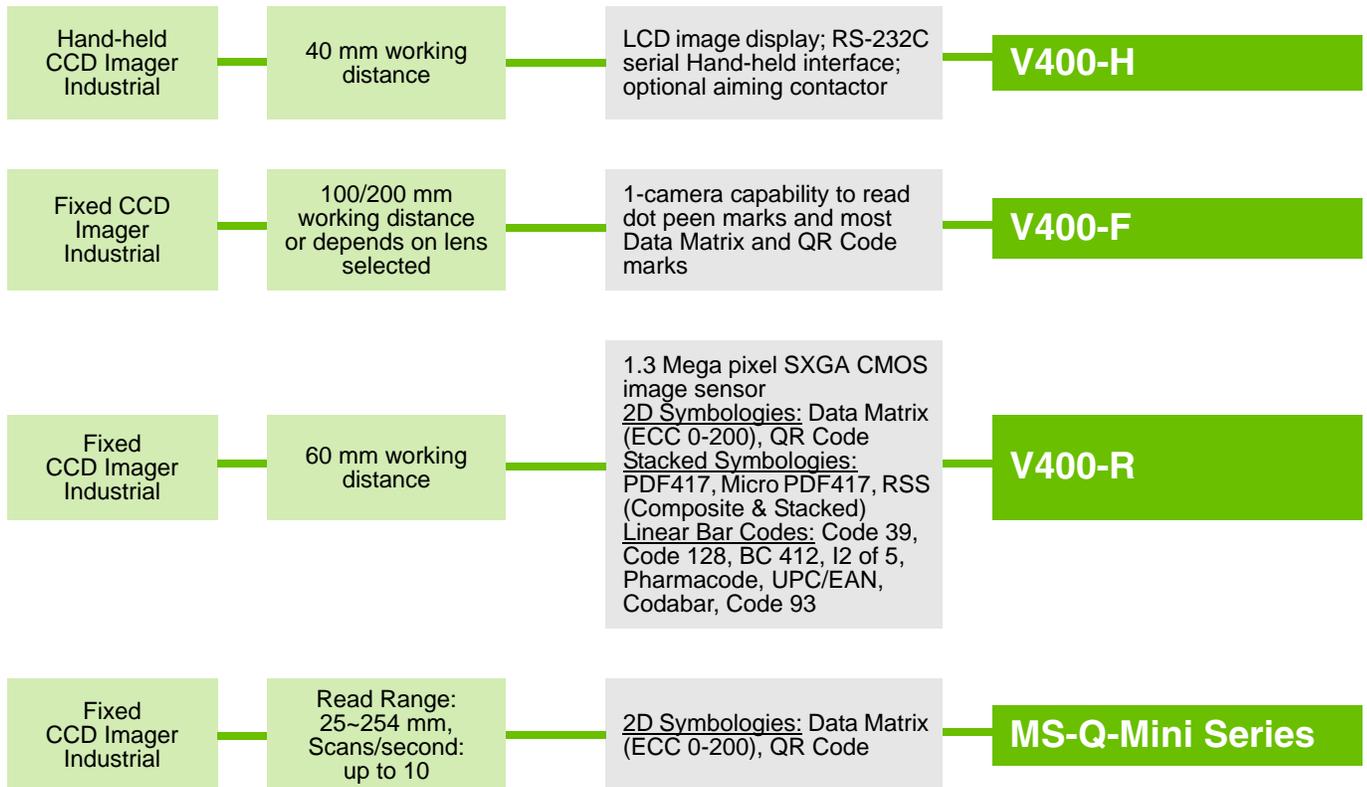
## Selection Guide

### Linear Code Readers

Fixed CCD Scan Engine	Read Range: 17.7~345.4 mm, Scans/second: up to 220	<u>Linear Bar Codes:</u> UPC (E&A), EAN, Code 39, Code 128, UCC EAN 128, Interleaved, Industrial and Standard 2 of 5, Codabar, Code 93, MSI, Plessey, GS1 Databar (RSS)	<b>MS2 Series</b>
Fixed Laser Scan Engine	Read Range: 51~254 mm, Scans/second: up to 1000	<u>Linear Bar Codes:</u> Code 93, Code 39, Code 128, Codabar, Pharmacode, Interleaved 2 of 5, UPC/EAN, PDF417 (option)	<b>MS-3 Series</b>
Fixed Laser Industrial (Horizontal)	Read Range: 25~762 mm, Scans/second: up to 1100	<u>Linear Bar Codes:</u> PDF417, Codabar, Code 128, UPC/EAN, Code 39, Code 93, Interleaved 2 of 5, Pharmacode (option)	<b>MS-820 Series</b>
Fixed Laser Industrial (Vertical)	Read Range: 25~762 mm, Scans/second: up to 1200	<u>Linear Bar Codes:</u> Code 128, Code 39, Code 93, Codabar, RSS (Composite), Interleaved 2 of 5, UPC/EAN, PDF417, Micro PDF, and Pharmacode	<b>MS-860 Series</b>
Fixed CCD Imager Industrial	Read Range: 25~254 mm, Scans/second: up to 10	<u>2D Symbologies:</u> Data Matrix (ECC 0-200), QR Code <u>Stacked Symbologies:</u> PDF417, Micro PDF417, RSS (Composite & Stacked) <u>Linear Bar Codes:</u> Code 39, Code 128, BC 412, I2 of 5, Pharmacode, UPC/EAN, Codabar, Code 93	<b>MS-Q-Mini Series</b>
Hand-held CCD	Read Range: 25~254 mm Scans/second: up to 80	<u>Linear Bar Codes:</u> UPC/EAN, Code 39, Codabar, Interleaved 2 of 5, Code 128, and Code 93	<b>BCH5□□□ Series</b>

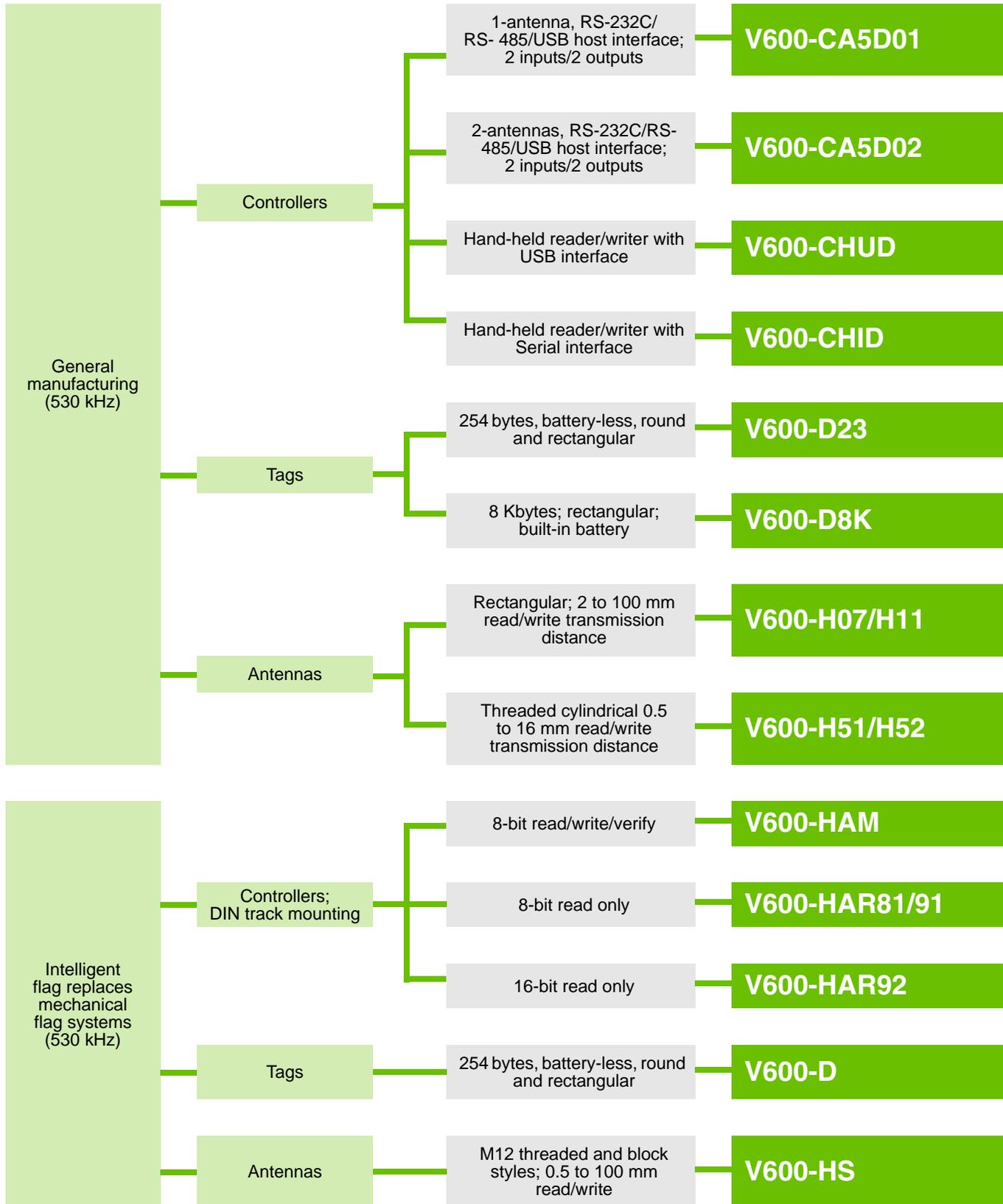
## Selection Guide

### 2-Dimensional Code Readers



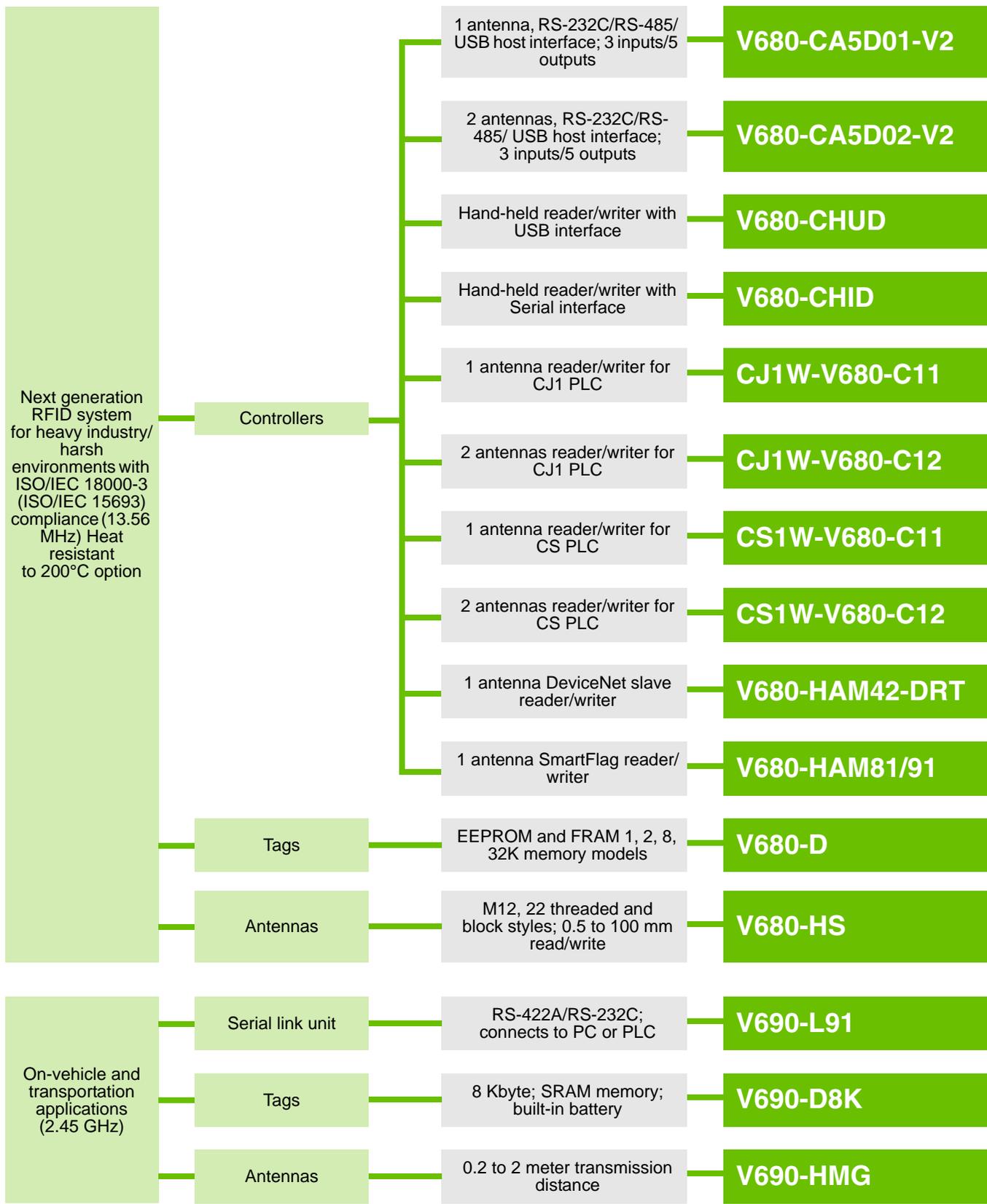
## Selection Guide

### Industrial RFID Systems



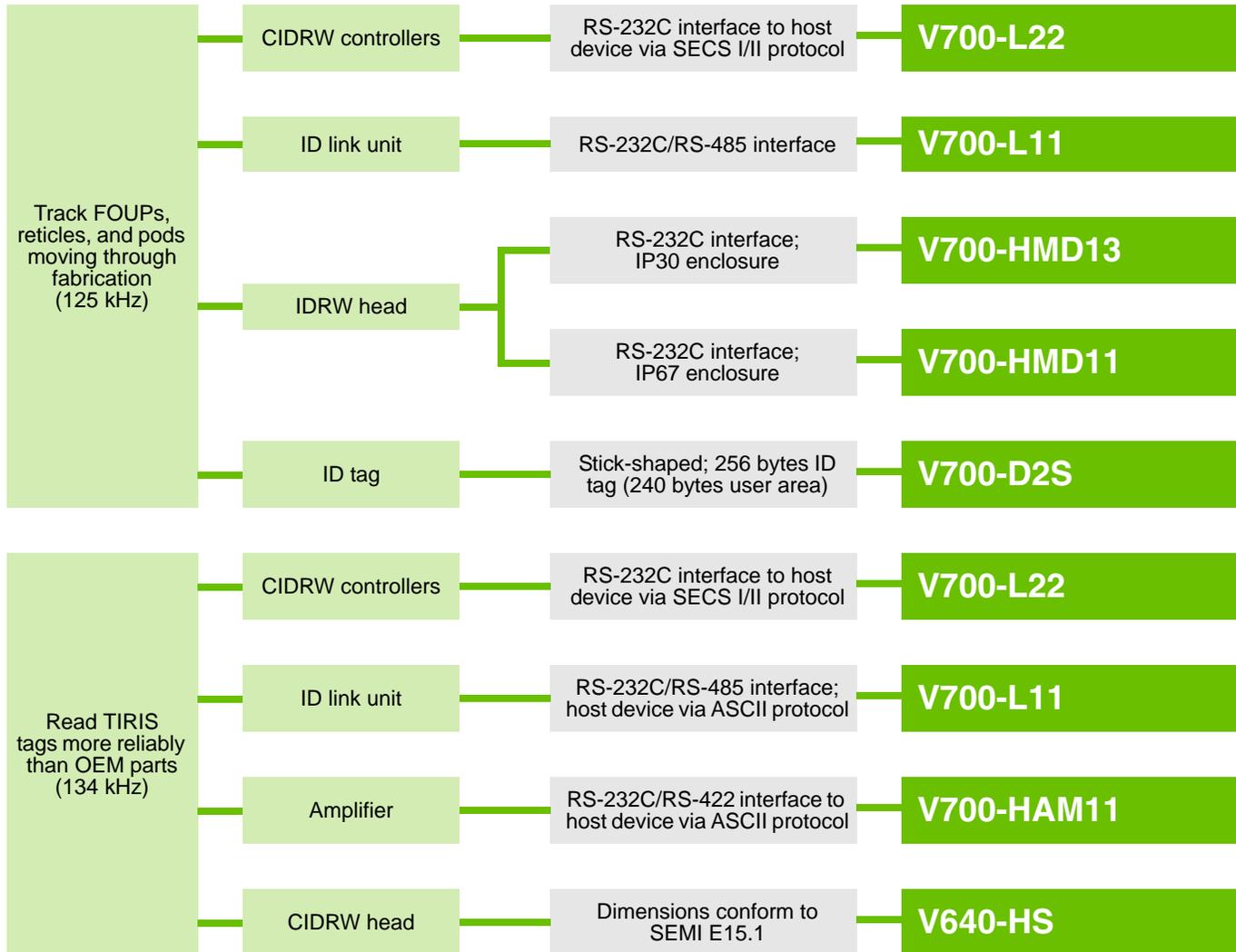
## Selection Guide

### Industrial RFID Systems (continued)



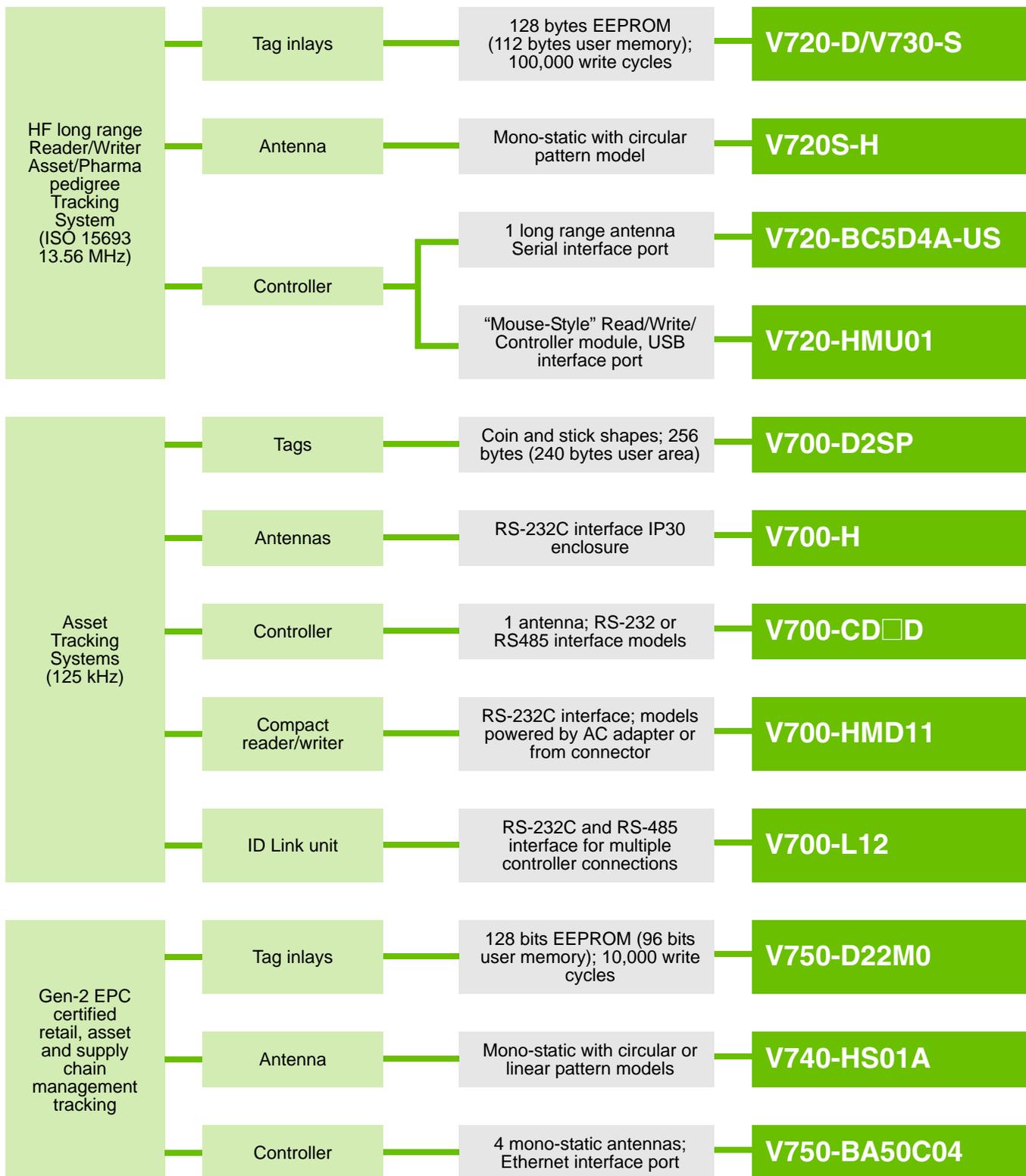
## Selection Guide

### Semiconductor Industry RFID Systems



## Selection Guide

### Supply Chain/Asset Tracking RFID Systems



## Selection Guide

## Linear Code Reader

# MS-2

Quick Link  
D222

### Ultra-Compact CCD Reader

- Scans/second: up to 220
- Read range: 0.7 to 13.6" (17.7 to 345.4 mm)
- Low 5 V power draw
- IP54 Enclosure
- Four standard versions available



The user-friendly MS-2 is a fully packaged CCD reader, offering easy integration and several configurations to meet a variety of needs. Advanced CCD technology is coupled with world class algorithms to ensure easy and accurate decoding of small, damaged or poorly printed codes. High performance and flexibility make the MS-2 the optimal embedded reader for reading difficult codes.

#### Application Examples

- Clinical instruments
- Bank ATMs
- Parking kiosks
- Point-of-sale terminals
- Robotics

#### Symbologies Supported

- Code 93
- Code 39
- Code 128
- Codabar
- Pharmacode
- Interleaved 2 of 5
- UPC/EAN
- PDF417 (option)

## Linear Code Reader

# MS-3

Quick Link  
D223

### Ultra-Compact Laser Reader

- Decodes/second: up to 1000
- Read range: 2 to 10" (51 to 254 mm)
- Wide scan angle
- IP54 Enclosure



At 1,000 decodes per second, the MS-3 Laser offers the fastest read performance in the class of embedded compact bar code scanners. The wide scan angle of 70 degrees coupled with ultra-compact size and flexible mounting make the MS-3 Laser the optimal choice for high-speed reading in OEM instruments.

High performance and flexibility are designed into virtually every aspect of the MS-3 Laser. Optics are factory-adjustable and our feature-rich firmware can be customized to satisfy almost any application. The MS-3 is well suited for any embedded bar code application where size, performance, and budget savings are core factors.

#### Application Examples

- Clinical instruments
- Bank ATMs
- Parking kiosks
- Point-of-sale terminals
- Robotics

#### Symbologies Supported

- Code 93
- Code 39
- Code 128
- Codabar
- Pharmacode
- Interleaved 2 of 5
- UPC/EAN
- PDF417 (option)

## Linear Code Reader

# MS-820

Quick Link

D224

### Industrial Bar Code Scanner

- The MS-820 scanner provides an integrated decoding solution for linear codes and PDF417 symbol
- It's easy to use and is available in multiple focal distances
- Its small size, robust reading and industrial features have established the MS-820 as the standard bar code scanner on the assembly lines of many large manufacturers
- Includes ESP® Easy Setup Program, a single-point software solution that provides quick and easy setup and advanced features
- Features Microscan's world-class decode algorithms to ensure accurate reading every time

The MS-820 scanner's capacity to read various bar code densities from 1 to 30 inches makes it the leader in the class of high-speed, fixed-mount industrial scanners. Using advanced technology in decoding, optics, and analog processing, the MS-820 can decode high density labels throughout its scan speed range. The MS-820's IP65 enclosure rating makes it ideal for applications such as conveyors, assembly lines, or embedding within machinery.



#### Symbologies

- PDF417
- Codabar
- Code 128

- UPC/EAN
- Code 39
- Code 93
- Int. 2 of 5
- Pharmacode (option)

## Linear Code Reader

# MS-860

Quick Link

D225

### Industrial Bar Code Scanner

- Decodes/second: up to 1200
- Read range: 1 to 47" (25 to 1193 mm)
- Wide scan angle
- IP65 Enclosure

The MS-860 makes reading bar codes and stacked 2D codes easy. Push-button calibration and a fully programmable feature set enable you to quickly and easily configure the scanner to meet your needs. Raster settings are programmable to read multiple symbols at different locations or at varying distances.

Easy to setup, the MS-860's push-button setup will save installers of all skill levels valuable time. Pressing the EZ button initiates the calibration process to optimize the MS-860's settings for each bar code type and setup. This maximizes performance and can be done onsite.

By combining flexible features with ease of use, the MS-860 is adaptable to a wide variety of bar code applications across multiple industries with operators of varying experience levels.



#### Symbologies

- Code 128
- Code 39
- Code 93
- Codabar

- RSS (Composite)
- Int. 2 of 5
- UPC/EAN
- PDF417
- Micro PDF
- Pharmacode

# Two-Dimensional Code Reader

# MS Quadrus™ Mini

Quick Link  
D226

## Industrial Ultra-Compact, Autofocus Mega Pixel Imager

- Decodes/second: up to 10
- Read range: 1 to 10" (25 to 254 mm)
- 1.3 megapixel processing
- Patented quadrus technology
- Autofocus
- Wide scan angle
- IP65 Enclosure



It is the ideal imager for automation engineers who need flexibility to read any code, at any distance, at any speed. Quadrus MINI reads both linear bar codes and 2D codes in any orientation, while in motion. EZ button setup, symbol locator, and visible performance indicators provide ease of use while large area reading and small form factor allow for positioning flexibility.

**Autofocus:** Position your symbol at the center of the field of view and push the EZ button for a true auto focus experience. Quadrus MINI automatically adjusts for distance to focus on the symbol and sets internal parameters to optimize reading of symbol.

**Mega Pixel Processing:** Mega Pixel processing allows for reading multiple small, high density codes or long 1D codes. Quadrus MINI can read down to 3.3 mil high density codes and can decode up to 100 symbols within the field of view in a single read capture. Three optical versions are available. Dynamic, Omni-Directional Reading: The Quadrus MINI decodes linear bar codes or 2D codes omni-directionally in moving applications at speeds up to 100 feet per minute (0.5 meters/second).

**Push-Button Setup:** The EZ button is a powerful setup feature. Three programmable positions can be used to perform tasks including: Read Rate, Autofocus/Calibration, Save for Power-on, Load New Master, Sleep Mode.

## Symbologies

### Linear Bar Codes:

- Code 39
- Code 128
- BC 412
- I2 of 5
- Pharmacode
- UPC/EAN
- Codabar
- Code 93

### 2D Symbologies:

- Data Matrix (ECC 0-200)
- QR Code

### Stacked Symbologies:

- PDF417
- Micro PDF417
- RSS (Composite & Stacked)

# Linear Code Reader

# BCH5000 Series



## Hand-Held CCD Bar Code Readers

- **High move tolerance:** The scanner will read bar codes while in motion, relative to the bar code symbol. This allows the task of scanning the symbol to become secondary to the actual work being done.
- **Anatomical design:** The compact, lightweight, and ergonomic design of the scanner makes it easy to hold and use, even for small hands. The angled shape allows for wrist neutral scanning, reducing the risk of repetitive motion injuries
- **Reads all standard bar codes:** The scanner automatically reads and discriminates UPC/EAN, Codabar, Code 39, Code 93, Code 128, and Interleaved 2 of 5. It can also read UPC/EAN with 2 or 5 digit addendum.
- **Versatile trigger options:** The two trigger switches can be used to activate the scanner, resend the last scanned data or send a one-byte ASCII message. The scanner can also operate in an auto-rigger mode.
- **Reads poor quality symbols:** The advanced circuitry and optics of the scanners allow them to read dirty and low contrast bar code symbols.
- **Maintenance free over a long life:** The totally solid state design of the BCH5000 series has no moving parts, allowing for long term reliable operation without maintenance or adjustments.
- **Single voltage operation:** All units operate on a single 5-volt power supply for compatibility with standard interface voltages.



# Two-Dimensional Code Reader

## V400-H

Quick Link  
D322

### Hand-Held 2-Dimensional Code Reader with Built-In Monitor

- Read directly marked 2-dimensional codes on metal parts, printed circuit boards, and electronic components
- Display reading results in four patterns to match your application
- Easy-to-press trigger buttons and light weight 230 g (approx. 8 oz) reduce operator fatigue
- Change settings onsite without connecting to a PC
- Equipped with both coaxial illumination and oblique illumination, reader automatically switches to match the object being read, accounting for different reflection factors
- Built-in LCD monitor confirms the position of the 2D code then displays the reading results and image
- Simplify positioning with optional detachable aiming guide
- Read data can be time stamped then stored on a commercially available SD memory card
- Connect to a 5 VDC power supply or use optional AC adapter



## Ordering Information

### Hand-Held Reader

Item	Description	Model
Hand-held 2D code reader	3 x 3 mm field of vision; RS-232C serial interface	V400-SH111-1 (See note 1)
	5 x 5 to 10 x 10 mm field of vision; RS-232C serial interface	V400-H111-1
	15 x 15 to 30 x 30 mm field of vision; RS-232C serial interface	V400-H211
Contact for positioning	Detachable aiming guide simplifies accurate positioning for high-efficiency operation	V400-AC2
Power supply	Provides 5 VDC from AC line power	S8VS-01505
AC adapter	Provides 5 VDC directly from supply 115 VAC outlet	V600-AC22

**Note: 1.** V400-SH111-1 sold as an assembled kit, consisting of; Micro code reader, contactor, and communication cable. Power converter is required, but not included.

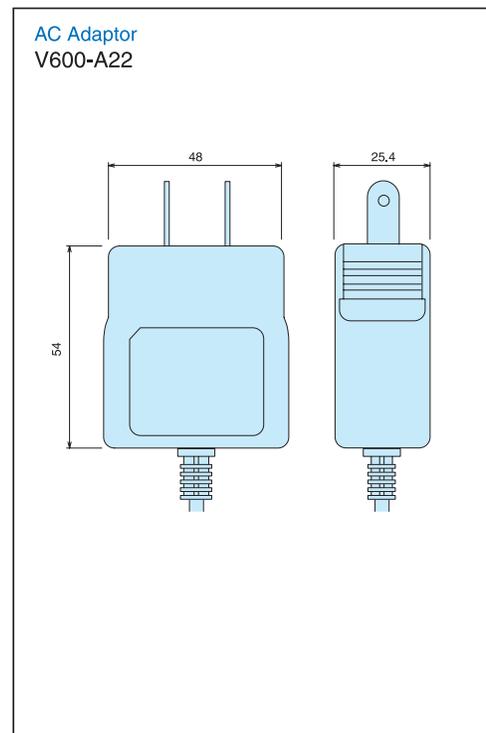
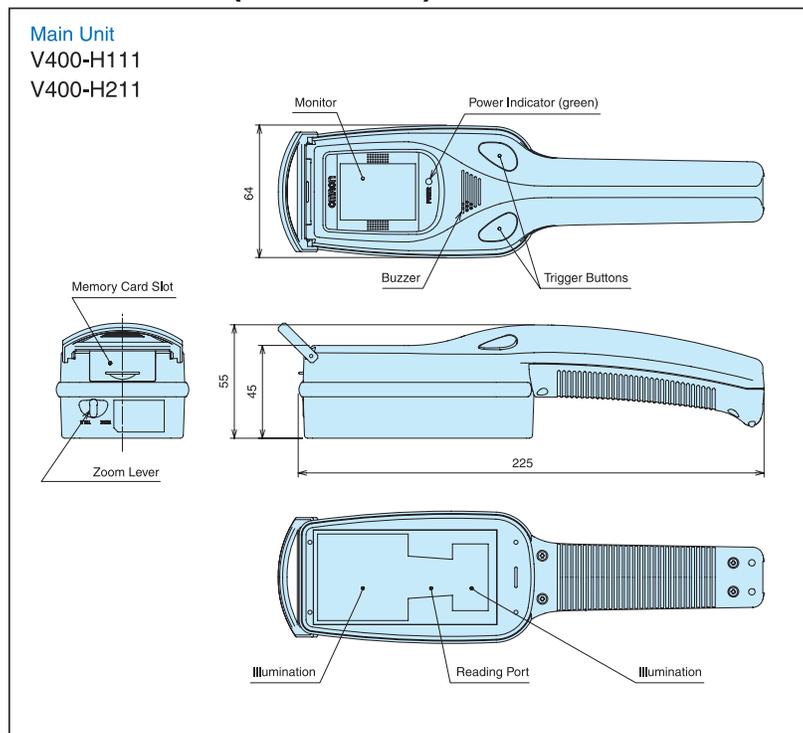
### Cables

Item	Description	Length	Model
Communications cable	For Omron PLC connection, with power cord	2 m	V400-W20-2M
		5 m	V400-W20-5M
	For PC-compatible connection, with power cord	2 m	V400-W21-2M
		5 m	V400-W21-5M
	For PC-compatible connection when using AC adapter	2 m	V400-W22-2M
		5 m	V400-W22-5M

## Specifications

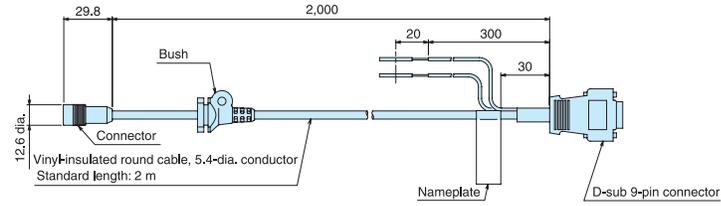
Model	V400-SH111-1	V400-H111	V400-H211
Field of vision	3 x 3 mm	5 x 5 to 10 x 10	15 x 15 to 30 x 30
Working distance	40 mm (flush when contactor is mounted)		
Power supply	5 VDC ±10%		
Current consumption	1.0 A max.		
Serial interface	RS-232C		
Applicable codes	Data Matrix, ECC200, 10 x 10 to 64 x 64, 8 x 18 to 16 x 48, QR Code (Models 1, 2), 21 x 21 to 57 x 57 (Versions 1 to 10)		
Operation method	Pressing the trigger button		
Settings	Make settings by using the manual setting window, uploading from an SD Memory Card, or by using Support Software		
Memory card	SD Memory Card		
Monitor	1.8-inch TFT LCD, displaying images and read data		
Display illumination	Operation display, memory card access		
Ambient temperature	Operation: 0° to 40°C; Storage: -25° to 60°C		
Ambient humidity	35 to 85% (with no condensation)		
Ambient conditions	No corrosive gases		
Vibration resistance	10 to 150 Hz, single amplitude 0.35 mm (50 m <sup>2</sup> /s max. acceleration)		
Shock resistance	150 m <sup>2</sup> /s in ±X, Y, and Z directions, 3 times		
Weight	Approx. 230 g		
Degree of protection	IEC 60529 IP64		
Materials	Case: ABS; optical surface: PC; display surface: PMMA		

## Dimensions (Units: mm)

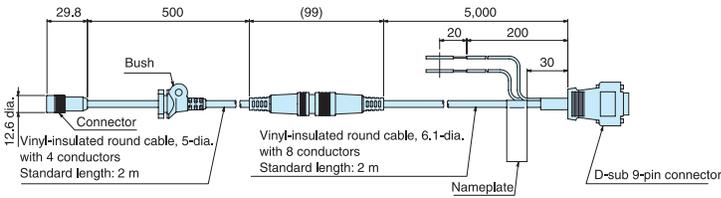


Communications Cable

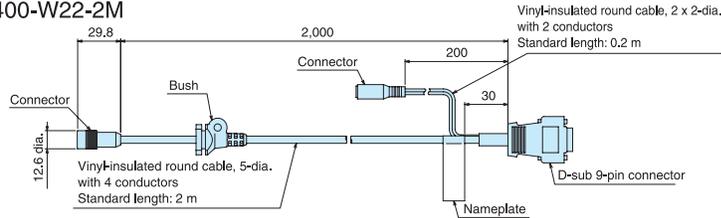
V400-W20-2M/W21-2M



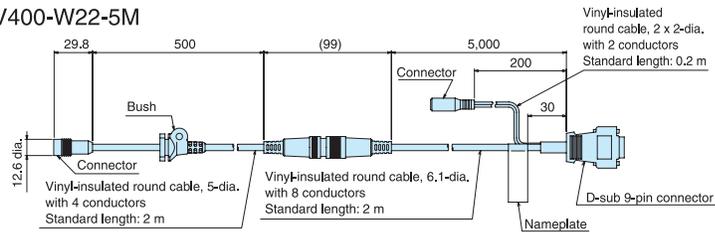
V400-W20-5M/W21-5M



V400-W22-2M

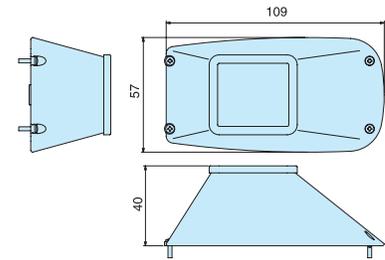


V400-W22-5M



Contactor

V400-AC2



# Two-Dimensional Code Reader

## V400-F



### Fixed Mount 2D Code Reader

- **Simpler Selection with a One-Piece Design.** The selection process is greatly simplified by the integrated lens and lighting design. No more worrying about having to match each work piece to a vast number of lens and lighting combinations.
- **Easier Initial Adjustments.** Easy, one-step teaching lets you set the reading parameters instantly. Naturally, adjustments are also possible using commands from external devices.
- **Change the Process without Stopping the Line.** The Auto Bank Change function lets the operator automatically change preset reading conditions recorded in banks. Up to five banks can be set in advance to greatly reduce bothersome steps when changing the line process.
- **Stable, Accurate Reading for any Workpiece.** We have achieved high accuracy for directly marked codes by combining the industry's most advanced reading algorithm with lighting control that is optimized for data reading. Even directly marked 2D codes printed onto materials with varying reflectivity, such as metals, printed wiring boards, and glass, can be read with excellent accuracy.



## Ordering Information

Item	Description	Field of view	Working distance	Cell size	Code size	Model
2D Code readers	Narrow field of vision	14 x 18 mm	100 mm	0.2 to 0.3 mm	2 to 9 mm	V400-F250
	Wide field of vision	31 x 42 mm	200 mm	0.4 to 0.7 mm	4 to 21 mm	V400-F350
	C-mount	Can be varied using a C-mount lens. External 2-channel lighting. (See note 2)				V400-F050

**Note:** 1. These are intended to be reference values for use in model selection.

2. For use only with Moritex MG-Wave Series lighting.

## Cables

Item	Description	Length	Model
Communications cable	For connection to SYSMAC Series PLC (includes power line)	5 m	V400-W23 (NPN)
			V400-W23P (PNP)
	For connection to an IBM PC/AT or compatible (includes power line)		V400-W24 (NPN)
			V400-W24P (PNP)
Monitor cable	NTSC signal level, video output		V400-WMO

## Monitor

Item	Description	Size	Model
LCD Monitor	Panel mount, liquid crystal color – TFT	143 H x 185 W x 42.2 D mm	F150-M05L-2D (See note)

**Note:** There is no need for an external power supply when this monitor is used. (Power is supplied from the V400-F.)

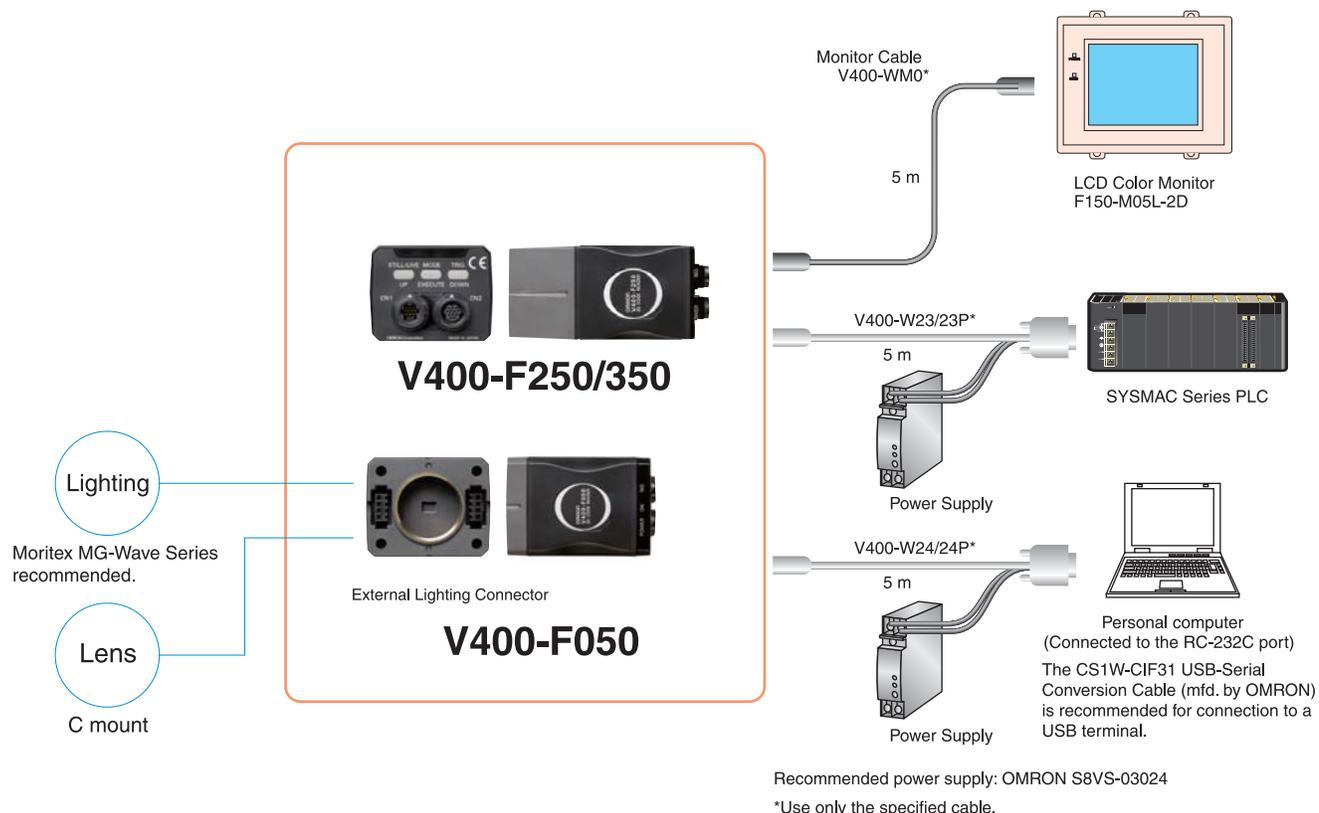
## Specifications

Model	V400-F050	V400-F250	V400-F350
Dimensions	40 x 50 x 75.3 mm	40 x 50 x 97.1 mm	
Field of vision	Depends on the lens	Approx. 14 x 18 mm	Approx. 31 x 42 mm
Working distance	Depends on the lens	Approx. 100 mm	Approx. 200 mm
Power supply	24 VDC $\pm$ 10%		
Current consumption	0.5 A max.		
Communications	RS-232C		
Image sensor	1/3" CCD		
Effective pixels	640 x 480 pixels		
Insulation resistance	20 M $\Omega$ min.		
Withstand voltage	1,000 VAC for 1 min.		
Leakage current	0.25 mA max.		
Noise resistance	Power line: 2 kVp-p, Pulse width: 50 ns, Rise time: 5 ns, Consecutive burst time: 15 ms, Cycle 300 ms		
Applicable standards	CE: EN 61326: 1997, +A1: 1998, +A2: 2001 (EMI: Class A)		
Illumination	Up to two can be directly powered	Red LED	
Ambient temperature	Operating: 0° to 45° C, Storage: -25° to 65° C		
Ambient humidity	Operating/storage: 25% to 85% (with no icing or condensation)		
Ambient conditions	No corrosive gasses		
Vibration resistance	10 to 150 Hz, 0.35 mm half-amplitude (maximum acceleration: 50 m/s <sup>2</sup> ) 10 times for 8 minutes each in 3 directions		
Shock resistance	150 m/s <sup>2</sup> 3 times each in 6 directions		
Weight	Approx. 130 g	Approx. 150 g	
Degree of protection	None	IEC 60529 IP67	
Materials			

## Monitor

Model	F150-M05L Color LCD Monitor
Size	5.5 inches; 111.36 x 83.52 mm (H x V)
Type	Liquid crystal color TFT
Resolution	320 x 240 dots
Input signals	NTSC composite video (1.0 V/75 $\Omega$ )
Power supply voltage	20.4 to 26.4 VDC
Current consumption	Approx. 700 mA
Ambient temperature	Operating: 0° to 50° C (32° to 122° F); Storage: -25° to 65° C (52° to 149° F) with no icing or condensation
Ambient humidity	Operating or storage: 35% to 85% (with no condensation)
Weight (monitor only)	Approx. 1 kg
Accessories	Instruction manual and 4 mounting brackets

## System Configuration



## V400-F Imager Resolution Table

Appearance			
Type	Narrow field of vision	Wide field of vision	C-mount
Model	V400-F250	V400-F350	V400-F050
Field of view	14 x 18 mm	31 x 42 mm	Can be varied using a C-mount lens. External 2-channel lighting. (See note 2)
Working distance	100 mm	200 mm	
Cell size (See note 1)	0.2 to 0.3 mm	0.4 to 0.7 mm	
Code size (See note 1)	2 to 9 mm	4 to 21 mm	

- Note:** 1. These are intended to be reference values for use in model selection.  
2. For use only with Moritex MG-Wave Series lighting.

# Two-Dimensional Code Reader

## V400-R

Quick Link  
D324

### Ultra-Small Linear and 2D Code Reader

- Multi-code reading that automatically recognizes major paper/label 1D and 2D codes
- 1.3 Mega pixels (SXGA) CMOS image sensor
- Aiming feature (Green LED) to quickly position the scanning area for code recognition
- Front view and Side view types available for flexible installation



## Ordering Information

### Multi-Code Imager (Scanner)

Type	Description	Image sensor type	Effective pixels	Cable length, 8-pin DIN connector	Dimensions (H x W x D mm)	Model
Imager	Side view type	CMOS	1280 x 1024	1.5 m	58 x 46 x 24.2	V400-R1CS
	Front view type					V400-R1CF

### Dedicated Cables (Order Separately)

Cable type	Cable length	Model
SYSMAC D-sub 9-pin cable	0.8 m	V509-W011
IBM PC/AT or compatible D-sub 9-pin cable		V508-W011D

### Accessories (Order Separately)

Description	Description	Model
Power supply	Switching power supply, DIN rail mount 100~240 VAC input, 5 VDC 15 W output	S8VS-01505

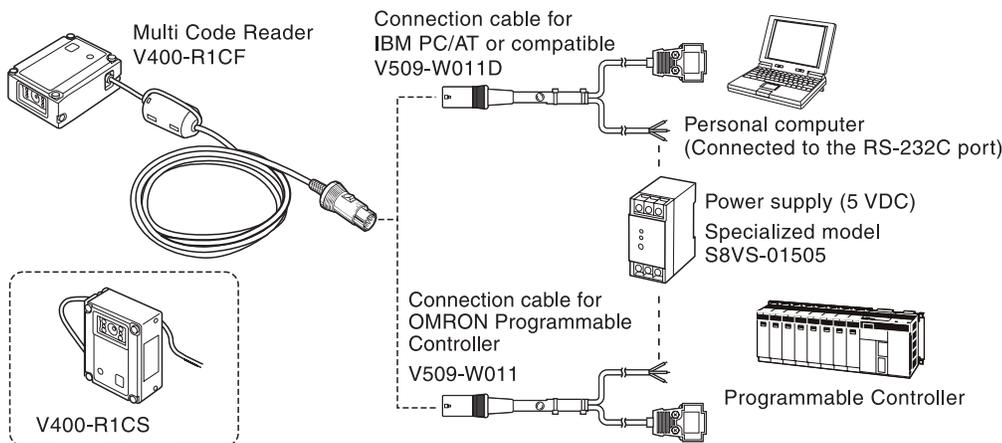
## General Specifications

Item	V400-R1CF	V400-R1CS
View direction	Front view	Side view
Applicable codes	2D code: QRCode, DataMatrix (ECC200), MicroQR, PDF417 Bar code: WPC(JAN/EAN/UPC-A/UPC-E), NW-7, ITF, STF (2 of 5 bar), Code39, Code93, Code128, RSS-14, RSS Limited, RSS Expanded	
Resolution	Bar code: 0.1 mm 2D code: 0.169 mm	
Working distance (WD)	Approx. 60 mm	
Field of vision, WD=60 mm	52 x 41 mm	
Lighting	Red LED x 4 (wavelength: 630 nm)	
Aiming guide	Green LED x 2 (wavelength: 527 nm)	
Image sensor	CMOS area sensor	
Effective pixels	1280 x 1024 pixels	
Power supply voltage	4.5 to 5.5 VDC	
Current consumption	Operation: 500 mA Standby: 300 mA	
Serial interface	RS-232C	
OK/NG outputs	NPN open collector output	
Weight	Approx. 120 g (Cables and accessories not included)	
Size	58 x 46 x 24.2 mm	
I/O connector	DIN 8-pin connector	
Cable length	Approx. 1.5 m	

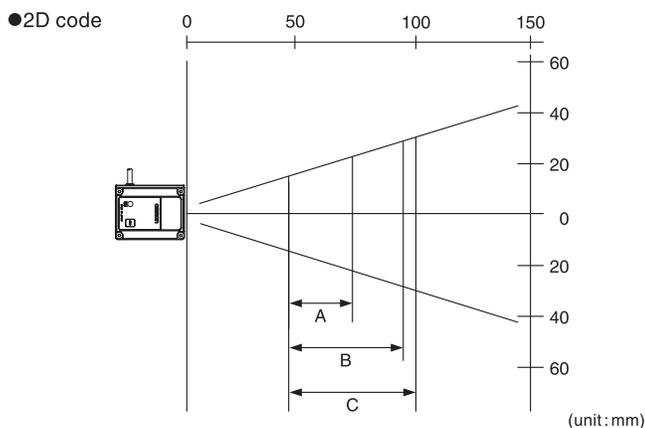
## Functional Specifications

Item	V400-R1CF/R1CS	
Function setting method	Menu sheet reading method or host command method	
Functional specifications	Reading trigger	External trigger (transistor input) Trigger by command (RS-232C) Trigger a test reading by pressing the SCAN button on the product
	OK/NG signals	OK signal is turned on to indicate a successful read OK signal is turned on to indicate a successful read of registered label NG signal is turned on to indicate a successful read of a non-registered label
	Indication LED	OK LED (green) illuminates to indicate a successful read NG LED (red) illuminates for failed reading with an error message output
	Buzzer	Notifies a successful reading with a buzzer sound (Muting available)
Environmental specifications	Ambient temperature	At operation: 0 to +45°C; At storage: 2 to +60°C
	Ambient humidity	At operation and storage: 20 to 85% RH (with no icing or condensation)
	Ambient atmosphere	No corrosive gases
	Ambient light resistance	10,000 lx (fluorescent lamp), 100,000 lx (sunlight)
	Vibration resistance	12 to 100 Hz, 19.6 m/s <sup>2</sup> (2G), 1 hour each in three directions
	Degree of protection	IP54 (IEC60529)

## System Configuration



## Scanning Area (Units: mm)



●Bar code (typical examples)

(unit: mm)

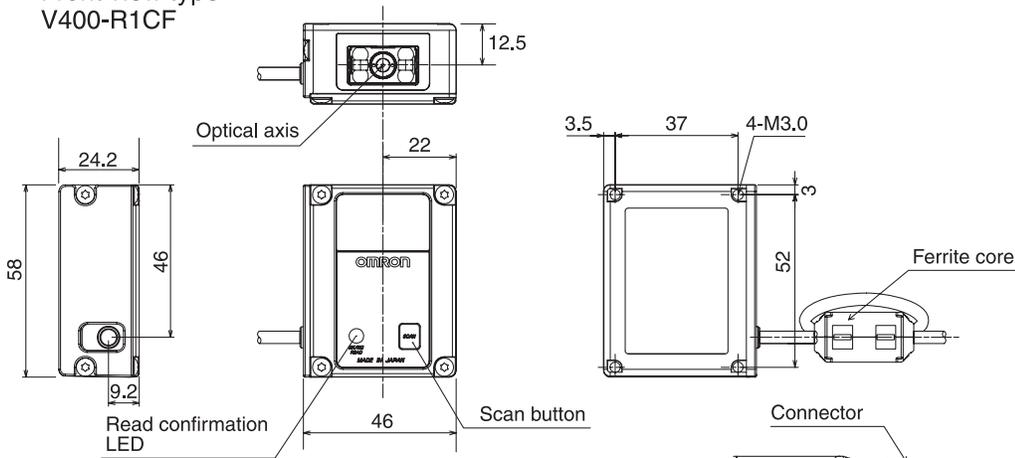
Code type	Narrow bar width	Reading distance
Code39	0.1	45.0 ~ 70.0
Code128	0.2	45.0 ~ 80.0
JAN13	0.39	50.0 ~ 100.0

\*Reference value from using our standard label and testing environment

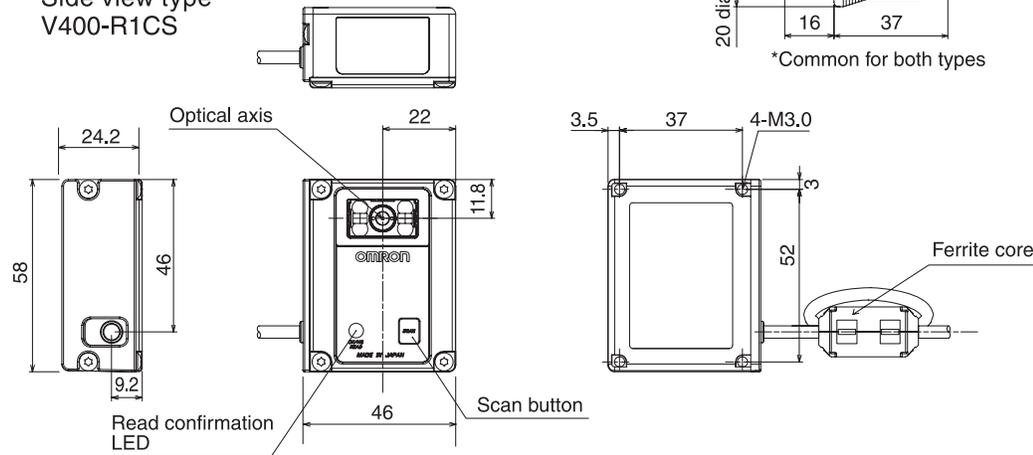
**Dimensions (Units: mm)**

●Multi Code Reader

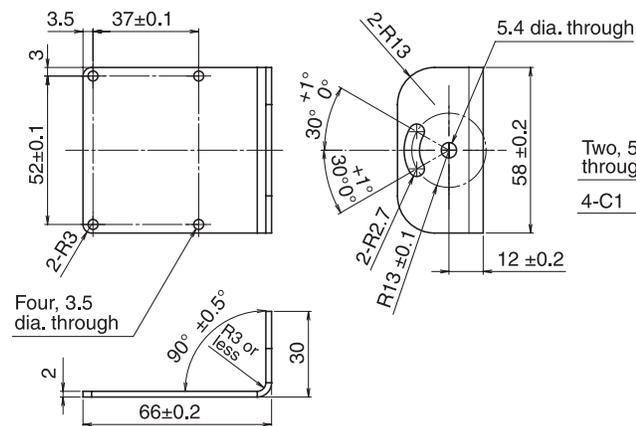
Front view type  
V400-R1CF



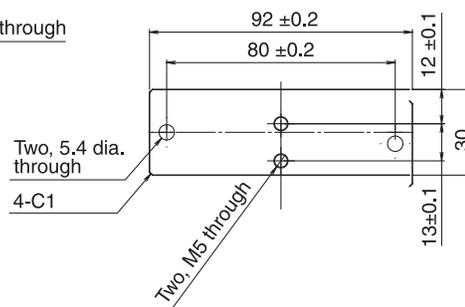
Side view type  
V400-R1CS



●Mounting Bracket



●Mounting Base



# Industrial RFID Systems V600

Quick Link  
D422

## Short Distance System for Heavy Industry/ Harsh Environments

- Use V600 RFID systems to collect and apply data from production, quality control and shipping to processes plant-wide
- Access readable data even when data carriers get dirty, painted, grease-covered and defaced
- Read/write transmission distance ranges from contact up to 100 mm (4 inches) max.
- Overwrite content 300,000 times for battery-less data carriers at normal temperature
- Reusable data carriers (tags) are designed to mount on or in metal
- Communications frequency (530 kHz) resists interference from welding and other sources
- High memory capacity of 8 Kbytes for built-in battery Data Carriers and 254 bytes for battery-less data carriers
- Self-diagnostic battery life detecting function for built-in battery data carriers
- Heat-resistant data carriers withstand temperatures to 150° C max.
- Thin, compact, and low-cost data carriers available
- Read/write controllers available in hand-held, panel mounting and PLC backplane mounting models
- Compact panel mounting controller V600-CA5D02 combines input from up to two V600-H antennas, RS-232/RS-485 serial communications and discrete I/O all in one
- Panel mounting controller V600-CD1D-V3 accepts one V600-H antenna input and provides RS-232 serial communications



- Hand-held USB-connected wand V600-CHUD combines controller and antenna for all V600 data carriers
- Directly control RFID from an Omron PLC for easy system integration using CJ1 or CS1 ID Sensor modules

## Ordering Information

### Data Carriers (Tags)

Type	Description	Data capacity	Data storage type	Dimensions (H x W x D mm)	Model
Built-in battery data carriers	Rectangular compact	8 Kbytes	SRAM	40 x 65 x 15	<b>V600-D8KR12</b>
	Thin rectangular			54 x 86 x 10.3	<b>V600-D8KR13</b>
	Intermediate-range rectangular			54 x 86 x 20	<b>V600-D8KR04</b>
Battery-less data carriers	Ultra-thin card type	254 bytes	EEPROM	54 x 86 x 1.5	<b>V600-D23P71</b>
	Thin half-size card type			34 x 50 x 1.5	<b>V600-D23P72</b>
	Rectangular			34 x 34 x 3.5	<b>V600-D23P66N</b>
	Rectangular package with PFA			36.5 x 95 x 6.5	<b>V600-D23P66SP</b>
	Rectangular compact			24 x 32 x 6	<b>V600-D23P61</b>
	Round super-compact			8 dia. x 5	<b>V600-D23P53</b>
	Round compact			12 dia. x 6	<b>V600-D23P54</b>
	Round, chemical-resistant PPS			8 dia. x 5	<b>V600-D23P55</b>
	Rectangular			8 Kbytes	Fe-RAM

## Read/Write Heads (Antennas)

Read/write head type		Data carrier compatibility	Transmission distance	Dimensions (H x W x D mm)	Cable length	Model
Rectangular type		V600-D23P71	Stationary: 10 to 70 mm Moving: 30 to 60 mm	100 x 100 x 30	0.5 m	V600-H07 0.5M
		V600-D23P72	Stationary: 10 to 50 mm Moving: 30 to 40 mm		2 m	V600-H07 2M
		V600-D23P66N	Stationary: 5 to 45 mm Moving: 25 to 40 mm		5 m	V600-H07 5M
		V600-D23P66SP	Stationary: 5 to 40 mm Moving: 20 to 40 mm		10 m	V600-H07 10M
		V600-D8KR12	Stationary: 10 to 60 mm Moving: 25 to 60 mm			
		V600-D8KR13	Stationary: 10 to 35 mm Moving: 20 to 35 mm			
		V600-D8KR04	Stationary: 10 to 100 mm Moving: 50 to 100 mm			
		V600-D23P71	Stationary: 5 to 40 mm Moving: 15 to 40 mm	40 x 53 x 23	0.5 m	V600-H11 0.5M
		V600-D23P72	Stationary: 5 to 30 mm Moving: 15 to 30 mm		2 m	V600-H11 2M
		V600-D23P66N	Stationary: 5 to 30 mm Moving: 15 to 25 mm		5 m	V600-H11 5M
		V600-D23P66SP	Stationary: 5 to 25 mm Moving: 10 to 25 mm		0.5 m robotic cable	V600-H11-R 0.5M
		V600-D8KR12	Stationary: 5 to 45 mm Moving: 25 to 45 mm		10 m	V600-H11 10M
		V600-D8KR13	Stationary: 10 to 30 mm Moving: 15 to 30 mm			
		V600-D23P61	Stationary: 2 to 19 mm Moving: 12 to 19 mm			
		V600-D8KR04	Stationary: 10 to 65 mm Moving: 30 to 65 mm			
	Cylindrical type		V600-D23P61	Stationary: 1 to 16 mm Moving: 7 to 16 mm	22 dia. x 80	0.5 m
		2 m				V600-H51 2M
		5 m				V600-H51 5M
		10 m				V600-H51 10M
		V600-D23P53	Stationary: 0.5 to 4.5 mm	22 dia. x 85	0.5 m	V600-H52 0.5M
					2 m	V600-H52 2M
					5 m	V600-H52 5M
	V600-D23P55	Stationary: 0.5 to 9.0 mm		10 m	V600-H52 10M	
Separate amplifier type	Amplifier section	—	—	22.6 x 73.8 x 36.5	2 m	V600-HA51 2M
		—	—		5 m	V600-HA51 5M
		—	—		10 m	V600-HA51 10M
	Sensor section	V600-D23P53	Stationary: 0.5 to 4.5 mm	12 dia. x 35	2 m	V600-HS51
		V600-D23P54	Stationary: 0.5 to 6.5 mm			
		V600-D23P55	Stationary: 0.5 to 6.5 mm			
		V600-D23P53	Stationary: 0.5 to 4.5 mm	18 x 30.5 x 10	2 m	V600-HS61
V600-D23P54	Stationary: 0.5 to 7.0 mm					
V600-D23P55	Stationary: 0.5 to 7.0 mm					
Hand-held type		V600-D23P53	0 to 2.5 mm	33 x 25.5 x 160.5	0.8 m	V600-CHUD 0.8M
		V600-D23P54	0 to 4 mm		1.9 m	V600-CHUD 1.9M
		V600-D23P55	0 to 10 mm			
		V600-D23P61	0 to 11 mm			
		V600-D23P66N	0 to 17 mm			
		V600-D23P66SP	0 to 12 mm			
		V600-D23P71	0 to 25 mm			
		V600-D23P72	0 to 23 mm			
		V600-D8KR12	0 to 25 mm			
		V600-D8KR13	0 to 20 mm			
		V600-D8KR04	0 to 35 mm			
	V600-D8KF04	0 to 18 mm				

## ID Controllers

Description	Appearance/dimensions (H x W x D mm)	Features	Power supply	Model
Hand-held reader/writer and controller		Read/write head built in; USB host interface, series A plug; 0.8 m cable connects directly to a PC	5 VDC	<b>V600-CHUD 0.8M</b>
		Read/write head built in; USB host interface, series A plug; 1.9 m cable connects directly to a PC	5 VDC	<b>V600-CHUD 1.9M</b>
DIN track mounting controller		2 Read/write head; RS-232C/RS-485/USB host interface; 2 inputs/2 outputs	24 VDC	<b>V600-CA5D02</b>
		Power supply converts 100-240 VAC, 50/60 Hz to DC power source	24 VDC	<b>S8VS-03024</b>
CS1 Series PLC mount controller		1 Read/write head	Power from PLC	<b>CS1W-V600C11</b>
2 Read/write heads		<b>CS1W-V600C12</b>		
CJ1 Series PLC mount controller		1 Read/write head	Power from PLC	<b>CJ1W-V600C11</b>
		2 Read/write heads		<b>CJ1W-V600C12</b>

## Accessories

Description	Features	Cable length	Model
Extension cables for read/write heads (antennas)	Standard cable, non-water-resistant connectors	3 m	<b>V600-A45</b>
		5 m	<b>V600-A44</b>
		10 m	<b>V600-A40</b>
		20 m	<b>V600-A41</b>
		30 m	<b>V600-A42</b>
	Robotic cable, non-water-resistant connections	3 m	<b>V600-A56</b>
		5 m	<b>V600-A55</b>
		10 m	<b>V600-A50</b>
		20 m	<b>V600-A51</b>
		30 m	<b>V600-A52</b>
Data carrier holders	For V600-D8KR16; mounts with at least two M3 countersunk flat head screws	—	<b>V600-A81</b>
	For V600-D23P71 and V600-D23P72; ultrasonic deposition can be used on the plastic holder	—	<b>V600-A84</b>
	For V600-D23P66N	—	<b>V600-A86</b>

# Industrial RFID Systems V600-HAM/HAR



## Intelligent Flag Systems Provide Positive Identification

- Innovative RFID electronic flags replace mechanical flags and printed cards for applications from Kanban replenishment to quality control systems
- No program needed, operates like a sensor
- Compact data carriers, read-only and read/write heads, and controllers
- DC power supply
- Open collector output or DeviceNet I/O communications
- Precise installation not required with transmission distance of 100 mm max.
- Sensors mount to metal surfaces or flush-mount in metal bases
- IP67 rated oil- and water-resistant read/write heads



## Ordering Information

### Data Carriers (Tags)

Type	Description	Data capacity	Data storage type	Dimensions (H x W x D mm)	Model
Built-in battery data carriers	Rectangular compact	8 Kbytes	SRAM	40 x 65 x 15	V600-D8KR12
	Thin rectangular			54 x 86 x 10.3	V600-D8KR13
	Intermediate-range rectangular			54 x 86 x 20	V600-D8KR04
Battery-less data carriers	Ultra-thin card type	254 bytes	EEPROM	54 x 86 x 1.5	V600-D23P71
	Thin half-size card type			34 x 50 x 1.5	V600-D23P72
	Rectangular			34 x 34 x 3.5	V600-D23P66N
	Rectangular package with PFA			36.5 x 95 x 6.5	V600-D23P66SP
	Rectangular compact			24 x 32 x 6	V600-D23P61
	Round super-compact			8 dia. x 5	V600-D23P53
	Round compact			12 dia. x 6	V600-D23P54
	Round, chemical-resistant PPS			8 dia. x 5	V600-D23P55

### Read/Write Heads

Description	Features	Cable length	Dimensions (H x W x D mm)	Model
Read/write antennas	All models rated IP67	2 m	M12 x 35 L; 28 threaded L	V600-HS51
			30.5 x 18 x 10	V600-HS61
	High temperature (to 70° C); power indicator		53 x 40 x 23	V600-HS63
			100 x 100 x 30	V600-HS67

## Intelligent Flag Controllers

Type	Power supply	Dimensions (H x W x D mm)	Input	Output	Model
Read-only (8-bit)	21.6 to 26.4 VDC	98 x 30 x 55	Transistor or contact output	NPN open collector, 20 mA at 30 VDC	<b>V600-HAR91</b>
Multi-functional (8-bit)				PNP open collector, 20 mA at 30 VDC	<b>V600-HAR81</b>
				NPN open collector, 20 mA at 30 VDC	<b>V600-HAM91</b>
Read-only (16-bit)				PNP open collector, 20 mA at 30 VDC	<b>V600-HAM81</b>
	Transistor output	NPN open collector, 20 mA at 30 VDC	<b>V600-HAR92</b>		
Read/write (24-bit/16-bit)	18 to 26.4 VDC	69 x 65 x 63	2 input words in DeviceNet master	2 output words in DeviceNet master	<b>V600-HAM42-DRT</b>

## Interface Cables

Connect the amplifier to wiring terminal blocks and programmable controller modules.

Amplifier	Cable length	Model
V600-HAR91/81 (Connector: 20 pin)	2 m	<b>V600-A60R</b>
	5 m	<b>V600-A61R</b>
	10 m	<b>V600-A62R</b>
V600-HAM91/81 V600-HAR92 (Connector: 26 pin)	2 m	<b>V600-A60M</b>
	5 m	<b>V600-A61M</b>
	10 m	<b>V600-A62M</b>

## Accessories

Description	Features	Cable length	Model
Extension cables for read/write heads (antennas)	Standard cable, non-water-resistant connectors	3 m	<b>V600-A45</b>
		5 m	<b>V600-A44</b>
		10 m	<b>V600-A40</b>
		20 m	<b>V600-A41</b>
		30 m	<b>V600-A42</b>
	Robotic cable, non-water-resistant connections	3 m	<b>V600-A56</b>
		5 m	<b>V600-A55</b>
		10 m	<b>V600-A50</b>
		20 m	<b>V600-A51</b>
		30 m	<b>V600-A52</b>
Data carrier holders	For V600-D8KR16; mounts with at least two M3 countersunk flat head screws	—	<b>V600-A81</b>
	For V600-D23P71 and V600-D23P72; ultrasonic deposition can be used on the plastic holder	—	<b>V600-A84</b>
	For V600-D23P66N	—	<b>V600-A86</b>

## Recommended Combinations

Data carrier	Amplifier	V600-HAR91/-HAR81/-HAM91/-HAM81/-HAR92			
	Read/write head	V600-HS51	V600-HS61	V600-HS63	V600-HS67
Battery-less data carrier, EEPROM memory	V600-D23P53	0.5 to 3.0 mm	0.5 to 3.0 mm	—	—
	V600-D23P54	0.5 to 5.0 mm	0.5 to 5.5 mm	—	—
	V600-D23P55	0.5 to 7.0 mm	0.5 to 7.0 mm	0.5 to 9.5 mm	—
	V600-D23P61	0.5 to 8.0 mm	0.5 to 9.0 mm	2 to 16 mm	—
	V600-D23P66N	—	—	5 to 30 mm	5 to 35 mm
	V600-D23P66SP	—	—	5 to 25 mm	5 to 30 mm
	V600-D23P71	—	—	5 to 35 mm	10 to 70 mm
	V600-D23P72	—	0.5 to 18 mm	5 to 35 mm	10 to 50 mm
Built-in-battery type data carrier with SRAM Memory	V600-D8KR12	5 to 15 mm	5 to 18 mm	5 to 45 mm	10 to 60 mm
	V600-D8KR13	—	—	10 to 30 mm	10 to 40 mm
	V600-D8KR04	—	—	10 to 65 mm	10 to 100 mm

Data carrier	Amplifier	V600-HAM42-DRT			
	Read/write head	V600-HS51	V600-HS61	V600-HS63	V600-HS67
Battery-less data carrier, EEPROM memory	V600-D23P53	0.5 to 3.0 mm	0.5 to 3.0 mm	—	—
	V600-D23P54	0.5 to 5.0 mm	0.5 to 5.5 mm		
	V600-D23P55	0.5 to 7.0 mm	0.5 to 7.0 mm		
	V600-D23P61	0.5 to 8.0 mm	0.5 to 9.0 mm	2 to 16 mm	—
	V600-D23P66N	—	—	5 to 30 mm	
	V600-D23P66SP	—	—	5 to 25 mm	
	V600-D23P71	—	—	5 to 35 mm	
	V600-D23P72	—	0.5 to 18 mm	5 to 35 mm	
Built-in-battery type data carrier with SRAM Memory	V600-D8KR12	5 to 15 mm	5 to 18 mm	5 to 45 mm	10 to 50 mm
	V600-D8KR04	—	—	10 to 65 mm	10 to 90 mm

## Specifications

### Read/Write Heads

Model	V600-HS51	V600-HS61	V600-HS63	V600-HS67
Transmission frequency	530 kHz			
Ambient temperature	-10° to 60° C		-10° to 70° C	
Storage temperature	-25° to 75° C			
Ambient humidity	35% to 95%			
Degree of protection	IEC60529: IP67			
Cable length	2 m (fixed)			
Wireless transmission error direction	16-bit CRC (Cyclic Redundancy Check) in both directions			
Indicator	—		Power: green	
Weight	Approx. 70 g		Approx. 190 g	Approx. 540 g

### Intelligent Flag Controllers

Type	Read-only (8-bit)		Read/write (8-bit)		Read-only (16-bit)
Model	V600-HAR91	V600-HAR81	V600-HAM91	V600-HAM81	V600-HAR92
Power supply	24 VDC ±10%, ripple (p-p): 10%				
Current consumption	130 mA max.				
Input	Transistor output or contact output Short-circuit current: 3 mA (typical) IN terminal and 0-V short-circuit OFF voltage: 15 to 30 VDC ON voltage: 0 to 5 VDC Input impedance: 8.2 kΩ Applied voltage: 30 VDC max.				Transistor output OFF voltage: 15 to 30 VDC Input impedance: 8.2 kΩ Short-circuit current: 3 mA typical (for 0-V short-circuit of INHIBIT/TRG) ON voltage: 0 to 5 VDC Applied voltage: 30 VDC max.
Output	NPN open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.	PNP open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.	NPN open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.	PNP open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.	NPN open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.
Diagnostic functions	Checks for CPU errors and transmission errors				

Item	V600-HAM42-DRT
Type	Read/write (24-bit read/16-bit write)
Data read	24 bits from the set address
Input/output	2 input words and 2 output words to DeviceNet Master
Data write	8-bit or 16-bit data to the set address
Communications power supply voltage	11 to 25 VDC (provided from communications connector)
Internal circuit power supply voltage	18 to 26.4 VDC
Internal current consumption	Communications power supply: 40 mA max. Internal circuit power supply: 150 mA max.

# Industrial RFID Systems V680 Series



## Next-Generation RFID Systems with ISO/IEC 18000-3 (ISO/IEC 15693) Compliance

- High-speed, 27-kbps transmission (response-only speed of 53 kbps from the V680-D□KF68)
- Read/write Antennas and ID Tags with excellent environmental resistance
- Wide line-up of ultra-compact, long-life ID Tags, with capacities from 1 to 32 Kbytes
- Seven software modes make it possible to visualize data transmission
- ID Map Manager simplifies memory map designing for ID Tags
- Complies with FCC Standards and R&TTE Directive



## Ordering Information

### Data Carriers (Tags)

Type	Description	Data capacity	Data storage type	Dimensions (H x W x D mm)	Model
Battery-less	Embedding in metallic or non-metallic surface	1-Kbyte	EEPROM	8 dia. x 5 mm	V680-D1KP52MT
	Flush mounting on metallic surface			34 x 34 x 3.5 mm	V680-D1KP66MT
	Flush mounting on non-metallic surface				V680-D1KP66T
				Square PFA package 95 x 36.5 x 6.5 mm	V680-D1KP66T-SP
	Embedding in metallic or non-metallic surface	2-Kbyte	FRAM	8 dia. x 5 mm	V680-D2KF52M
	Flush mounting on metallic surface			40 x 40 x 4.5 mm	V680-D2KF67M
	Flush mounting on non-metallic surface				V680-D2KF67
		8-Kbyte		86 x 54 x 10 mm	V680-D8KF68
		32-Kbyte			V680-D32KF68
		Post mounting on non-metallic surface (See note 1)	1-Kbyte	EEPROM	8 dia. x 110 mm

Note: 1. High temperature (200°C) storage

### Read/Write Heads (Antennas with Detachable Amplifier Unit Type)

Read/write head type	Data carrier compatibility	Connector/cable type	Dimensions (H x W x D mm)	Cable length	Model
Cylindrical type (M12)	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D1KP66T-SP, V680-D2KP52M	Flexible cable, non-waterproof connector	M12 x 35 mm	2 m	V680-HS51 2M

Read/write head type	Data carrier compatibility	Connector/cable type	Dimensions (H x W x D mm)	Cable length	Model
Cylindrical type (M22)	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D2KF52M, V680-D2KF67M, V680-D2KF67	Standard cable, waterproof connector	M22 x 65 mm	2 m	V680-HS52-W 2M
				12.5 m	V680-HS52-W 12.5M
		Flexible cable, non-waterproof connector		2 m	V680-HS52-R 2M
				12.5 m	V680-HS52-R 12.5M
Square type	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D2KF52M, V680-D2KF67M, V680-D2KF67, V680-D8KF68, V680-D32KF68	Standard cable, waterproof connector	40 x 53 x 23 mm	2 m	V680-HS63-W 2M
				12.5 m	V680-HS63-W 12.5M
		Flexible cable, non-waterproof connector		2 m	V680-HS63-R 2M
				12.5 m	V680-HS63-R 12.5M
Mid size-square	V680-D1KP66T, V680-D1KP66MT, V680-D2KF67, V680-D2KF67M, V680-D32KF68	Standard cable, waterproof connector	100 x 100 x 30	2 m	V680-HS65-W 2M
				12.5 m	V680-HS65-W 12.5M
		Flexible cable, non-waterproof connector		2 m	V680-HS65-R 2M
				12.5 m	V680-HS65-R 12.5M

### Read/Write Heads (Antennas, with Built-In Amplifier)

Read/write head type	Data carrier compatibility	Transmission distance	Dimensions (H x W x D mm)	Cable length	Model
Square	V680-D1KP58HT	0 to 150 mm (See note 2)	250 x 200 x 35 mm	0.5 m (See note 1)	V680-H01

- Note:** 1. Use an antenna cable to connect the read/write antenna to the controller. The maximum cable length is 30.5 m.  
 2. The transmission distance may be reduced if the V680-D1KP66T or V680-D1KP58HT is mounted onto a metallic surface. Refer to the *User's Manual* (V680-D1KP66T: Cat. No. Z262, V680-D1KP58HT: Cat. No. Z221) for details.

### Amplifier Unit

Type	Data carrier compatibility	Connector/cable type	Dimensions (H x W x D mm)	Cable length	Model
For 1-Kbyte memory	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D2KF52M, V680-D2KF67M, V680-D2KF67	Standard cable, waterproof connector	25 x 40 x 65 mm	5 m	V680-HA63A 5M
				10 m	V680-HA63A 10M
For 2-/8-/32-Kbyte memory	V680-D2KF52M, V680-D2KF67M, V680-D2KF67, V680-D8KF68, V680-D32KF68	Standard cable, waterproof connector	40 x 53 x 23 mm	5 m	V680-HA63B 5M
				10 m	V680-HA63B 10M

### ID Controllers

No. of connectable R/W Heads	Dimensions (H x W x D mm)	Transmission interface	Power supply	Model
Single	 105 x 90 x 65 mm	RS232C, RS422/RS485, USB	DC power supply	V680-CA5D01-V2
Dual	 105 x 90 x 65 mm			V680-CA5D02-V2

## ID Sensor Unit Controllers

Type	Unit style	Connected ID system		External power supply	No. of unit numbers used	Current consumption (A)			Model
						5 V	24 V	26 V	
CJ1 Special I/O unit		V680 Series	1 Head	—	1 unit	0.26	0.13 (See note 1)	—	CJ1W-V680C11
CJ1 Special I/O unit			2 Head		2 units	0.32	0.26		CJ1W-V680C12
CJ1 Special I/O unit			1 Head		1 units	0.26	0.13 (See note 1)		CS1W-V680C11
CJ1 Special I/O unit			2 Head	24 VDC	2 units	0.32	0.26	0.36	CS1W-V680C12

**Note: 1.** When connected to the V680-H01: 0.28 A

## Handheld Reader Writer

Type	Unit style	Transmission interface	Power supply	Cable length	Model
Handheld wand - serial I/F to Pision		RS232C	5 VDC ±5%	0.8 m	V680-CH1D-PSI
Handheld wand - USB I/F to PC		USB	5 VDC ±5%	0.8 m	V680-CHUD 0.8M
				1.9 m	V680-CHUD 1.9M
Handheld wand - serial I/F to PC or PLC		RS232C	5 VDC ±5%	2.5 m	V680-CH1D 2.5M
AC Power adapter (order separately)		—	115 VAC Wall outlet	2.0 m	V600-A22
Portable PC for handheld wand		Serial, Bluetooth	3.7 V, 3000 mAh High capacity battery pack	—	V680-A-7527S-G2-EG-S (See note 1)

**Note: 1.** V680-A-7527S-GS-EG-S includes; the handheld terminal, batteries, and a charger.

**Accessories (Order Separately)**

Description	Appearance	Cable length	Model
For the V680-D1KP66T		—	V600-A86
To mount the V680-D1KP58HT			V680-A80
Amplifier unit extension cable		10 M	V700-A43 10 M
		20 M	V700-A44 20 M
V680-H01 Antenna cable		2 M	V700-A40-W 2M
		5 M	V700-A40-W 5M
		10 M	V700-A40-W 10M
		20 M	V700-A40-W 20M
		30 M	V700-A40-W 30M
RS-232C Communications connector	Connector plug	—	XM3B-0922-111
	Connector hood		XM2S-0911

Industrial RFID Systems

# V680-HAM42-DRT



## V680-Series DeviceNet-Compatible Slaves for RFID Systems. Read and Write up to 58 Bytes

- V680-series DeviceNet-compatible slaves for RFID systems
- Includes a built-in Amplifier, yet has a compact size of 65 x 65 x 65 mm; compatible with V680-series ID Tags and Antennas
- Read and write 4, 26, or 58 bytes of data
- Includes an Access Mode compatible with the V600-HAM42-DRT to enable the use of existing programs
- Complies with international standards, including CE, UL/CSA, and radio wave regulations. (Radio wave regulation compliance is applicable to Japan, Europe, the U.S.A., and Canada. Radio wave regulation compliance for China and South Korea is pending.)
- Approval for UL/CSA is pending



## Ordering Information

### Data Carriers (Tags)

Type	Description	Data capacity	Data storage type	Dimensions (H x W x D mm)	Model	
Battery-less	Embedding in metallic or non-metallic surface	1-Kbyte	EEPROM	8 dia. x 5 mm	V680-D1KP52MT	
	Flush mounting on metallic surface			34 x 34 x 3.5 mm	V680-D1KP66MT	
	Flush mounting on non-metallic surface				V680-D1KP66T	
				Square PFA package 95 x 36.5 x 6.5 mm	V680-D1KP66T-SP	
	Embedding in metallic or non-metallic surface	2-Kbyte	FRAM	8 dia. x 5 mm	V680-D2KF52M	
	Flush mounting on metallic surface			40 x 40 x 4.5 mm	V680-D2KF67M	
	Flush mounting on non-metallic surface				V680-D2KF67	
				86 x 54 x 10 mm	V680-D8KF68	
			8-Kbyte			V680-D32KF68
			32-Kbyte			V680-D32KF68
	Post mounting on non-metallic surface (See note 4)	1-Kbyte	EEPROM	8 dia. x 110 mm	V680-D1KP58HT	

### Read/Write Heads (Antennas Direct Connection to DRT Controller Unit)

Read/write head type	Data carrier compatibility	Connector/cable type	Dimensions (H x W x D mm)	Cable length	Model
Cylindrical type (M12)	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D1KP66T-SP, V680-D2KP52M	Flexible cable, non-waterproof connector	M12 x 35 mm	2 m	V680-HS51 2M
Cylindrical type (M22)	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D2KF52M, V680-D2KF67M, V680-D2KF67	Standard cable, waterproof connector	M22 x 65 mm	2 m	V680-HS52-W 2M
				12.5 m	V680-HS52-W 12.5M
		Flexible cable, non-waterproof connector		2 m	V680-HS52-R 2M
				12.5 m	V680-HS52-R 12.5M

Read/write head type	Data carrier compatibility	Connector/cable type	Dimensions (H x W x D mm)	Cable length	Model
Square type	V680-D1KP52MT, V680-D1KP66MT, V680-D1KP66T, V680-D2KF52M, V680-D2KF67M, V680-D2KF67, V680-D8KF68, V680-D32KF68	Standard cable, waterproof connector	40 x 53 x 23 mm	2 m	V680-HS63-W 2M
		Flexible cable, non-waterproof connector		12.5 m	V680-HS63-W 12.5M
				2 m	V680-HS63-R 2M
		12.5 m		V680-HS63-R 12.5M	
Mid size-square	V680-D1KP66T, V680-D1KP66MT, V680-D2KF67, V680-D2KF67M, V680-D32KF68	Standard cable, waterproof connector	100 x 100 x 30	2 m	V680-HS65-W 2M
		Flexible cable, non-waterproof connector		12.5 m	V680-HS65-W 12.5M
				2 m	V680-HS65-R 2M
		12.5 m		V680-HS65-R 12.5M	

## ID Controllers

No. of connectable R/W heads	Dimensions (H x W X D mm)	Transmission interface	Power supply	Model
Square	 <p>65 x 65 x 65 mm</p>	DeviceNet slave	DC power supply	V680-HAM42-DRT

- Note:**
1. Attach an antenna to the V680-HAM42-DRT DeviceNet ID slave to read and write V680 ID Tag data.
  2. The DeviceNet ID slave can communicate with ID Tags that comply with ISO/IEC 18000-3 (ISO/IEC 15693) in addition to V680-series ID Tags. Communications with ID Tags other than V680-series ID Tags, however, may not be stable. Always check compatibility completely before using other ID Tags.
  3. Use a V680-HS51/-HS52 antenna if the V680-D1KP52MT or V680-D2KF52M is to be embedded in metal. Communications cannot be performed if a V680-HS63 antenna is used in combination with the V680-D1KP52MT or V680-D2KF52M. Communications cannot be performed if a V680-HS65 antenna is used in combination with the V680-D1KP52MT or V680-D2KF52M.
  4. High temperature (200°C) storage.

## Accessories (Order Separately)

Description	Appearance	Cable length	Model
For the V680-D1KP66T		—	V600-A86
To mount the V680-D□KF68			V680-A81

# Semiconductor Industry RFID Systems V640



## Reliable Antenna and Controller Reads TIRIS Tags

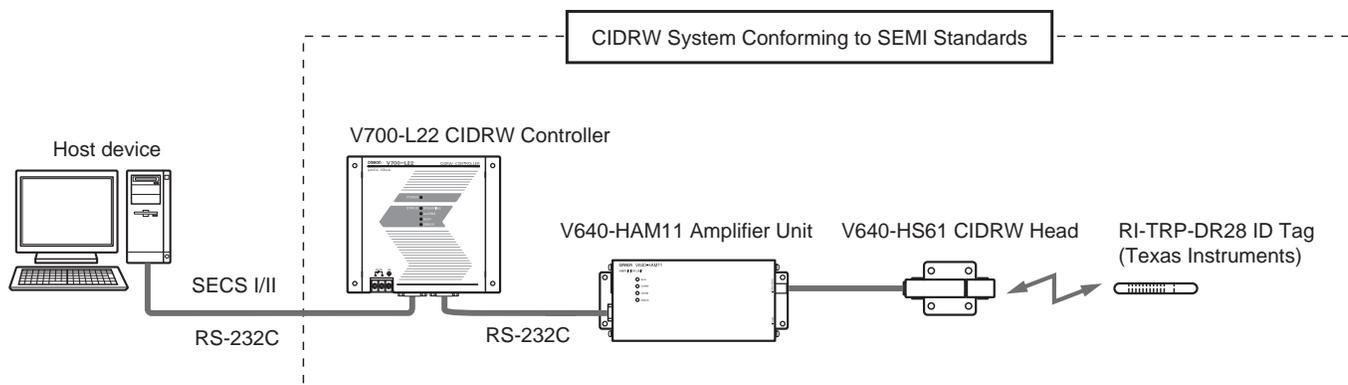
- Read/write data embedded in TIRIS tags (Texas Instruments 32-mm Glass Multipage Transponder model RI-TRP-DR2B) at 134 kHz
- V640 antenna and controller offer better repeatability, distance and reliability than OEM parts
- Conforms to carrier reader/writer-related SEMI standards; SEMI E99, E4, and E5
- Antenna dimensions conform to SEMI E15.1
- Noise measurement function for detecting proper placement of antenna
- Shielded antenna reduces influence of surrounding metal
- Sustain productive uptime: Use an ID Link Unit (V700-L11) to keep the CIDRW system turned ON while the amplifier unit is removed/installed due to malfunction or during maintenance
- Compatible with SECS communications protocol (CIDRW Controller V700-L22)
- Track FOUPs (Front-Opening Unified Pods), reticles, and pods moving through the fabrication
- CE marking/FCC approvals



## Ordering Information

Product	Description	Dimensions (H x W x D mm)	Model
CIDRW head	2-meter cable	30 x 50 x 12 mm (including mounting plate)	V640-HS61
Amplifier unit	RS-232C interface RS-485 interface 24 VDC	185 x 80 x 43 mm	V640-HAM11-V2
CIDRW controller	24 VDC; RS-232C interface (compatible with SECS I/II protocol)	167 x 150 x 28 mm	V700-L22
ID link unit	24 VDC; RS-232C interface; RS-485 interface	65 x 110 x 64 mm	V700-L11
Accessories set	Connector accessories for the V640 Amplifier Unit: Power supply connector (1) Power supply connector Pins (3) RS-485 Port connector (1)	—	V640-A90

## Build a CIDRW System Conforming to SEMI Standards



# Semiconductor Industry RFID Systems V700



## RFID System Conforms to SEMI E15.1 and E99, and SECS I/II

- Track FOUPs (Front-Opening Unified Pods), reticles, and pods moving through the fabrication
- Antenna dimensions are based on antenna area specifications in SEMI E15.1, ensuring conformance with the standard's transmission range specification
- Compatible with the SECS interface specified in SEMI E4, E5, and E99
- Cost-effective design: Build a CIDRW system where just one host channel can control several antennas connected via load ports to an ID Link Unit
- Clean stick-shape ID tags in purified water
- Read/write data embedded in Omron ID tags at 125 kHz

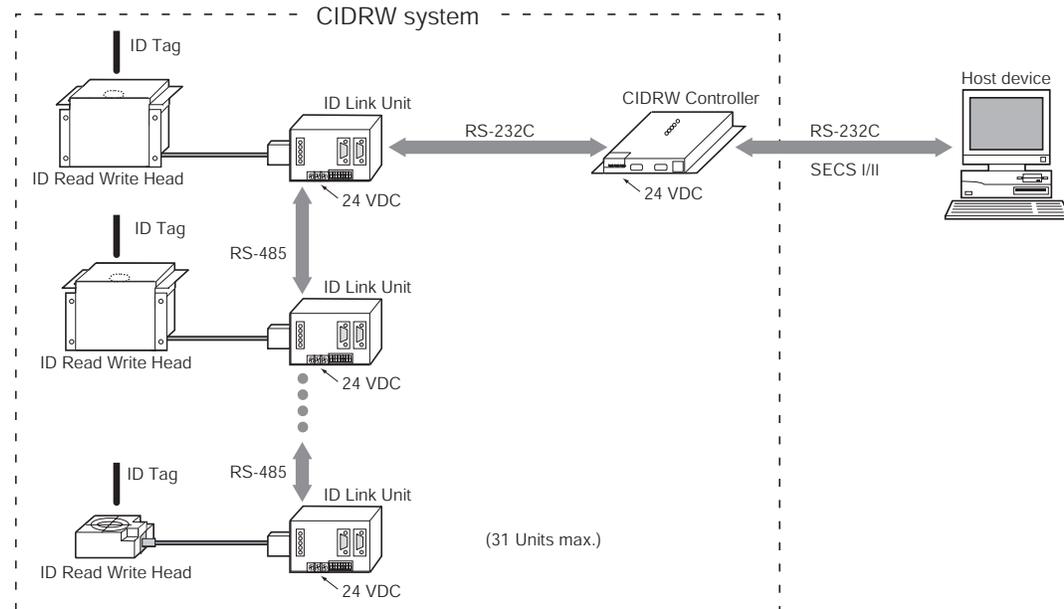


- CIDRW controller V700-L22 conforms to SEMI standard E99-0303 (issued March 2003)
- CE marking/FCC approvals

## Ordering Information

Name	Description	Dimensions (H x W x D mm)	Model
ID tag	Special stick-shaped Tag for semiconductors 256 bytes (with user area of 240 bytes)	3.9 dia. x 25 L	V700-D23P41-1
IDRW head	RS-232C interface; aluminum case, Bakelite body; IP30 enclosure rating; 1-m cable	44.8 x 149.8 x 73	V700-HMD13A
	RS-232C interface; ABS resin case, epoxy potted; IP67 enclosure rating; 1-m, 2-m, and 4-m cables	40 x 53 x 23	V700-HMD11-1 1M
			V700-HMD11-1 2M V700-HMD11-1 4M
ID link unit	24 VDC, RS-232C interface, RS-485 interface	110 x 65 x 64	V700-L11
CIDRW controller	24 VDC, RS-232C interface (compatible with SECS I/II protocol.)	150 x 167 x 28	V700-L22

## Build a CIDRW System Conforming to SEMI Standards



For more details on the standards, refer to SEMI for standards information. (SEMI URL: <http://www.semi.org/>).

# Asset Tracking RFID Systems

## V700

Quick Link

D522

### Cost-Effective Way to Improve Product and Distribution Management

- A long transmission distance and a wide transmission range allow position displacement and axial offset of ID Tags to be handled with ease
- Reading and writing are possible with several ID Tags in the antenna's transmission range, allowing use in new applications
- Easy-to-use, reasonably-priced ID Tags enable the creation of low-cost systems even in applications using a large number of Tags
- Compact reader/writer V700-HMD11(-1) fits space-confined areas
- Use an ID Link Unit for multi-drop connections and RS-485 interfaces
- The V700-HMD11-1 compact reader/writer connects directly to the ID link unit or an OMRON PLC without an AC adapter
- CE marking (except for V700-H02)



### Ordering Information

Name	Description	Dimensions (H x W x D mm)	Model
ID tag	Coin-shaped 256 bytes (with user area of 240 bytes)	20 dia. x t 2.7	V700-D23P31
	Stick-shaped 256 bytes (with user area of 240 bytes)	3.9 dia. x 25 L	V700-D23P41
ID tag holder	Special holder for the V700-D23P31 (There is no ID Tag provided with the product.)	11.5 x 40 x 22	V700-A80
Antenna	Standard antenna, 100-mm cable	250 x 200 x 35	V700-H01
	Wide-field antenna, 100-mm cable	650 x 200 x 35	V700-H02
Controller	RS-232C interface; 24 VDC, 1 channel for antenna connection	90 x 65 x 75	V700-CD1D-V3
	RS-485 interface; 24 VDC, 1 channel for antenna connection Maximum number of controllers that can be connected: 31	90 x 65 x 75	V700-CD2D-V3
Antenna cable	Material: Vinyl chloride The connector is not waterproof.	2 m	V700-A40
		3 m	V700-A41
		5 m	V700-A42
		10 m	V700-A43
		20 m	V700-A44
		30 m	V700-A45
Compact reader/writer	RS-232C interface; 5 VDC supplied via AC Adapter	40 x 53 x 23	V700-HMD11
	RS-232C interface; 5 VDC supplied from connector		V700-HMD11-1 1M
			V700-HMD11-1 2M
			V700-HMD11-1 4M
ID link unit	RS-232C and RS-485 interface Unit for multiple connections	110 x 65 x 64	V700-L12
AC adapter	AC Adapter for V700-HMD11	—	V600-A22

# Industrial RFID Systems V720



## HF Long Range (ISO 15693/13.56 MHz) Reader/Writer

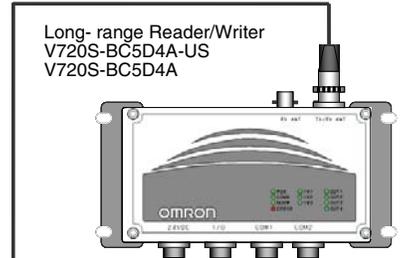
Asset/Pharma Pedigree Tracking

- Provide a communications distance of 25 cm
- Both I-CODE1 and I-CODE SLI types are available
- Conform to the international standard ISO 15693 for contactless IC cards
- Two antenna terminals available for use in a variety of applications
- Includes RS-232C and RS-485 interfaces
- Allows multi-drop connection of up to 32 antennas
- Six different cable lengths available

Long-Range antenna  
V720-HS04

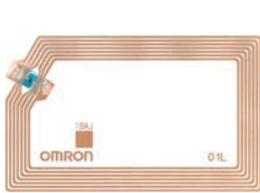


Antenna Cable  
V720-A41-US



Long-range Reader/Writer  
V720S-BC5D4A-US  
V720S-BC5D4A

For North America. The antenna, V720-HS04, is supposed to connect to V720S-BC5D4A-US with V720-A41-US.



V720S D13P01



V720S D13P02



V720S D13P06



V720 D52P03



V720 D52P04



V720S-HMU01



V720S-D13P40

Complies with R & TTE, FCC Part 15, EN300 330, ETS 300 683, EN 60065, FCC Part 15 Subpart C



## Ordering Information

### Data Carriers (Inlays)

Type	Description	Memory capacity	Memory type	Communication frequency	Number of overwrites	Model
Tag inlays	I.CODE SLI	112 bytes (user area)	128-byte EEPROM	13.56 MHz	100,000 times for each address	V720S-D13P01
						V720S-D13P02
	I.CODE 1	44 bytes (user area)	64-byte EEPROM			V720S-D13P06
						V720-D52P03
Smart card	I.CODE SLI	112 bytes (user area)	128-byte EEPROM			V720-D52P04
						V720S-D13P40

## Data Carriers (Inlays)

Item	V720S-D13P01	V720S-D13P02	V720S-D13P06	V720-D52P03	V720-D52P04	V720S-D13P40
Width	48 ±1.0 mm		70 ±1.0 mm	48 ±1.0 mm		554 x 85 mm
Pitch between the coils	96 ±0.3 mm	48 ±0.3 mm	32 ±0.3 mm			—
Thickness at electronic parts	Max. 270 µm					0.74 mm
Overall thickness of the copper antenna coil	50+10 µm/-0 µm					
Size of the antenna coil	46 × 75 mm	46 × 43 mm	60 × 20 mm	φ21 mm	16.5 × 22 mm	46 × 75 mm
Data retention time	10 years after data is written (at 55°C max.)					
Ambient temperature in operation	-10 to +70° C (non icing or condensing)					
Ambient temperature in storage	-30 to +70° C (with no icing)					
Degree of protection	No communication error after leaving the product in ambient atmosphere at 85° C with 85% humidity for 250 hours. (See note 1 and 2)					IEC 60529, IP67
Material	PET resin					

- Note:** 1. Inlets are supplied in roll stock, contact Omron for details.  
2. Inlet degree of protection is based on converted covering materials.

## Read/Write Head (Antenna)

Read/write head type	V720-HS04
Communication frequency	13.56 MHz
Ambient operating temperature	-10 to +55°C (no freezing)
Ambient storage temperature	-25 to +65°C (no freezing)
Ambient operating humidity	35 to 85% (with no condensation)
Insulation resistance	20 MΩ min. between cable terminal and casing (with 500 VDC mega)
Dielectric strength	Leakage current of 1 mA max. by applying 1000 VAC, 50/60 Hz power for 1 minute between cable terminal and casing
Vibration resistance	Durable at 10 to 150 Hz, Double amplitude less than 0.7 mm, 10 sweeps for 8 minutes each in 3 directions
Shock resistance	Durable at 150 m/s <sup>2</sup> , 3 times in 3 directions
Protective structure	IP50 (IEC60529 standard)
Input impedance	50 Ω
Maximum input power	4 W
Antenna gain	-30dbi or lower
Weight	About 1.8 kg
Connection	BNC connector
Dimensions	407 (H) x 334 (W) x 35 (D) mm
Housing material	PVC
V720-H	I-CODE SLI

## V700-A4 Antenna Cables

Model	V720-A41 3.35 M	V720-A41 10.33 M
Cable type	Coaxial cable	
No. of leads	2 (shield)	
Insulation resistance	10 MΩ or more between terminal and coating (with DC250 V Mega)	
Withstand voltage	AC300V/1 min. Leak current: 1 mA or less	
Insulation material	PVC	
Cable length	φ5.5 mm x 3.35 m	φ5.5 mm x 10.33 m

- Note:** 1. The connectors do not have waterproof specifications.

## ID Controllers

Model	V720S-BC5D4A-US	V720S-HMU01	V720S-HMC75
Frequency	13.56 MHz		
Supported protocol	ISO 15693	ISO/IEC 15693 & 18000-3	ISO 15693
Operating temperature	-10° to 50° C (14° to 122° F) with no icing	-10 to 40° , with no icing	-10 to +55° C, with no icing
Operating humidity	35% to 85% RH (with no condensation)	25 to 85%RH (no condensing)	25% to 85% max. (with no condensation)
Protective construction	IP60 (IEC 60529)	IP40	n/a
Power supply	24 VDC 25 w/1.04 A	5 VDC ±5% (supply USB as power source) 200 mA	5 VDC ±10% 40 mA
Dimensions	247 (H) x 84 (W) x 128 (D) mm	80 (W) x 19.5 (H) x 50 (D) mm	40 (W) x 47 (H) x 6 (D) mm
Control interface	RS232C or RS485	USB ver.2.0 (operation as a virtual serial port)	RS232, TTL 5 VDC
Input/output function	3 inputs 4 outputs	—	—

# Supply Chain RFID Systems V750 Series



## EPC Generation 2 Interrogator Platform

- 750-series Radio wave propagative RFID system is ideal for long range communication and for the system
- Designed to have “**High read range**”, “**Quick response**” and “**Simple operation**”
- Well-tuned communication performance and functions for customers' applications
- Rich maintenance functions and on-site verification functions
- Self-operation function
- Multiple LED operation displays
- Complies with FCC Standards and R&TTE Directive, 902.75 - 927.75 MHz



## Ordering Information

### Data Carriers (Tags)

Type	Description	Data capacity	Data storage type	Dimensions (H x W x D mm)	Model
Battery-less, Omron Inlays, EPC global Class 1, Gen.2 (See note 1)	WAVE, for generic use	112 bits	240-bits NVM (EPC Area 96 bit)	94.0 x 16.0 mm	<b>V750-D22M01-1M</b>
	LOOP, for RF unfriendly products			68.0 x 70.0 mm	<b>V750-D22M02-1M</b>
	Ninja, for level tagging and bulk reading			28.0 x 28.0 mm	<b>V750-D22M03-1M</b>
	Scorpion, for generic use			28.0 x 68.0 mm	<b>V750-D22M04-1M</b>

- Note:** 1. Inlays must be converted into a protective material, e.g. paper, polyethylene, polyester, etc.  
 2. The transmission distance may vary based on packaging and application considerations. Refer to the *User's Manual* (V750: Cat. No. SRFM-012-A) for details.

### Read/Write Head (Antenna)

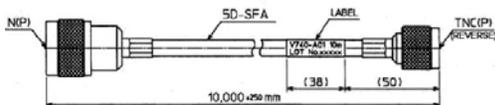
Read/write head type	Data carrier compatibility	Transmission interface	Dimensions (H x W x D mm)	Cable length	Model
Square type, mono-static antenna (circular)		Standard cable, waterproof connector	256 x 256 x 57	0.3 m	<b>V740-HS01CA</b>

**Note:** 1. Use an Antenna Cable to connect the Read/Write Antenna to the Controller. The maximum cable length is 10 m.

### ID Controllers

No. of connectable antennas	Dimensions (H x W x D mm)	Transmission interface	Power supply	Model
Four	 246 x 215 x 43.5 mm	Ethernet, RS232C	DC power supply, includes exclusive AC adapter	<b>V750-BA50C04-US</b>

### Accessories (Order Separately)

Description	Appearance	Cable length	Model
Antenna cable		3 m	<b>V740-A01-3.0M</b>
		10 m	<b>V740-A01-10M</b>

## Contents

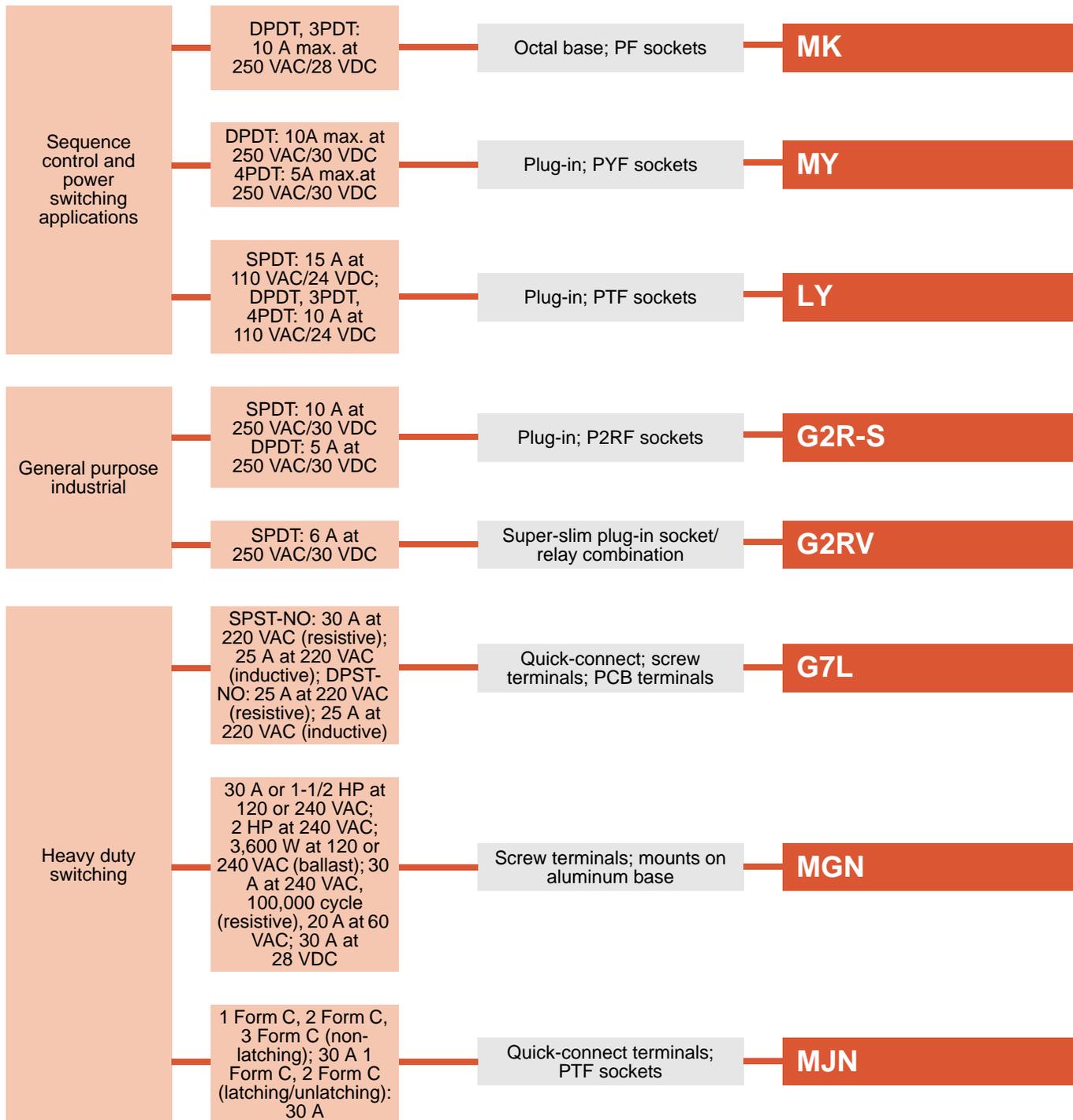
<b>Selection Guide</b>		P-ii
<b>General-Purpose Electromechanical Relays</b>		
<b>MK</b>	General-purpose 10 A relay, round pin arrangement	P-1
<b>MY</b>	Plug-in mini 10 A power relay offers time-saving features	P-3
<b>LY</b>	Plug-in general-purpose 15 A relay	P-5
<b>G2R-S</b>	Slim general-purpose 10 A plug-in relays	P-7
<b>G2RV</b>	Ultra-slim industrial 6 A relay for PLC expansion	P-9
<b>G7L</b>	High-capacity relay, 30 A rated load	P-11
<b>G7Z</b>	Multi-pole power relay for contactor current range - 40 A at 440 VAC	P-12
<b>MGN</b>	Heavy-duty power relay switches 30 A loads	P-14
<b>MJN</b>	Rugged power driver with superior arch suppression, up to 30 A	P-16
<b>Solid State Relays</b>		
<b>G3NA</b>	1-phase, hockey puck style SSR	P-18
<b>G3PA/ G3PB</b>	1-phase, built-in heat sink SSR	P-20
<b>G3PB</b>	3-phase, built-in heat sink	P-22

## Monitoring Relays

<b>K8AB-A</b>	Current monitoring relays for over- and undercurrents	P-24
<b>K8AB-V</b>	Voltage monitoring relays for over- and undervoltage conditions	P-25
<b>K8AB-P</b>	Phase monitoring relays for protecting industrial equipment from adverse power conditions	P-26
For Temperature Monitoring Relays see Temperature and Process Controllers section		
For Time Delay Relays see Timer section		
For Programmable Relays see ZEN in the Programmable Controllers section		

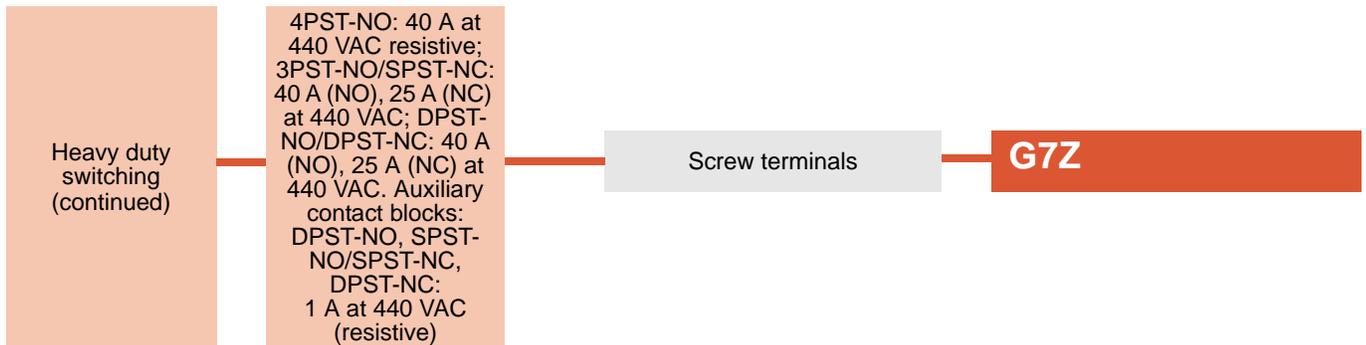
## Selection Guide

### Electromechanical Relays

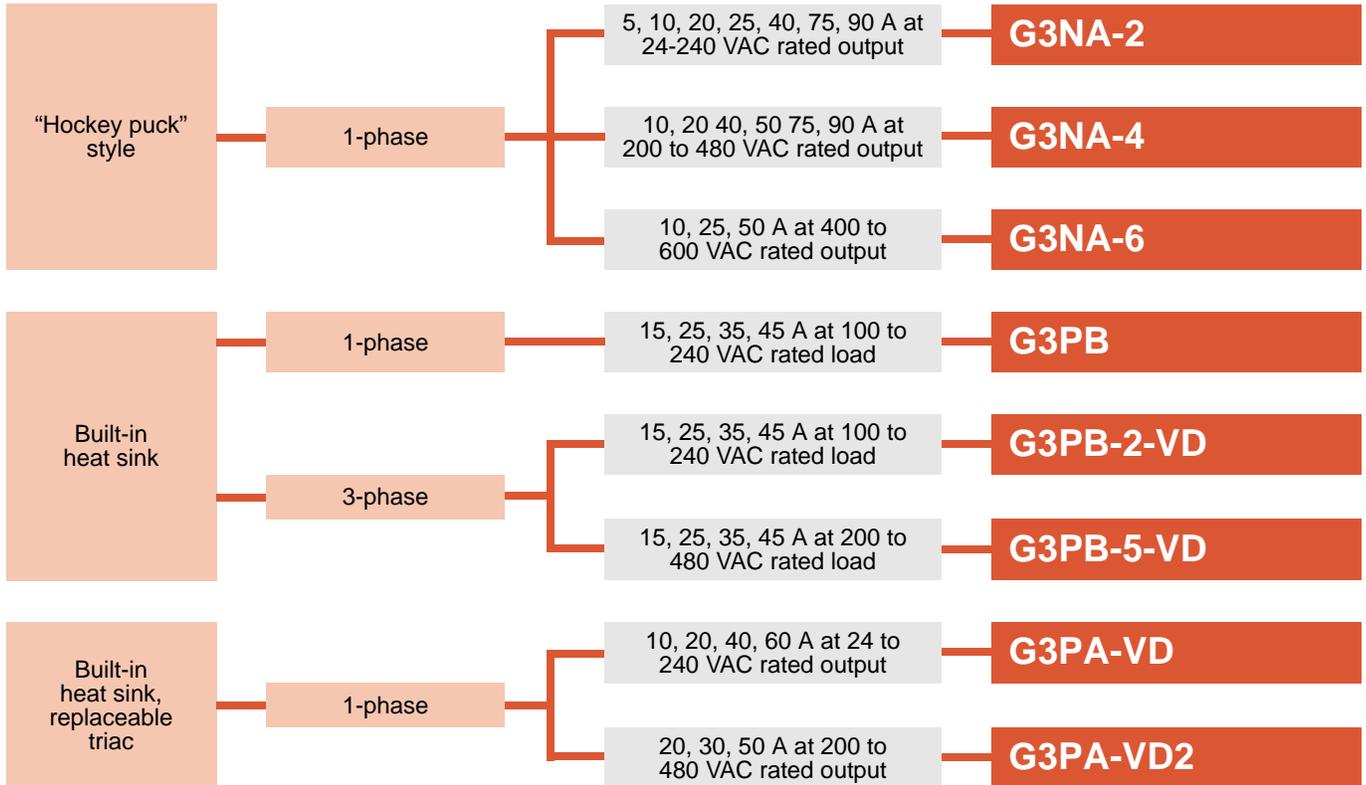


## Selection Guide

### Electromechanical Relays (continued)

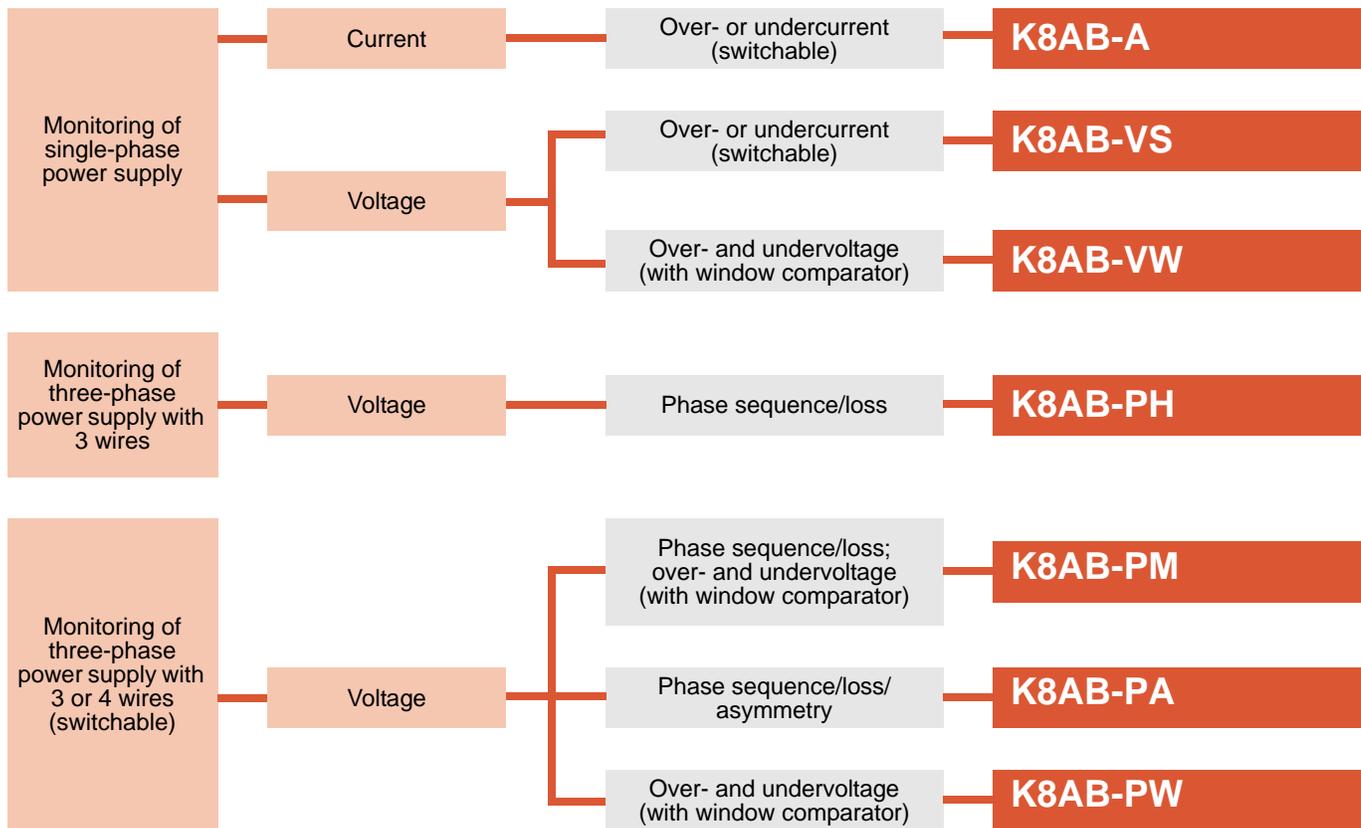


### Solid State Relays



## Selection Guide

### Monitoring Relays



# Electromechanical Relays

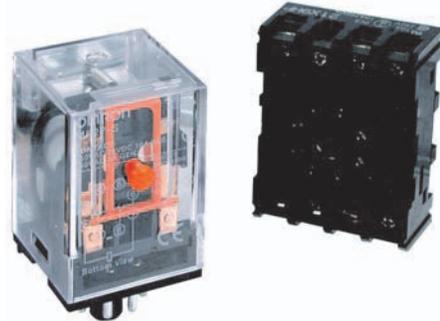
# MK

Quick Link  
R222

## General-Purpose Plug-In Power Relay

Reliable MK relays with silver contacts ensure a long service life. Easily check contact operation by mechanical indicator and/or push-to-test button options.

- 8-pin DPDT and 11-pin 3PDT contact types
- Mechanical and LED operation indication
- Push-to-test button
- Diode and varistor surge suppression available
- 10 A rated load
- Reverse polarity models available
- All relays fit standard 8-pin or 11-pin round sockets
- RoHS compliant



## Ordering Information

### Relays

Type	Features	Coil polarity	Coil ratings	Contact form model	
				DPDT (2-pole)	3PDT (3-pole)
Standard	Mechanical indicator	Standard	AC and DC	MK2P-I	MK3P-5-I
	Mechanical indicator and push-to-test button			MK2P-S	MK3P-5-S
LED indicator	Mechanical indicator			MK2PN-I	MK3PN-5-I
	Mechanical indicator and push-to-test button			MK2PN-S	MK3PN-5-S
LED indicator and diode	Mechanical indicator		DC only	MK2PND-I	MK3PND-5-I
	Mechanical indicator and push-to-test button			MK2PND-S	MK3PND-5-S
LED indicator and varistor	Mechanical indicator		AC only	MK2PNV-I	MK3PNV-5-I
	Mechanical indicator and push-to-test button			MK2PNV-S	MK3PNV-5-S
Diode	Mechanical indicator		DC only	MK2PD-I	MK3PD-5-I
	Mechanical indicator and push-to-test button			MK2PD-S	MK3PD-5-S
Varistor	Mechanical indicator	AC only	MK2PV-I	MK3PV-5-I	
	Mechanical indicator and push-to-test button		MK2PV-S	MK3PV-5-S	

### Accessories

Item	Description	Model
Sockets	DIN-rail/surface-mounting, screw terminal, MK2 relays	PF083A-E
	DIN-rail/surface-mounting, screw terminal, MK3 relays	PF113A-E
Hold-down clips	Fits both MK2 and MK3 relays	PFC-A1

## Specifications

- Contact form: DPDT, 3PDT
- Contact ratings:
  - Resistive: 10 A at 250 VAC/28 VDC
  - Inductive: 7 A at 250 VAC
- Operate time: 20 ms max. (AC); 30 ms max. (DC)
- Release time: 20 ms max.
- Must operate voltage: 80% max. of rated voltage
- Must release voltage: 30% max. of rated voltage (AC); 15% max. (DC)
- Electrical service life: 100,000 operations minimum
- Dimensions: 34.5 H x 34.5 W x 52.5 D mm

## Coil Ratings

Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption	
	% of rated voltage				
AC	12 V, 24 V, 50 V, 100 V, 110 V	80% max.	30%	90 to 110%	2.3 VA (60 Hz)
	120 V, 220 V, 230 V, 240 V	80%			2.7 VA (60 Hz)
DC	6 V, 12 V, 24 V, 48 V, 100/110 V	80% max.	15%		1.5 W

## Technical Data

Item	2- and 3-pole
Operating time	AC: 20 ms max.; DC: 30 ms max.
Release time	20 ms max.
Dielectric strength	2,500 VAC (coil contact)
Ambient temperature	Operating -10 C to 40 C (no icing or condensation)
Size in mm	53.3 H x 34.5 W x 34.5 D

## Contact Ratings

Number of poles	2-pole and 3-pole	
Load	Resistive load	Inductive load
Rated load	10 A at 250 VAC	7 A at 250 VAC
	10 A at 28 VDC	—
Rated carry current	10 A	
Max. switching voltage	250 VAC, 250 VDC	
Max. switching current	10 A	
Max. switching power	2,500 VA, 280 W	1,750 VA
Min. permissible load	10 mA at 1 VDC	
Mechanical life	10,000,000 operations minimum	
Electrical life	100,000 operations minimum	

# Electromechanical Relays

# MY



## Plug-In Mini Power Relay Offer Time-Saving Features

Versatile MY relays offer convenience features that save time during installation, commissioning and operation.

- 10 A (DPDT) and 5 A (4DPT) contact types
- Gold-clad contact for maximum reliability (MY4)
- Mechanical and LED operation indication
- Push-to-test button offers momentary and lockable settings
- Large write-on label area allows clear identification
- Hermetically sealed (MYH) and latching (MY2K) versions available
- All relays have plug-in socket/solder terminals
- RoHS compliant



## Ordering Information

Type	Features	Coil polarity	Coil ratings	Contact form model			
				DPDT (2-pole)	4PDT (4-pole)	4PDT (4-pole) bifurcated	
Standard	LED indicator	Standard	AC and DC	MY2N	MY4N	MY4ZN	
	LED indicator and lockable test button			MY2IN	MY4IN	MY4ZIN	
	Without LED indicator			MY2	MY4	MY4Z	
With built-in diode	LED indicator			DC only	MY2N-D2	MY4N-D2	MY4ZN-D2
	LED indicator and lockable test button				MY2IN-D2	MY4IN-D2	MY4ZIN-D2
With built-in CR	LED indicator			110/120 VAC and 220/240 VAC only	MY2N-CR	MY4N-CR	MY4ZN-CR
	LED indicator and lockable test button	MY2IN-CR	MY4IN-CR		MY4ZIN-CR		
Standard	LED indicator	Reversed	DC only	MY2N1	MY4N1	MY4ZN1	
	LED indicator and lockable test button			MY2IN1	MY4IN1	MY4ZIN1	
With built-in diode	LED indicator			DC only	MY2N1-D2	MY4N1-D2	MY4ZN1-D2
	LED indicator and lockable test button				MY2IN1-D2	MY4IN1-D2	MY4ZIN1-D2

**Note:** When ordering add the rated coil voltage and (S) to the ordering number, for example: MY4 110/120VAC (S), see specifications

## Accessories

Applicable relay model	DIN-rail / surface-mounting socket		Back-mounting socket	
	Screwless clamp terminal	Screw terminal	Solder terminals	Solder terminals with clip
MY2	PYF08S	PYF08A-E	PY08	PY08-Y1
	—	PYF08A-N	—	—
MY4	PYF14S	PYF14A-E	PY14	PY14-Y1
	—	PYF14A-N	—	—

## Specifications

### Coil Ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption
		% of rated voltage			
AC	12 V, 24 V	80% max.	30%	110%	1.0 to 1.2 VA (60 Hz)
	110/120 V, 220/240 V	80%			0.9 to 1.1 VA (60 Hz)
DC	6 V, 12 V, 24 V, 48 V, 100/110 V	80% max.	10%		0.9 W

### Technical Data

Item	1-pole
Operating time	20 ms max.
Release time	20 ms max.
Dielectric strength	2,000 VAC (coil contact)
Ambient temperature	Operating -55 C to 70 C (no icing or condensation)
Size in mm	28 H x 21.5 W x 36 D

### Contact Ratings

Number of poles	2-pole		4-pole		4-pole (bifurcated)	
	Resistive load	Inductive load	Resistive load	Inductive load	Resistive load	Inductive load
Load						
Rated load	5 A at 250 VAC	2 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC
	5 A at 30 VDC	2 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC
Rated carry current	10 A		5 A			
Max. switching voltage	250 VAC, 125 VDC					
Max. switching current	10 A		5 A			
Max. switching power	2,500 VA, 300 W	1,250 VA, 300 W	1,250 VA, 150 W	500 VA, 150 W	1,250 VA, 150 W	500 VA, 150 W
Min. permissible load	1 mA at 5 VDC		1 mA at 1 VDC		100 µA at 1 VDC	
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.				20,000,000 operations min.	
Electrical life	500,000 operations minimum		200,000 operations		100,000 operations	

# Electromechanical Relays

# LY



## Plug-In General-Purpose Relay

The LY series is equipped with an arc barrier and built-in diode. Wide range of contact forms and mounting options available. Long dependable service life is assured by Ag-alloy contacts.

- SPDT, DPDT, 3PDT and 4PDT contact types
- 10 A rated load
- DIN rail by socket, also PCB and flange mounting types available
- High dielectric strength (2,000 VAC)
- Choose models with single or bifurcated contacts, LED indicator, diode surge suppression, push-to-test button, or RC circuit
- All models meet UL and CSA approvals; VDE, LR, and SEV approved versions are available
- Relays plug into sockets, offer solder terminals
- RoHS compliant



## Specifications

- Contact form: SPDT, DPDT, 3PDT, 4PDT
- Contact ratings:
  - SPDT: 15 A at 110 VAC/24 VDC (resistive);
    - 10 A at 110 VAC/7 A at 24 VDC (inductive)
  - DPDT, 3PDT, 4PDT: 10 A at 110 VAC/24 VDC (resistive);
    - 7.5 A at 110 VAC/5 A at 24 VDC (inductive)
  - DPDT bifurcated contacts: 5 A at 110 VAC/24 VDC (resistive);
    - 4 A at 110 VAC/24 VDC (inductive)
- Operate time: 25 ms max.
- Release time: 25 ms max.
- Must operate voltage: 80% max. of rated voltage
- Must release voltage: 30% max. of rated voltage (AC); 10% max. (DC)
- Electrical service life: 200,000 operations minimum;
  - 500,000 operations minimum, bifurcated contact models
- Dimensions:
  - LY1, LY2: 28 H x 21.5 W x 36 D mm
  - LY3: 28 H x 31.5 W x 36.5 D mm
  - LY4: 28 H x 41.5 W x 36 D mm

## Ordering Information

### Relays

Features	Contact form	Coil ratings		Power consumption	Model
		Voltage	Resistance (ohms)		
Plug-in	SPDT	24 VAC	180	1.0 to 1.2 VA	LY1-AC24
		120 VAC	4430	0.9 to 1 VA	LY1-AC110/120
		12 VDC	160	0.9 W	LY1-DC12
		24 VDC	650		LY1-DC24
	DPDT		180	1.0 to 1.2 VA	LY2-AC24
		120 VAC	4430	0.9 to 1 VA	LY2-AC110/120
		12 VDC	160	0.9 W	LY2-DC12
		24 VDC	650		LY2-DC24
	3PDT	120 VAC	2300	1.6 to 2.0 VA	LY3-AC120
		24 VDC	410	1.4 W	LY3-DC24
	4PDT	120 VAC	1800	1.95 to 2.5 VA	LY4-AC120
		12 VDC	100	1.5 W	LY4-DC12
24 VDC		650	LY4-DC24		

## Relays (Continued)

Features	Contact form	Coil ratings		Power consumption	Model	
		Voltage	Resistance (ohms)			
Plug-in with LED and test button	DPDT	120 VAC	4430	0.9 to 1 VA	LY2I4N-AC110/120	
		24 VDC	650	0.9 W	LY2I4N-DC24	
Flange mounting	SPDT	24 VAC	180	1.0 to 1.2 VA	LY1F-AC24	
		120 VAC	4430	0.9 to 1 VA	LY1F-AC110/120	
		12 VDC	160	0.9 W	LY1F-DC12	
		24 VDC	650		LY1F-DC24	
	DPDT			180	1.0 to 1.2 VA	LY2F-AC24
			120 VAC	4430	0.9 to 1 VA	LY2F-AC110/120
			12 VDC	160	0.9 W	LY2F-DC12
			24 VDC	650		LY2F-DC24

## Accessories

Item	Description	Model
Sockets	DIN-rail/surface-mounting, screw terminal, LY1 (1-pole), LY2 (2-pole) relays	PTF08A-E
	DIN-rail/surface-mounting, screw terminal, LY3 (3-pole) relays	PTF11A
	DIN-rail/surface-mounting, screw terminal, LY4 (4-pole) relays	PTF14A-E
	Back mounting socket, solder terminals, LY1 (1-pole), LY2 (2-pole) relays	PT08
	Back mounting socket, solder terminals, LY3 (3-pole) relays	PT11
	Back mounting socket, solder terminals, LY4 (4-pole) relays	PT14

# Electromechanical Relays

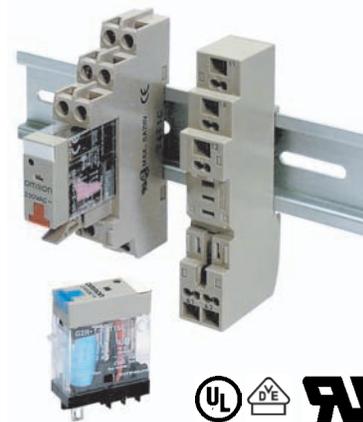
# G2R-S

Quick Link  
R225

## General-Purpose, Plug-In Relays

The G2RS relay sets new standards in feature design and reliability. These slim-line interface relays give enhanced features and flexibility for more user-friendly installation, commissioning and operation. G2RS comes with standard nameplate and mechanical indicator.

- Space saving - 16 mm width with socket
- LED indicator models; color coded green for DC versions, red for AC versions
- Test button, momentary and lockable, blue for DC, red for AC versions
- Diode and varistor surge suppression models available
- Additional coil voltages available
- Screw-less clamp-terminal sockets available
- RoHS compliant



## Specifications

- Contact form: SPDT (G2R-1-S); DPDT (G2R-2-S)
- Contact resistance: 100 mΩ max.
- Contact ratings: 10 A at 250 VAC (G2R-1-S), resistive
  - 5 A at 250 VAC (G2R-2-S), resistive
- Minimum permissible load: SPDT: 100 mA at 5 VDC
  - DPDT: 10 mA at 5 VDC
- Operate time: 15 ms max.
- Release time: SPDT: 10 ms max. (AC), 5 ms max. (DC)
  - DPDT: 15 ms max. (AC), 10 ms max. (DC)
  - Models with diode: 20 ms max.
- Must operate voltage: 80% max. of rated voltage (AC); 70% max. (DC)
- Must release voltage: 30% min. of rated voltage (AC); 15% min. (DC)
- Electrical service life: 100,000 operations minimum
- Dimensions: 35.5 H x 13 W x 29 D mm

## Ordering Information

### Relays

A wide range of contact forms and coil voltages are available. Contact Omron.

Features	Contact form	Coil ratings			Power consumption	Model
		Voltage	Current (mA)	Resistance (ohms)		
General purpose	SPDT	12 VDC	43.2	278	0.53 W	G2R-1-S-DC12S
		24 VDC	21.6	1113		0.9 VA at 60 Hz
		120 VAC	7.5	7286	G2R-1-S-AC24S	
		240 VAC	3.2	30,360	G2R-1-S-AC120S	
	DPDT	12 VDC	43.2	278	0.53 W	
		24 VDC	21.6	1113	0.9 VA at 60 Hz	G2R-2-S-DC24S
		120 VAC	7.5	7286		G2R-2-S-AC24S
		240 VAC	3.2	30,360		G2R-2-S-AC120S
LED indicator	SPDT	24 VDC	21.6	1113		0.53 W
		DPDT	120 VAC	7.5	7286	0.9 VA at 60 Hz
	240 VAC		3.2	30,360	G2R-2-SN-AC120S	
	DPDT	120 VAC	7.5	7286	G2R-2-SN-AC240S	
240 VAC		3.2	30,360	G2R-2-SN-AC240S		
LED indicator and diode	SPDT	12 VDC	43.2	278	0.53 W	G2R-1-SND-DC12S
		24 VDC	21.6	1113		G2R-1-SND-DC24S
	DPDT	120 VAC	7.5	7286	0.53 W	G2R-2-SND-DC12S
		240 VAC	3.2	30,360		G2R-2-SND-DC24S

## Accessories

Description	Model
Track mount socket for G2R-1-S, screw-less clamp terminals	P2RF-05-S
Track mount socket for G2R-1-S, screw terminals	P2RF-05-E
Back mount socket for G2R-1-S	P2R-05P
Track mount socket for G2R-2-S, screw-less clamp terminals	P2RF-08-S
Track mount socket for G2R-2-S, screw terminals	P2RF-08-E
Back mount socket for G2R-2-S	P2R-08-P

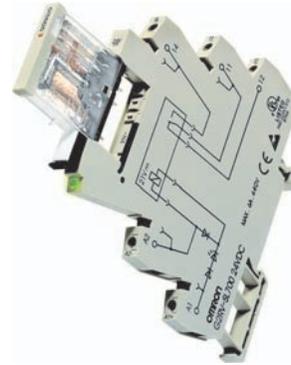
# Electromechanical Relays

# G2RV

Quick Link  
R226

## Industrial Super Slim 6 A Relay

- Reinforced relay plug-in terminals for reliable connection and replacement
- LED indicator, clear relay case, and mechanical flag for easy verification of operation
- Slim outline to save space in high volume rack and PLC applications
- Low power consumption for system energy savings
- Rated at full 6 A @ 250 VAC/30 VDC
- 6.2 mm wide screw terminal sockets or push-in clamp terminal sockets for simplified wiring
- RoHS compliant



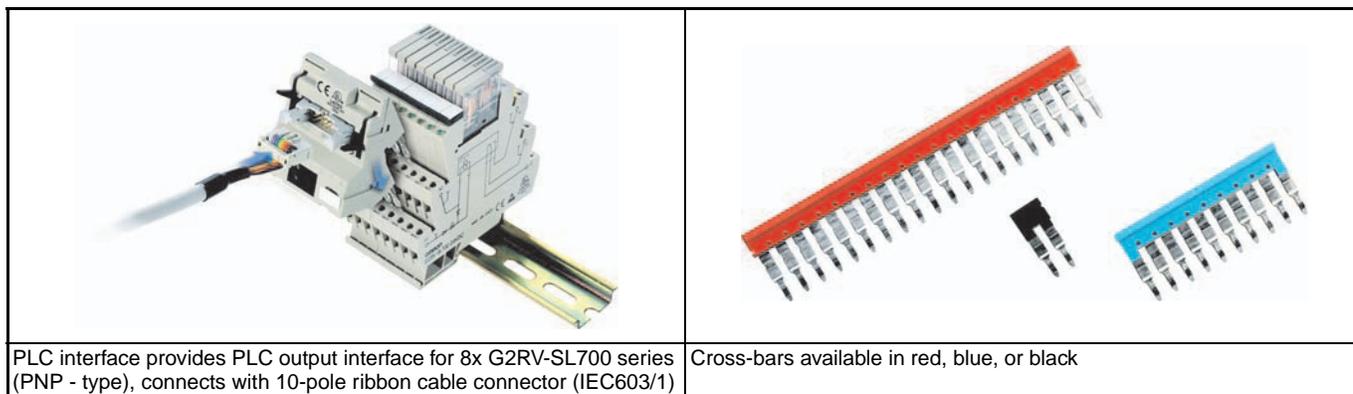
## Ordering Information

### Relay and Socket Combinations

Input voltage	Screw terminal models	Push-in terminal models
12 VDC	G2RV-SL700 DC12 (DC11)	G2RV-SL500 DC12 (DC11)
24 VDC	G2RV-SL700 DC24 (DC21)	G2RV-SL500 DC24 (DC21)
24 VAC/DC	G2RV-SL700 AC/DC24	G2RV-SL500 AC/DC24
48 VAC/DC	G2RV-SL700 AC/DC48	G2RV-SL500 AC/DC48
110 VAC	G2RV-SL700 AC110	G2RV-SL500 AC110
230 VAC	G2RV-SL700 AC230	G2RV-SL500 AC230

## Accessories

Item	Description	Model	Note
PLC interface	Connect 8 relays and PLC output	P2RVC-8-0-F	—
Cross bar	2-pole	P2RVM-020_	_ = select color R (red) S (blue) B (black)
	3-pole	P2RVM-030_	
	4-pole	P2RVM-040_	
	10-pole	P2RVM-100_	
	20-pole	P2RVM-200_	
Label	Plastic labels for mounting on socket	R99-15	—
Label (sticker)	Paper labels for mounting on socket or relay	R99-16	
Separating plates	50 plates (minimum order) provides isolation between adjacent relays to achieve 400 V isolation	P2RV-S	
Relay	Replacement for 12 VDC G2RV-SL Series	G2RV-1-S DC11	
	Replacement for 24 VDC and 24 VAC/VDC G2RV-SL Series	G2RV-1-S DC21	
	Replacement for 48 VAC/VDC and 110, 230 VAC G2RV-SL Series	G2RV-1-S DC48	



PLC interface provides PLC output interface for 8x G2RV-SL700 series (PNP - type), connects with 10-pole ribbon cable connector (IEC603/1)

Cross-bars available in red, blue, or black

## Specifications

### Coil Ratings

Rated voltage	Rated current			Operate voltage	Release voltage	Power consumption		Input voltage
	AC		DC			% of rated voltage	AC (VA) Approx.	
	50 Hz	60 Hz		% of rated voltage				
12 VDC	—	—	27.2	80%	10%	—	300 mW	±10%
24 VDC	—	—	13.3	—	—	—	—	—
24 VAC/DC	21.1	22.5	13	—	—	0.5 VA	—	—
48 VAC/DC	8.5	9	5.2	—	—	0.4 VA	250 mW	—
110 VAC	7.1	7.5	—	—	—	0.8 VA	—	—
230 VAC	7.3	7.9	—	1.7 VA	—	—	—	—

### Technical Data

Item	Description
Operating time	15 ms max.
Release time	5 ms max.
Dielectric strength	4,000 VAC, 50/60 Hz for 1 min. between coil and contacts
	1,000 VAC, 50/60 Hz for 1 min. between contacts of same polarity
Ambient temperature	Operating: -40 C to 70 C (with no icing or condensation)
Size in mm	97.4 H x 6.2 W x 106.7 D max. (relay and socket complete unit)

### Contact Ratings

Contact form	SPDT	
Load	Resistive ( $\cos\phi = 1$ )	Inductive ( $\cos\phi = 0.4$ , L/R = 7 ms)
Rated load	2 A at 400 VAC; 6 A at 250 VAC; 6 A at 30 VDC	2.5 A at 250 VAC; 2 A at 30 VDC
Rated carry current	6 A	
Max. switching voltage	440 VAC, 125 VDC	
Max. switching current	6 A	
Max. switching power	1,500 VA; 180 W	500 VA; 60 W
Min. permissible load	5 mA at 5 VDC	
Mechanical life	5 million operations	
Electric life	100,000 operations (typical under rated load)	

# Electromechanical Relays

# G7L

Quick Link  
R227

## High-Capacity Relay Withstands Voltage Drops Without Chattering

High-capacity G7L relays offer a high-withstand voltage compatible with momentary voltage drops. Even with momentary voltage drops up to 50% of rated voltage, G7L was designed for no contact chattering. Long dependable service life is assured by Ag-alloy contacts.

- SPST-NO and DPST-NO types
- 30 A rated load
- UL Class B construction standard
- Wide-range AC-activated coil that handles 100 to 120 VAC at either 50 or 60 Hz
- Miniature hinge for maximum switching capacity, particularly for inductive loads
- Flame resistant materials (UL94V-0-qualifying) used for all insulation material
- Quick-connect, screw, and PCB terminals available



- DIN rail mounting socket with cover available
- Choose models with "E" bracket and upper bracket mounting, and push-to-test button
- RoHS compliant

## Specifications

- Contact form: SPST-NO, DPST-NO
- Contact ratings:
  - SPST-NO: 30 A at 220 VAC (resistive); 25 A at 220 VAC (inductive)
  - DPST-NO: 25 A at 220 VAC (resistive); 25 A at 220 VAC (inductive)
- Minimum permissible load: 100 mA at 5 VDC
- Operate time: 30 ms max.
- Release time: 30 ms max.
- Must operate voltage: 75% max. of rated voltage
- Must release voltage: 15% max. of rated voltage
  - Electrical service life: 100,000 operations minimum
- Dimensions: Quick-connect: 47 H x 33.5 W x 50.5 D mm
  - Screw terminal: 49 H x 34.5 W x 50.5 D mm
  - 68.5 D mm at mounting flanges

## Ordering Information

A wide range of other coil voltages and mounting configurations are available. Contact Omron.

### Relays with Quick-Connect Terminals

Features	Contact form	Coil ratings		Power consumption	Model
		Voltage	Resistance (ohms)		
Upper bracket mounting, with test button	SPST-NO	24 VAC	303	1.7 to 2.5 VA	G7L-1A-TUBJ-CB AC24
		110/120 VAC	5260		G7L-1A-TUBJ-CB AC110120
	DPST-NO	24 VAC	303		G7L-2A-TUBJ-CB AC24
		110/120 VAC	5260		G7L-2A-TUBJ-CB AC110120

### Relays with Screw Terminals

Features	Contact form	Coil ratings		Power consumption	Model
		Voltage	Resistance (ohms)		
Upper bracket mounting, with test button	SPST-NO	24 VAC	303	1.7 to 2.5 VA	G7L-1A-BUBJ-CB AC24
		110/120 VAC	5260		G7L-1A-BUBJ-CB AC110120
	DPST-NO	24 VAC	303		G7L-2A-BUBJ-CB AC24
		110/120 VAC	5260		G7L-2A-BUBJ-CB AC110120

## Accessories

Item	Description	Model
Socket and cover	DIN-rail mounting front-connecting socket with screw terminals and cover	P7LF-06

# Multi-Pole Power Relay

# G7Z

Quick Link

R228

## Multi-Pole Power Relay for Carrying and Switching Contactor Current Range of 40 A at 440 VAC

- Typical applications: high current or high inrush power supplies, commercial and industrial. 40 A at 440 VAC can be carried and switched on each of 4 poles
- Possible to reach a maximum load capacity of 160 A when using 4-pole parallel connections
- Provides EN 60947-4-1 certified safety functionality via mirror contact mechanisms
- Using a combination of the relay and auxiliary contact blocks, loads range from 0.1 mA to 40 A in the same relay
- Directly mounts to DIN track
- Contact configurations: 4PDT, 3PST-NO/SPST-NC, or DPDT/DPDT
- Auxiliary contacts: DPST-NO, SPST-NO/SPST-NC, or DPST-NC
- Connection: Screw terminals
- Double break, AgSnIn main contact; bifurcated crossbar auxiliary contact
- Service life: 100,000 operations minimum with DC resistive load
- RoHS compliant
- Approved standards: UL508, UL840 (File No. E41643), CSA C22.2 No. 14, TÜV (EN 60947-4-1, Certification No. R50079155) and CE
- Dimensions: 92 H x 62 W x 45 D mm



## Specifications

### Ratings

#### Coil Ratings

Rated voltage	Item	Rated current	Coil resistance	Must operate voltage	Must release voltage	Maximum voltage	Power consumption
				Percentage of rated voltage			
12 VDC		333 mA	39 Ω	75% max.	10% min.	110%	Approx. 3.7 W
24 VDC		154 mA	156 Ω				

- Note:**
1. Rated current and coil resistance were measured at a coil temperature of 23 C with coil resistance of  $\pm 15\%$ .
  2. Operating characteristics were measured at a coil temperature of 23 C.
  3. The maximum allowable voltage is the maximum value of the fluctuation range for the Relay coil operating power supply and was measured at an ambient temperature of 23 C. There is, however, no continuous allowance.

## Contact Ratings

### Relay

Item	Model Load	G7Z-4A-□Z, G7Z-3A1B-□Z, G7Z-2A2B-□Z		
		Resistive load	Inductive load $\cos\phi = 0.3$	Resistive load L/R = 1 ms
Contact structure		Double break		
Contact material		AgSnIn		
Rated load	NO	40 A at 440 VAC	22 A at 440 VAC	5 A at 110 VDC
	NC	25 A at 440 VAC	10 A at 440 VAC	5 A at 110 VDC
Rated carry current	NO	40 A	22 A	5 A
	NC	25 A	10 A	5 A
Maximum contact voltage		480 VAC		125 VDC
Maximum contact current	NO	40 A		
	NC	25 A		
Maximum switching capacity	NO	17,600 VA	9,680 VA	550 W
	NC	11,000 VA	4,400 VA	550 W
Minimum load		2 A at 24 VDC		

**Note:** The ratings for the auxiliary contact block mounted on the G7Z are the same as those for the G73Z auxiliary contact block.

### Auxiliary Contact Block

Item	Model Load	G73Z-20Z, G73Z-11Z, G73Z-02Z		
		Resistive load	Inductive load $\cos\phi = 0.3$	Resistive load L/R = 1 ms
Contact structure		Double break		
Contact material		AgSnIn + Ag Rotary		
Rated load		1 A at 440 VAC	0.5 A at 440 VAC	5 A at 110 VDC
Rated carry current		1 A		
Maximum contact voltage		480 VAC		125 VDC
Maximum contact current		1 A		
Maximum switching capacity		440 VA	220 VA	110 W
Minimum load		1 mA at 5 VDC		

## Ordering Information

### Relay with Auxiliary Contact Block

#### Relay with Auxiliary Contact Block (for Screw Terminals)

Contact configuration		Rated voltage	Model
Relay	Auxiliary contact block		
4PST-NO	DPST-NO	12, 24 VDC	G7Z-4A-20Z
	SPST-NO/SPST-NC		G7Z-4A-11Z
	DPST-NC		G7Z-4A-02Z
3PST-NO/SPST-NC	DPST-NO		G7Z-3A1B-20Z
	SPST-NO/SPST-NC		G7Z-3A1B-11Z
	DPST-NC		G7Z-3A1B-02Z
DPST-NO/DPST-NC	DPST-NO		G7Z-2A2B-20Z
	SPST-NO/SPST-NC		G7Z-2A2B-11Z
	DPST-NC		G7Z-2A2B-02Z

### Accessories (Order Separately)

#### Auxiliary Contact Block

Contact configuration	Model
DPST-NO	G73Z-20Z
SPST-NO/SPST-NC	G73Z-11Z
DPST-NC	G73Z-02Z

# Electromechanical Relays

# MGN

Quick Link

R229

## Heavy Duty Power Relay Switches 30-Amp Loads

Rugged MGN relays handle high switching loads and feature rugged construction.

- 30 A heavy duty power relay
- Reliable 5/16-inch diameter Ag alloy contacts
- Class F coil insulation system for 155 C total temperature
- Coil molded in DuPont Rynite® resin for environmental protection
- Rugged construction rivets screw terminals to base
- Short and long based models available
- Aluminum dust cover with sealed knock-out holes for conduit fittings available

\* Rynite® is a registered trademark of E. I. du Pont de Nemours and Company for its brand of thermoplastic polyester resin.



## Specification

- Contact form: SPDT, SPST-NO, DPDT, DPST-NO
- Contact ratings:
  - Resistive: 30 A at 240 VAC; 20 A at 600 VAC
  - Horsepower: 1 1/2 hp at 120 or 240 VAC; 2 hp @ 240 VAC
  - Lamp load (ballast): 3600 W at 120 or 240 VAC
- Operate time: 30 ms max.
- Release time: 30 ms max.
- Must operate voltage: 85% max. of rated voltage (AC); 75% max. (DC)
- Electrical service life: 100,000 operations minimum
- Dimensions:
  - Short base: 55.88 H x 63.5 W x 63.5 D mm
  - Long base: 60.45 x 63.5 W x 84.33 D

## Ordering Information

Features	Contact form	Coil ratings		Power consumption	Model				
		Voltage	Resistance (ohms)						
Short base	SPDT	24 VAC	11.5	9.5 VA	MGN1C-AC24				
		120 VAC	295.0		MGN1C-AC120				
		12 VDC	72.0	2 W	MGN1C-DC12				
		24 VDC	290.0		MGN1C-DC24				
	SPST-NO-DM	12 VAC	2.85	9.5 VA	MGN1X-AC12				
		24 VAC	11.5		MGN1X-AC24				
		120 VAC	295.0	2 W	MGN1X-AC120				
		12 VDC	72.0		MGN1X-DC12				
	SPST-NO			11.5	9.5 VA	MGN1A-AC24			
						MGN2A-AC24			
	DPST-NO			11.5	9.5 VA	MGN2A-AC120			
						MGN2A-AC240			
						12 VDC	72.0	2 W	MGN2A-DC12
						24 VDC	290.0		MGN2A-DC24

## Ordering Information (Continued)

Features	Contact form	Coil ratings		Power consumption	Model
		Voltage	Resistance (ohms)		
Long base	DPDT	24 VAC	11.5	9.5 VA	MGN2C-AC24
		120 VAC	295.0		MGN2C-AC120
		240 VAC	1170		MGN2C-AC240
		12 VDC	72.0	2 W	MGN2C-DC12
		24 VDC	290.0		MGN2C-DC24
	DPDT with magnetic blow-out	120 VAC	295.0	9.5 VA	MGN2CM-AC120
		24 VDC	290.0	2 W	MGN2CM-DC24

## Accessories

Description	Dimensions	Model
Dust cover with snap action closure. Aluminum construction.	76.2 H x 127 W x 101.6 D mm	MGCOV

# Electromechanical Relays

# MJN



## Power Relay Reduces Arcing with Wide Contact Spacing

The MJN relays are ideal for a wide range of applications including motor loads, lighting loads and resistive loads.

- 10 A heavy duty power relay
- Superior arc suppression from 3/16" through-air and 3/8" over surface spacing
- Reliable 3/16-inch dia. silver alloy contacts
- Interlocked frame and contact block assures correct contact alignment at plug-in
- Industry standard contact configuration and termination (0.187-inch tab terminals)
- Options available include open and dust cover relays, indicator lamps and push-to-test buttons
- Socket and flange mounting models



## Specification

- Contact form: SPDT, DPDT, 3PDT
- Contact ratings:
  - 10 A models: 10 amp @ 28 VDC and 120/240 VAC at 80% pf, 1/3 hp @ 120 VAC, 1/2 hp @ 277/240/480/600 VAC, 36 LRA--8.5FLA at 18 VDC, 3 amp @ 480/600 VAC at 80% pf, 10 amp @ 277 VAC resistive
  - 20 A models: 20 amp @ 28 VDC and 120/240/277 VAC, 10 amp @ 480/600 VAC, 3/4 hp @ 120 VAC, 1-1/2 hp @ 240 VAC, 17FLA, 65LRA, 300 VAC
  - 30 A models: 30 amp @ 28 VDC, 15 amp @ 480/600 VAC, 1 hp @ 120 VAC, 1-1/2 hp @ 240 VAC
- Operate time: 15 ms (nominal); 20 ms max.
- Release time: 6 ms (nominal); 10 ms max.
- Latch time: 13 ms (nominal) + 50 ms minimum latch pulse at nominal voltage
- Unlatch time: 13 ms (nominal) + 50 ms minimum unlatch pulse at nominal voltage
- Duty cycle: Rated for continuous duty operation at 25% overvoltage
- Electrical service life: 100,000 operations minimum
- Dimensions:
  - Socket mount: 48.38 H x 38.73 W x 35.56 D mm
  - Flange mount: 73.66 H x 38.73 W x 35.56 D mm

## Ordering Information

Contact rating	Contact form	Coil ratings		Case style	Terminals	Model
		Voltage	Resistance (ohms)			
10 A	SPDT	12 VDC	120	Socket	8-pin	MJN1C-DC12
		24 VDC	470	Flange		MJN1CF-DC12
10 A	DPDT	24 VAC	75	Socket		MJN1CF-DC24
		120 VAC	2.25 K			MJN2C-AC24
		240 VAC	9.1K		MJN2C-AC120	
		12 VDC	120		MJN2C-AC240	
		24 VDC	470		MJN2C-DC12	
		110 VDC	10 K		MJN2C-DC24	
10 A	DPDT	24 VAC	75	Flange	MJN2C-DC110	
		120 VAC	2.25 K		MJN2CF-AC24	
		12 VDC	120		MJN2CF-AC120	
		24 VDC	470		MJN2CF-DC12	
					MJN2CF-DC24	

## Ordering Information (Continued)

Contact rating	Contact form	Coil ratings		Case style	Terminals	Model	
		Voltage	Resistance (ohms)				
10 A	DPDT, latching	24 VAC	88 latch/1.74 K unlatch	Socket	8-pin	MJN2CK-AC24	
		120 VAC	2.09 K latch/17.43K unlatch			MJN2CK-AC120	
		12 VDC	80 latch/275 unlatch			MJN2CK-DC12	
		24 VDC	330 latch/1.07 K unlatch			MJN2CD-DC24	
10 A	3PDT		72		Flange	11-pin	MJN3C-AC24
		120 VAC	1.7 K				MJN3C-AC120
		12 VDC	120				MJN3C-DC12
		24 VDC	470				MJN3C-DC24
		110 VDC	10 K	MJN3C-DC110			
10 A	3PDT	24 VAC	72	MJN3CF-AC24			
		120 VAC	1.7 K			MJN3CF-AC120	
		240 VAC	7.2 K			MJN3CF-AC240	
		12 VDC	120			MJN3CF-DC12	
		24 VDC	470			MJN3CF-DC24	
20 A	DPDT		75	MJN2CE-AC24			
		120 VAC	2.25 K	MJN2CE-AC120			
		12 VDC	120	MJN2CE-DC12			
		24 VDC	470	MJN2CE-DC24			

## Accessories

Description	Model
Track mount socket, square, 11-pin, screw terminal	PTF11PC
Screw mount socket, square, 11-pin, 0.187" quick-connect tab terminals	PTF11QDC
Screw mount socket, square, 11-pin, screw terminal	PTF21PC
Screw mount socket, square, 11-pin, PCB terminal	PTFPCB

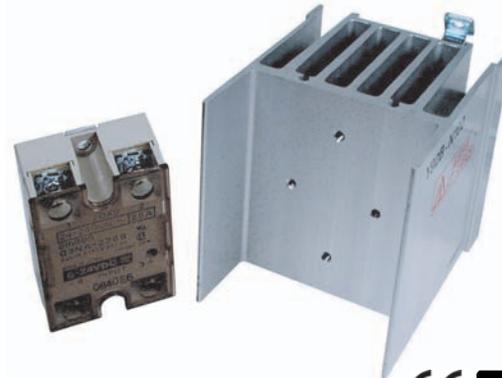
# Solid State Relays

# G3NA

Quick Link  
R422

## Reliable SSRs in Industry Standard Package

- One size for all output load models provides a uniform mounting pitch
- Built-in MOV absorbs external surges
- Operation indicator (red LED) for monitoring operation
- Protective cover for greater safety included
- AC output relays with 75 A and 90 A currents available
- 400-600 volt load models available
- All models are CE marked



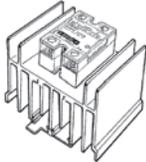
## Specifications

- Zero cross function
- Leakage current: 5 mA at 100 VAC; 10 mA at 200 VAC
- Maximum output load when mounted to a heat sink

## G3NA Solid State Relays

Appearance/ dimensions H x W x D mm	Isolation	Input voltage	Load current	Load voltage	Inrush current	Model		
 27 x 43 x 58	Phototriac	5 to 24 VDC	10 A at 24 to 240 VAC	19 to 264 VAC	150 A (1 cycle, 60 Hz)	<b>G3NA-210B DC5-24</b>		
			20 A at 24 to 240 VAC		220 A (1 cycle, 60 Hz)	<b>G3NA-220B DC5-24</b>		
			25 A at 24 to 240 VAC		220 A (1 cycle, 60 Hz)	<b>G3NA-225B DC5-24</b>		
			40 A at 24 to 240 VAC		440 A (1 cycle, 60 Hz)	<b>G3NA-240B DC5-24</b>		
			75 A at 24 to 240 VAC		800 A (1 cycle, 60 Hz)	<b>G3NA-275B-UTU DC5-24</b>		
			90 A at 24 to 240 VAC		1000 A (1 cycle, 60 Hz)	<b>G3NA-290B-UTU DC5-24</b>		
			Photocoupler		20 A at 200 to 480 VAC	180 to 528 VAC	220 A (1 cycle, 60 Hz)	<b>G3NA-420B DC5-24</b>
							10 A at 400 to 600 VAC	360 to 660 VAC
	25 A at 400 to 600 VAC	220 A (1 cycle, 60 Hz)		<b>G3NA-625B DC5-24</b>				
	50 A at 400 to 600 VAC	440 A (1 cycle, 60 Hz)		<b>G3NA-650B DC5-24</b>				
	100 to 120 VAC, 50/60 Hz	25 A at 24 to 240 VAC		19 to 264 VAC	220 A (1 cycle, 60 Hz)	<b>G3NA-225B AC100-120</b>		
					40 A at 24 to 240 VAC	440 A (1 cycle, 60 Hz)	<b>G3NA-240B AC100-120</b>	
					100 to 240 VAC, 50/60 Hz	75 A at 24 to 240 VAC	800 A (1 cycle, 60 Hz)	<b>G3NA-275B-UTU AC100-240</b>
							90 A at 24 to 240 VAC	1000 A (1 cycle, 60 Hz)
	10 A at 400 to 600 VAC	360 to 660 VAC	150 A (1 cycle, 60 Hz)	<b>G3NA-610B AC100-240</b>				
				25 A at 400 to 600 VAC	220 A (1 cycle, 60 Hz)	<b>G3NA-625B AC100-240</b>		
50 A at 400 to 600 VAC				440 A (1 cycle, 60 Hz)	<b>G3NA-650B AC100-240</b>			

## Heat Sinks

Description	Applicable solid-state relays	Model
Track mount 	For 5 A and 10 A relays: G3NA-205B, G3NA-210B, G3NA-D210B, G3NA-410B, G3NA-610B	<b>Y92B-N50</b>
	For 20 A relays: G3NA-220B, G3NA-420B	<b>Y92B-N100</b>
	For 25 A and 40 A relays: G3NA-225B, G3NA-240B, G3NA-425B, G3NA-440B, G3NA-625B	<b>Y92B-N150</b>
	For 50 A relays: G3NA-450B	<b>Y92B-P250</b>
	For 50 A at 600 VAC relays: G3NA-650B DC5-24, G3NA-650B AC100-240	<b>Y92B-P250N</b>
	For 75 A and 90 A relays: G3NA-275B-UTU, G3NA-290B-UTU, G3NA-475-UTU, G3NA-490B-UTU	<b>Y92B-P250NF</b>
Standard mount	For 5 A, 10 A and 20 A relays: G3NA-205B, G3NA-210B, G3NA-D210B, G3NA-220B, G3NA-410B, G3NA-420B	<b>Y92B-A100</b>
	For 25 A and 40 A relays: G3NA-225B, G3NA-240B, G3NA-425B G3NA-440B	<b>Y92B-A150N</b>
	For 40 A relay G3NA-440B	<b>Y92B-A250</b>

## Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PPF-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PPF-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PPF-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PPF-M</b>
Track mounting plate		44 H x 81 W	Directly mounts SSR to DIN rail track without heat sink	<b>R99-12 FOR G3NA</b>

# Solid State Relays

# G3PA/G3PB

Quick Link

R423

## Single Phase SSRs with Built-In Heat Sinks

- Built-in heat sink increases service life and reliability for frequently cycling circuits
- Operation indicator turns on when control power is applied
- DIN rail mount
- Relays with replaceable triac output cartridge (G3PA) simplifies maintenance
- Built-in linking brackets for dense side-by-side mounting (G3PA)
- Conforms to international safety standards: UL508 File No. E64562; CSA C22.2 (No. 14, No. 950) File No. LR35535; EN60950 File No. 5915UG



## Specifications

- Zero cross function, reduces initial inrush load currents
- Leakage current:
  - 10 A and 20 A G3PA: 5 mA max. at 120 VAC 10 mA max. at 230 VAC
  - 40 A and 60 A G3PA: 10 mA max. at 120 VAC 20 mA max. at 230 VAC
  - 20 A, 200-480 VAC G3PA: 20 mA max. at 400 VAC
  - All G3PB models: 10 mA max. at 200 VAC

## G3PA Single-Phase SSRs, Replaceable Triac Output Cartridge

Appearance Dimensions H x W x D mm	Isolation	Input voltage	Load current	Load voltage	Inrush current	Model	
 100 x 27 x 100	Phototriac	5-24 VDC	10 amps	19 to 264 VAC (50/60 Hz)	150 amps, 60 Hz	G3PA-210B-VD-DC5-24	
 100 x 37 x 100			20 amps		220 amps, 60 Hz		G3PA-220B-VD-DC5-24
 100 x 47 x 100			40 amps		440 amps, 60 Hz		G3PA-240B-VD-DC5-24

## G3PA Single-Phase SSRs, Replaceable Triac Output Cartridge (Cont'd)

Appearance Dimensions H x W x D mm	Isolation	Input voltage	Load current	Load voltage	Inrush current	Model
 100 x 110 x 100	Phototriac	5-24 VDC	60 amps	19 to 264 VAC (50/60 Hz)	440 amps, 60 Hz	<b>G3PA-260B-VD DC5-24</b>
 100 x 37 x 100		12-24 VDC	20 amps	180 to 528 VAC (50/60 Hz)	220 amps, 60 Hz	<b>G3PA-420B-VD DC5-24</b>

## G3PB Single-Phase SSRs

Appearance Dimensions H x W x D mm	Isolation	Input voltage	Load current	Load voltage	Inrush current	Model
 100 x 22.5 x 100	Phototriac	12-24 VDC	15 amps	75 to 264 VAC (50/60 Hz)	150 amps, 60 Hz	<b>G3PB-215B-VD DC12-24</b>
			25 amps		220 amps, 60 Hz	<b>G3PB-225B-VD DC12-24</b>
35 amps			440 amps, 60 Hz		<b>G3PB-235B-VD DC12-24</b>	
45 amps					<b>G3PB-245B-VD DC12-24</b>	
 100 x 44.5 x 100						

## Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PFP-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PFP-M</b>

## Replacement Parts

Description	Carry current	Applicable SSR	Model
Power device cartridge	10 A	G3PA-210B-VD DC5-24	<b>G32A-A10-VD DC5-24</b>
	20 A	G3PA-220-VD DC5-24	<b>G32A-A20-VD DC5-24</b>
	40 A	G3PA-240-VD DC5-24	<b>G32A-A40-VD DC5-24</b>
	60 A	G3PA-260-VD DC5-24	<b>G32A-A60-VD DC5-24</b>
	20 A	G3PA-420-VD DC12-24	<b>G32A-A420-VD DC12-24</b>

# Solid State Relays

## G3PB

Quick Link

R424

### 3-Phase SSRs with Built-In Heat Sinks

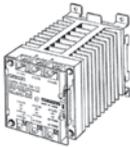
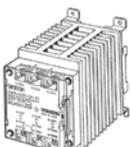
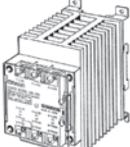
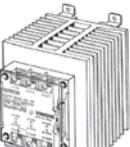
- Save space and installation time with new heat sink construction
- 3-pole models stocked; 2-pole models available
- DIN track mounting supported as standard (screw mounting also possible)
- Conforms to all UL, CSA, VDE and CE requirements



### Specifications

- Zero cross function reduces noise in the circuit by restricting the switching operations to the point where the voltage crosses zero
- Leakage current: 20 mA at 480 VAC

### G3PB 3-Phase SSRs

Appearance Dimensions H x W x D mm	Isolation	Input voltage	Load current (Heater capacity: Class-1 AC resistive load)	Load voltage	Inrush current	Model	
 100 x 80 x 150.5	Phototriac coupler	12 to 24 VDC	15 A (12.5 kW max.)	200 to 480 VAC	220 A (60 Hz, 1 cycle)	<b>G3PB-515B-3N-VD DC12-24</b>	
 120 x 80 x 150.5			25 A (20.7 kW max.)			<b>G3PB-525B-3N-VD DC12-24</b>	
 140 x 80 x 150.5			35 A (29.0 kW max.)			440 A (60 Hz, 1 cycle)	<b>G3PB-535B-3N-VD DC12-24</b>
 140 x 110 x 150.5			45 A (37.4 kW max.)			<b>G3PB-545B-3N-VD DC12-24</b>	

## Accessories

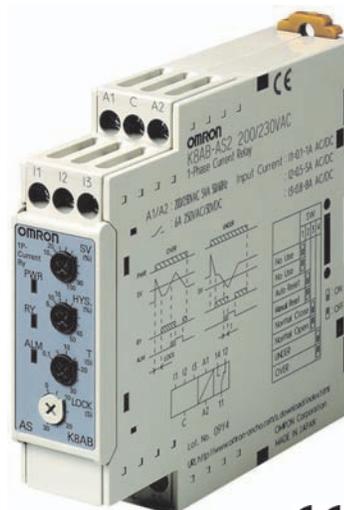
Description	Appearance	Dimensions H x W x D mm	Specification	Model
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PFP-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PFP-M</b>

# Monitoring Relays K8AB-AS



## Ultra-Slim 22 mm Current Monitoring Relays

- Monitor industrial equipment for overcurrents and undercurrents
- Manual resetting and automatic resetting supported by one relay
- Start-up lock and operating time can be set separately
- Output relay can be switches between normally open and normally closed
- Accepts input from commercially available current transformers (0 to 1 A, 0 to 5 A)
- Monitor output status from LED indicator
- Track-mount or surface mount with M4 screws
- Dimensions: 90 H x 22.5 W x 100 D mm



## Single-Phase Current Monitoring Relays

Features	Input current	Output	Model
Over- and undercurrent	2 to 20 mA AC/DC, 10 to 100 mA AC/DC 50 to 500 mA AC/DC	SPDT relay, 6 A at 250 VAC	K8AB-AS1 100-115 VAC
			K8AB-AS1 24 VACDC
	0.1 to 1 A AC/DC 0.5 to 5 A AC/DC 0.8 to 8 A AC/DC		K8AB-AS2 100-115 VAC
			K8AB-AS2 24 VACDC
	10 to 100 A AC/DC, 20 to 200 A AC/DC; requires K8AC-CT200L current transformer		K8AB-AS3 100-115 VAC
			K8AB-AS3 24 VACDC

# Voltage Monitoring Relays K8AB-V



## Ultra-Slim 22 mm Voltage Monitoring Relays

- Monitor overvoltage and undervoltage simultaneously with independent settings and outputs
- Manual resetting and automatic resetting supported by one relay
- Pre-alarm monitoring mode enables early warning of conditions to take preventative action
- Monitor output status from LED indicator
- Track-mount or surface mount with M4 screws
- Dimensions: 90 H x 22.5 W x 100 D mm



## Single-Phase Voltage Relays

Description	Features	Input voltage	Output	Model
1-Phase Voltage Relay	Over- and undervoltage	6 to 60 mV AC/DC, 10 to 100 mV AC/DC, 30 to 300 mV AC/DC	SPDT relay, 6 A at 250 VAC	K8AB-VS1 100-115 VAC
				K8AB-VS1 24 VACDC
		1 to 10 V AC/DC, 3 to 30 V AC/DC, 15 to 150 V AC/DC		K8AB-VS2 100-115 VAC
				K8AB-VS2 24 VACDC
		20 to 200 V AC/DC, 30 to 300 V AC/DC, 60 to 600 V AC/DC		K8AB-VS3 100-115 VAC
				K8AB-VS3 24 VACDC
1-Phase Voltage Relay, Window Comparator	Over- and undervoltage, window comparator	6 to 60 mV AC/DC, 10 to 100 mV AC/DC, 30 to 300 mV AC/DC	2 x SPDT relays, 6 A at 250 VAC	K8AB-VW1 100-115 VAC
				K8AB-VW1 24 VACDC
		1 to 10 V AC/DC, 3 to 30 V AC/DC, 15 to 150 V AC/DC		K8AB-VW2 100-115 VAC
				K8AB-VW2 24 VDC
		20 to 200 V AC/DC, 30 to 300 V AC/DC, 60 to 600 V AC/DC		K8AB-VW3 100-115 VAC
				K8AB-VW3 24 VDC

# Phase Monitoring Relays

## K8AB-P

Quick Link  
R624

### Ultra-Slim 22 mm Phase Monitoring Relays

- Phase monitoring relay (K8AB-PH) distinguishes between positive phases, reversed phases and phase loss when power is turned ON; prevents reverse motor rotation due to incorrect wiring
- Monitor 3-phase voltage asymmetry (K8AB-PA), phase sequence and phase loss
- Monitor 3-phase power supplies (K8AB-PM) for over-voltages, undervoltages, phase sequence and phase loss
- Monitor overvoltage and undervoltage (K8AB-PW) for 3-phase power supplies
- 3-wire and 4-wire power supply input, field selectable
- Monitor output status from LED indicator
- Track-mount or surface mount with M4 screws
- Dimensions: 90 H x 22.5 W x 100 D mm



## Phase Monitoring Relays

Description	Features	Input voltage	Output	Model
Phase-sequence, Phase-loss relay	For 3-phase source; prevents reverse motor rotation due to incorrect wiring	200 to 500 VAC	SPDT relay, 6 A at 250 VAC	K8AB-PH1
3-Phase voltage, phase-sequence, phase loss relay	Over- and undervoltage (window comparator) Operation level and time settings	200, 220, 230, or 240 VAC	2 x SPDT relays, 6 A at 250 VAC	K8AB-PM1
		380, 400, 415, or 480 VAC		K8AB-PM2
3-Phase asymmetry, phase-sequence, phase-loss relay	Operation level and time settings	200, 220, 230, or 240 VAC	SPDT relay, 6 A at 250 VAC	K8AB-PA1
		380, 400, 415, or 480 VAC		K8AB-PA2
3-Phase voltage relay	Over- and undervoltage (window comparator)	200, 220, 230, or 240 VAC	2 x SPDT relays, 6 A at 250 VAC	K8AB-PW1
		380, 400, 415, or 480 VAC		K8AB-PW2

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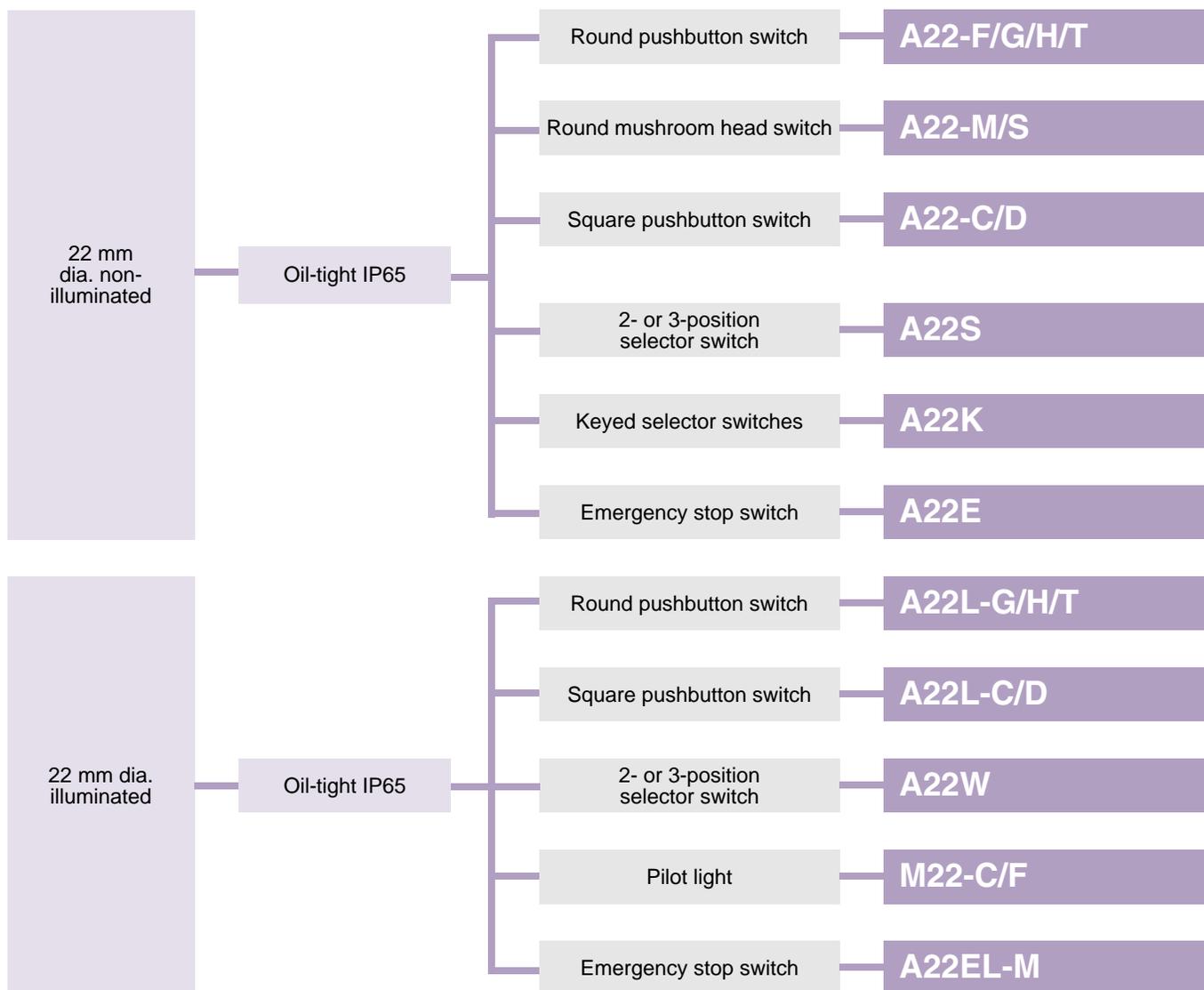
**22 mm dia.  
IP65 oil-tight, lighted or non-lighted,  
round or square, pushbutton switches**

<b>A22</b>	Pushbutton switches	
<b>A22L</b>	Lighted pushbutton switches	Q-1
<b>A22E</b>	Emergency stop switches	
<b>A22EL</b>	Lighted emergency stop switches	Q-5
<b>A22S</b>	Selector switches	
<b>A22W</b>	Lighted selector switches	Q-7
<b>A22K</b>	Keyed selector switches	Q-9
<b>M22</b>	Pilot lights	Q-11

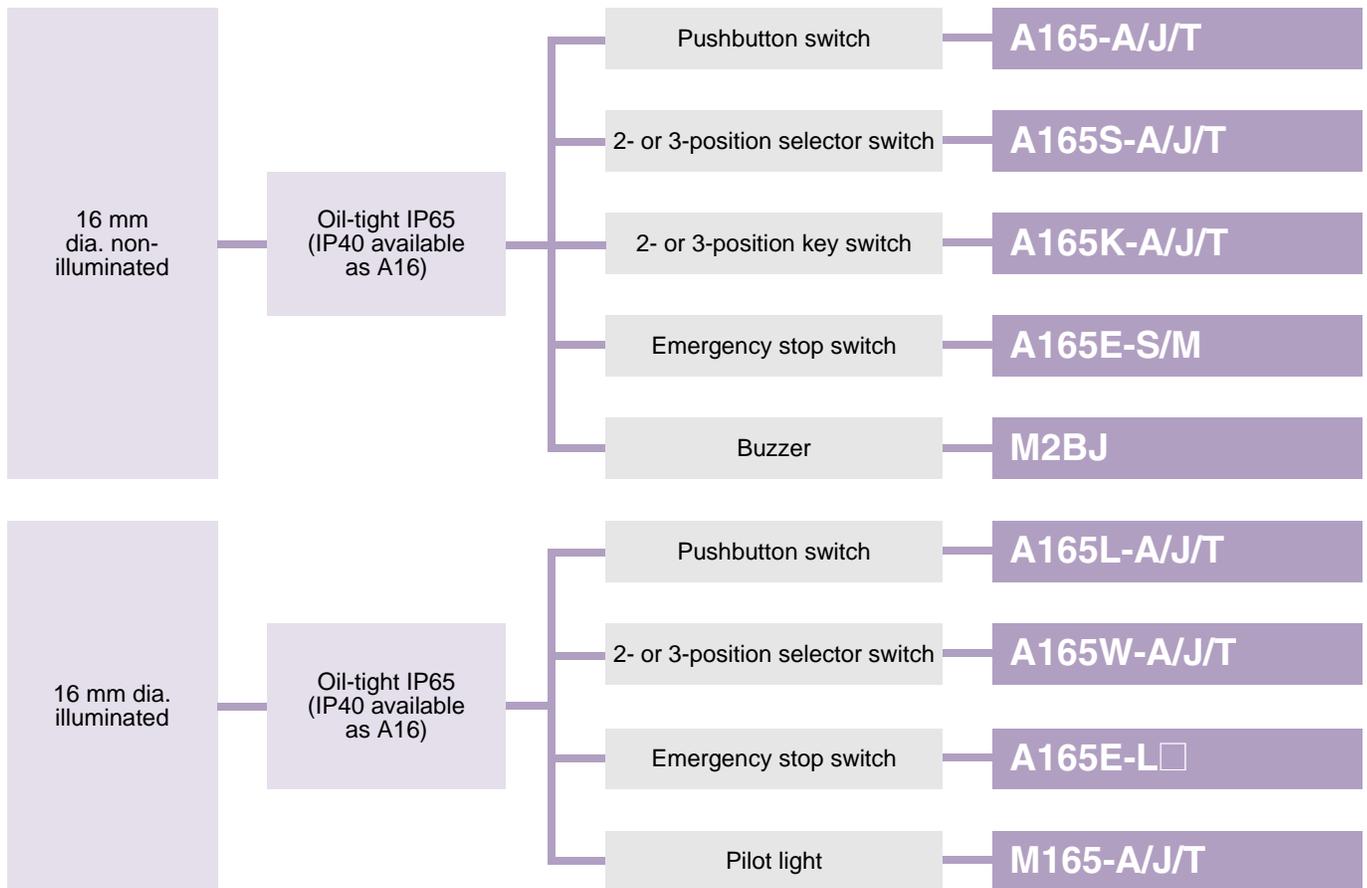
**16 mm dia.  
IP40 or IP65, lighted or non-lighted,  
round, square or rectangular push-  
button switches**

<b>A16</b>	Pushbutton switches	
<b>A16L</b>	Lighted pushbutton switches	
<b>A165</b>	IP65 Pushbutton switches	
<b>A165L</b>	IP65 Lighted pushbutton switches	Q-13
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<b>A165W</b>	Lighted selector switches	Q-19
<b>A165K</b>	Keyed selector switches	Q-21
<b>M16</b>	Pilot lights	
<b>M165</b>	IP65 Pilot lights	Q-23
<b>M2BJ</b>	Panel-mounted buzzer	Q-25

## Selection Guide



## Selection Guide



## Selection Guide

# Pushbutton Switches A22/A22L Series



## 22 mm Dia. Lighted and Non-Lighted Pushbutton Switches

- Wide range of options to match most of your panel building needs
- IP65 rated for oil resistance
- Lighting: Non-lighted (A22) and lighted (A22L)
- Short mounting depth, less than 28.5 mm below panel
- "Snap-in" switch unit for quick and easy, tool-free assembly
- RoHS compliant



## Specifications

- Rated load (SPDT, DPDT):
  - 10 A at 125 VAC, 6 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
  - Microload types: 50 mA @ 24 VDC; 1 mA @ 5 VDC min. applicable load
- Operating force:
  - SPDT: 29.4 N

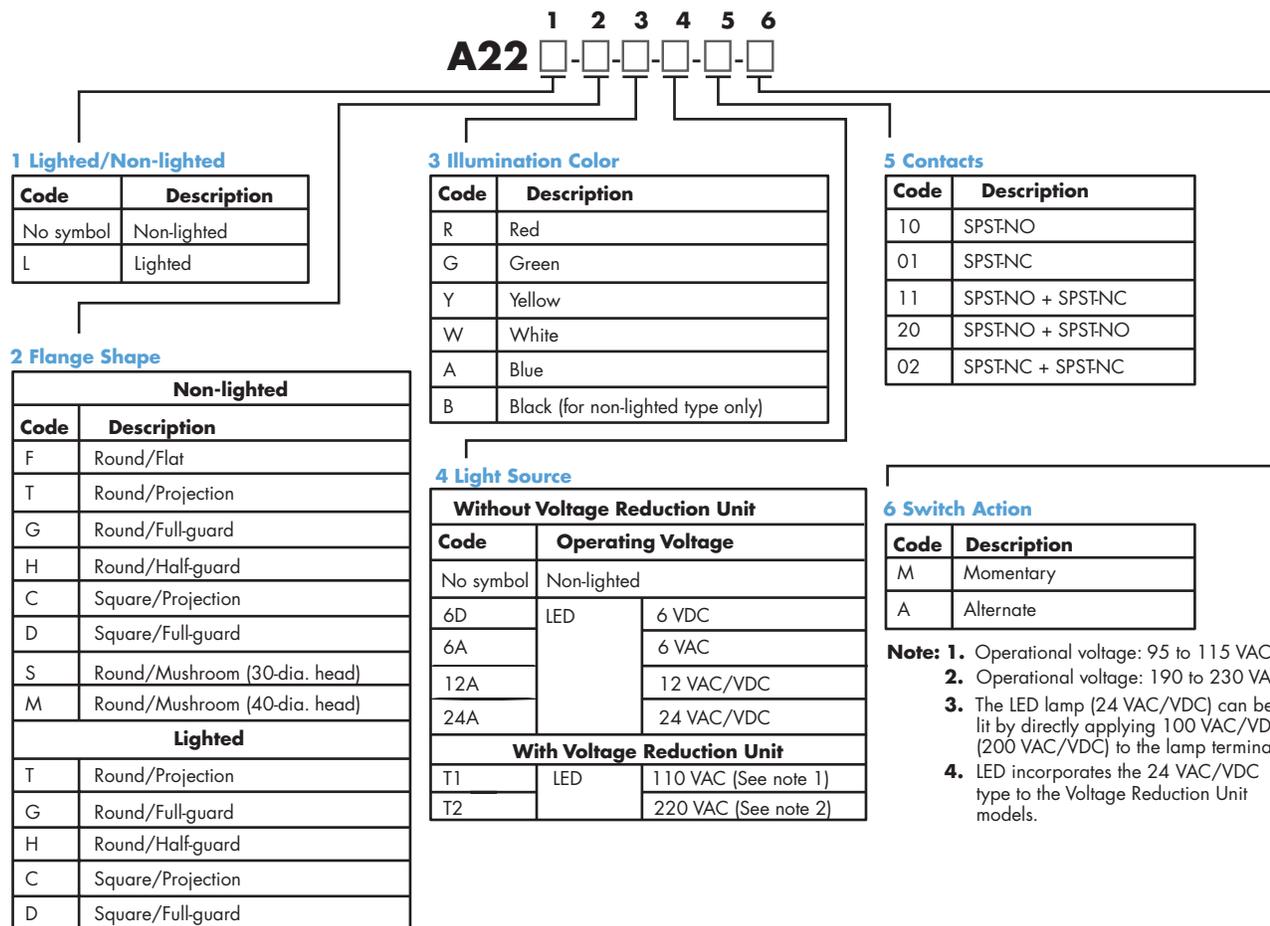
- Rated durability service life:
  - Mechanical: 5,000,000 operations min.
  - Electrical: 500,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Non-lighted		Model
Round flat		A22-F
Round projection		A22-T
Round full guard		A22-G
Round half guard		A22-H
Square projection		A22-C
Square full guard		A22-D

Non-lighted		Model
Round mushroom head 30 mm dia.		A22-S
Round mushroom head 40 mm dia.		A22-M

Lighted		Model
Lighted round projection		A22L-T
Lighted round full guard		A22L-G
Lighted round half guard		A22L-H
Lighted square projection		A22L-C
Lighted square full guard		A22L-D

# Options



## Ordering Information - Most Commonly Ordered Types

### A22L Lighted Oil-Tight Pushbutton Switches with Solder Terminals

Shape	Color	Lighted	Light voltage	Contact	Operation	Model			
Round, full guard	Green	Yes	12 V AC/DC	SPST-NO	Momentary	A22L-GG-12A-10M			
				24 V AC/DC		SPST-NO	A22L-GG-24A-10M		
						SPST-NO + SPST-NC	A22L-GG-24A-11M		
						SPST-NC	A22L-GG-12A-11M		
			Red	110 VAC		SPST-NO	A22L-GG-T1-10M		
						SPST-NO	A22L-GR-T1-10M		
						24 V AC/DC	SPST-NO + SPST-NC	A22L-GR-24A-11M	
							SPST-NC	A22L-GR-24A-01M	
	White			24 V AC/DC		SPST-NO	A22L-GW-24A-10M		
						SPST-NO + SPST-NC	A22L-GW-24A-11M		
						Yellow	24 V AC/DC	SPST-NO + SPST-NC	A22L-GY-24A-11M
								SPST-NO + SPST-NC	A22L-TG-24A-10M
	SPST-NO		A22L-TG-24A-11M						
	SPST-NO + SPST-NC		A22L-TG-T1-10M						
	Round projection		Green	110 VAC		SPST-NO	A22L-TG-T1-10M		
						24 V AC/DC	SPST-NO	A22L-TR-24A-10M	
SPST-NO + SPST-NC		A22L-TR-24A-11M							
SPST-NC		A22L-TR-24A-01M							
Red		110 VAC	SPST-NC	A22L-TR-T1-01M					
			24 V AC/DC	SPST-NO	A22L-TW-24A-10M				
				SPST-NO	A22L-TY-24A-10M				
				SPST-NO + SPST-NC	A22L-CG-24A-11M				
White		24 V AC/DC		SPST-NO + SPST-NC	A22L-CY-24A-11M				
			SPST-NO + SPST-NC	A22L-DG-24A-11M					
Yellow		24 V AC/DC	SPST-NO						
			SPST-NO						
Square projection	Green								
	Yellow								
Square, full guard	Green								

### A22 Non-Lighted Oil-Tight Pushbutton Switches with Solder Terminals

Shape	Color	Lighted	Light voltage	Contact	Operation	Model		
Round flat	Black	No	—	SPST-NO	Momentary	A22-FB-10M		
				SPST-NC		A22-FB-01M		
				SPST-NO + SPST-NC		A22-FB-11M		
				Green		SPST-NO	A22-FG-10M	
						SPST-NC	A22-FG-01M	
						SPST-NO + SPST-NC	A22-FG-11M	
						Red	SPST-NO	A22-FR-10M
				SPST-NC			A22-FR-01M	
	SPST-NO + SPST-NC			A22-FR-11M				
	SPST-NO + SPST-NO			A22-FR-20M				
	Yellow			SPST-NO		A22-FY-10M		
				SPST-NO + SPST-NC		A22-FY-11M		
				Blue		SPST-NO	A22-FA-10M	
						SPST-NO + SPST-NC	A22-FA-11M	
	Round projection					Black	SPST-NO	A22-TB-10M
							SPST-NO + SPST-NC	A22-TB-11M
Green		SPST-NO	A22-TG-10M					
		SPST-NO + SPST-NC	A22-TG-11M					
	Red	SPST-NO	A22-TR-10M					
		SPST-NO + SPST-NC	A22-TR-11M					
SPST-NC		A22-TR-01M						
Yellow		24 V AC/DC	SPST-NO	A22-TY-10M				
	SPST-NO		A22-TA-10M					
Blue	24 V AC/DC	SPST-NO						
		SPST-NO						

**A22 Non-Lighted Oil-Tight Pushbutton Switches with Solder Terminals (continued)**

Shape	Color	Lighted	Light voltage	Contact	Operation	Model
Round, full guard	Black	No	—	SPST-NO	Momentary	A22-GB-10M
	Green			SPST-NO		A22-GG-10M
				SPST-NC		A22-GG-01M
	Red			SPST-NO + SPST-NC		A22-GG-11M
				SPST-NO		A22-GR-10M
	White			SPST-NO + SPST-NC		A22-GR-11M
				SPST-NO		A22-GW-10M
	Yellow			SPST-NO		A22-GY-10M
				SPST-NO + SPST-NC		A22-GY-11M
	Blue			SPST-NO		A22-GA-10M
SPST-NO		A22-HB-10M				
Round, half guard	Black	No	—	SPST-NO	Momentary	A22-HB-10M
	Green			SPST-NO		A22-HG-10M
	Red			SPST-NO		A22-HR-10M
	White			SPST-NO		A22-HW-10M
	Yellow			SPST-NO		A22-HY-10M
	Blue			SPST-NO		A22-HA-10M
				SPST-NO		A22-HA-10M
Square projection	Black	No	—	SPST-NO + SPST-NC	Alternate	A22-CB-11A
	Green			SPST-NO	Momentary	A22-CG-10M
				Red		A22-CR-11M
	White			SPST-NC	Alternate	A22-CR-01A
				SPST-NO	Momentary	A22-CW-10M
	Blue			SPST-NO + SPST-NC		A22-CW-11M
				SPST-NO	A22-CA-10M	
	Square, full guard			Green	No	—
SPST-NO		A22-DG-10M				
Red		SPST-NO + SPST-NC	A22-DR-11M			
		SPST-NO + SPST-NC	Alternate	A22-DR-11A		
White		SPST-NO + SPST-NC	Momentary	A22-DW-11M		
		SPST-NO + SPST-NC		A22-DY-11M		
Yellow		SPST-NO + SPST-NC	A22-DA-11M			
		SPST-NO + SPST-NC	A22-DR-01M			
Blue		SPST-NC	A22-DR-01M			

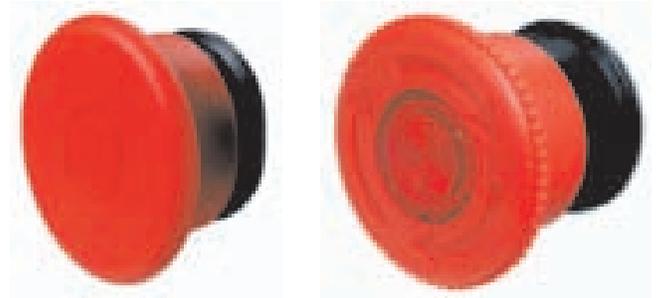
# Emergency Stop Switches A22E Series



## 22 mm Dia. Lighted and Non-Lighted Emergency Stop Switches

Use these e-stop switches as part of a Safety Category 4 system

- Direct opening mechanism opens the circuit when the contact welds
- Safety lock mechanism prevents operating errors
- Easily mount and remove switch blocks using a lever
- Mount three switch units in series to improve wiring efficiency
- Finger protection mechanism on switch unit provided as a standard feature
- Install using either round or forked crimp terminals
- Oil-resistant to IP65



## Specifications

- Rated load (SPDT, DPDT):
  - 10 A at 125 VAC, 6 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
  - Microload types: 50 mA @ 24 VDC; 10 mA @ 5 VDC min. applicable load
- Operating force:
  - SPDT: 29.4 N

- Rated durability service life:
  - Mechanical: 300,000 operations min.
  - Electrical: 300,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Push-pull		Model
Round medium 40 mm dia. Push-pull		<b>A22E-MP</b>
Round large 60 mm dia. Push-pull		<b>A22E-LP</b>

Push-lock turn-reset		Model
Round small 30 mm dia. Push-lock turn-reset		<b>A22E-S</b>
Round medium 40 mm dia. Push-lock turn-reset		<b>A22E-M</b>
Round large 60 mm dia. Push-lock turn-reset		<b>A22E-L</b>
Lighted round large 60 mm dia. Push-lock turn-reset		<b>A22EL-M</b>

## Options

**A22E** □ - □ - □ - □ - □

**1 Lighted/Non-lighted**

Code	Description
None	Non-lighted
L	Lighted (See note.)

**Note:** Lighted Emergency Stop Switches are available only for the medium (M) push-lock turn-reset models.

**2 Head Size**

Code	Size	Description
MP	Medium 40 dia.	Push-pull
LP	Large 60 dia.	
S	Small 30 dia.	Push-lock turn-reset
M	Medium 40 dia.	
L	Large 60 dia.	
SK	Small 30 dia.	Push-lock key reset
MK	Medium 40 dia.	

**3 Light Source**

Without Voltage Reduction Unit		
Code	Operating Voltage	
None	Non-lighted	
6D	LED	6 VDC
6A		6 VAC
12A		12 VAC/VDC
24A		24 VAC/VDC
With Voltage Reduction Unit		
None	Non-lighted	
T1	LED	110 VAC
T2		220 VAC

**Note: 1.** The LED lamp (24 VAC/VDC) can be lit by directly applying 110 VAC/VDC (220 VAC/VDC) to the lamp terminal. LED incorporates the 24 VAC/VDC models.  
**2.** Equipped with 24 VAC/DC LED.

**4 Contacts**

Code	Description
01	SPSTNC
11	SPSTNO + SPSTNC
02	DPSTNC
01S	SPST-NC (micro load)

**5 Configuration**

Code	Configuration
None	Switch only
B	Switch with Integrated Control Box

## Ordering Information - Most Commonly Ordered Types

### A22EL Lighted Emergency Stop Switches with Solder Terminals

Operator diameter	Reset	Lighted	Light voltage	Contact	Model
40 mm	Push-lock turn-reset	Yes	24 V AC/DC	SPST-NO + SPST-NC	<b>A22EL-M-24A-11</b>
			12 V AC/DC	SPST-NC	<b>A22EL-M-12A-01</b>
				SPST-NO + SPST-NC	<b>A22EL-M-12A-11</b>

### A22E Non-Lighted Emergency Stop Switches with Solder Terminals

Operator diameter	Reset	Lighted	Light voltage	Contact	Model
30 mm	Push-lock turn-reset	No	—	SPST-NC	<b>A22E-S-01</b>
				SPST-NC microload	<b>A22E-M01S</b>
				SPST-NO + SPST-NC	<b>A22E-S-11</b>
				DPST-NC	<b>A22E-S-02</b>
40 mm	Push-lock turn-reset	No	—	SPST-NC	<b>A22E-M-01</b>
				DPST-NC	<b>A22E-MP-02</b>
	Push-pull reset			SPST-NC	<b>A22E-MP-01</b>
	DPST-NC			<b>A22E-MP-02</b>	
	Push-lock turn-reset			SPST-NO + SPST-NC	<b>A22E-M-11</b>
				DPST-NC	<b>A22E-M-02</b>
	Push-lock key-reset			DPST-NC	<b>A22E-MK-02</b>
				SPST-NO + SPST-NC	<b>A22E-MK-11</b>
60 mm	Push-lock turn-reset	No	—	SPST-NC	<b>A22E-L-01</b>
				SPST-NO + SPST-NC	<b>A22E-L-11</b>
				SPST-NO + SPST-NC	<b>A22E-LP-11</b>
				DPST-NC	<b>A22E-LP-01</b>

# Selector Switches A22S/A22W Series



## 22 mm Dia. Lighted and Non-Lighted Selector Switches

- Knob style selector switches provide users a reliable way to start or choose between machine operations
- 2- and 3-position switches with manual or automatic reset to meet your panel building needs
- IP65-rated for oil resistance
- Lighting: Non-lighted (A22S) and lighted (A22W)
- New "ultra-bright" LED used in all lighted models
- Short mounting depth, less than 28.5 mm below panel
- "Snap-in" switch unit for quick and easy, tool-free assembly
- RoHS compliant
- Use optional legend plates to identify the selections



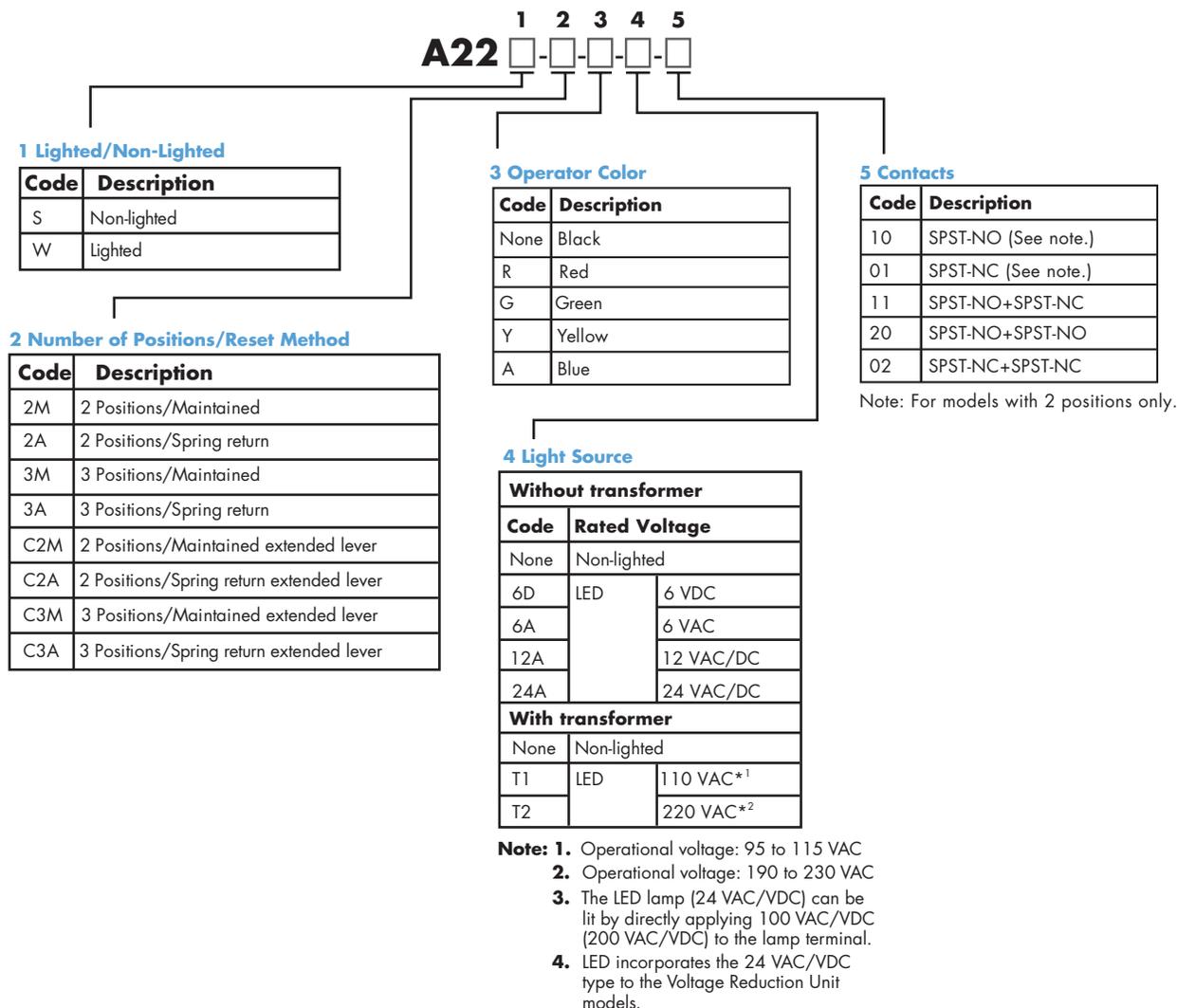
## Specifications

- Rated load (SPDT, DPDT):
  - 10 A at 125 VAC, 6 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
  - Microload types: 50 mA @ 24 VDC; 1 mA @ 5 VDC min. applicable load
- Rated durability service life:
  - Mechanical: 5,000,000 operations min.
  - Electrical: 500,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Non-lighted		Model
Non-lighted selector switch		A22S

Lighted		Model
Lighted selector switch		A22W

## Options



## Ordering Information - Most Commonly Ordered Types

### A22W Lighted Oil-Tight Selector Switches with Solder Terminals

Shape	Color	No. of positions	Reset method	Lighted	Light voltage	Contact	Model
Round	Yellow	2	Maintained	Yes	110 VAC	SPST-NO + SPST-NC	<b>A22W-2MY-T1-11</b>
		3			24 V AC/DC	SPST-NC + SPST-NO	<b>A22W-3MY-24A-20</b>
	Blue	3			24 V AC/DC	SPST-NC + SPST-NO	<b>A22W-3MA-24A-20</b>

### A22S Non-Lighted Oil-Tight Selector Switches with Solder Terminals

Shape	Color	No. of positions	Reset method	Lighted	Light voltage	Contact	Model
Round	Black	2	Maintained	No	—	SPST-NO	<b>A22S-2M-10</b>
						SPST-NO + SPST-NC	<b>A22S-2M-11</b>
						SPST-NC + SPST-NO	<b>A22S-2M-20</b>
		3				SPST-NO + SPST-NC	<b>A22S-3M-11</b>
						SPST-NC + SPST-NO	<b>A22S-3M-20</b>

# Keyed Selector Switches A22K Series



## 22 mm Dia. Keyed Selector Switches

- Design in extra security with keyed selector switches; only authorized operators are allowed to change settings using the key
- 2- and 3-position switches with manual or automatic reset to meet your panel building needs
- IP65-rated for oil resistance
- Short mounting depth, less than 28.5 mm below panel
- "Snap-in" switch unit for quick and easy, tool-free assembly
- RoHS compliant
- Use optional legend plates to identify the selections



## Specifications

- Rated load (SPDT, DPDT):
  - 10 A at 125 VAC, 6 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
  - Microload types: 50 mA @ 24 VDC; 1 mA @ 5 VDC min. applicable load
- Rated durability service life:
  - Mechanical: 5,000,000 operations min.
  - Electrical: 500,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Keyed switch		Model
Keyed selector switch		A22K

## Options

**A22K** 1 2

1 Number of Positions/Reset Method				2 Contacts	
Code	Positions	Reset Method	Key release position	Code	Description
2ML	2 Positions	Maintained	Left	10	SPST-NO (2 position models)
2M			Left and right	01	SPST-NC (2 position models)
2AL		Spring return	Left	11	SPST-NO+SPST-NC
3ML	3 Positions	Maintained	Left	20	DPST-NO
3M			Left and right	02	DPST-NC
3MC			Center		
3AC		Spring return	Center		

Note: SPST=Single Pole, Single Throw  
DPST=Double Pole, Single Throw

## Ordering Information - Most Commonly Ordered Types

### A22K Oil-Tight Keyed Selector Switches with Solder Terminals

Shape	No. of positions	Reset method	Key release position	Contact	Model
Round	2	Spring return	Left/right	SPST-NO	<b>A22K-2AL-10</b>
				SPST-NO, SPST-NC	<b>A22K-2AL-11</b>
		Maintained	Left/right	SPST-NO	<b>A22K-2M-10</b>
				SPST-NO, SPST-NC	<b>A22K-2M-11</b>
		Left	Left	SPST-NC	<b>A22K-2ML-01</b>
				SPST-NO	<b>A22K-2ML-10</b>
	3	Spring return	Center	SPST-NO, SPST-NC	<b>A22K-2ML-11</b>
				DPST-NO	<b>A22K-2ML-20</b>
				DPST-NO	<b>A22K-3AC-20</b>

## Accessory

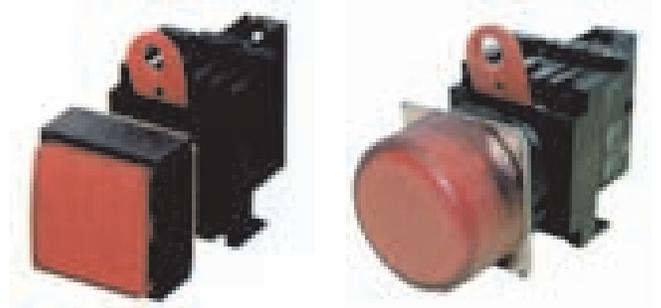
Description	Model
Replacement key for A22K selector switch	<b>A22K-KEY</b>

# Pilot Lights M22 Series



## 22 mm Dia. Pilot Lights

- Pilot lights indicate status of machinery and processes on control panels
- Bright LED light source is easy to read under most lighting conditions
- Easy mounting and removal of socket unit
- Oil-resistant, IP65 rated
- Short mounting depth, less than 28.5 mm below panel
- RoHS compliant
- Use optional legend plates to identify indicators



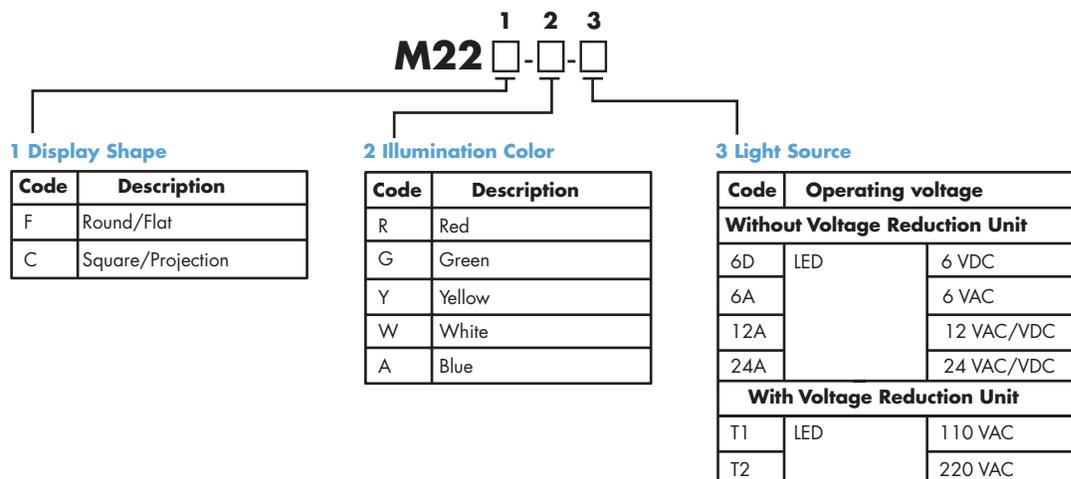
## Specifications

- Current consumption:
  - 60 mA @ 6 VDC ±5%
  - 60 mA @ 6 VAC ±5%
  - 30 mA @ 12 VAC/VDC ±5%
  - 15 mA @ 24 VAC/VDC ±5%
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Pilot lights		Model
Square projection pilot light		M22-CR

Pilot lights		Model
Round flat pilot light		M22-FR

## Options



**Note:** The LED lamp (24 VAC/VDC) can be lit by directly applying 110 VAC/VDC (220 VAC/VDC) to the lamp terminal. LED incorporates the 24 VAC/VDC type.

## Ordering Information - Most Commonly Ordered Types

### M22 Oil-Tight Pilot Lights with Solder Terminals

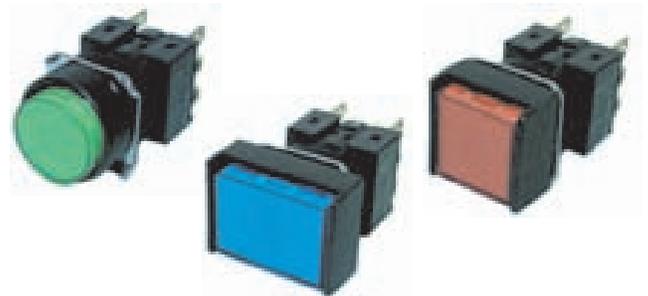
Shape	Color	Light voltage	Model
Round flat	Green	24 V AC/DC	<b>M22-FG-24A</b>
		110 VAC	<b>M22-FG-T1</b>
	Red	24 V AC/DC	<b>M22-FR-24A</b>
		110 VAC	<b>M22-FR-T1</b>
	White	24 V AC/DC	<b>M22-FW-24A</b>
		110 VAC	<b>M22-FW-T1</b>
	Yellow	24 V AC/DC	<b>M22-FY-24A</b>
		110 VAC	<b>M22-FY-T1</b>
	Blue	24 V AC/DC	<b>M22-FA-24A</b>
		110 VAC	<b>M22-FA-T1</b>
Square projection	Green	110 VAC	<b>M22-CG-T1</b>
	Red		<b>M22-CR-T1</b>
	White	24 V AC/DC	<b>M22-CW-24A</b>
	Blue	110 VAC	<b>M22-CA-T1</b>

# Pushbutton Switches A16/A165 Series



## 16 mm Dia. Lighted and Non-Lighted Pushbutton Switches

- Wide range of options to match most of your panel building needs
- Protection: IP65 oil-resistant models (A165) and standard IP40 models (A16)
- Lighting: Non-lighted (A16 and A165) and lighted (A16L and A165L)
- New "ultra-bright" LED used in all lighted models
- Short mounting depth, less than 28.5 mm below panel
- "Snap-in" switch unit for quick and easy, tool-free assembly
- RoHS compliant



## Specifications

- Rated load (SPDT, DPDT):
  - B300 (NO) C300 (NC),
  - 5 A at 125 VAC, 3 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
- Operating force:
  - SPDT/DPDT: 4.41 N (IP40); 4.91 N (IP65)
- Rated durability service life:
  - Mechanical:
    - Momentary operation: 2,000,000 operations min.
    - Alternating operation: 200,000 operations min.
  - Electrical: 100,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Round		Model
Lit and unlit round projection		A16-T, A16L-T, A165-T, A165L-T
Lighted round projection, 110 VAC transformer		A16L-T-T1, A165L-T-T1
Lighted round projection, 220 VAC transformer		A16L-T-T2, A165L-T-T2

Rectangular		Model
Lit and unlit rectangular 2-way guard		A16-J, A16L-J, A165-J, A165L-J
Lighted rectangular 2-way guard, 110 VAC transformer		A16L-J-T1, A165L-J-T1
Lighted rectangular 2-way guard, 220 VAC transformer		A16L-J-T2, A165L-J-T2

Square		Model
Lit and unlit square 2-way guard		A16-A, A16L-A, A165-A, A165L-A
Lighted square 2-way guard, 110 VAC transformer		A16L-A-T1, A165L-A-T1
Lighted square 2-way guard, 220 VAC transformer		A16L-A-T2, A165L-A-T2

# Options

A16 **5**-**L**-**J****R****M**-**24D**-**2**

### 1 Degree of Protection

Symbol	Protection
None	IP40
5	IP65 oil-resistant

### 2 Lighted/Non-lighted

Symbol	Type
None	Non-lighted
L	Lighted

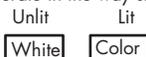
### 3 Shape of Pushbutton

Symbol	Shape	
J	Rectangular	2-way guard
A	Square	2-way guard
T	Round	Projecting model

### 4 Color of Pushbutton

Symbol	Color
R	Red
Y	Yellow
PY	Pure yellow
G	Green
W	White
PW	Pure White
A	Blue
B	Black (non-lighted models only)

"Colored-illumination" models operate in the way shown below:



The built-in LED is colored.

### 5 Switch Operation

Symbol	Operation
M	Momentary
A	Alternate

Momentary. Self-resetting.  
Alternate. Self-holding.

### 7 Contact Configuration

Symbol	Type	Terminal
1	SPDT	Solder Terminal
2	DPDT	
1P	SPDT	PCB Terminal
2P	DPDT	
2S	DPDT	Screw-Less Clamp

Only DPDT contacts are available with Screw-Less Clamp.

### 6 Light Source

Symbol	Type	Operating voltage	Rated voltage
None	Non-lighted		
5D	LED	5 ±5% VDC	5 VDC
12D		12 ±5% VAC/VDC	12 VAC/VDC
24D		24 ±5% VAC/VDC	24 VAC/VDC

### Voltage Reduction Unit (24-V Built-in LED)

Symbol	Type	Operating voltage	Rated voltage
T1	LED	90 to 121 VAC/VDC	110 VAC
T2		180 to 242 VAC/VDC	220 VAC

- Note:
- Solder terminals are available only with 100-V models.
  - The Voltage Reduction Unit is not available for models with PCB terminals.
  - "T2" is available only for the Screw-Less Clamp type.

**Ordering Information - Most Commonly Ordered Types**

**A165L Lighted Oil-Tight Pushbutton Switches with IP65 and Solder Terminals**

Shape	Color	Operation	Lighted	Light voltage	Contact	Model						
Round	Red	Momentary	Yes	24 V AC/DC	DPDT	A165L-TRM-24D-2						
	Green					A165L-TGM-24D-2						
Rectangular	White					A165L-JWM-24D-2						
	Green					A165L-JGM-24D-2						
Square	Red					A165L-ARM-24D-2						
	Green					Alternate	A165L-AGA-24D-2					
Rectangular	Yellow					Momentary	24 V AC/DC	DPDT	A165L-JYM-24D-2			
Round									A165L-TYM-24D-2			
Square									Red	12 V AC/DC	SPDT	A165L-ARM-12D-1
Rectangular									Blue	Alternate	24 V AC/DC	DPDT
Round		A165L-TAM-24D-2										
Square		Red	Alternate	5 V AC/DC	SPDT				A165L-ARA-24D-2			
Square	Green	Momentary	12 V AC/DC			DPDT	A165L-AGM-5D-1					
	White		5 V AC/DC			SPDT	A165L-AWM-5D-1					
Round	Red	Alternate	24 V AC/DC	DPDT	A165L-TRA-24D-2							
Square	Green	Momentary			SPDT	A165L-AGM-24D-1						
Round	White				DPDT	A165L-TWM-24D-2						
Square	Green				A165L-AGM-24D-2							
	White				Alternate	A165L-AWM-24D-2						

**A165 Non-Lighted Oil-Tight Pushbutton Switches with IP65 and Solder Terminals**

Shape	Color	Operation	Lighted	Light voltage	Contact	Model		
Rectangular	Yellow	Momentary	No	—	DPDT	A165-JYM-2		
Square	Red					A165-ARM-2		
	White					A165-AWM-2		
Rectangular	Black					A165-JBM-2		
	Green					A165-JGM-2		
Square	White					Alternate	SPDT	A165-AGA-1
						Momentary	DPDT	A165-AGM-2
Rectangular	Blue					A165-JWM-2		
	Yellow					A165-AAM-2		
Round	Black					Momentary	No	—
		SPDT	A165-TBM-1					
		DPDT	A165-TBM-2					
		SPDT	A165-TWM-1					
		DPDT	A165-TWM-2					
		SPDT	A165-TRM-1					
		DPDT	A165-TYM-2					
		SPDT	A165-TGM-1					
		DPDT	A165-TRM-2					
		SPDT	A165-TYM-1					
		DPDT	A165-TGM-2					
		SPDT	A165-TAM-2					
		DPDT	A165-TAM-1					
Rectangular	White	Momentary	Yes	24 V AC/DC	DPDT	A165-TRA-2		
Round	Green					SPDT	A165L-JWA-24D-2	
Square	Yellow					DPDT	A165L-TGA-24D-1	
Square	Yellow	Momentary	No	—	DPDT	A165L-AYM-24D-2		

**A16L Lighted Pushbutton Switches with IP40 and Solder Terminals**

Shape	Color	Operation	Lighted	Light voltage	Contact	Model
Round	Yellow	Momentary	Yes	12 V AC/DC	DPDT	A16L-TYM-12D-2
	Red			24 V AC/DC	SPDT	A16L-TRM-24D-1
	Blue			5 V AC/DC		A16L-TRM-5D-1
Square	Red	Momentary	Yes	24 V AC/DC	SPDT	A16L-TAM-5D-1
Round	White			A16L-ARM-24D-1		
Rectangular	Green			A16L-TWM-24D-1		
Round	White	Momentary	Yes	12 V AC/DC	DPDT	A16L-JGM-12D-2
Rectangular				Green		5 V AC/DC
Round	Red	Momentary	Yes	12 V AC/DC	SPDT	A16L-JRA-12D-1
Rectangular						Green
Square	Red	Momentary	Yes	12 V AC/DC	SPDT	A16L-ARM-12D-1

**A16 Non-Lighted Pushbutton Switches with IP40 and Solder Terminals**

Shape	Color	Operation	Lighted	Light voltage	Contact	Model	
Rectangular	Green	Alternate	No	—	DPDT	A16-JGA-2	
	Red					A16-JRA-2	
	Yellow					A16-JYA-2	
Square	Red	Momentary	No	—	SPDT	A16-ARM-1	
	White					A16-AWM-1	
	Green					A16-AGM-1	
Round	Red	Momentary	No	—	DPDT	A16-AGA-1	
						Green	A16-TRM-1
							Black
	Red	Alternate	No	—	SPDT	A16-TBM-1	
						Blue	A16-TRM-2
	Yellow	Momentary	No	—	DPDT	A16-TAM-2	
						Black	A16-TRA-2
						Blue	A16-TYM-2
						Red	A16-TBM-2
						Green	A16-TAM-1
Green	Momentary	No	—	SPDT	A16-TGM-1		
					Blue	A16-TAM-1	

# Emergency Stop Switches A165E Series



## 16 mm Dia. Lighted and Non-Lighted Emergency Stop Switches

Use these e-stop switches as part of a Safety Category 4 system

- Direct opening mechanism to open contacts in emergencies, such as when they are welded
- Conforms to EN60418
- Includes a safety lock to prevent misuse
- Features separate construction that allows the switch to be separated for easier wiring and one-piece-like construction that allows easier handling
- Models available with 3 contacts built into single block (A165E-U)

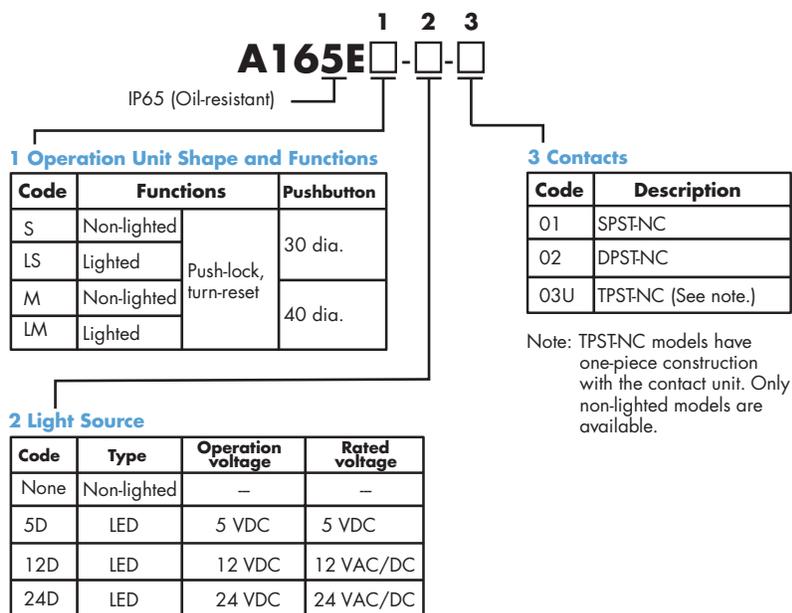


## Specifications

- Rated load (SPDT, DPDT):
  - B300 (NO) C300 (NC)
  - 5 A at 125 VAC, 3 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
- Operating force:
  - SPDT/DPDT: 14.7 N
- Rated durability service life:
  - Mechanical: 100,000 operations min.
  - Electrical: 100,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Push-lock turn-reset		Model
Lighted round 30 mm dia., Push-lock turn-reset		<b>A165E-LS</b>
Round 30 mm dia., Push-lock turn-reset		<b>A165E-S</b>
Round 40 mm dia. Push-lock turn-reset		<b>A165E-M</b>

## Options



Note: Models with separate construction (SPST-NC and DPST-NC) are for normal loads only. One-piece models (TPST-NC) are for either normal loads or microloads.

## Ordering Information - Most Commonly Ordered Types

### A165E Emergency Stop Switches with Solder Terminals

Operator diameter	Reset	Lighted	Light voltage	Contact	Model
30 mm	Push-lock turn-reset	No	—	SPST-NC	<b>A165E-S-01</b>
				DPST-NC	<b>A165E-S-02</b>
				TPST-NC	<b>A165E-S-03U</b>
40 mm	Push-lock turn-reset	No	—	SPST-NC	<b>A165E-M-01</b>
				DPST-NC	<b>A165E-M-02</b>
				TPST-NC	<b>A165E-M-03U</b>

### A165E-L Lighted Emergency Stop Switches with Solder Terminals

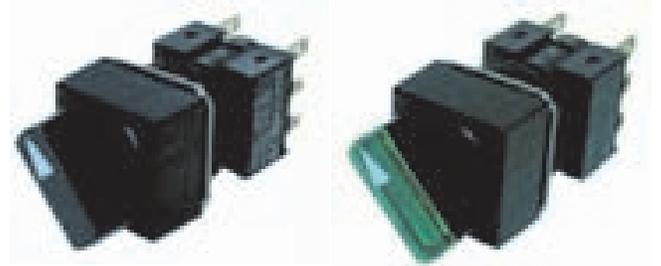
Operator diameter	Reset	Lighted	Light voltage	Contact	Model
30 mm	Push-lock turn-reset	Yes	24 VDC	DPST-NC	<b>A165E-LS-24D-02</b>
				SPST-NC	<b>A165E-LS-24D-01</b>
40 mm	Push-lock turn-reset	Yes	24 VDC	DPST-NC	<b>A165E-LM-24D-02</b>
				SPST-NC	<b>A165E-LM-24D-01</b>

# Selector Switches A165S/W Series



## 16 mm Dia. Lighted and Non-Lighted Selector Switches

- Knob style selector switches provide users a reliable way to start or choose between machine operations
- 2- and 3-position switches with manual or automatic reset to meet your panel building needs
- IP65-rated for oil resistance
- Lighting: Non-lighted (A165S) and lighted (A165W)
- New "ultra-bright" LED used in all lighted models
- Short mounting depth, less than 28.5 mm below panel
- "Snap-in" switch unit for quick and easy, tool-free assembly
- RoHS compliant
- Use optional legend plates to identify the selections



## Specifications

- Rated load (SPDT, DPDT):
  - B300 (NO) C300 (NC)
  - 5 A at 125 VAC, 3 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
- Operating force:
  - SPDT: 0.1 Nm
  - DPDT: 0.1 Nm
- Rated durability service life:
  - Mechanical: 250,000 operations min.
  - Electrical: 100,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Non-lighted		Model
Square base selector switch		<b>A165S-A</b>
Rectangular base selector switch		<b>A165S-J</b>
Round base selector switch		<b>A165S-T</b>

Lighted		Model
Lighted square base selector switch		<b>A165W-A</b>
Lighted rectangular base selector switch		<b>A165W-J</b>
Lighted round base selector switch		<b>A165W-T</b>

## Options

**A 165 W-A-2A R-24D-1**

123456

**1 Lighted/Non-lighted**

Symbol	Type
S	Non-lighted
W	Lighted

**2 Shape of Selector**

Symbol	Shape
J	Rectangular
A	Square
T	Round

**3 Number of Notches/Resetting Method**

Symbol	No. of notches	Reset method
2M	2 notches	Manual
2A		Automatic
3M	3 notches	Manual
3A		Automatic

**4 Color of Selector**

Symbol	Color
None	Black (non-lighted models only)
R	Red
G	Green
Y	Yellow

**5 Light Source**

Symbol	Type
None	Non-lighted
5D	5 VDC LED
12D	12 VAC/DC LED
24D	24 VAC/DC LED

**6 Contact Configuration**

Symbol	Type	Terminal
1	SPDT	Solder terminal
2	DPDT	
1P	SPDT	PCB terminal
2P	DPDT	
2S	DPDT	Screw-Less Clamp

**Note: 1.** Only DPDT contacts are available with 3-notch models and Screw-Less Clamp models.

**2.** PCB terminals are available only with 2-notch models.

### Voltage Reduction Unit (24-V Built-in LED)

Symbol	Type	Rated voltage
T1	LED	110 VAC/VDC
T2		220 VAC/VDC

- Note: 1.** Solder terminals are only available with "T1" 110-V models.
- 2.** The Voltage Reduction Unit is not available for models with PCB terminals.

## Ordering Information - Most Commonly Ordered Types

### A165W Lighted Oil-Tight Selector Switches with Solder Terminals

Shape	Color	No. of notches	Reset method	Lighted	Light voltage	Contact	Model
Square	Yellow	2	Manual	Yes	24 V AC/DC	SPDT	A165W-A2MY-24D-1
			Automatic				A165W-T2AR-24D-1
			Manual				A165W-T2MG-24D-1
			Automatic				A165W-T2AY-24D-1
	Green	3	Manual			DPDT	A165W-T2MY-24D-2
			Automatic			A165W-T2MG-24D-2	
			Manual			A165W-T3MG-24D-2	
			Automatic				

### A165S Non-Lighted Oil-Tight Selector Switches with Solder Terminals

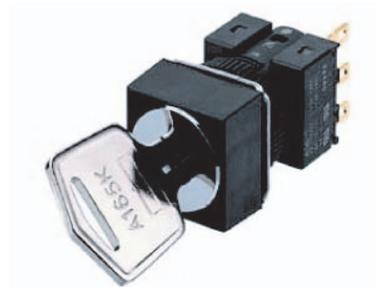
Shape	Color	No. of notches	Reset method	Lighted	Light voltage	Contact	Model
Square	Black	2	Manual	No	—	SPDT	A165S-A2M-1
			DPDT			A165S-A2M-2	
		3	Automatic			A165S-A3M-2	
			Automatic			A165S-A3A-2	
Rectangular	Black	2	Manual	SPDT	A165S-J2M-2		
		3		DPDT	A165S-J3M-2		
		2		SPDT	A165S-T2M-1		
Round	Black	2	Manual	DPDT	A165S-T2M-2		
					3	A165S-T3M-2	
			Automatic		A165S-T3A-2		

# Keyed Selector Switches A165K Series



## 16 mm Dia. Keyed Selector Switches

- Design in extra security with keyed selector switches; only authorized operators are allowed to change settings using the key
- 2- and 3-position switches with manual or automatic reset to meet your panel building needs
- IP65-rated for oil resistance
- Short mounting depth, less than 28.5 mm below panel
- "Snap-in" switch unit for quick and easy, tool-free assembly
- RoHS compliant
- Use optional legend plates to identify the selections

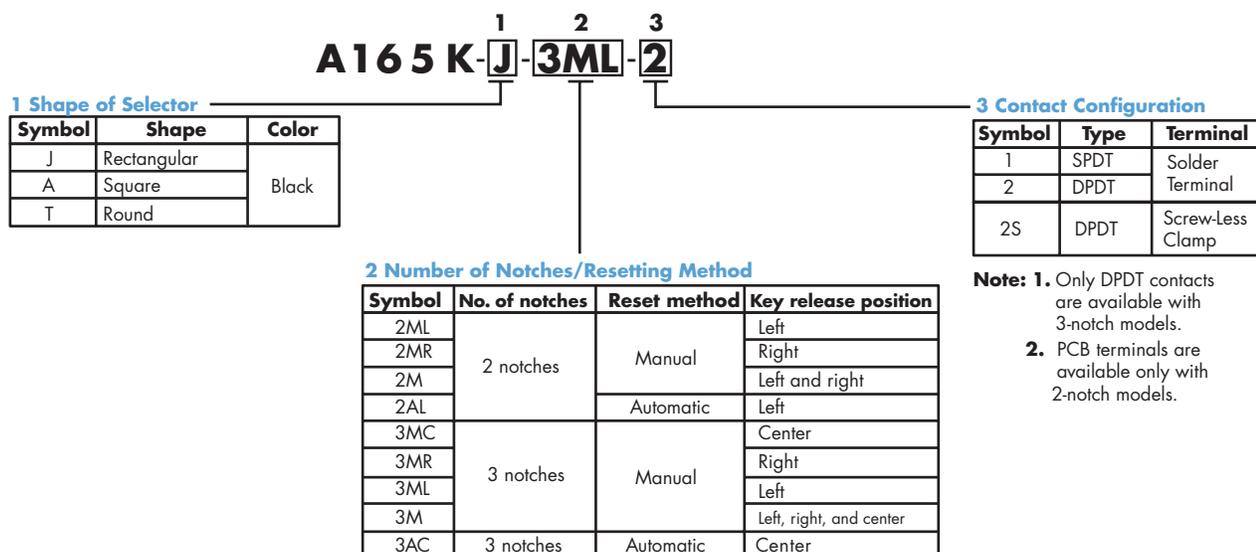


## Specifications

- Rated load (SPDT, DPDT):
  - B300 (NO) C300 (NC)
  - 5 A at 125 VAC, 3 A at 250 VAC (NO & NC)
  - 3 A at 30 VDC
- Operating force:
  - SPDT: 0.1 Nm
  - DPDT: 0.1 Nm
- Rated durability service life:
  - Mechanical: 250,000 operations min.
  - Electrical: 100,000 operations min.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Keyed switches		Model
Square base keyed selector switch		A165K-A
Rectangular base keyed selector switch		A165K-J
Round base keyed selector switch		A165K-T

## Options



## Ordering Information - Most Commonly Ordered Types

### A165K Oil-Tight Keyed Selector Switches with Solder Terminals

Shape	No. of notches	Reset method	Key release position	Contact	Model
Square	2	Automatic	Left	SPST	A165K-A2AL-1
		Manual		DPDT	A165K-A2ML-2
		Automatic			A165K-A2AL-2
		Manual		A165K-A2ML-2	
	3	Automatic	Left/right	A165K-A2M-2	
			Left/right/center	A165K-A3M-2	
Rectangular	2	Automatic	Left	DPDT	A165K-J2AL-2
Round	2	Manual	Left/right	DPDT	A165K-T2M-2
		Automatic	Left		A165K-T2AL-2
		Manual	Left		A165K-T2ML-2
	3	Automatic	Left/right/center	A165K-T3ML-2	
			Left/right/center	A165K-T3M-2	

## Accessory

Description	Model
Replacement key for A165K selector switch	A165K-KEY

# Pilot Lights M16 & M165 Series



## 16 mm Dia. Pilot Lights

- Pilot lights indicate status of machinery and processes on control panels
- Bright LED light source is easy to read under most lighting conditions
- Easy mounting and removal of socket unit
- Standard IP40 and oil-resistant IP65 models
- Short mounting depth, less than 28.5 mm below panel
- RoHS compliant
- Use optional legend plates to identify indicators

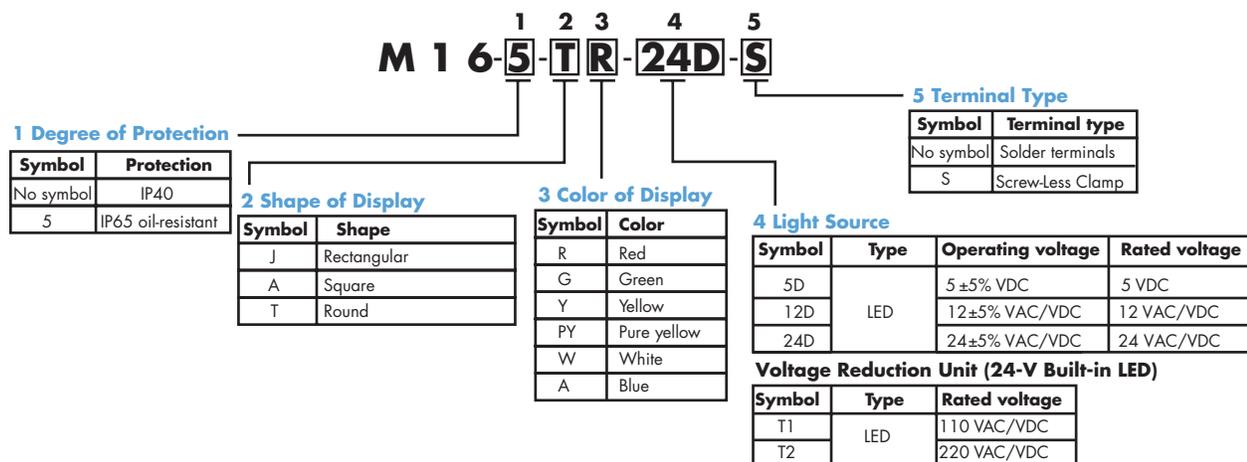


## Specifications

- Current consumption:
  - 30 mA @ 5 VDC ±5%
  - 15 mA @ 12 VDC ±5%
  - 10 mA @ 24 VDC ±5%
  - 1.5 mA @ 110 VAC/VDC
  - 1.5 mA @ 220 VAC/VDC
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Pilot light		Model
Square pilot light		M16-A, M165-A
Rectangular pilot light		M16-J, M165-J
Round pilot light		M16-T, M165-T

## Options



Solder terminals are available only with "T1" 110-V models.

## Ordering Information - Most Commonly Ordered Types

### M16 Standard Pilot Lights with Solder Terminals

Shape	Color	Light voltage	Protection	Model
Square	Red	12 V AC/DC	IP65	M16-AR-12D
Round	Blue	24 V AC/DC	IP40	M16-TA-24D
	Green			M16-TG-24D
	Red			M16-TR-24D
	Yellow			M16-TY-24D

### M165 Oil-Tight Pilot Lights with Solder Terminals

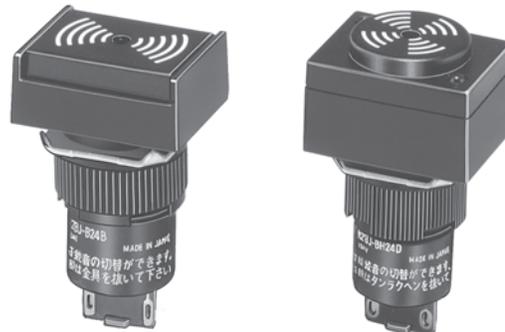
Shape	Color	Light voltage	Protection	Model
Square	Green	24 V AC/DC	IP65	M165-AG-24D
	Red			M165-AR-24D
	Yellow	12 V AC/DC		M165-AY-12D
		24 V AC/DC		M165-AY-24D
Round	Green	12 V AC/DC	M165-TG-12D	
		24 V AC/DC	M165-TG-24D	
		110 V AC/DC	M165-TG-T1	
	Red	24 V AC/DC	M165-TR-24D	
	White		M165-TW-24D	
	Yellow		M165-TY-24D	
	Rectangular	Green		M165-JG-24D
		Red		M165-JR-24D

# Buzzers M2BJ



## 16 mm Dia. Panel-Mounted Buzzers

- Four models offer eight different types of sounds, plus two modes with high-sound output
- Intermittent or continuous sound selected by jumper setting
- Jumper storage provided at bottom of unit
- Complements the A16 range of Pushbuttons, Selector Switches and Key Switches
- RoHS compliant
- LED's incorporated on high-sound models

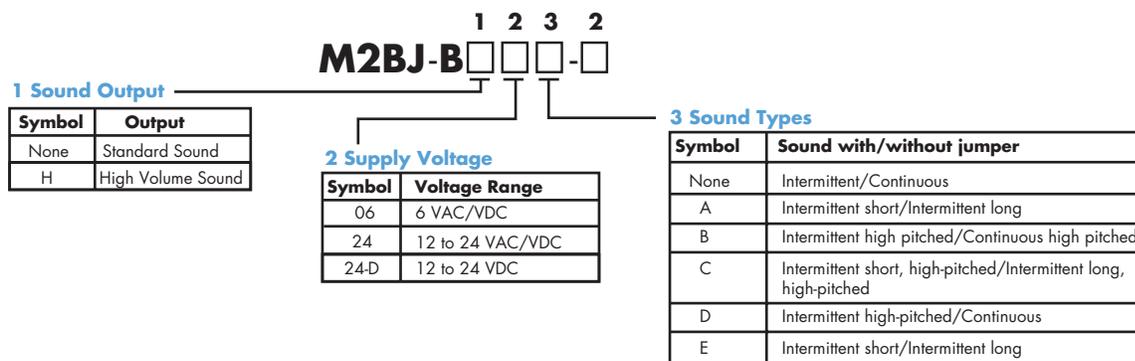


## Specifications

- Current consumption:
  - Standard sound types:
    - DC: 7 mA max.
    - AC: 20 mA max.
  - High-sound (includes LED) types:
    - DC: 50 mA max.
    - AC: 100 mA max.
- Approvals:
  - UL: UL508, File No. E41515
  - cUL: CSA C22 No. 14
  - TÜV: EN60947-5-1:2004

Buzzers		Model
Standard sound buzzer		M2BJ-B
High volume sound buzzer		M2BJ-BH

## Options



## Ordering Information - Most Commonly Ordered Types

### M2BJ Buzzers with Solder Terminals

Sound types	Sound output	Voltage	Model
Intermittent/continuous	High	12-24 VDC	<b>M2BJ-BH24D</b>
Intermittent/continuous high pitched		12-24 V AC/DC	<b>M2BJ-B24B</b>
Intermittent/continuous	Standard		<b>M2BJ-B24</b>
Intermittent short/intermittent long	High	12-24 VDC	<b>M2BJ-B24A</b>
Intermittent high pitched/continuous		6 V AC/DC	<b>M2BJ-BH06D</b>

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<b>D4C</b>	Sealed, compact, slim pre-wired limit switch	R-7
<b>D4CC</b>	Sealed, compact, slim limit switch with connector	R-9
<b>ZE/ZV/ ZV2</b>	High capacity AC switches, 3 mounting styles	R-11
<b>D4MC</b>	Compact enclosed limit switch	R-13
<b>D4E-N</b>	Slim and compact enclosed limit switch with a long life	R-14
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<b>VB</b>	Multiple plunger limit switch	R-16
<b>D5B</b>	Tactile switches detect objects from multiple directions	R-17

## Selection Guide

General purpose switches	SPDT double break: 10 A max. at 125 VAC, NEMA A600	Side rotary standard and high-precision overtravel switches; plunger switches, flexible rod switches	WL
	SPDT double break: 10 A max. at 125 VAC, NEMA A600	Side rotary standard, high-precision, low-torque and maintained contact switches; plunger switches; flexible rod switches	D4A-1□□□N
Enclosed switches	DPDT double break: 5 A max. at 125 VAC, NEMA B600	Side rotary standard, sequential operation, center neutral operation switches; plunger switches	D4A-2□□□N
	Pre-wired miniature switch; SPDT: 5 A max. at 250 VAC, NEMA B300	Plunger; sealed plunger; panel mount plunger; roller lever; flexible rod switches	D4C
	Miniature switch with M12 connector; SPDT, 1 A max. at 125 VAC, NEMA B300 or 1 A max. at 30 VDC	Plunger; sealed plunger; panel mount plunger; roller lever; flexible rod switches	D4CC
	High-capacity AC switch: SPDT, 15 A max. at 125 VAC, NEMA B300 or 1 A max. at 30 VDC	Plunger; roller arm lever; sealed plunger switches	ZE (side mounting) ZV (diagonal side mounting) ZV2 (flanged base)
	Compact AC switch: SPDT, 10 A max. at 125 VAC; NEMA A300	Panel mount plunger; hinge lever; hinge roller lever switches	D4MC
	Slim, compact AC switch: SPDT, 5 A max. at 125 VAC, NEMA A300	Plunger, sealed plunger and roller lever switches	D4E-N
	Coil spring action switches: SPDT, 10 A max. at 125 VAC, NEMA A300	Plunger; panel mount plunger, hinge lever; hinge roller lever	SHL
	2 to 6 switches in single housing: SPDT, 10 A max. at 125 VAC	Roller or bevel plunger	VB
Tactile switch	SPST double break; 1 mA at 5 VDC to 30 mA max. at 30 VDC	Hemispheric, cone-shaped, and wobble-stick actuators in 3 sizes	D5B

# General-Purpose Limit Switches WL Series



## Robust Single-Pole/Double Break Switches with Built-In Actuators

- Rugged diecast aluminum housing with high mechanical strength
- Rated IP67 with waterproof, oil-tight and dust-proof construction
- Easy to install and maintain
- Wide range of actuators:
  - Roller levers: short, medium, long; flush mounting; flange mounting
  - Adjustable levers: roller lever, rod lever
  - Fork roller levers
  - Plungers: plain top, top roller, top ball, plain side, side roller, side ball
  - Wobble levers: steel wire, nylon rod, coil spring
- Wide variety of standard, high-precision and overtravel models
- LED or neon lamp status indicator models available



## Specifications

- Load rating: 10 A max. at 125 VAC, NEMA A600
- Contact configuration: SPDT double break
- Mechanical life: 15 million operations
- High temperature, low temperature, corrosion proof, hermetic, anti-coolant, spatter resistant types available
- Micro-load and “Long-Life” types available
- Class 1 protection against electric shock
- Connection: 1/2-14 NPT conduit entrance, terminal screw connections
- Enclosure rating: IP67; UL 3, 4, and 13

## Actuator/Head Features

Type	Basic	High sensitivity overtravel	90-Degree overtravel	High precision overtravel
Action				
Features	<ul style="list-style-type: none"> <li>■ Used with roller levers.</li> </ul>	<ul style="list-style-type: none"> <li>■ Operation is highly sensitive with only 10° pretravel.</li> <li>■ Overtravel is large, making setting the dog easier.</li> <li>■ Mounting is compatible with basic models.</li> </ul>	<ul style="list-style-type: none"> <li>■ Overtravel is large, making setting the dog easier.</li> <li>■ Mounting is compatible with basic models.</li> </ul>	<ul style="list-style-type: none"> <li>■ Repeat accuracy is twice that of basic models.</li> <li>■ Operation is highly sensitive with only 5° pretravel.</li> <li>■ Ideal for positioning, e.g., with machine tools.</li> </ul>
One-way operation	Possible	Not possible	Not possible	Not possible
Head mounting	Any of 4 directions	Any of 4 directions	Any of 4 directions	Any of 4 directions

## Basic Side Rotary Switches

Actuator type	Appearance	Total travel/switch type	Operating force	Dimensions H x W x D mm	Model
Short roller lever switch		45 degree/basic side rotary, 38 mm radius	1.36 kg-f (3 lb-f)	125 x 40 x 59	WLCA2-TS
Short roller lever switch, LED indicator		45 degree/basic side rotary, 38 mm radius	1.36 kg-f (3 lb-f)	125 x 40 x 59	WLCA2LD
Short roller lever switch		45 degree/high precision, 1-way operation, 38 mm radius	1.36 kg-f (3 lb-f)	125 x 40 x 59	WLGCA2-TS
Adjustable roller lever switch		45 degree/basic side rotary, 25 to 89 mm	1.36 kg-f (3 lb-f)	119.1 to 183.1 x 40 x 67	WLCA12-TS
Adjustable rod lever switch		45 degree/basic side rotary, 25 to 140 mm	142 g-f (5 oz-f)	119.1 to 234.1 x 40 x 55	WLCL-TS

## Overtravel Side Rotary Switches

High-precision models, ideal for position control, require a very small movement to operation (approx. 5°) and a repeat accuracy that is twice that of basic models.

Actuator type	Appearance	Total travel/switch type	Operating force	Dimensions H x W x D mm	Model
Short roller lever switch, LED indicator		80 degree/overtravel, 38 mm radius, high sensitivity	1 kg g-f	125 x 40 x 60	WLG2LD
Short roller lever switch		90 degree/overtravel, 38 mm radius	1 kg g-f	125 x 40 x 60	WLCA22-TS
Short roller lever switch, LED indicator		90 degree/overtravel, 38 mm radius	1 kg g-f	125 x 40 x 60	WLCA22LD
Short roller lever switch		90 degree, overtravel, 1-way operation, 38 mm radius	1 kg g-f	125 x 40 x 60	WLCA22N
Adjustable roller lever switch		90 degree/overtravel type, 25 to 89 mm	1 kg g-f	119.1 to 183.1 x 40 x 68	WLCA122-TS

## Plunger Switches

Actuator type	Appearance	Total travel/switch type	Operating force	Dimensions H x W x D mm	Model
Plain top plunger switch		29.5 mm	2.72 kg-f (6 lb-f)	99.4 x 40 x 42	WLD-TS
Top roller plunger switch		39.5 mm	2.72 kg-f (6 lb-f)	109.4 x 40 x 42	WLD2-TS

## Flexible Rod Switches

Actuator type	Appearance	Total travel/switch type	Operating force	Dimensions H x W x D mm	Model
Coil spring 6.5 m dia. switch		—	150 g-f (5.29 oz-f)	203.7 x 40 x 42	WLNJ-TS
Nylon rod switch		—	150 g-f (5.29 oz-f)	190.1 x 40 x 42	WLNJ-2-TS

## Levers for WL Series

Use these levers and actuator heads to modify existing WL switches or to support maintenance.

Description	Model
Short 38 mm radius roller lever	WL-1A100
Medium 50 mm radius roller lever	WL-1A200
Long 63 mm radius roller lever	WL-1A300
Adjustable roller lever	WL-2A111
Adjustable rod lever 140 mm	WL-4A201
Adjustable rod lever 380 mm	WL-3A100
Spring rod lever	WL-3A200
Nylon rod head with actuator	WL-9H300

# General-Purpose Limit Switches D4A-N



## Heavy-Duty SPDT and DPDT Switches with Plug-In Construction

- Oil-tight, watertight construction with double seal on the head, a complete gasket cover
- Plug-in construction reduces downtime for maintenance
- Convenient front mounting simplifies installation
- User selectable operating direction for side rotary switches — CW, CCW, or both
- Position and lock the operating head at any of four 90° positions
- Wide operating temperature range: -40° to 100° C (side rotary)
- Side rotary switches accept a wide selection of levers
- DPDT, double-break models available for sequential operation and center neutral switching
- Approved by UL, CSA, and CCC (Chinese standard)



## Specifications

- Load rating: SPDT double break: 10 A max. at 125 VAC, NEMA A600
  - DPDT double break: 5 A max. at 125 VAC, NEMA B600
- Mechanical life:
  - SPDT double break: 50 million operations
  - DPDT double break: 30 million operations
- Connection: 1/2-14 NPT conduit entrance, terminal screw connections
- Enclosure rating: IP67; UL NEMA 3, 4, 4X, 6P, 12 and 13
- Class I protection against electrical shock

## SPDT Double Break Switches

### Side Rotary Switches

Order levers separately.

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Model
Standard side rotary switch		39.7 g-f (0.088 lb-f)	104.5 x 42 x 59 to 64.5	D4A-1101N
High precision side rotary switch		39.7 g-f (0.088 lb-f)		D4A-1102N
Low torque side rotary switch		20.4 g-f (0.045 lb-f)		D4A-1103N
Maintained contact side rotary switch		39.7 g-f (0.088 lb-f)	108.6 x 42 x 58.5 to 64	D4A-1105N

### Plunger Switches

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Model
Plain top plunger switch		1.8 kg-f (3.97 lb-f)	116.5 x 42 x 44	D4A-1109N
Top roller plunger switch		1.8 kg-f (3.97 lb-f)	126.5 x 42 x 44	D4A-1110N
Adjustable plunger switch		1.8 kg-f (3.97 lb-f)	126 x 42 x 44	D4A-1111N

### Flexible Rod Switches

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Model
Plastic rod switch		149.9 g-f (0.33 lb-f)	220.5 x 42 x 44	D4A-1114N
Coil spring switch		149.9 g-f (0.33 lb-f)	230.5 x 42 x 44	D4A-1116N

## DPDT Double Break Switches

### Side Rotary Switches

Order levers separately.

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Model
Standard operation side rotary switch		39.7 g-f (0.088 lb-f)	104.5 x 42 x 59 to 64.5	D4A-2501N
Sequential operation side rotary switch		39.7 g-f (0.088 lb-f)	104.5 x 42 x 59 to 64.5	D4A-2717N
Center neutral operation side rotary switch		39.7 g-f (0.088 lb-f)	104.5 x 42 x 59 to 64.5	D4A-2918N

### Plunger Switches

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Model
Plain top plunger switch		1.8 kg-f (3.97 lb-f)	220.5 x 42 x 44	D4A-2509N
Top roller plunger switch		1.8 kg-f (3.97 lb-f)	230.5 x 42 x 44	D4A-2510N

### Levers for D4A-N Series

Use these levers and actuator heads to modify existing D4A-N switches or to support maintenance. A wider selection of levers is available.

Description	Appearance	Model
Roller lever, 11.5 mm depth		D4A-A00
Adjustable roller lever (33 to 91 mm)		D4A-C00
Adjustable rod lever (150 mm max.)		D4A-D00
Standard side rotary operating head	—	D4A-0001N
SPDT double break switch and body	—	D4A-0100N

# Enclosed Limit Switches D4C



## Sealed, Compact, Slim Pre-Wired Limit Switch

- Rugged diecast aluminum housing
- Rated IP67; triple-sealed construction
- Designed for easy gang mounting
- Standard cable offers high flexibility, outstanding oil and extreme temperature resistance
- Wide range of actuators:
  - Plunger: pin, roller, cross roller, bevel
  - Sealed plunger: pin, roller, cross roller
  - Panel mount plunger: pin, roller, cross roller
  - Roller lever: standard, center mount
  - Plastic rod
- Approved by UL, CSA, CE and CCC (Chinese standard)
- Gang mount up to 6 switches

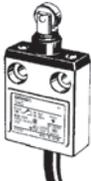


## Specifications

- Load rating: SPDT: 5 A max. at 250 VAC, NEMA B300
- Mechanical life: 10 million operations
- Connection: Pre-wired with 3 or 5 cable
- Enclosure rating: IP67; UL NEMA 3, 4 and 13
- Micro load versions available
- Weather-resistant models available

## Pre-Wired Enclosed Switches

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Cable length	Model
Pin plunger		1.2 kg-f (42.32 oz-f)	54.2 x 40 x 16	3 m	D4C-1601
Roller plunger		1.2 kg-f (42.32 oz-f)	67 x 40 x 16	3 m	D4C-1602
				5 m	D4C-1702
Cross roller plunger		1.2 kg-f (42.32 oz-f)	67 x 40 x 16	3 m	D4C-1603

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Cable length	Model
Roller lever, R38		580 g-f (20.46 oz-f)	102.7 x 40 x 16	3 m	D4C-1620
				5 m	D4C-1720
Sealed pin plunger		1.8 kg-f (63.49 oz-f)	56 x 40 x 16	3 m	D4C-1631
Sealed roller plunger		1.8 kg-f (63.49 oz-f)	66 x 40 x 16	3 m	D4C-1632
Sealed cross roller plunger		1.8 kg-f (63.49 oz-f)	66 x 40 x 16	3 m	D4C-1633
Plastic rod		150 g-f (5.29 oz-f)	104 x 40 x 16	3 m	D4C-1650

# Enclosed Limit Switches D4CC



## Sealed, Compact, Slim Limit Switch with Connector

- Center roller lever models enable ganged mounting of up to 6 Switches
- M12 4-pin connector reduces installation and maintenance time
- Rated IP67; triple-sealed construction for plungers provides oil-tight and water-tight protection
- AC and DC switching models
- Wide range of actuators:
  - Plunger: pin, roller, cross roller, bevel
  - Sealed plunger: pin, roller, cross roller
  - Panel mount plunger: pin, roller, cross roller
  - Roller lever: low operating force, center mounted
  - Plastic rod
- Micro-Change® connector cordsets available separately



## Specifications

- Load rating: SPDT, 1 A max. at 125 VAC, NEMA B300 or 1 A max. at 30 VDC
- Mechanical life: 10 million operations
- Connection: M12 single keyway 4-pin connector
- Enclosure rating: IP67; UL NEMA 3, 4 and 13

## Enclosed Switches with M12 Connectors

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Switching voltage	Model
Roller plunger		1.2 kg-f (42.32 oz-f)	85.5 x 40 x 16	AC	D4CC-1002
				DC	D4CC-3002
Low force roller lever		0.58 kg-f (20.46 oz-f)	121.2 x 40 x 50	AC	D4CC-1024
Sealed plunger		1.8 kg-f (63.49 oz-f)	81 x 40 x 16	AC	D4C-C1031
Sealed roller plunger		1.8 kg-f (63.49 oz-f)	90.3 x 40 x 16	AC	D4CC-1032
				DC	D4CC-3032

## Connector Cordset

---

### M12, 4-Pin Single Key-Way Connector Cordsets\*

Connector type	Cable size	Length	Straight connector	Right angle connector
Female 4-pole AC Micro-Change®	22 AWG	6 ft	Y96E-44SA6	Y96E-44RA6
		12 ft	Y96E-44SA12	Y96E-44RA12
		20 ft	Y96E-44SA20	Y96E-44RA20
Female 4-pole DC Micro-Change®	22 AWG	2 m (6.56 ft)	Y96E-44SD2	Y96E-44RD2
		5 m (16.4 ft)	Y96E-44SD5	Y96E-44RD5
		10 m (32.8 ft)	Y96E-44SD10	Y96E-44RD10

\* Not available in Canada.

# Enclosed Limit Switches ZE/ZV/ZV2

Quick Link  
L826

## High Capacity AC Switches

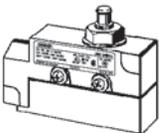
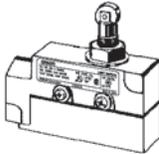
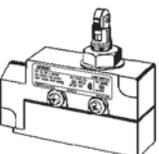
- Large 15-amp, 125 VAC switching capacity and long service life
- Wide range of actuators:
  - Plunger: pin, roller, cross roller
  - Roller arm lever: standard and sealed
  - Sealed plunger: pin, roller, cross roller
- Rugged diecast aluminum housing
- Sealed switches rated IP65 (ZE-N), meet NEMA types 1, 2, 3, 4 and 5
- Three mounting styles available:
  - Side mounting (ZE)
  - Diagonal side mounting (ZV2) is ideal for gang mounting several switches
  - Flanged base mounting (ZV)
- ZE, ZV, and ZV2 series are approved by CCC, UL, CSA

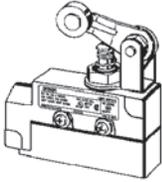
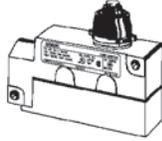
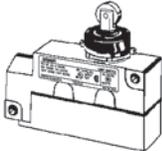
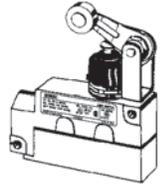
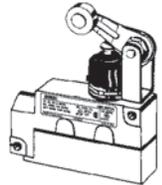


## Specifications

- Load rating: SPDT, 15 A max. at 125 VAC, NEMA B300 or 1 A max. at 30 VDC
- Mechanical life: 10 million operations
- Connection: Screw terminals on internal switch face forward when the cover is opened
- Enclosure rating: IP65 (ZE-N); IP60 ZE-Q)
- Micro load version available

## High Capacity Enclosed Switches

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Mounting	Model
Plunger		249.8 to 349.8 gram-force 0.55 to 0.77 pound-force	63.7 x 25.4 x 86	Side	ZE-Q-2S
Roller plunger		249.8 to 349.8 gram-force 0.55 to 0.77 pound-force	75.2 x 25.4 x 86	Side	ZE-Q22-2S
Cross roller plunger		249.8 to 349.8 gram-force 0.55 to 0.77 pound-force	75.2 x 25.4 x 86	Side	ZE-Q21-2S

Actuator type	Appearance	Operating force	Dimensions H x W x D mm	Mounting	Model
Roller arm lever		570 gram-force 1.26 pound-force	92.6 x 25.4 x 86	Side	<b>ZE-QA2-2S</b>
Sealed plunger		800.5 gram-force 1.76 pound-force	71.4 x 25.4 x 86	Diagonal side	<b>ZV2-N-2S</b>
Sealed roller plunger		499.7 gram-force 1.1 pound-force	75.2 x 25.4 x 86	Diagonal side	<b>ZV2-N22-2S</b>
Sealed roller arm lever		640.4 gram-force 1.41 pound-force	102.1 x 25.4 x 86	Diagonal side	<b>ZV2-NA2-2S</b>
Sealed roller arm lever		640.4 gram-force 1.41 pound-force	102.1 x 25.4 x 86; base width 54 mm	Flange base	<b>ZV-NA2-2S</b>

# Limit Switches D4MC



## Compact Enclosed Limit Switch

- Suitable for applications demanding higher mechanical strength, dustproof and drip-proof properties
- Rated IP67; gasket diaphragm seal provides high environmental resistance
- High precision and long life (10,000,000 mechanical operations)
- Wide range of actuators:
  - Panel mount plunger, roller plunger, cross roller plunger
  - Short and standard hinge lever
  - Standard, short and one-way action short hinge roller lever
- Screw terminals or pre-wired with 1 m cable



## Specifications

- Control output: SPDT (form C), rated 10 A max. at 125 VAC (inductive load)
- NEMA A300 rated
- Dimensions: 47 H x 21.7 W x 60 D mm (switch body with boot)

## List of Models

Actuator	Model
Panel mount plunger 	D4MC-5000
Panel mount roller plunger 	D4MC-5020
Panel mount crossroller plunger 	D4MC-5040
Short hinge lever 	D4MC-1020
Hinge lever 	D4MC-1000
Hinge roller lever 	D4MC-2000
Short hinge roller lever 	D4MC-2020
One-way action short hinge roller lever 	D4MC-3030

**Note:** Use molded terminal models when using the Switch under one of the following conditions:

- a) dusty, b) high amount of dripping oil, or c) high humidity.

Models are available with the lead outlet in one of three locations: right-hand, left-hand, and underside.

When placing order for molded terminal types, you must specify the required length of V,C,T cable in addition to the model number of the switch. Available lengths are 1 m and 3 m.

Location of lead outlet model:

Right-hand D4MC-□□□1

Left-hand D4MC-□□□2

Underside D4MC-□□□3

Example:

Standard type: D4MC-5020

Location of the lead outlet: Underside

Length of lead: 1 m (V,C,T, Lead)

When placing your order for the above switch, specify the model number as D4MC-5023 VCT 1M

# Limit Switches D4E-N



## Slim and Compact Enclosed Limit Switch with a Long Life

- Ideal for gang mounting
- Rated IP67; NEMA 3, 4 and 13
- Long service life (10,000,000 mechanical operations)
- Wide range of actuators:
  - Plunger, roller plunger, cross roller plunger
  - Sealed plunger, roller plunger, cross roller plunger
  - Standard and one-way action roller lever
- Screw terminals, connector or pre-wired with 1 m cable models
- Micro-load types available



## Specifications

- Control output: SPDT (form C), rated 5 A max. at 125 VAC (inductive load)
- NEMA A300 rated
- Dimensions: 36.4 H x 18 W x 43 D mm (switch body)

## List of Models

	One-touch connector type		Screw terminal type			
	General-purpose	Micro load	General-purpose without cable	Micro load without cable	General-purpose with cable	Micro load with cable
<b>Actuator</b>						
Roller plunger	D4E-1A□0N	D4E-2A□0N	D4E-1A20N (See note 2)	D4E-2A20N	D4E-1A21N	D4E-2A21N
Crossroller plunger	D4E-1B□0N	D4E-2B□0N	D4E-1B20N (See note 2)	D4E-2B20N	D4E-1B21N	D4E-2B21N
Plunger	D4E-1C□0N	D4E-2C□0N	D4E-1C20N (See note 2)	D4E-2C20N	D4E-1C21N	D4E-2C21N
Sealed roller plunger	D4E-1D□0N	D4E-2D□0N	D4E-1D20N (See note 2)	D4E-2D20N	D4E-1D21N	D4E-2D21N
Sealed crossroller plunger	D4E-1E□0N	—	D4E-1E20N (See note 2)	D4E-2E20N	D4E-1E21N	D4E-2E21N
Sealed plunger	D4E-1F□0N	D4E-2F□0N	D4E-1F20N (See note 2)	D4E-2F20N	D4E-1F21N	D4E-2F21N
Roller lever	D4E-1G□0N	D4E-2G□0N	D4E-1G20N (See note 2)	D4E-2G20N	D4E-1G21N	D4E-2G21N
One-way action roller lever	D4E-1H□0N	D4E-2H□0N	D4E-1H20N (See note 2)	D4E-2H20N	D4E-1H21N	D4E-2H21N

- Note:**
1. When ordering, specify the current type by replacing the blank box of the model number with 0 for AC connector or 1 for DC connector.
  2. Approved by UL and CSA.
  3. For the plunger and lever actuator models, the NC and NO terminal indicators are reversed.

# Limit Switches

# SHL

Quick Link  
L829

## Enclosed Limit Switch with Coil Spring Action

- Coil spring mechanism extends life of the switch
- Rated IP67; rigid zinc diecast alloy housing
- Hinge lever switches require low operating force similar to precision basic switches (0.53 to 0.88 lbf)
- Long service life (10,000,000 mechanical operations)
- Wide range of actuators:
  - Plunger
  - Panel mount plunger, roller plunger, cross roller plunger
  - Standard and short hinge lever
  - Standard and short hinge roller lever
  - One-way action standard and short hinge roller lever
- Screw terminals or pre-wired with 1 m cable models
- Molded terminal and indicator models available



## Specifications

- Control output: SPDT (form C), rated 10 A max. at 125 VAC (inductive load)
- Microload types rated @ 0.1 A
- UL & NEMA A300 rated
- Dimensions: 31.5 H x 17.5 W x 45.6 D mm (switch body)

## List of Models

Actuator	Standard model	Micro voltage
Plunger 	SHL-D55	SHL-D55-01
Panel mount plunger 	SHL-Q55	SHL-Q55-01
Panel mount roller plunger 	SHL-Q2255	SHL-Q2255-01
Panel mount crossroller plunger 	SHL-Q2155	SHL-Q2155-01
Short hinge lever 	SHL-W55	SHL-W55-01
Hinge lever 	SHL-W155	SHL-W155-01
Short hinge roller lever 	SHL-W255	SHL-W255-01
Hinge roller lever 	SHL-W2155	SHL-W2155-01
One-way action short hinge roller lever 	SHL-W355	SHL-W355-01
One-way action hinge roller lever 	SHL-W3155	SHL-W3155-01

# Limit Switches VB



## Multiple Plunger Limit Switch

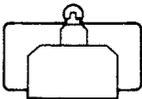
- Multiple plunger switches are ideal for machine tools and sequential control
- Robust solution offers 2 to 6 switches in one enclosure
- Easy to install and service; switch box has an oil drain
- Rated IP67; rugged diecast aluminum housing
- Ground terminal models have EN/IEC approval (CE marking)
- Long service life (5,000,000 mechanical operations)
- Roller plunger or bevel plunger actuators
- G1/2 conduit entrance; screw terminals



## Specifications

- Control output: SPDT (form C), rated 10 A max. at 125 VAC (resistive load)
- Dimensions: 68 H x 85 W x 58 D mm (2 switch model); 106 D mm (6 switch model)
- Microload types rated @ 0.1 A

## List of Models

Actuator	Conduit	Model	
		With flange 	Without flange 
Roller plunger (with a 6.8-dia. roller) 	Two on the side	VB-2211	VB-2241
		VB-3211	VB-3241
		VB-4211	VB-4241
		VB-5211	VB-5241
		VB-6211	VB-6241
	Four	VB-2221	VB-2251
		VB-3221	VB-3251
		VB-4221	VB-4251
		VB-5221	VB-5251
		VB-6221	VB-6251
Bevel plunger 	Two on the side	VB-2111	VB-2141
		VB-3111	VB-3141
		VB-4111	VB-4141
		VB-5111	VB-5141
		VB-6111	—
	Four	VB-2121	VB-2151
		VB-3121	VB-3151
		VB-4121	VB-4151
		VB-5121	—
		VB-6121	—

- Note:**
1. Other than the above models, micro load models switching 0.1 A are available. When ordering a micro load model, add the suffix A to the model number (i.e., VB-2211A for example).
  2. SC connectors can be connected to VB models.
  3. Models with ground terminals are also available. When ordering a ground terminal model, add the suffix E to the model number (i.e., VB-2211E for example).
  4. Since the actuator is incorporated into the monoblock switch, the actuator cannot be replaced.

# Limit Switches D5B



## Tactile Switches Detect Objects from Multiple Directions

- Detects object contact and operates even with a slight force
- Gold-plated contacts provide high contact reliability
- Switches micro current/voltage loads
- Long service life (10 million mechanical operations)
- Rated IP67 for resistance to dust, fine particles and water or oil splash
- Three sizes (M10, M8, and M5) to match total travel and operating force requirements
- Three actuator types: hemispheric, cone-shaped, and wobble-stick type
- Pre-wired with 1, 3 or 5 m cable



## Specifications

- Control output: SPST double break; 1 mA at 5 VDC to 30 mA max. at 30 VDC (resistive load)
- Dimensions: M5 x 24.5 L mm (hemispheric); 27 L mm (cone-shaped); 64.1 L mm (wobble stick)
- M8 x 28 L mm (hemispheric); 32.5 L mm (cone-shaped); 92.8 L mm (wobble stick)
- M10 x 33.3 L mm (hemispheric); 39.3 L mm (cone-shaped); 111.1 L mm (wobble stick)

## List of Models

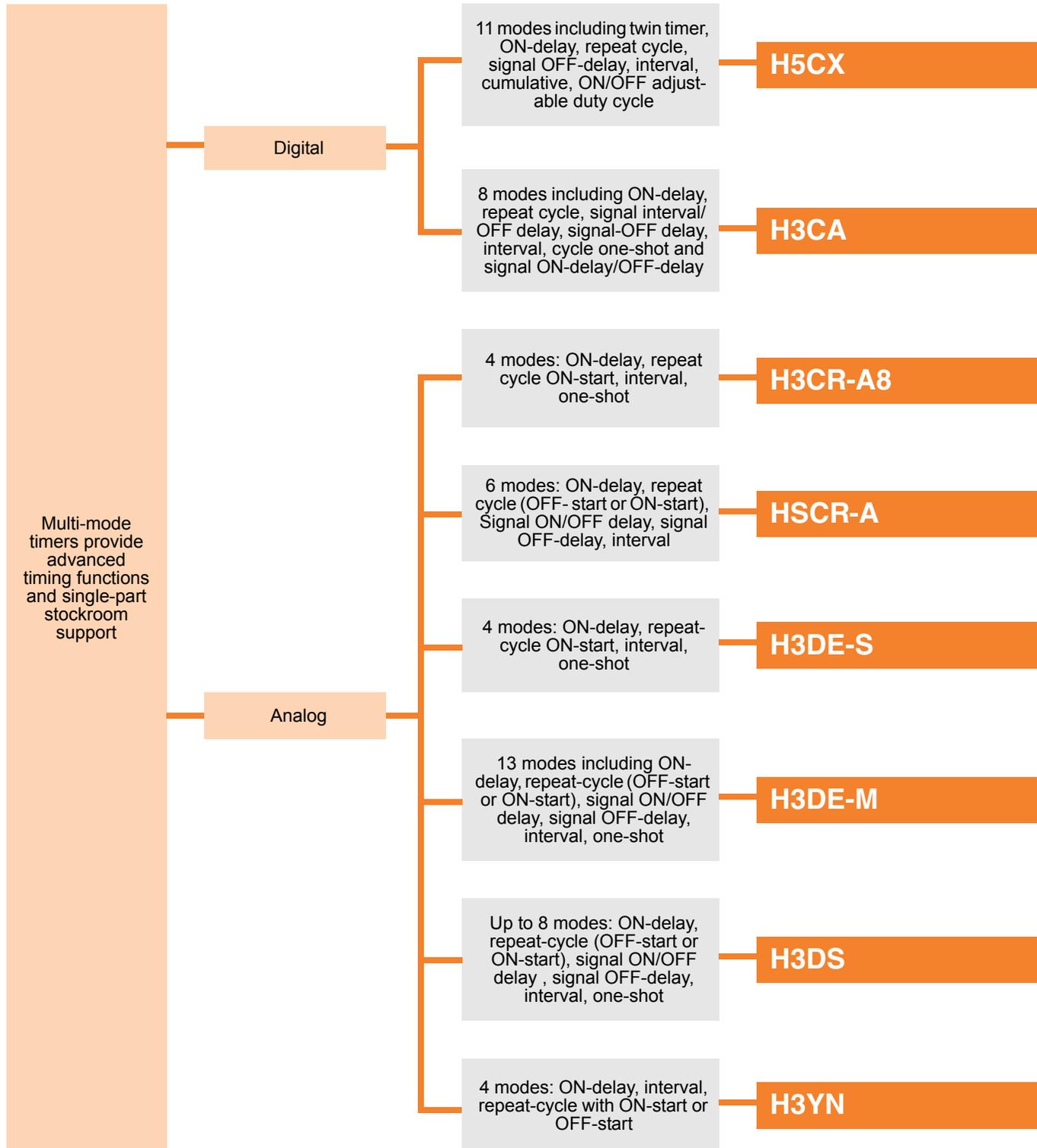
Type		Cable length	M5	M8	M10
Hemispheric actuator 		1 m	D5B-5011	D5B-8011	D5B-1011
		3 m	D5B-5013	D5B-8013	D5B-1013
		5 m	D5B-5015	D5B-8015	D5B-1015
Cone-shaped actuator 		1 m	D5B-5021	D5B-8021	D5B-1021
		3 m	D5B-5023	D5B-8023	D5B-1023
		5 m	D5B-5025	D5B-8025	D5B-1025
Wobble stick actuator 	Short spring	1 m	D5B-5511	D5B-8511	D5B-1511
		3 m	D5B-5513	D5B-8513	D5B-1513
		5 m	D5B-5515	D5B-8515	D5B-1515
	Long spring	1 m	—	—	D5B-1531
		3 m	—	—	D5B-1533
		5 m	—	—	D5B-1535



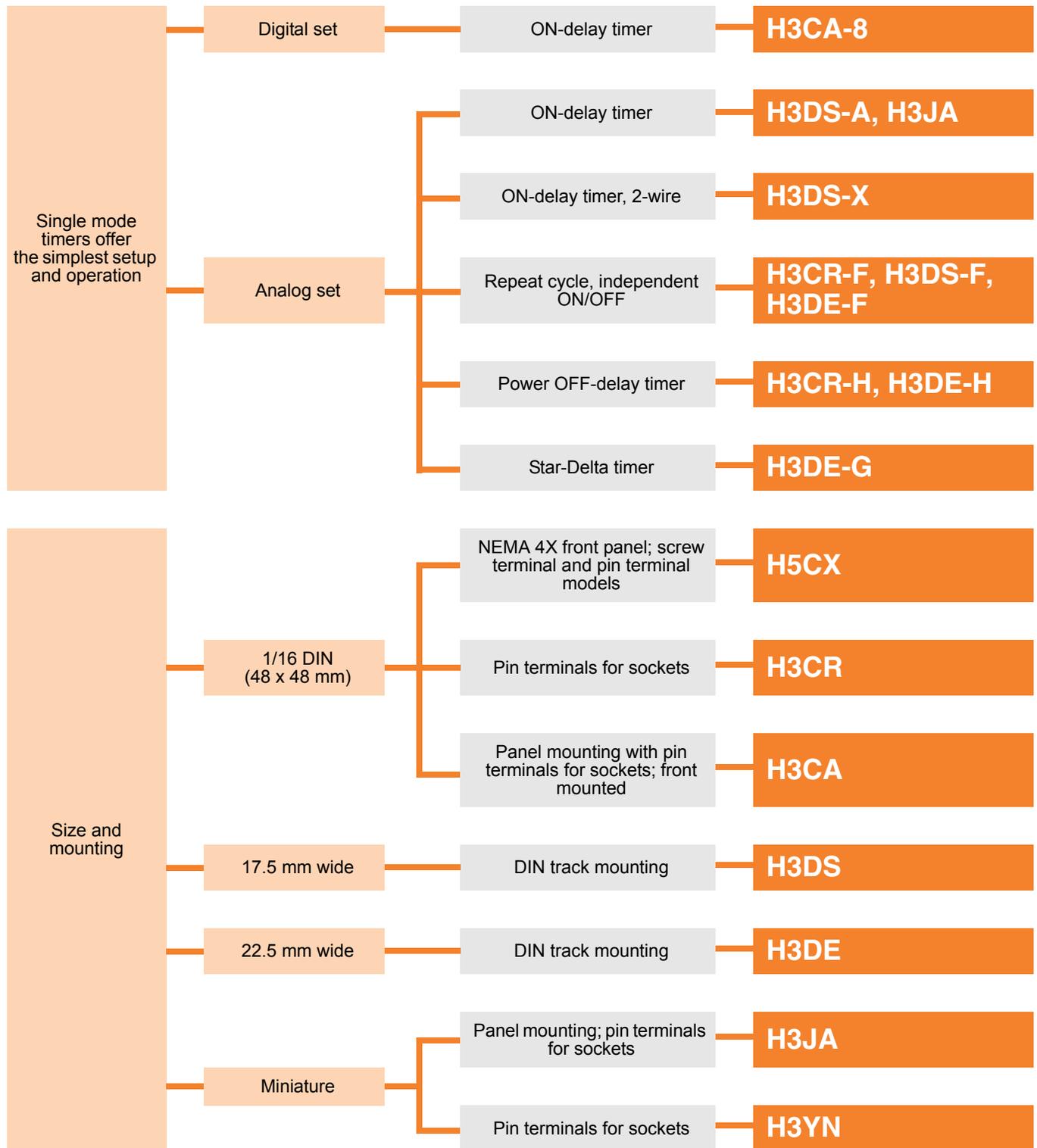
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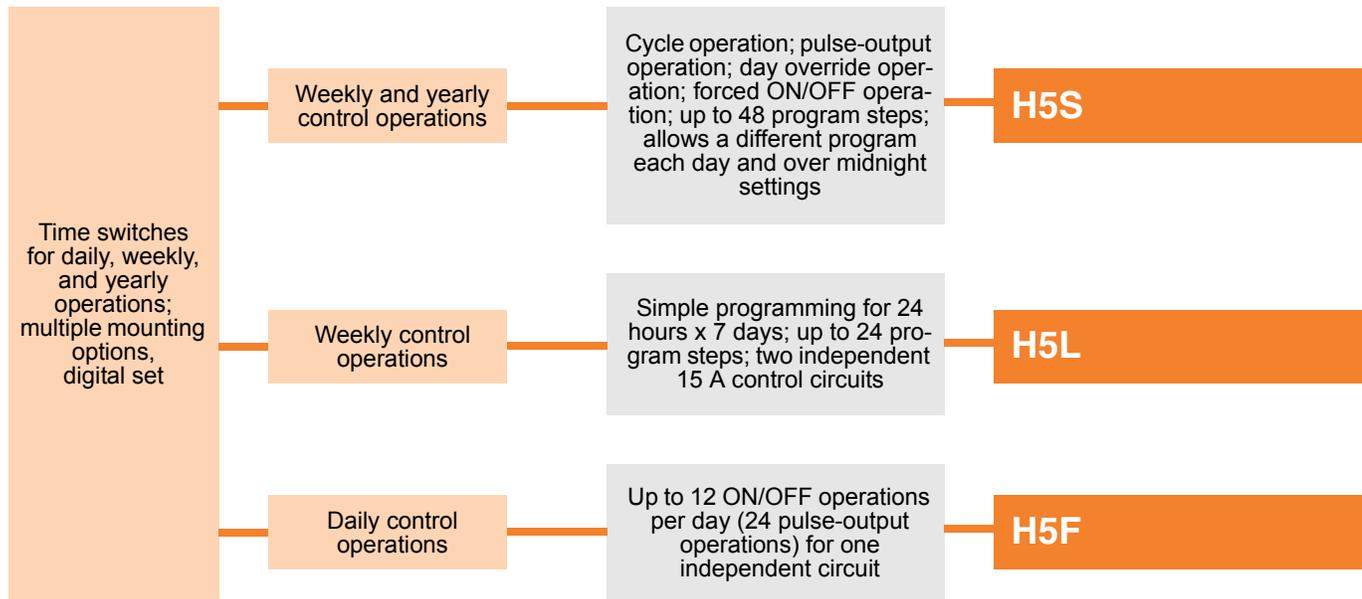
## Selection Guide



## Selection Guide



## Selection Guide



# Multi-Mode Digital Timers H5CX



## 1/16 DIN with Advanced Functionality and Twin Timer

- 11 modes including ON-delay, Repeat cycle, Signal OFF-delay, Interval, Cumulative, ON/OFF adjustable duty cycle
- Twin Timer mode satisfies a wide range of cyclic control applications
- Display elapsed time or remaining time
- Settable display color alerts operator of output status changes by changing from green to red
- Set parameters via front panel keys or DIP switches
- PNP/NPN selectable input
- Protect settings with 5 levels of key access
- NEMA 4/IP66 front panel
- Short mounting depth models save panel space



## Specifications

- Supply voltage: 100 to 240 VAC, 50/60 Hz, or AC/DC24
- Timing functions: Signal ON delay, Power ON delay, Repeat cycle (OFF or ON start, sustained or one-shot output), Signal OFF delay, Interval, Cumulative, ON/OFF duty cycle, Twin timer (ON or OFF start)
- Timing ranges: 9 time ranges, from 0.001 s to 9999 h
- Repeat accuracy:  $\pm 0.01\% \pm 50$  ms max.
- Control output: SPDT relay, 5 A at 250 VAC
  - NEMA B300 Pilot Duty
  - 1/4 HP 5 A resistive load at 120 VAC
  - 1/3 HP 5 A resistive load at 240 VAC

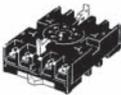
## 1/16 DIN Multi-Mode Digital Timers

Appearance/Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Inputs	Input rating	Connection type	Model
 48 x 48 x 98.7 with P3GA-11 socket	100 to 240 VAC, 50/60 Hz	Relay	SPDT, 5 A at 250 VAC	Start, Reset, Gate	No-voltage/voltage, selectable	11-pin socket	H5CX-A11 AC100/240
 48 x 48 x 100						Screw terminals	H5CX-A AC100/240
 48 x 48 x 64	24 VAC/ 12 to 24 VDC					H5CX-AD AC24/DC12-24	

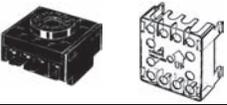
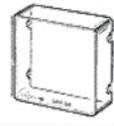
## 1/16 DIN Multi-Mode Digital Timers (Continued)

Appearance/ Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Inputs	Input rating	Connection type	Model
 48 x 48 x 64	24 VAC/ 12 to 24 VDC	Transistor	NPN open collector, 100 mA at 30 VDC	Start, Reset, Gate	No-voltage/ voltage, selectable	Screw terminals	H5CX-ASD AC24/DC12-24
 48 x 48 x 84.8	100 to 240 VAC, 50/60 Hz	Relay	SPDT, 5 A at 250 VAC	Start, Reset	No voltage	8-pin socket	H5CX-L8 AC100/240
 48 x 48 x 84.8	24 VAC/ 12 to 24 VDC	Relay	SPDT, 5 A at 250 VAC	Start, Reset	No voltage	8-pin socket	H5CX-L8D AC24/DC12-24

## Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Panel mounting adapter		58 x 48	Fits behind panel, ideal for side-by-side installation. Use P3G□-□ sockets. Order separately for H5CX-A11 and H5CX-L8 models.	Y92F-30
Waterproof packing		—	Order separately for H5CX-A11 and H5CX-L8 models.	Y92S-29
Track mounting/front connecting socket		74 x 50 x 20.3	8-pin socket	P2CF-08
		74 x 50 x 21.5	8 pin, finger-safe socket	P2CF-08-E
		74 x 50 x 31.2	11-pin socket	P2CF-11
			11-pin, finger-safe socket	P2CF-11-E

**Accessories (Continued)**

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Back-connecting socket for panel mounting		45 x 45 x 21.9	8-pin socket	<b>P3G-08</b>
		48 x 48 x 32.4 installed	8-pin socket with finger-safe terminal cover	<b>P3G-08 with Y92A-48G</b>
		45 x 45 x 27	11-pin socket	<b>P3GA-11</b>
		48 x 48 x 37.5 installed	11-pin socket with finger-safe terminal cover	<b>P3GA-11 with Y92A-48G</b>
Hard cover		50.5 x 50.5 x 16	Protects front panel from dirt and water	<b>Y92A-48</b>
Soft cover		50.5 x 50.5	Protects front panel against oil penetration from operators' hands, to IP54P	<b>Y92A-48F1</b>
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PFP-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PFP-M</b>

# Solid-State Digital Timer H3CA



## 1/16 DIN, Digital-Set Timer with LCD Bar Graph Display

- 8 field selectable operation modes or ON-delay only model
- Time remaining LCD bar graph and LCD output indicator
- Easy to install, fits 8- or 11-pin sockets
- Universal AC/DC supply voltage timer available
- Selectable no-voltage start, reset, gate and check inputs expand capabilities
- Time limit or Instantaneous output, select SPDT or DPDT models (3 A @ 250 VAC)
- Panel mounting adapters, sockets and accessories available
- UL, CSA, SEV approved



## Specifications

- Supply voltage: 100/110/120 VAC, 50/60 Hz, 200/220/240 VAC, AC24V, DC110V, DC12V or DC24V, Universal voltage model: 24 to 240 VAC, 50/60 Hz; 12 to 240 VDC
- Timing functions: Multi-mode: ON-delay, Repeat cycle, Signal Interval/OFF-delay, Signal-OFF delay (I & II), Interval, Cycle and Signal ON-delay/OFF-delay, ON-delay only
- Timing ranges: 7 ranges: 0.1 seconds to 9990 hours
- Repeat accuracy:  $\pm 0.3\%$  of range,  $\pm 0.05$  second
- Control output: 10 mA to 3 A at 250 VAC

## Solid-State Timers with 8 Selectable Functions

Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Inputs	Input rating	Connection type	Model
 48 x 48 x 89	24 to 240 VAC, 50/60 Hz; 12 to 240 VDC	Relay	SPDT, 3 A at 250 VAC	Start, Reset, Gate	No-voltage	11-pin socket	H3CA-A
 75 x 45 x 101						Front mounted screw terminals	H3CA-FA

## Solid-State Timers - ON-Delay Only

Add the supply voltage to the part number when ordering ON-delay only timers. For example, H3CA-8H-AC/100/110/120.

Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Inputs	Input rating	Connection type	Model
 48 x 48 x 89	Specify 24 VAC, 100/110/120 VAC, or 200/220/240 VAC; 50/60 Hz	Relay (time limit or instantaneous)	SPDT, 3 A at 250 VAC	Start, Reset, Gate	No-voltage	8-pin socket	H3CA-8H
	Specify 12, 24, 48 or 110 VDC	Relay					H3CA-8

**Note:** Refer to datasheet for available sockets and accessories.

# Multi-Mode Timers H3CR



## 1/16 DIN Analog-Set Timer

- Use for delay timing, repeatable cycles or duration (interval) timing
- Select 4- or 6-function models to handle most applications
- Repeat cycle models with independent ON and OFF periods available
- Power-OFF delay models available
- 5-amp DPDT relay switches when timing cycle completes
- Short, 80 mm (3.15 inch) panel mounting depth with socket allows space-efficient control panel design
- Field-selectable time ranges from front panel
- Wide range AC/DC supply voltage models
- No-voltage/NPN voltage input models stocked; PNP input models available
- Match panel aesthetics with light gray, medium gray or black optional panel covers
- UL, CSA, CE approved



## Specifications

- Supply voltage: Multi-function: AC100-240/DC100-125 or AC 24-48/DC 12-24
  - Power-OFF delay: AC 100-120, AC 200-240 or AC/DC 24
  - Repeat cycle: AC 100-240, DC 48-125, DC 12, or AC/DC 24
- Timing functions:
  - 4-function: ON-delay, Repeat cycle ON-start, Interval, One-shot
  - 6-function: ON-delay, Repeat cycle (OFF-start or ON-start), Signal ON/OFF delay, Signal OFF-delay, Interval
  - Power-OFF delay: Instantaneous and time-limit operation
  - Repeat cycle: Independent ON and OFF periods
- Timing ranges:
  - 0.05 second to 300 hours; 0.1 second to 600 hours
  - Power-OFF delay: 0.05 to 12 seconds or minutes
  - Repeat cycle: 0.05 seconds to 30 hours; 1.2 seconds to 300 hours
- Repeat accuracy: Multi-function:  $\pm 0.2\%$  full scale max.
  - Power-OFF delay:  $\pm 0.3\%$  full scale max.
  - Repeat cycle:  $\pm 0.3\%$  full scale max.
- Control output: DPDT relay, 10 mA to 5 A at 240 VAC/30VDC

## Multi-Function Timers

Appearance/ Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Inputs	Input rating	Connection type	Model
 48 x 48 x 66.6	100 to 240 VAC, 50/60 Hz/ 100-125 VDC	DPDT Relay	5 A at 240 VAC/30 VDC	Start, Reset, Gate	No-voltage, NPN type	11-pin socket	H3CR-A AC100-240/DC100-125
	24-48 VAC, 50/60 Hz/ 12-48 VDC						H3CR-A AC24-48/DC12-48
	100 to 240 VAC, 50/60 Hz/ 100-125 VDC					8-pin socket	H3CR-A8 AC100-240/DC100-125
	24-48VAC, 50/60Hz/ 12-48 VDC						H3CR-A8 AC24-48/DC12-48
	100 to 240 VAC, 50/60 Hz/ 100-125 VDC	SPDT Relay	5 A at 250 VAC	—	H3CR-A8E AC100-240/DC12-48		

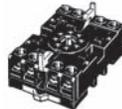
## Repeat Cycle Timers with Independent Settings

Appearance/ Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Operation	Timing range	Connection type	Model
 48 x 48 x 66.6	100 to 240 VAC, 50/60	DPDT Relay	5 A at 250 VAC	OFF-start	1.2 seconds to 300 hours	8-pin round socket	H3CR-F8-300 AC100240
	24 VAC/VDC			ON-start	0.05 seconds to 30 hours		H3CR-F8 AC100240
				OFF-start	0.05 seconds to 30 hours		H3CR-F8 ACDC24
	100 to 240 VAC, 50/60			ON-start	1.2 seconds to 300 hours		H3CR-F8N-300 AC100240
				OFF-start	0.05 seconds to 30 hours	H3CR-F8N AC100240	
							11-pin round socket

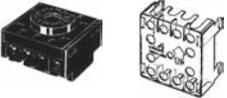
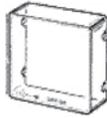
## Power-OFF Delay Timers

Appearance/ Dimensions H x W x D mm	Supply voltage	Output type	Output rating	Inputs	Timing range	Connection type	Model
 48 x 48 x 78	100-120 VAC, 50/60 Hz	DPDT Relay	5 A at 250 VAC	—	0.05 to 12 minutes	8-pin round socket	H3CR-H8L AC100120 M
							H3CR-H8L AC100120 S

## Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Panel mounting adapter		58 L x 48 H x 15.5 D	Fits behind panel, ideal for side-by-side installation. Use P3G□-□ sockets.	Y92F-30
Track mounting/front connecting socket		70 L x 50 H x 20.3 D	8-pin socket	P2CF-08
		70 L x 50 H x 21.5 D	8 pin, finger-safe socket	P2CF-08-E
		70 L x 50 H x 31.2 D	11-pin socket	P2CF-11
			11-pin, finger-safe socket	P2CF-11-E

## Accessories (Continued)

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Back connecting socket for panel mounting		45 L x 45 H x 17 D	8-pin socket	<b>P3G-08</b>
		47.7 L x 47.7 H x 27.6 D	8-pin socket with finger-safe terminal cover	<b>P3G-08 with Y92A-48G</b>
		45 L x 45 H x 27 D	11-pin socket	<b>P3GA-11</b>
		47.7 L x 47.7 H x 27.6 D	11-pin socket with finger-safe terminal cover	<b>P3GA-11 with Y92A-48G</b>
Hard cover		50.5 L x 50.5 H x 16 D	Protects front panel from dirt and water	<b>Y92A-48</b>
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PFP-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PFP-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PFP-100N2</b>
End plate		50 L x 11.5 H x 10 D	Holds track-mounted devices in place	<b>PFP-M</b>

## Solid-State Timer

# H3YN

Quick Link  
T324

### Analog-Set Relay Timers with Multiple Operating Modes

- Space-saving and easy to operate
- Miniature timer offers 4 selectable timing modes
- Seconds/minutes timing range models in stock; minutes/hours models available
- Monitor relay status using independent Power-ON and Time-Up indicators
- Socket-mount timers simplify installation and maintenance
- Sockets, hold-down clips and mounting accessories available separately
- UL, CSA, CE approved



### Specifications

- Supply voltage: 100-120 VAC, 200-230 VAC, or 24 VAC, 50/60 Hz; 24 VDC
- Timing functions: ON-delay, Interval and Repeat cycle with OFF-start or ON-start (DIP switch selectable)
- Timing ranges: 4 ranges: 0.1 second to 10 minutes; 0.1 minute to 10 hours
- Repeat accuracy:  $\pm 1\%$  FS max.
- Control output: DPDT, 5 A at 250 VAC (H3YN-2), 4PDT, 5 A at 250 VAC (H3YN-4)

## Multi-Function Timers

# H3DE

Quick Link  
T326

### Slim 22.5 mm Track-Mount Analog Set

- Narrow width saves space in control panels
- Meets UL508 and European standards EN61812-1, IEC60664-1
- Wide AC/DC power supply range (24 to 230 VAC/DC) minimizes inventory
- H3DE-M model available with 12 VDC supply voltage
- Wide choice of operating modes: 8 -H3DE-M models/ 4-H3DE-S models
- Selectable time ranges from 0.1 second to 120 hours
- Control output: DPDT (time-limit or instantaneous/switchable) or SPDT time-limit
- Additional single function models available - Repeat cycle independent ON/OFF, Star-Delta, power OFF delay
- Finger protection terminal block
- UL, CSA, CE approved



### Specifications

- Supply voltage: 24 to 230 VAC, 50/60 Hz/24 to 230 VDC
- Timing functions: ON-delay (signal or power); Repeat-cycle OFF start or ON start (signal or power); Signal ON-/OFF-delay; Signal OFF-delay; Interval; Signal ON-/OFF-delay; One-shot (signal or power)
- Timing ranges: 0.1 to 1.2 s, 1 to 12 s, 0.1 to 1.2 min, 1 to 12 min, 0.1 to 1.2 h, 1 to 12 h, 10 to 120 h
- Repeat accuracy:  $\pm 1\%$  max. of full scale
- Control output: 5 A at 250 VAC/30 VDC (resistive load)

## Multi-Mode Analog Timers

# H3DS

Quick Link  
T328

### Ultra-slim 17.5 mm Timers, Track-Mount Analog Set

- Eight operating modes (H3DS-M) and four operating modes (H3DS-S) to cover a wide range of applications
- Offers wide time setting range of 0.10 s to 120 h
- Smart Dial/Selector-Locking Mechanism prevents the dials and selectors on the timer's front panel from being operated without authorization (can only be unlocked and locked with an optional pen-type Lock Key)
- Additional single function models available - Repeat cycle independent ON/OFF, ON-delay, ON-delay timer 2 wire, Star-Delta, power OFF delay
- Finger protection terminal block prevents shock, meets VDE0106/P100
- High immunity to inverter noise



## Specifications

- Supply voltage: 24 to 230 VAC/24 to 48 VDC
- Timing functions: ON-delay (Signal or Power); Repeat-cycle OFF-start (Signal or Power); Repeat-cycle ON-start (Signal or Power); Signal ON/OFF-delay; Signal OFF-delay; Interval (Signal or Power); Signal ON/OFF-delay; One-shot (Signal or Power)
- Timing ranges: 0.1 to 1.2 s, 1 to 12 s, 0.1 to 1.2 min., 1 to 12 min., 0.1 to 1.2 h, 1 to 12 h, 10 to 120 h
- Repeat accuracy:  $\pm 1\%$  max. of full scale
- Control output: 5 A at 250 VAC/30 VDC (resistive load)

## Solid-State Timer

# H3JA

Quick Link  
T327

### Economical, Compact, Plug-in Timer

- ON-delay time limit operation with automatic resetting
- DIN size (36 x 36 mm), fits standard 8-pin socket
- Wide choice of supply voltages: 100 to 120 VAC stocked; 24, 200 to 240 VAC, 12 and 24 VDC models available
- Wide choice of time ranges: 1, 3, 5, 10, 30, 60 seconds/3, 5, 10, 30, 60 minutes/3 hours
- Time-limit 5-amp DPDT contact models stocked; 7-amp SPDT models available
- Dual LED indication for power and output status
- Large transparent setting knob
- Surface, flush and DIN track mountable
- UL, CSA, CE approved



## Specifications

- Supply voltage: 100-120 VAC, 50/60 Hz
- Timing functions: ON-delay, time limit; automatic resetting
- Timing ranges: 0.1 to 1 second, 0.3 to 3 seconds, 0.5 to 5 seconds, 1 to 10 seconds, 3 to 30 seconds, 6 to 60 seconds, 0.3 to 3 minutes, 0.5 to 5 minutes, 1 to 10 minutes, 3 to 30 minutes, 6 to 60 minutes, 0.3 to 3 hours
- Repeat accuracy:  $\pm 2\%$  max.
- Control output: DPDT, 100 mA to 5 A at 125/250 VAC (resistive load)

# Weekly and Yearly Time Switches H5S



## Weekly and Yearly Timer with AM/PM Display

- Control lighting, HVAC systems and production equipment for energy saving operation
- Independent Day Keys provide easier operation
- Temporary holiday setting function makes it easy to turn OFF output for holidays and non-operating days
- Easy-to-use, prompted programming with test mode for easy program checking
- Automatic or manual operation following power failure
- Field-adjustable ON/OFF, cycle and pulse output
- Battery back-up for memory protection
- 2-circuit models include time counter and total counter functions with alarm indicator
- Compact DIN size 72 x 72 mm
- Protective cover and other accessories available separately
- UL, CSA, SEV approved



## Yearly models offer:

- Automatic switching to summertime (Daylight Savings Time) adjustment
- Integrated temperature compensation circuit helps keep accurate time over a wide operating temperature range
- Automatic Program Switching by Seasons
- Yearly operation can be set to automatically change the weekly program depending on the season

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
	← Spring			Summer →			Autumn			← Winter →		
Season (See note)	Spring		Summer		Autumn		Winter					
Program example	17:30 ON ▼ 21:00 OFF		19:00 ON ▼ 22:00 OFF		18:00 ON ▼ 21:00 OFF		17:00 ON ▼ 21:00 OFF					

**Note:** Up to four seasons can be set for 4-circuit models, and up to two seasons for 2-circuit models.

## Ordering Information

### List of Models

Control cycle	Number of outputs	Mounting method	Supply voltage	Models
Weekly	2 circuits	Flush mounting	100 to 240 VAC	H5S-WB2
			24 VDC	H5S-WB2D
		Surface mounting/ track mounting	100 to 240 VAC	H5S-WFB2
			24 VDC	H5S-WFB2D
Yearly	2 circuits	Flush mounting	100 to 240 VAC	H5S-YB2-X
			24 VDC	H5S-YB2D-X
		Surface mounting/ track mounting	100 to 240 VAC	H5S-YFB2-X
			24 VDC	H5S-YFB2D-X
	4 circuits	Flush mounting	100 to 240 VAC	H5S-YB4-X
			24 VDC	H5S-YB4D-X
		Surface mounting/ track mounting	100 to 240 VAC	H5S-YFB4-X
			24 VDC	H5S-YFB4D-X

## Specifications

### Ratings

Item		Weekly 2-circuit Models (H5S-W□2)	Yearly 2-circuit Models (H5S-Y□2)	Yearly 4-circuit Models (H5S-Y□4)
Rated supply voltage		100 to 240 VAC (50/60 Hz), 24 VDC (See note 1)		
Operating voltage range		AC: 85% to 110% rated supply voltage DC: 85% to 120% rated supply voltage		
Power consumption		Approx. 2.9 VA at 264 VAC 60 Hz Approx. 0.9 W at 28.8 VDC	Approx. 0.8 W at 28.8 VDC Approx. 3.5 VA at 264 VAC 60 Hz	Approx. 3.2 VA at 264 VAC 60 Hz Approx. 1.0 W at 28.8 VDC
Control outputs	Number of circuits	SPST-NO x 2 circuits		SPST-NO x 4 circuits
	Circuits	Power supply circuit and other (no-voltage) circuit		
	Capacity	Resistive load ( $\cos\phi = 1$ )	15 A at 250 VAC (See note 2)	3 A at 250 VAC
	Inductive load	10 A at 250 VAC ( $\cos\phi = 0.7$ )	2 A at 250 VAC ( $\cos\phi = 0.4$ )	
Ambient operating temperature		-10 to 55°C (with no icing or condensation)		
Ambient operating humidity		25 to 85%		
Storage temperature		-25 to 65°C (with no icing or condensation)		
Case color		Light gray (Munsell 5Y7/1)		

**Note: 1.** Do not use inverter output as a power supply.

**2.** The capacity is 15 A per circuit, but derating of the total current for two circuits is required as shown below depending on the ambient temperature.

## Operation

Item		Weekly 2-circuit Models (H5S-W□2)	Yearly 2-circuit Models (H5S-Y□2)	Yearly 4-circuit Models (H5S-Y□4)
Operation method		Digital quartz		
Operation period		1 week (7 days)	1 year (with integrated calendar to 2099)	
Display		<ul style="list-style-type: none"> <li>Day, hrs (switchable between 24-hr indication and a.m./p.m. 12-hr indication), minutes, seconds (0.00 to 23:59, 0.00 to 11:59 a.m., 0.00 to 11:59 p.m.)</li> <li>Digital indication by LCD (character height: 10 mm)</li> <li>Digital display of operation schedule during operation</li> <li>Timing chart display of operation schedule during operation</li> </ul>		
Min. setting unit		1 min		
Number of steps that can be set	Weekly program (See note 1)	40 steps/circuit	48 steps/circuit (See note 2) 24 steps/circuit (See note 3)	48 steps/circuit (See note 2) 12 steps/circuit (See note 3)
	Yearly program	—	4 yearly programs/circuit	
	Number of settable yearly temporary holiday settings	—	16	

**Note:** 1. Depending on the operation, the following steps can be used for weekly programs.

Timer operation: 2 steps

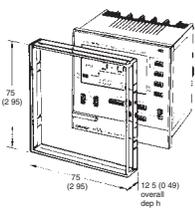
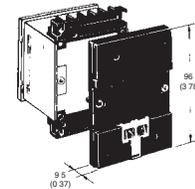
Pulse-output operation: 1 step

Cyclic operation: 4 steps

2. When the season switching setting is not being used.

3. When the season switching setting is being used.

## Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Hard cover		75 x 75 x 12.5	Hard plastic protective cover prevents accidental resetting and shields the front panel from dirt and water.	<b>Y92A-72C</b>
Track mounting adapter		96 x 72 x 9.5	Mounts H5S-FB timer on DIN rail track. Two screws supplied with the timer fasten the adapter to the timer.	<b>Y92F-90</b>
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PPF-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PPF-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PPF-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PPF-M</b>

## Digital Weekly Time Switch H5L

Quick Link  
T334

### 1/4 DIN Size Timer, Easy Programming and Large Display

- Programming for 24 hrs x 7 days using just five switches
- Twenty-four program steps available
- Two independent 15 A control circuits
- Manual override switch for each output
- 10-year battery backup for memory protection
- Large, easy-to-read LCD display
- Multiple-day operation
- Designed for track mounting; panel and surface mounting hardware included



### Specifications

- Supply voltage: 100 to 240 VAC
- Timing functions: Weekly timer, 24 hrs x 7 days, ON or OFF programming
- Timing ranges: 00:00 to 23:59 (hours:minutes), 1 minute cycle minimum
- Repeat accuracy:  $\pm 0.01\%$ ,  $\pm 0.05$  sec maximum
- Control output: 15 A at 250 VAC (resistive load)

## Digital Daily Time Switch H5F

Quick Link  
T333

### 1/16 DIN Size Timer with Simple Programming

- Control up to 12 ON/OFF operations per day (24 for pulse-output operation) for one independent circuit
- Special holidays can be handled easily with the holiday setting function
- Adjustments for sudden schedule changes can be made easily using output override and automatic return operation
- Operation program can be easily checked with the program check function
- Enables pulse output operation and summer time setting
- Incorporates finger-safe terminals
- Flush, surface, and DIN track mounting options



### Specifications

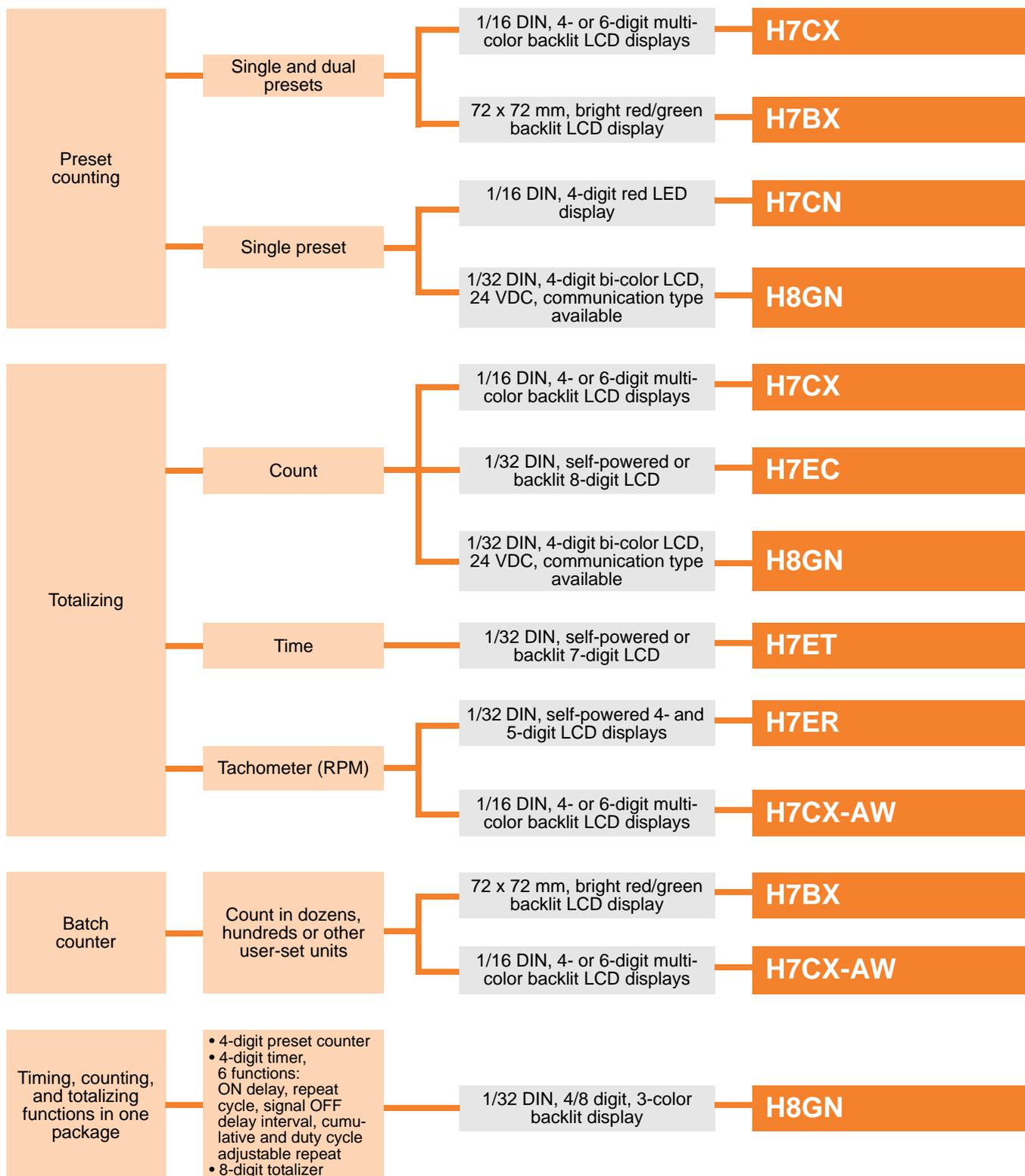
- Supply voltage: 100 to 240 VAC
- Timing functions: Daily timer, 24 hrs x 7 days, ON or OFF programming
- Timing ranges: 24 h x 7 days (Operation days can be specified.) 1 to 59 s, or 1 to 60 min. Pulse-output operation (Pulse width can be set in units of 1 s from 1 to 59 s and in units of 1 min from 1 to 60 min.)
- Repeat accuracy:  $\pm 0.01\%$ ,  $\pm 0.05$  sec maximum
- Control output: Contact output: SPST-NO, 15 A at 250 VAC, resistive load. 10 A at 24 VDC, resistive load. Minimum applied load: 100 mA at 5 VDC (failure level: P, reference value)



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## Selection Guide



# Multi-Function Digital Counters H7CX



## Advanced 1/16 DIN Size Preset Counters

- High-speed response up to 5 KHz
- Fully scalable
- Large, reverse-lit LCD display for long distance legibility
- Programmable display color (from green to red or red to green) helps operators identify status changes quickly
- Protect settings with 5 levels of key access
- Built-in sensor power supply available
- Accepts voltage and non-voltage inputs, PNP/NPN selectable
- Wide range of input modes: Increment, decrement, command, individual and quadrature
- NEMA 4/IP66 front panel
- Panel mounting adapter and waterproof packing provided with screw terminal connection types



## Specifications

- Supply voltage: 100-240 VAC, 50/60 Hz, 12 to 24 VDC, 12 to 24 VDC/24 VAC (-A11 models)
  - 12 VDC, 100 mA for inputs
- Counting functions: 1-stage counter, 1-stage counter with totalizer (-A and A11 models)
  - 1-stage counter, 2-stage counter, 1-stage counter with totalizer, 1-stage counter with batch counter, dual counter, tachometer (-AW models)
- Counting ranges: -999 to 9,999 (4-digit); -99,999 to 999,999 (6-digit)
- Control output: SPDT contact output rating 5 A @ 250 VAC
- Output functions: One-shot and sustained outputs with 8, 11 or 12 user selections

## Preset Digital Counters

Appearance/ Dimensions L x W x H mm	Counting action	Display digits	Sensor power supply	Supply voltage	Connection type	Model
 48 x 48 x 78.5	1-stage counter, 1-stage counter with totalizer	6	12 VDC	100 to 240 VAC, 50/60 Hz	11-pin socket	H7CX-A11-AC100240
				24 VAC/12 to 24 VDC		H7CX-A11D1-DC1224AC24
 48 x 48 x 106		4		100 to 240 VAC, 50/60 Hz	Screw terminal	H7CX-A4-AC100240
				Not provided		12 to 24 VDC
 48 x 48 x 70						

Preset Digital Counters (Continued)

Appearance/ Dimensions L x W x H mm	Counting action	Display digits	Sensor power supply	Supply voltage	Connection type	Model
 48 x 48 x 106	1-stage counter, 1-stage counter with totalizer	6	12 VDC	100 to 240 VAC, 50/60 Hz	Screw terminal	<b>H7CX-A-AC100240</b>
 48 x 48 x 70			Not provided	12 to 24 VDC		<b>H7CX-AD-DC1224</b>
 48 x 48 x 106	1-stage counter, 2-stage counter, 1-stage counter with totalizer, 1-stage counter with batch counter, dual counter, tachometer		12 VDC	100 to 240 VAC, 50/60 Hz		<b>H7CX-AW-AC100240</b>
 48 x 48 x 106				24 VAC/12 to 24 VDC		<b>H7CX-AWD1-DC1224AC24</b>

Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Panel mounting adapter		58 x 48	Order separately for H7CX-A11 and H7CX-L8 models	<b>Y92F-30</b>
Waterproof packing		—		<b>Y92S-29</b>
Track mounting/front connecting socket		74 x 50 x 31.2	11-pin socket with built-in hold down latches	<b>P2CF-11</b>
		74 x 50 x 31.2	11-pin, finger-safe socket with built-in hold down latches	<b>P2CF-11-E</b>
Back connecting socket for panel mounting		45 x 45 x 27	11-pin round socket	<b>P3GA-11</b>
		48 x 48 x 37.5 installed	11-pin socket with finger-safe terminal cover	<b>P3GA-11 with Y92A-48G</b>

**Accessories (Continued)**

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Hard cover		50.5 x 50.5 x 16	Protects front panel from dirt and water	<b>Y92A-48</b>
Soft cover		50.5 x 50.5	Protects front panel against oil penetration from operators' hands, to IP54P	<b>Y92A-48F1</b>
Mounting track		500 L x 35 H x 7.3 D	0.5 m length	<b>PPF-50N</b>
		1000 L x 35 H x 7.3 D	1 m length	<b>PPF-100N</b>
		1000 L x 35 H x 16.0 D	1 m length	<b>PPF-100N2</b>
End plate		50 x 10 x 10	Holds track-mounted devices in place	<b>PPF-M</b>

# Self-Powered Totalizers

## H7EC

Quick Link

T423

### Subminiature Count Totalizer

- Large 8-digit display with 8.6 mm height
- Backlit LCD display available for improved visibility
- PNP/NPN DC voltage input available
- Key-protect switch to prevent front face resetting
- Offers both 1 kHz input for high speed no chatter input signals or 30/20 Hz inputs for relay and switch (high chatter) inputs
- Up counting
- NEMA 4/IP66 front face
- Black case matches panel aesthetics
- Battery powered (user replaceable)



### Specifications

- Supply voltage: Backlight models require 24 VDC • Inputs: AC/DC voltage: 24 to 240 VAC/VDC, 50/60 Hz; 6 to 240 VDC at “High” logic level, 0 to 2.4 VAC, 50/60 Hz or 0 to 2 VDC at “Low” logic level, No-voltage: Short-circuit impedance 10 kΩ max.
- Reset time: 20 ms reset signal

### Self-Powered Totalizer

Appearance/ Dimensions H x W x D mm	Counting action/speed	Display digits	Sensor power supply	Supply voltage	Input type	Connection type	Model
	Count totalizer/ 30 Hz or 1 kHz	8	No	Battery	PNP/NPN universal DC voltage input	Screw terminal	H7EC-NV-B
				Backlight 24 VDC			H7EC-NV-BH
	Count totalizer/ 20 Hz			Battery	AC/DC multi-voltage input		H7EC-NV-B
	Count totalizer/ 30 Hz or 1 kHz				No-voltage		H7EC-N-B

### Accessories

Description	Appearance	Dimensions H x W x D mm	Specification	Model
Replaceable battery		24.5 dia. x 7.7 H	Battery replacement	Y92S-36
Panel adapter		26 x 45 x 4	Flush mounting adapter	Y92F-75
		24.8 x 48.8 x 4		Y92F-77B

# Self-Powered Time Counter H7ET



## Subminiature Counters Display Accumulated Time in Use

- Displays cumulative time counting the output signals from a sensor; input applied enables the timing circuit to start; disabling the inputs stops the timing sequence
- Large seven-digit display with 8.6 mm height
- Key-protect switch prevents front resetting
- Available with backlit LCD
- Selectable time range: 999999.9h or 3999d23.9h and 999h59m59s or 9999h59.9m
- NEMA 4/IP66 front face
- Black case for sleek aesthetics
- Battery powered (user replaceable)



## Specifications

- Supply voltage: Backlight models require 24 VDC
- Inputs: AC/DC voltage: 24 to 240 VAC/VDC, 50/60 Hz; 6 to 240 VDC at “High” logic level, 0 to 1.5 VAC, 50/60 Hz or 0 to 2 VDC at “Low” logic level, DC voltage input, 4.5 to 30 VDC at “High” logic level; 0 to 2 VDC at “Low” logic level, No-voltage: Short-circuit impedance 10 kΩ max.
- Reset time: 20 ms reset signal

## Self-Powered Time Totalizer

Appearance/Dimensions H x W x D mm	Counting action/ Time range	Display digits	Sensor power supply	Supply voltage	Input type	Connection type	Model	
	Time Counter/ 999999.9h or 3999d23.9h (selectable)	7	No	Battery	PNP/NPN universal DC voltage input	Screw terminal	H7ET-NV-B	
				Backlight 24 VDC			H7ET-NV-BH	
	Battery			H7ET-NV1-B				
	Backlight 24 VDC			H7ET-NV1-BH				
	Time Counter/ 999h59m59s or 9999h59.9m (selectable)			Time Counter/ 999999.9h or 3999d23.9h (selectable)	Battery		AC/DC multi-voltage input	H7ET-NFV-B
					No-voltage input		H7ET-N-B	
							AC/DC multi-voltage input	H7ET-NFV1-B
							No-voltage input	H7ET-N1-B

## Accessories

Description	Dimensions H x W x D mm	Specification	Model
Replaceable battery	24.5 dia. x 7.7 H	Battery replacement	Y92S-36
Panel adapter	26 x 45 x 4	Flush mounting adapter	Y92F-75
	24.8 x 48.8 x 4		Y92F-77B

# Self-Powered Tachometer H7ER

Quick Link

T425

## Subminiature Tachometers

- Large display with 8.6 mm height
- PNP/NPN DC voltage input available
- Selectable dual revolution display on 5-digit models extends up to 10,000 rpm
- Revolution is displayed according to encoder resolution used:
  - 4-digit: 1000 rps or  $s^{-1}$  (1 pulse/rev.), 1000 rpm or  $m^{-1}$  (60 pulse/rev.)
  - 5-digit: 1000.0 rps or  $s^{-1}$  (10 pulse/rev.), 1000.0 rpm or  $m^{-1}$  (600 pulse/rev.) 10,000 rpm or  $m^{-1}$  (60 pulse/rev.), switchable
- NEMA 4/IP66 front face
- Battery powered (user replaceable)



## Specifications

- Supply voltage: Backlight models require 24 VDC
- Inputs:
  - PNP or NPN universal DC voltage input, 4.5 to 30 VDC at "High" logic level; 0 to 2 VDC at "Low" logic level
  - No-voltage: Short-circuit impedance 10 k $\Omega$  max.
- Minimum signal width: 1 kHz: 0.5 ms; 10 kHz: 0.05 ms

## Self-Powered Tachometers

Appearance/ Dimensions H x W x D mm	Counting action/speed	Display digits	Encoder resolution	Supply voltage	Input type	Connection type	Model
	Tachometer/ 1 kHz	4	1000 rps or $s^{-1}$ (1 pulse/ rev.), 1000 rpm or $m^{-1}$ (60 pulse/ rev.)	Backlight 24 VDC	PNP/NPN universal DC voltage input  No-voltage input	Screw terminal	H7ER-NV-BH
				Battery			H7ER-NV-B
	Tachometer/ 10 kHz	5	1000.0 rps or $s^{-1}$ (10 pulse/ rev.), 1000.0 rpm or $m^{-1}$ (600 pulse/rev. 10,000 rpm or $m^{-1}$ (60 pulse/rev.), switchable	Backlight 24 VDC	PNP/NPN universal DC voltage input		H7ER-NV1-BH
				Battery	PNP/NPN universal DC voltage input		H7ER-NV1-B

## Accessories

Description	Dimensions H x W x D mm	Specification	Model
Replaceable battery	24.5 dia. x 7.7 H	Battery replacement	Y92S-36
Panel adapter	26 x 45 x 4	Flush mounting adapter	Y92F-75
	24.8 x 48.8 x 4		Y92F-77B

## Digital Counters

# H7BX

Quick Link  
T427

### 72 x 72 mm Multi-Function Counter with a Bright, Easy-to-view, Negative Transmissive LCD

- Provides a total and preset counter, batch counter, dual counter, and tachometer
- Large highly visible display with backlit transmissive LCD
- Selectable display color (red/green) enables checking output status at a distance
- Easy operation with a key for each digit
- Perform all basic settings with a DIP switch
- Wide range of inputs accepted for NPN/PNP inputs (multi-inputs) and 2-wire DC sensors
- Degree of protection: IP54 equivalent (front section only)



### Specifications

- Supply voltage: 100 to 240 VAC, 24 VAC/12 to 24 VDC
- Inputs: voltage or no-voltage inputs; 12 VDC external power supply
- Counting functions: 1-stage preset counter, 2-stage preset counter, total and preset counter, batch counter, dual counter, tachometer
- Ranges: counting -99,999 to 999,999 (6-digit); tachometer 0 to 999,999 (6 digits)
- Control output: contact output: 3 A at 250 VDC/30 VDC (resistive load); transistor output: 100 mA max. at 30 VDC max.
- Output functions: One-shot and sustained outputs with up to 12 user selections
- Reset time: 1 ms or 20 ms selectable

## Digital Counters

# H7CN

Quick Link  
T428

### 1/16 DIN, Single Preset Counter with Four-Digit LED Display

- Simple to set and operate
- Easy-to-read 8 mm-high LED display
- Contact (SPST-NO or SPDT) or solid-state (open-collector) outputs
- Single counting speed per model: 30 cps models stocked; 5 kcps available
- Separate UP, DOWN and REVERSIBLE counting models
- Memory protection circuit available on AC models
- 8-pin or 11-pin round socket models available
- Panel-mount adapter, sockets and accessories available separately
- UL, CSA approved



### Specifications

- Supply voltage: 100-240 VAC, 50/60 Hz
- Counting functions: 1-stage (single preset) UP counter
- Counting ranges: 0 to 9,999 (4-digit)
- Control output: Contact and transistor options
- Output functions: Sustained output until reset

## Digital Counters

# H8GN

Quick Link  
T429

### Timing, Counting, and Totalizing Functions in One 1/32 DIN Size Package

- Choose between 4-digit preset counter and 4-digit timer operation
- Preset counter can be programmed to display the monitoring total count value (8-digit totalizer)
- Built-in prescaling for counter operation
- ON/OFF-duty adjustable repeat-cycle mode that can be used to perform cyclic control is available for timer operation
- Four preset values programmable via the front panel key (SV-bank)
- Available with RS-485 communications
- Inputs: no voltage
- Degree of protection: NEMA 4X/IP66 front panel



### Specifications

- Supply voltage: 24 VDC
- Inputs: No-voltage inputs
- Counting functions: Increment, decrement, individual, quadrature inputs, totalizing
- Timing functions: Signal ON-delay, repeat cycle, signal OFF-delay, interval, cumulative, ON/OFF-duty adjustable repeat cycle
- Ranges: Counting -999 to 9,999; Time ranges 0.000 to 9.999 s, 0.00 to 99.99 s, 0.0 to 999.9 s, 0 to 9999 s, 0 min 00 s to 99 min 59 s, 0.0 to 999.9 min, 0 h 00 min to 99 h 59 min, 0.0 h to 999.9 h, 0 h to 9999 h
- Control output: SPDT contact output: 3 A at 250 VAC/30 VDC (resistive load)
- Output functions: One-shot, sustained output, and overrun display
- Reset time: 1 ms or 20 ms selectable

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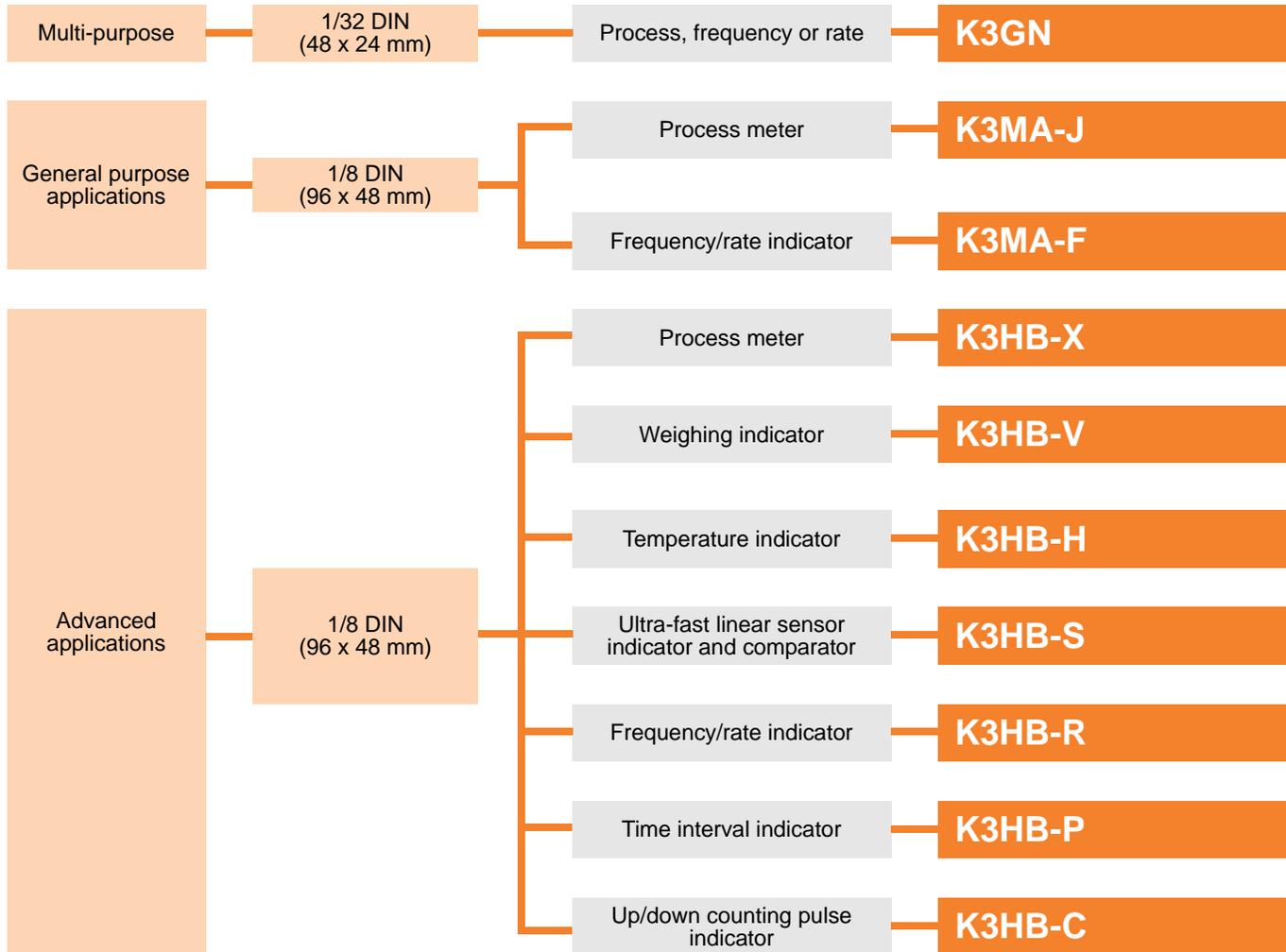
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### Signal Converters

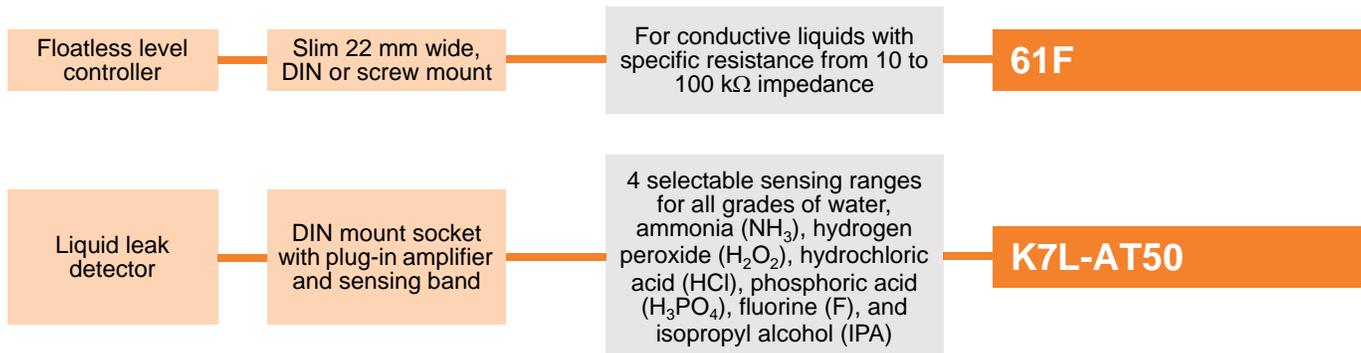
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## Selection Guide

### Digital Panel Meters



### Liquid Level Controls and Detectors



## Selection Guide

### Signal Converters

Signal converters and transducers	3-way signal isolator, current	Input signal: 0 to 20 mA, 4 to 20 mA DC Output signal: 0 to 20 mA, 4 to 20 mA DC	<b>K3FP-YV-I-I</b>
	3-way signal isolator, voltage	Input signal: 0 to 10 VDC, -10 to 10 VDC Output signal: 0 to 10 VDC, -10 to 10 VDC	<b>K3FP-YV-U-U</b>
	3-way signal isolator, current/voltage	Input signal: 0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 2 to 10 VDC, 0 to 5 VDC, 1 to 5 VDC Output signal: 0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 2 to 10 VDC, 0 to 5 VDC, 1 to 5 VDC	<b>K3FP-VS-UI-UI</b>
	Dual output 3-way signal isolator	Input signal: 0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 1 to 5 VDC Output signal: 0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 1 to 5 VDC	<b>K3FP-VS-UI-2I</b>
	Loop-powered isolator, 1 channel	Input signal: 0 to 20 mA, 4 to 20 mA DC Output signal: 0 to 20 mA, 4 to 20 mA DC	<b>K3FP-SN1-I-I</b>
	Loop-powered isolator, 2 channel	Input signal: 0 to 20 mA, 4 to 20 mA DC Output signal: 0 to 20 mA, 4 to 20 mA DC	<b>K3FP-SN2-I-I</b>
	Thermocouple transducer	Input signal: Types J and K thermocouples (conforms to IEC 60584-1) Output signal: 0 to 20 mA, 4 to 20 mA, 20 to 0 mA, 20 to 4 mA DC; 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, 10 to 0 VDC	<b>K3FP-TS-UI</b>
	RTD transducer	Input signal: Pt100 platinum resistance thermometer (conforms to IEC 60751) Output signal: 0 to 20 mA, 4 to 20 mA, 20 to 0 mA, 20 to 4 mA DC; 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, 10 to 0 VDC	<b>K3FP-RS-UI</b>
	Repeater power supply	Input signal: 0 to 20 mA, 4 to 20 mA DC Output signal: 0 to 20 mA, 4 to 20 mA DC	<b>K3FP-DY-I-I</b>
	Limit value switch	Input signal: 0 to 20 mA DC, 0 to 10 VDC Output signal: SPDT output	<b>K3FP-SL-UI</b>

## Selection Guide

# Digital Panel Meters K3HB



## Panel Meters with 5-Digit, 3-Color Double Display and a Variety of Option Boards

- High visibility, three-color display with 14.2 mm high (PV) and 4.9 high (SV) characters
- Easy recognition of status change and judgment results using numeric display that can be switched between red and green
- Short mounting depth: 95 mm behind the panel
- High-speed sampling and response rates
- Front-panel key operation for easy setting
- Optional boards for outputs, communications and event inputs
- Average processing suppresses display flickering
- Water- and dust-proof NEMA 4X (IP66 equivalent) front panel
- Wide range of types: process indicator, weight indicator, temperature indicator, linear sensor comparator, rotary pulse indicator, time interval indicator, up/down count indicator



## Specifications

- Input types: See individual models and K35 event inputs
- Measuring accuracy: See individual models
- Control output (order K33 and K34 units separately):
  - Relay, SPDT, 5 A at 250 VAC/30 VDC; Electrical operations: 100,000 minimum
  - Transistor, 50 mA max. load, 24 VDC; leakage current 0.1 mA max.
- Linear current: 0 to 20 mA DC; 500Ω max., 10,000 resolution, ±0.5% FS output error
- Linear voltage: 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC; 5 kΩ max., 10,000 resolution, ±0.5% FS output error
- Communications (order separately): RS-232C, RS-485, DeviceNet
- Dimensions: 112 L x 96 W x 48 H mm; 95 mm mounting depth, 97 mm with DeviceNet

## Digital Panel Meters

### Process Meters

- Sampling period: 50 times per second (20 ms)
- Comparative output response time: 100 ms max. (DC input); 300 ms max. (AC input)
- Linear output response time: 150 ms max. (DC input); 420 ms max. (AC input)
- Functions: Scaling function, measurement operation selection, averaging, previous average value comparison, forced zero, zero-limit, output hysteresis, output OFF-delay, output test, teaching, display value selection, display color selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Process meter, DC voltage	1.0000 to 5.0000 VDC, ±199.99 VDC, ±19.999 VDC, ±1.9999 VDC (10 MΩ input impedance)	Accuracy: ±0.1% reading ±1 digit max.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	K3HB-XVD 100240VAC
					24 VAC/VDC	K3HB-XVD 24VACVDC
	100 to 240 VAC				K3HB-XAD 100240VAC	
	24 VAC/VDC				K3HB-XAD 24VACVDC	
	4.000 to 20.000 mA, ±199.99 mA, ±19.999 mA, ±1.9999 mA					

Description	Range	Additional features	Display	Output	Supply voltage	Model
Process meter, AC voltage	0.0 to 400.0 VAC, 0.00 to 199.99 VAC, 0.000 to 19.999 VAC, 0.0000 to 1.9999 VAC (1 M $\Omega$ input impedance)	Accuracy: $\pm 0.5\%$ FS $\pm 5$ digits max.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-XVA 100240VAC</b>
					24 VAC/VDC	<b>K3HB-XVA 24VACVDC</b>
	100 to 240 VAC	<b>K3HB-XAA 100240VAC</b>				
	24 VAC/VDC	<b>K3HB-XAA 24VACVDC</b>				
	0.000 to 10.000 A, 0.000 to 1.999 A, 0.00 to 19.99 mA, 0.000 to 19.999 mA	Accuracy: $\pm 0.5\%$ reading $\pm 10$ digits max.				

## Weighing Indicator

- Sampling period 50 times per second (20 ms)
- Comparative output response time: 100 ms max.
- Linear output response time: 150 ms max.
- Functions: Scaling function, measurement operation selection, averaging, previous average value comparison, forced zero, tare function, zero limit, output hysteresis, output OFF-delay, output test, teaching, display value selection, display color selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Weighing indicator, load cell input	0.00 to 199.99 mV, 0.000 to 19.999 mV, 100.00 mV, 199.99 mV (1 M $\Omega$ input impedance)	Accuracy: $\pm 0.1\%$ reading $\pm 1$ digit max.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-VLC 100240VAC</b>
					24 VAC/VDC	<b>K3HB-VLC 24VACVDC</b>

## Temperature Indicator

- Inputs: Thermocouple types K, J, T, E, L, U, N, R, S, B, W/ Re 5-25; Platinum RTD types PT100 and JPT100
- Sampling rate: 50 times per second (20 ms)
- Comparative output response time: 120 ms max. (Platinum RTD); 180 ms max. (thermocouple input)
- Linear output response time: 170 ms max. (platinum RTD); 230 ms max. (thermocouple input)
- Functions: Scaling function, measurement operation selection, averaging, previous average value comparison, zero limit, output hysteresis, output OFF-delay, output test, display value selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Temperature indicator, universal thermocouple and platinum RTD inputs	Thermocouple: -200.0 to 2300.0 C, -300.0 to 3200.0 F; Platinum RTD: -200.0 to 850 C, -150.00 to 150.00 C	Accuracy: $\pm 0.3\%$ PV or $\pm 1$ C, $\pm 1$ digit max.; temperature input shift	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-HTA 100240VAC</b>
					24 VAC/VDC	<b>K3HB-HTA 24VACVDC</b>

## Linear Sensor Indicator and Comparator

- Sampling rate: 0.5 ms with one analog input; 1 ms max. with two analog inputs
- Functions: Scaling function, 2-input calculation function, measurement operation selection, averaging, previous average value comparison, forced zero, zero limit, output hysteresis, output OFF-delay, output test, teaching, display value selection, display color selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Linear Sensor Indicator, DC voltage or current inputs	Current: 0.0000 to 20.000 mA; 4.00 to 20.000 mA (120 $\Omega$ input impedance) Voltage: 0.000 to 5.000 V; 1.000 to 5.000 V; $\pm 5.000$ V; $\pm 10.000$ V (1 M $\Omega$ input impedance)	Accuracy: One input: $\pm 0.1\%$ FS, $\pm 1$ digit max. Two inputs: $\pm 0.2\%$ FS, $\pm 1$ digit max.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-SSD 100240VAC</b>
					24 VAC/VDC	<b>K3HB-SSD 24VACVDC</b>

## Rotary Pulse Indicator

- Input types: No-voltage contact up to 30 Hz, voltage pulse and open collector up to 50 kHz
- Measurement operations: Rotational speed (rpm/rps), pulse frequency, circumferential speed, instantaneous flowrate; absolute ratio; error ratio; rotational difference; flow rate ratio; and passing time
- Functions: Scaling function, measurement operation selection, averaging, previous average value comparison, output hysteresis, output OFF-delay, output test, teaching display value selection, display color selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Rotary Pulse Indicator, NPN input/voltage pulse input	0.5 mHz to 50 kHz (for voltage pulse/open collector sensors)	Accuracy: Rpm and passing time: $\pm 0.006\%$ reading, $\pm 1$ digit max. Ratio and difference functions: $\pm 0.02\%$ reading, $\pm 1$ digit max.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-RNB 100240VAC</b>
					24 VAC/VDC	<b>K3HB-RNB 24VACVDC</b>
Rotary Pulse Indicator, PNP input		Accuracy: Rpm and passing time: $\pm 0.006\%$ reading, $\pm 1$ digit max. Ratio and difference functions: $\pm 0.02\%$ reading, $\pm 1$ digit max.			100 to 240 VAC	<b>K3HB-RPB 100240VAC</b>
					24 VAC/VDC	<b>K3HB-RPB 24VACVDC</b>

## Time Interval Indicator

- Input types: No-voltage contact up to 30 Hz, voltage pulse and open collector up to 50 kHz
- Measurement operations: Passing speed, Cycle, Time difference, Time band, Measuring length, Interval
- Functions: Scaling function, measurement operation selection, output hysteresis, output OFF-delay, output test, teaching display value selection, display color selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Time Interval Indicator, NPN input/voltage pulse input	10 ms to 3,200 s; 0 to 4 gigacounts (length and interval)	Accuracy: $\pm 0.08\%$ reading, $\pm 1$ digit max.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-PNB 100240VAC</b>
					24 VAC/VDC	<b>K3HB-PNB 24VACVDC</b>
Time Interval Indicator, PNP input					100 to 240 VAC	<b>K3HB-PPB 100240VAC</b>
					24 VAC/VDC	<b>K3HB-PPB 24VACVDC</b>

## Up/Down Counting Pulse Indicator

- Input types: No-voltage contact input up to 30 Hz, cumulative pulse input up to 50 kHz; quadrature pulse input up to 25 kHz; up/down pulse inputs up to 30 kHz
- Measurement operations: Individual inputs, Phase differential inputs, Pulse counting input
- Functions: Scaling function, measurement operation selection, output hysteresis, output OFF-delay, output test, teaching display value selection, display color selection, key protection, bank selection, display refresh period, min/max hold, reset

Description	Range	Additional features	Display	Output	Supply voltage	Model
Up/Down Counting Indicator, NPN input/voltage pulse input	$\pm 2$ gigacounts (individual and phase diff. inputs) 0 to 4 gigacounts (pulse input)	Count value can be converted to length or any value.	5-digits (-19999 to 99999)	Order K33 or K34 output units or K35 event input units separately	100 to 240 VAC	<b>K3HB-CNB 100240VAC</b>
					24 VAC/VDC	<b>K3HB-CNB 24VACVDC</b>
Up/Down Counting Indicator, PNP input					100 to 240 VAC	<b>K3HB-CPB 100240VAC</b>
					24 VAC/VDC	<b>K3HB-CPB 24VACVDC</b>

## Optional Boards

Description	Model	K3HB-X	K3HB-V	K3HB-H	K3HB-S	K3HB-R	K3HB-P	K3HB-C
Relay output and 12 VDC sensor power supply board	K33-CPA	●	●	●	●	●	●	●
Relay output and 10 VDC sensor power supply board	K33-CPB	●	●	●	●			
Linear current output and 12 VDC sensor power supply board	K33-L1A	●	●	●	●	●	●	●
Linear current output and 10 VDC sensor power supply board	K33-L1B	●	●	●	●			
Linear voltage output and 12 VDC sensor power supply board	K33-L2A	●	●	●	●	●	●	●
Linear voltage output and 10 VDC sensor power supply board	K33-L2B	●	●	●	●			
12 VDC sensor power supply board	K33-A	●	●	●	●	●	●	●
10 VDC sensor power supply board	K33-B	●	●	●	●			
RS-232C communications and 12 VDC sensor power supply board	K33-FLK1A	●	●	●	●	●	●	●
RS-232C communications and 10 VDC sensor power supply board	K33-FLK1B	●	●	●	●			
RS-485 communications and 12 VDC sensor power supply board	K33-FLK3A	●	●	●	●	●	●	●
RS-485 communications and 10 VDC sensor power supply board	K33-FLK3B	●	●	●	●			
BCD output + transfer output (NPN open collector)	K34-BCD					●	●	●
DeviceNet Slave communications board	K34-DRT	●	●	●	●	●	●	●
Relay output board, 2 outputs	K34-C1	●	●	●	●	●	●	●
Relay output board, 4 outputs	K34-C2	●	●	●	●	●	●	●
Transistor output board, 5 outputs	K34-T1	●	●	●	●	●	●	●
Transistor output board, 5 outputs	K34-T2	●	●	●	●	●	●	●
Event input board, 5 inputs	K35-1	●	●	●	●	●	●	●
Event input board, 8 inputs	K35-2	●	●	●	●	●	●	●
Event input board, 5 inputs	K35-3	●	●	●	●	●	●	●
Event input board, 8 inputs	K35-4	●	●	●	●	●	●	●

## Accessories

Description	Application	Specification	Model
BCD output cable	Connects BCD output to PLC, display devices, etc.	0.3 m length, 37-pin D-sub female connector	K32-BCD
Event input cable	Connects K35-series event input to panel meter	3 m length, 8-pin connector	K32-DICN
Splash-proof soft cover	Allows settings changes without removal	—	K32-49SC
Hard cover	Prevents accidental setting changes	—	K32-49HC

# Digital Panel Meters K3MA-F



## Frequency/Rate Meter with 2-Color Display

- Wide range of inputs: Contact, NPN, PNP or voltage pulse
- High visibility 2-color display with 14.2 mm high characters
- Easy confirmation of max/min display
- Front-panel key operation for easy setting
- Average processing function suppresses display flickering
- Built-in functions for scaling, auto-zero time, startup compensation time
- Water- and dust-proof NEMA 4X (IP66 equivalent) front panel



## Specifications

- Input types:
  - No-voltage contact (30 Hz max., ON/OFF pulse width: 15 ms min.)
  - Voltage pulse (5 kHz max., ON/OFF pulse width: 90  $\mu$ s min., ON voltage: 4.5 to 30 V/OFF voltage: 0 to 2 V)
  - Open collector (5 kHz max., ON/OFF pulse width 90  $\mu$ s min.)
- Connectable Sensors
  - ON residual voltage: 2.5 V max.
  - OFF leakage current: 0.1 mA max.
- Load current: Must have switching capacity of 15 mA min.
- Must be able to dependably switch a load current of 5 mA max.
- Measuring accuracy:  $\pm 0.1\%$  FS  $\pm 1$  digit max.
- Relay output: Rating: Two SPST-NO relays, 5 A at 250 VAC/30 VDC
  - Electrical operations: 100,000 operation
- Memory protection: EEPROM, 100,000 rewrite capacity
- Dimensions: 97 L x 96 W x 48 H mm; 80 mm mounting depth

## Frequency/Rate Meters

Range	Additional features	Display	Output	Supply voltage	Model
0.05 to 30.00 Hz (no-voltage contact); 0.05 to 5000.0 Hz (open collector)	N/A	5-digits (-19999 to 99999)	None	100 to 240 VAC	<b>K3MA-F 100-240 VAC</b>
			Two 5 A relays		<b>K3MA-F-A2 100-240 VAC</b>
			None	24 VAC/VDC	<b>K3MA-F 24 VAC/VDC</b>
			Two 5 A relays		<b>K3MA-F-A2 24 VAC/VDC</b>

## Accessories

Description	Appearance	Function	Model
Splash-proof soft cover		Allows settings changes without removal	<b>K32-49SC</b>
Hard cover		Prevents accidental setting changes	<b>K32-49HC</b>

# Digital Panel Meters K3MA-J



## Process Meter with 2-Color Display

- Wide range of current and voltage inputs
- High visibility 2-color display with 14.2 mm high characters
- Easy confirmation of max/min display
- Front-panel key operation for easy setting
- Average processing function suppresses display flickering
- Fast 250 ms sampling period
- Built-in functions for scaling, auto-zero time, startup compensation time
- Water- and dust-proof NEMA 4X (IP66 equivalent) front panel



## Specifications

- Input types:
  - Voltage inputs: 1.000 to 5.000 V, 0.000 to 5.000 V, -5.000 to 5.000 V, -10.00 to 10.00 V; 1 MΩ input impedance
  - Current inputs: 0.00 to 20.00 mA, 4.00 to 20.00 mA; 45Ω input impedance
- Measuring accuracy: ±0.1% FS ±1 digit max.
- Relay output: Rating: Two SPST-NO relays, 5 A at 250 VAC/30 VDC
  - Electrical operations: 100,000 operation
- Memory protection: EEPROM, 100,000 rewrite capacity
- Dimensions: 97 L x 96 W x 48 H mm; 80 mm mounting depth

## Process Meters

Range	Additional features	Display	Output	Supply voltage	Model
Voltage: 0 to 5 V, 1 to 5 V, -5 to +5 V, -10 to +10 V Current: 0 to 20 mA, 4 to 20 mA	N/A	5-digits (-19999 to 99999)	None	100 to 240 VAC	K3MA-J 100-240 VAC
			Two 5 A relays		K3MA-J-A2 100-240 VAC
			None	24 VAC/VDC	K3MA-J 24 VAC/VDC
			Two 5 A relays		K3MA-J-A2 24 VAC/VDC

## Accessories

Description	Appearance	Function	Model
Splash-proof soft cover		Allows settings changes without removal	K32-49SC
Hard cover		Prevents accidental setting changes	K32-49HC

# Digital Panel Meters K3GN



## Compact 1/32 DIN Size, Multi-Purpose Process Meter

- Multi-purpose process meter supports 6 analog process input ranges and rpm/tachometer processor for input pulse frequency
- Save panel space with 1/32 DIN size and shallow mounting depth of 83 mm
- High visibility 2-color display with 7 mm high characters
- Display can be programmed to change color when an output turns on
- Easy setup from front panel
- Fast sampling period: 250 ms
- Built-in functions for scaling, forced zero, auto-zero time, startup compensation time, output operation action, decimal point position setting, teaching function for input range, leading zero suppression, average processing
- Water- and dust-proof NEMA 4X (IP66 equivalent) front panel



## Specifications

- Input types:
  - Voltage inputs: 1.000 to 5.000 V, 0.000 to 5.000 V, -5.000 to 5.000 V, -10.00 to 10.00 V; 1 MΩ input impedance
  - Current inputs: 0.00 to 20.00 mA, 4.00 to 20.00 mA; 60 Ω input impedance
  - No-voltage contact input: 0.05 to 30.00 Hz
  - Open collector input: 0.1 to 5000.0 Hz
- Measuring accuracy: ±0.1% FS ±1 digit max.
- Control outputs:
  - Two SPST-NO relays, 1 A at 250 VAC/30 VDC; Electrical operations: 100,000 minimum
  - Three NPN open collector transistors, 50 mA at 24 VDC; Leakage current 100 μA max.
  - Memory protection: EEPROM; 100,000 rewrites
  - Dimensions: 83 L x 48 W x 24 H mm

## Process Meters, 1/32 DIN

Range	Additional features	Display	Output	Supply voltage	Model
Voltage: 1.000 to 5.000 V, 0.000 to 5.000 V, -5.000 to 5.000 V, -10.00 to 10.00 V;	RS-485 communications; DC process signal or NPN pulse input	5-digits (-19999 to 99999)	Two SPST-NO relays	24 VDC	K3GN-NDC-FLK 24VDC
	Three NPN open collector		K3GN-NDT1-FLK 24VDC		
RS-485 communications; DC process signal or PNP pulse input	Two SPST-NO relays		K3GN-PDC-FLK 24VDC		
	Three NPN open collector		K3GN-PDT1-FLK 24VDC		
Current: 0 to 20 mA, 4 to 20 mA	DC process signal or NPN pulse input		Two SPST-NO relays		K3GN-NDC 24VDC
	Three NPN open collector		K3GN-NDT1 24VDC		
RPM processor: 30 Hz and 5 kHz	DC process signal or PNP pulse input	Two SPST-NO relays	K3GN-PDC 24VDC		
	Three NPN open collector	K3GN-PDT1 24VDC			

# Liquid Level Controls

# 61F

Quick Link  
X422

## Ultra-Slim 22 mm Single or Two-Point Level Controller

- Reliable, floatless level control for automatic water supply and drainage in industrial facilities and equipment
- Adjustable sensitivity for conductive liquids ranging from distilled water, city water, well water, industrial water, sea water and sewage, with specific resistance from 10 to 100 kΩ impedance
- Delay timer to prevent relay contact chatter from waves
- System components consists of a controller, electrodes and electrode mounting accessories
- DIN-rail or screw-mount options
- Dimensions: 90 H x 22.5 W x 100 D mm



## Floatless, Conductive Level Controller

Features	Input voltage	Output	Model
3-electrode system for water supply or drainage control; order electrodes, holders and socket separately Adjustable operating resistance sensitivity	24 VAC/VDC	One SPDT-NC, 6 A at 250 VAC/30 VDC	61F-D21T-V1 24VAC/DC
	100 to 240 VAC		61F-D21T-V1 100-240VAC

## Electrodes, Connecting, and Lock Nuts

Applicable liquids	Material	Component	Indication Mark	Inscription	Model
Purified city water, industrial water, sewage	SUS304	Electrode (1 m long)	1 line	—	F03-01 SUS304
		Connecting nut	—		F03-02 SUS304
		Locking nut	—		F03-03 SUS304
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316	Electrode (1 m long)	2 lines	6 316	F03-01 SUS316
		Connecting nut	—		F03-02 SUS316
		Locking nut	—		F03-03 SUS316

## Electrode Holders and Separators

Application	Mounting	Insulator Material	Max. temperature	Number of electrodes	Model
For city water and other general use Easy-to-replace separate version for maintenance.	Flange	Phenol resin	70 C	3	PS-3S
	Screw			3, 300 mm	PS-31-300MM
				3, 1000 mm	PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance	Flange	Ceramics	150 C (without water drips or vapor on the electrode holder surface)	1	BF-1
For resistance to high pressure Use in tanks with high temperature or pressure	Screw	PTFE	250 C (without water drips or vapor on the electrode holder surface)	1	BS-1
Electrode separators				1	F03-14 1P
				3	F03-14 3P

# Liquid Leak Detector K7L-AT50



## Protect your Process Equipment from Liquid Spills and Leaks

- Detects liquid leaks by monitoring the resistance between conductive sensing bands
- Four selectable sensing ranges for liquids with impedance high as 50 MΩ
- Ideal for all grades of water, ammonia (NH<sub>3</sub>), hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), hydrochloric acid (HCl), phosphoric acid (H<sub>3</sub>PO<sub>4</sub>), fluorine (F) and isopropyl alcohol (IPA)
- Track-mount sockets and plug-in sensor amplifier simplify installation and maintenance
- Noise canceller circuit ensures a high level of noise immunity for reliable operation
- Sends AC signals to the sensing band to prevent electric corrosion
- Two LEDs: green for power supplied, red for output indication
- Transistor output: NPN open collector
- Quick reaction to leaks: 800 ms response time
- Dimensions: 28.8 H x 12.8 W x 46 D mm

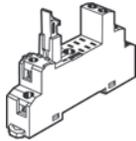


## Liquid Leakage Sensor

Description	Input signal	Output signal	Additional features	Supply voltage	Model
Liquid Leakage Sensor Amplifier	0 to 50 MΩ impedance	NPN open collector, 100 mA at 30 VDC	—	24 VDC	K7L-AT50

## Accessories

Description	Specification and appearance	Model
Sensing band, 1 m length	<p>Sheath: polyethylene; Core: 316 stainless steel; 8 W x 1.7 H mm</p>	F03-16PE-1M
Sensing band, 2 m length		F03-16PE-2M
Sensing band, 5 m length		F03-16PE-5M
Sensing band, 10 m length		F03-16PE-10M
Sensing band, 25 m length		F03-16PE-25M
Sensing band, 50 m length		F03-16PE-50M
Adhesive backed sensing band mounting bracket; 30 per pack	<p>Material: Polyethylene; 13 L x 32 W x 3 H mm</p>	F03-26PES
Screw mount sensing band bracket with two M3.5 dia. hole; 30 per pack	<p>Material: Polyethylene; 13 L x 32 W x 3 H mm</p>	F03-26PEN

Description	Specification and appearance	Model
Terminal block; 10 per pack	 <p>17 H x 29.1 W x 25 D mm Connects Sensing Band to Wiring Cable for sensor amplifier</p>	F03-20
Socket with finger-protection	 <p>85.5 H x 16 W x 61 D mm Mounts sensor amplifier to DIN rail</p>	P2RF-08-E
Socket	 <p>71.5 H x 19.5 W x 54 D mm Mounts sensor amplifier to DIN rail</p>	P2RF-08

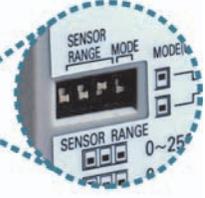
## Configuration



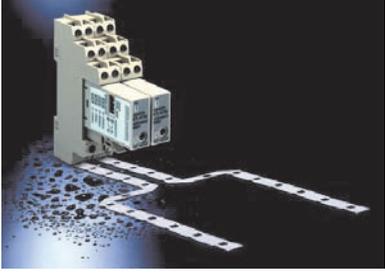
OMRON Corporation

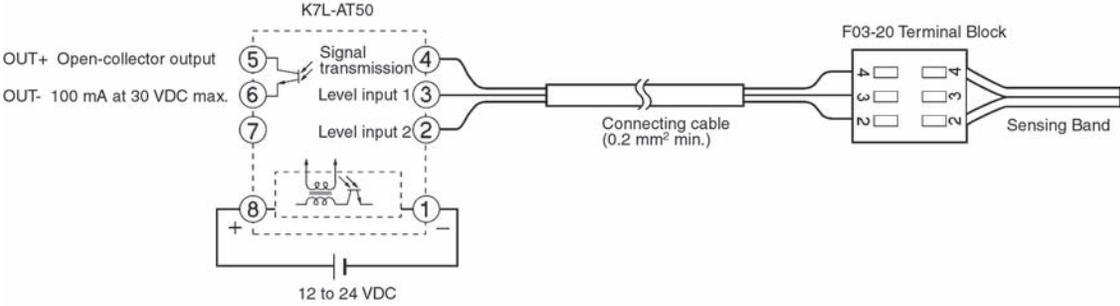
SENSOR RANGE MODE MODE

SENSOR RANGE 0~250KG 0~600KG 0~5M3 0~50M3



SENSOR RANGE 0~25





K7L-AT50

OUT+ Open-collector output

OUT- 100 mA at 30 VDC max.

Signal transmission

Level input 1

Level input 2

12 to 24 VDC

F03-20 Terminal Block

Connecting cable (0.2 mm<sup>2</sup> min.)

Sensing Band

## Typical Applications

Pipe Joint/Valve Leaks	Tank Leaks	Washing Process Leaks
		

# Signal Converters K3FP



## Ultra-Slim Track Mount Signal Converters

- Ultra-slim 6.2 mm wide converters install in limited space, such as between expansion modules and help to reduce the overall size of devices
- Close mounting makes devices more compact
- Easily wired with stepped terminal access
- 8 types of high-performance converters for every application
- Multi-range I/O provides flexibility for the desired signal format
- High-precision analog conversion with minimum current consumption
- Reduce wiring for power supply connections by using DIN rail bus connector (optional)
- Dimensions: 102.5 L x 6.2 W x 93.1 H mm

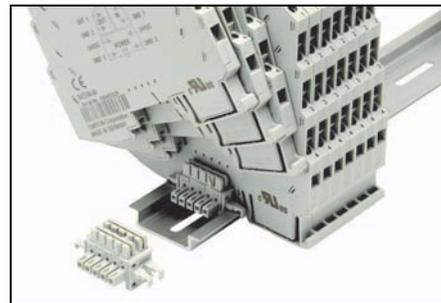


## Signal Converters

Description	Input signal	Output signal	Additional features	Supply voltage	Model
3-Way Signal Isolator, Current	0 to 20 mA, 4 to 20 mA DC	0 to 20 mA, 4 to 0 mA DC	Input and output types selected by DIP switch	24 VDC	K3FP-YV-I-I
3-Way Signal Isolator, Voltage	0 to 10 VDC, -10 to 10 VDC	0 to 10 VDC, -10 to 10 VDC			K3FP-YV-U-U
3-Way Signal Isolator, Current/Voltage	0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 2 to 10 VDC, 0 to 5 VDC, 1 to 5 VDC	0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 2 to 10 VDC, 0 to 5 VDC, 1 to 5 VDC			K3FP-VS-UI-UI
Dual Output 3-Way Signal Isolator	0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 1 to 5 VDC	0 to 20 mA, 4 to 20 mA DC; 0 to 10 VDC, 1 to 5 VDC			K3FP-VS-UI-2I
Loop-powered Isolator, 1 channel	0 to 20 mA, 4 to 20 mA DC	0 to 20 mA, 4 to 20 mA DC	No power connection required	—	K3FP-SN1-I-I
Loop-powered Isolator, 2 channels					K3FP-SN2-I-I
Thermocouple transducer	Types J and K thermocouples (conforms to IEC 60584-1)	0 to 20 mA, 4 to 20 mA, 20 to 0 mA, 20 to 4 mA DC; 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, 10 to 0 VDC	Input range and output types selected by DIP switch	24 VDC	K3FP-TS-UI
RTD transducer	Pt100 platinum resistance thermometer (conforms to IEC 60751)				K3FP-RS-UI
Repeater power supply	0 to 20 mA, 4 to 20 mA DC	0 to 20 mA, 4 to 20 mA DC	—	24 VD	K3FP-DY-I-I
Limit value switch	0 to 20 mA DC, 0 to 10 VDC	SPDT output	Selected by DIP switch		K3FP-SL-UI

## Accessories

Description / Application	Specification	Model
<b>DIN rail bus connector</b> - connects multiple signal converters to power without external wiring	Join connectors together then install on DIN rail before attaching converters	K3FP-1



## Typical Applications

### Install in Limited Space

**K3FP Series**

This ultra-slim 6.2 mm Signal Converter can be installed in limited space, such as where expansion is required, and help to reduce the overall size of devices.

Width: Just 6.2 mm.

### Isolators That Do Not Require Power Supply

**K3FP-SN1-I-I One-channel Passive Loop-powered Isolator**  
**K3FP-SN2-I-I Two-channel Passive Loop-powered Isolator**

This input signal provides power of the isolator, so power supply capacity does not need to be considered when expanding units: No power line wiring is required

### Reduce Spare Parts

**K3FP-VS-UI-UI 3-way Signal Isolator**

Input and output ranges are set using a DIP switch on the side of the unit.

Input Signal	Output Signal
0 to 10 V DC	0 to 10 V DC
2 to 10 V DC	2 to 10 V DC
0 to 5 V DC	0 to 5 V DC
1 to 5 V DC	1 to 5 V DC
0 to 20 mA DC	0 to 20 mA DC
4 to 20 mA DC	4 to 20 mA DC

### Three- and Four-Conductor RTD Transducers

**K3FP-RS-UI RTD Transducer**

2-conductor PT100    3-conductor PT100    4-conductor PT100

Select the number of conductors for the input platinum resistance thermometer using the DIP Switch on the side of the unit. Set any input range from -150 C to 850 C.

### Isolated Duplicate Signal Output

**K3FP-VS-UI-2I Dual Output 3-way Signal Isolator**

Input Signal

- 0 to 20 mA DC
- 4 to 20 mA DC
- 0 to 10 V DC
- 1 to 5 V DC

(switch using DIP switch)

Output to Digital Panel Meter: 4 to 20 mA DC

Output to Data Logger: 4 to 20 mA DC

### Limit Value Switches

**K3FP-SL-UI Limit Value Switch**

Alarm indicator

**Note:** Consider the following products for judging non-DC signal inputs.

- For AC current single-phase signal inputs: K8AB-AS
- For AC voltage single-phase signal inputs: K8AB-VS/K8AB-VW
- For AC voltage three-phase signal inputs: K8AB-PW
- For thermocouple and platinum resistance thermometer sensor inputs: K8AB-TH

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### Single-Phase

<b>S8VS</b>	Slim track mount models with Smart Display and alarm outputs for fast diagnostics (15 to 480 W)	V-1
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<b>S82K</b>	Track mount power supplies in plastic housing (3 to 100 W)	V-3
-------------	--	-----

<b>S8VM</b>	Economical track mount models with unique undervoltage alarm (15 to 1500 W)	V-4
-------------	---	-----

<b>S82J</b>	DIN rail mount industrial power supplies (10 to 600 W)	V-6
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<b>S8JX</b>	Compact and economical industrial power supplies (50 to 150 W)	V-6
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### Three-Phase

<b>S8VT-F</b>	Three-phase, track mount power supplies (120 to 960 W)	V-7
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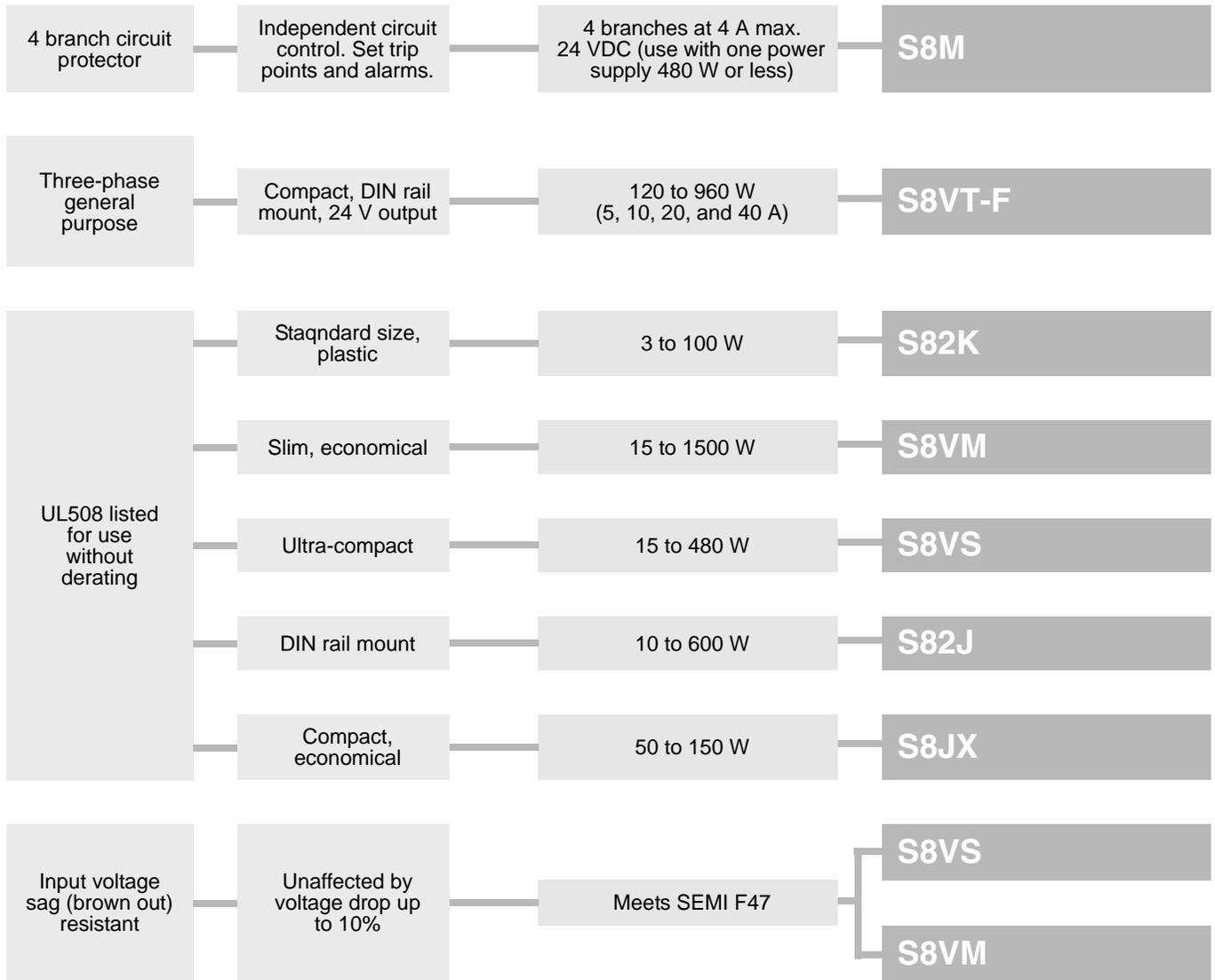
### Circuit Protection

<b>S8M</b>	DC digital multi-circuit protector reduces installation time and wiring costs for 4 branch circuits at up to 4 A each	V-8
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## Selection Guide

General purpose	Ultra-compact	15 to 60 W plastic enclosure 90 to 480 W metal and plastic enclosure	<b>S8VS</b>
	Slim, economical	15 to 1500 W	<b>S8VM</b>
	Standard size, plastic enclosure	3 to 100 W	<b>S82K</b>
	Metal covered or open frame, low cost	10 to 600 W	<b>S82J</b>
	Compact, economical	50 to 150 W	<b>S8JX</b>
High power	Uniform height, economical, alarms	Up to 1500 W	<b>S8VM</b>
	DIN rail mount	Up to 600 W	<b>S82J</b>
	Ultra compact	Up to 480 W	<b>S8VS</b>
Preventive maintenance	Service life remaining (maintenance forecast) monitor	60 to 480 W	<b>S8VS-A</b>
	Connected load operating time (run-time) monitor	60 to 480 W	<b>S8VS-B</b>
	Undervoltage alarms for momentary and gradual voltage drops	15 to 150 W	<b>S8VM-AD</b>
	Power failure alarm output (transistor) and LED indication	300 to 1500 W	<b>S8VM</b>

## Selection Guide



To calculate your power requirements:  
 $\text{__VDC} \times \text{__Amps (A)} = \text{__ Watts (W)}$  (e.g. 5 VDC X 60 A = 300 W)

Select a power supply that offers enough power for future expansion and peak start-up current.

All Omron Power Supplies feature: Universal Input (100 to 240 VAC), Power Factor Correction, and RoHS Compliance.

## Selection Guide

# Single-Phase Power Supplies S8VS



## Small Sized, DIN Rail Mount Power Supplies with Smart Display

- Ultra-compact size with wide power range of 15 - 480 W, saves panel space
- Unique LED displays for diagnostics (60 - 480 W models)
  - Only Omron's S8VS power supplies shorten troubleshooting time by offering a digital display and an alarm output for preventive maintenance.
  - Power supply service life (maintenance forecast) monitor (-A type) or connected load operating time (Run-time) monitor (-B type)
- Protect critical processes against line power brownouts — All models maintain constant output even with a 10% input voltage sag — meets SEMI F47 requirements
- RoHS compliant
- Power Factor Correction function standard
- Meets international safety standards: UL, cUL, UL508 Listed, SEMI F47 and CE
- Class 2 output (90 W models and below)
- 3-year warranty on all models
- Alarm outputs (90 - 480 W LED models)
  - 1 for undervoltage output and 1 for Lifetime or Run-time monitor



## Smart Display Shows At-A-Glance Status of:

<p>Output voltage</p>	<p>Output current</p>	<p>Peak hold current</p>
<p>Remaining service life</p>	<p>or</p>	<p>Total run-time of the load</p>

## Standard Models

Input voltage	Power rating	Output voltage	Output current	Alarm output	Dimensions H x W x D mm	Model
100 to 240 VAC, 50/60 Hz	15 W	5 VDC	2.0 A	—	85 x 22.5 x 96.4	S8VS-01505
		12 VDC	1.2 A			S8VS-01512
		24 VDC	0.65 A			S8VS-01524
	30 W	5 VDC	4.0 A			S8VS-03005
		12 VDC	2.5 A			S8VS-03012
		24 VDC	1.3 A			S8VS-03024
	60 W	24 VDC	2.5 A		95 x 40 x 108.3	S8VS-06024
						S8VS-06024A
	90 W	24 VDC	3.75 A			115 x 50 x 121.3
				S8VS-09024		
				S8VS-09024S (See note 3)		
	120 W	24 VDC	5 A	Sinking	S8VS-09024A	
					S8VS-09024B	
					S8VS-12024	
	180 W	24 VDC	7.5 A	—	115 x 75 x 125.3	S8VS-12024A
						S8VS-12024B
						S8VS-18024
	240 W	24 VDC	10 A	Sinking	115 x 100 x 125.3	S8VS-18024A
S8VS-18024B						
S8VS-24024						
480 W	24 VDC	20 A	—	115 x 150 x 127.2	S8VS-24024A	
					S8VS-24024B	
					S8VS-48024	
			Sinking/Sourcing		S8VS-48024A	
					S8VS-48024B	

- Note:**
1. Part numbers ending with A feature the Smart Display with Lifetime Monitor.
  2. Part numbers ending with B feature the Smart Display with Run-time Monitor.
  3. Specific 90 W model with Class 2 output.

## Accessories

Description	Appearance	Height	Channel depth	Length	Model
Mounting track		35 mm	7.3 mm	0.5 meter	PFP-50N
				1.0 meter	PFP-100N
			16.0 mm	1.0 meter	PFP-100N2
End plate		11.5 mm	10 mm	50 mm	PFP-M

# Single-Phase Power Supplies

## S82K



### DIN Rail Mount Switching Power Supplies in Plastic Housing

- All models UL508 listed for use at rated output without derating
- Class 2 approved on all models below 100 W
- Undervoltage indicators on all 90 W and 100 W
- Parallel operation capability (100 W)
- Finger-safe terminal block with cover according to VDE0106/P100
- RoHS compliant
- 3-year warranty



### Specifications

- Universal input voltage range: 100 to 240 VAC
- Power ratings: 3 W to 100 W
- Output voltages: 5 V, 12 V, 15 V, 24 V
- Current output: 0.13 A to 5 A
- Efficiency: 60% to 80% (varies by specifications)

### Single Output Plastic Body Power Supplies

Input voltage	Power rating	Output voltage	Output current	Function configuration			Dimensions H x W x D mm	Model
				Output	Under-voltage alarm	PFC		
100 to 240 VAC, 50/60 Hz	3 W	5 VDC	0.6 A	Single output	Indicator only	No	75 x 37.5 x 65	S82K-00305
		12 VDC	0.25 A					S82K-00312
		24 VDC	0.13 A					S82K-00324
	7.5 W	5 VDC	1.5 A					S82K-00705
		12 VDC	0.6 A					S82K-00712
		24 VDC	0.3 A					S82K-00724
	15 W	5 VDC	2.5 A				75 x 45 x 91	S82K-01505
		12 VDC	1.2 A					S82K-01512
		24 VDC	0.6 A					S82K-01524
	30 W	5 VDC	5.0 A				75 x 90 x 91	S82K-03005
		12 VDC	2.5 A					S82K-03012
		24 VDC	1.3 A					S82K-03024
50 W		2.1 A	75 x 145 x 91	S82K-05024				
	120/240 VAC selectable	90 W		3.75 A	S82K-09024			
		100 W		4.2 A	S82K-10024			

### Accessories

Description	Appearance	Height	Channel depth	Length	Model
Mounting track		35 mm	7.3 mm	0.5 meter 1.0 meter	PFP-50N PFP-100N
			16.0 mm	1.0 meter	PFP-100N2
			11.5 mm	10 mm	50 mm

# Single-Phase Power Supplies

# S8VM



## Reliable DC Source with Unique Undervoltage Alarm

- Slim DIN-rail mounting units help downsize machine panels
- Overvoltage protection (standard) of 105% to 160% rated load current
- Undervoltage alarm option signals an error and helps identify the source
- Terminal block protects fingers against electric shock
- Enclosed and open frame models available
- RoHS compliant
- Class 1, Div 2 rated for hazardous areas
- Power Factor Correction function standard
- Meets international safety standards:  
UL 508, 60950-1, 1604 (Class I/Division 2);  
CSA C22.2 No. 14, No. 60950-1, No. 213 (Class I/Division 2);  
EN50178, EN60950-1



## Undervoltage Alarm Option Models



The S8VM Undervoltage Alarm Function distinguishes between deterioration of the Power Supply and abnormal load or input as a cause of the error. The S8VM maintains the error history and even indicates the past errors with its LEDs.



- Two undervoltage alarm indicators:
  - DC LOW1 identifies momentary voltage drops of 2.7 V lower than the voltage output.
  - DC LOW2 identifies gradual voltage deterioration from age, when the output voltage drops to 20 V or lower.
- A transistor alarm output signals voltage drop errors on 50-, 100- and 150-W models:
  - NPN open collector, 50 mA max. at 30 VDC
  - ON-state residual voltage: 2 V max.
  - OFF-state leakage current: 0.1 mA max.

Input voltage	Power rating	Output voltage	Output current	Efficiency	Voltage adj. range	Output ripple (max.)	Dimensions H x W x D mm	Model
100 to 240 VAC, 50/60 Hz	15 W	24 VDC	0.65 A	80% min.	-10% to 20%	1.0% (p-p)	84.5 x 33.5 x 84.5	S8VM-01524AD
	30 W		1.3 A	81% min.			84.5 x 33.5 x 99.5	S8VM-03024AD
	50 W		2.2 A	80% min.		0.75 (p-p)	84.5 x 33.5 x 124.5	S8VM-05024AD
	100 W		4.5 A	82% min.			84.5 x 35 x 164.5	S8VM-10024AD
	150 W		6.5 A	83% min.			84.5 x 44 x 164.5	S8VM-15024AD

## Standard Models (15 - 150 W)

Input voltage	Power rating	Output voltage	Output current	Efficiency	Voltage adj. range	Output ripple (max.)	Dimensions H x W x D mm	Model
100 to 240 VAC, 50/60 Hz	15 W	5 VDC	3.0 A	75% min.	-20% to +20%	3.2% (p-p)	84.5 x 33.5 x 84.5	S8VM-01505CD
		12 VDC	1.3 A	78% min.		1.5% (p-p)		S8VM-01512CD
		24 VDC	0.65 A	80% min.		1.0% (p-p)		S8VM-01524CD
	30 W	5 VDC	6.0 A	75% min.		3.2% (p-p)	84.5 x 33.5 x 99.5	S8VM-03005CD
		12 VDC	2.5 A	79% min.		1.5% (p-p)		S8VM-03012CD
		24 VDC	1.3 A	81% min.		1.0% (p-p)		S8VM-03024CD
	50 W	5 VDC	10.0 A	80% min.		3.2% (p-p)	84.5 x 33.5 x 124.5	S8VM-05005CD
		12 VDC	4.3 A	79% min.		1.5% (p-p)		S8VM-05012CD
		24 VDC	2.2 A	80% min.		0.75% (p-p)		S8VM-05024CD
	100 W	5 VDC	20.0 A	81% min.		3.2% (p-p)	84.5 x 35 x 164.5	S8VM-10005CD
		12 VDC	8.5 A	81% min.		1.5% (p-p)		S8VM-10012CD
		24 VDC	4.5 A	82% min.		0.75% (p-p)		S8VM-10024CD
150 W	5 VDC	27.0 A	81% min.	3.2% (p-p)	84.5 x 44 x 164.5	S8VM-15005CD		
	12 VDC	12.5 A	81% min.	1.5% (p-p)		S8VM-15012CD		
	24 VDC	6.5 A	83% min.	0.75% (p-p)		S8VM-15024CD		

## Standard Models (300, 600, 1500 W)



S8VM-300□□C



S8VM-600□□C



S8VM-1500□□C

## Additional Features (300 - 1500 W models)

- Power failure alarm indication with transistor output
- Series and parallel operation (up to 2 units)
- Remote sensing and remote control functions

Input voltage	Power rating	Output voltage	Output current	Efficiency	Voltage adj. range	Output ripple (max.)	Dimensions H x W x D mm	Model
100 to 240 VAC, 50/60 Hz	300 W	24 VDC	14 A; Peak current: 16.5 A (200 VAC)	81% min.	-20% to 20%	1.0% (p-p)	83.5 x 62.5 x 188	S8VM-30024C
	600 W		27 A; Peak current: 31 A (200 VAC)	81% min.			83.8 x 101.8 x 192	S8VM-60024C
	1500 W		65 A (100 VAC), 70 A (200 VAC); Peak current: 105 A (200 VAC)	82% min.			82 x 126.5 x 327	S8VM-15224C

Note: Optional mounting brackets available.

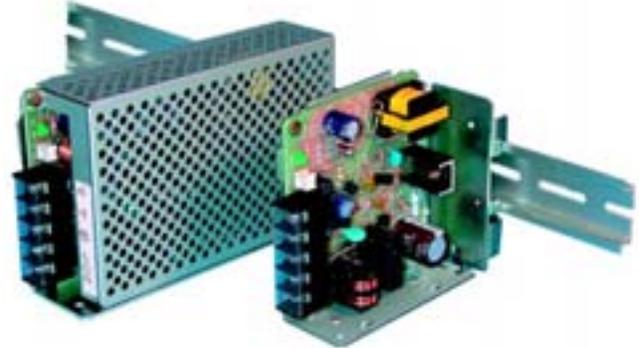
## Single-Phase Power Supplies

# S82J

Quick Link  
P225

### DIN Rail Mount Industrial Power Supplies

- Universal supply voltage: 100 to 240 VAC
- Power ratings from 10 to 600 W
- Wide range of output voltages: 5 V, 12 V, 15 V, or 24 V
- Current output from 0.5 A to 20 A
- Select from open-frame and covered types
- UL508 approval
- Class 2 approval available for models below 100 W
- Multiple mounting options available
- RoHS compliant
- 3-year warranty



## Single-Phase Power Supplies

# S8JX

Quick Link  
P228

### Compact and Economical Industrial Power Supply

- Universal supply voltage: 100 to 240 VAC
- Power ratings: 50, 100, and 150 W
- Wide range of output voltages: 5 V, 12 V, or 24 V
- Current output from 2.1 A to 20 A
- Select from open-frame and covered types
- Multiple mounting options available
- UL508 approval
- RoHS compliant
- 2-year warranty



# Three-Phase Power Supplies

## S8VT-F



### Compact 3-Phase Input Power Supply

- 3-phase input 340-576 VAC
- 5, 10, 20 and 40A models; 24 VDC output
- High stability, low ripple and noise level. Conforms to EN61000-3-2
- Efficiency: 86% to 91% (varies per model)
- Compact design and convection air cooled - no fans
- Overload and overvoltage protection included
- Parallel and series operation possible
- RoHS compliant



## Ordering Information

### Three-Phase Power Supplies

Input voltage	Power rating	Output voltage	Output current	Model
400 to 500 VAC 3-phase	120 W (See note 1)	24 V	5 A	S8VT-F12024E
	240 W (See note 1)		10 A	S8VT-F24024E
	480 W		20 A	S8VT-F48024E
	960 W		40 A	S8VT-F96024E

**Note: 1.** Approvals pending at time of printing for 120 W and 240 W models, please consult your Omron representative for availability.

# DC Digital Multi-Circuit Protector S8M



## Flexible DC Circuit Protector with a Wide Array of Displays, Alarm Outputs, and Functions

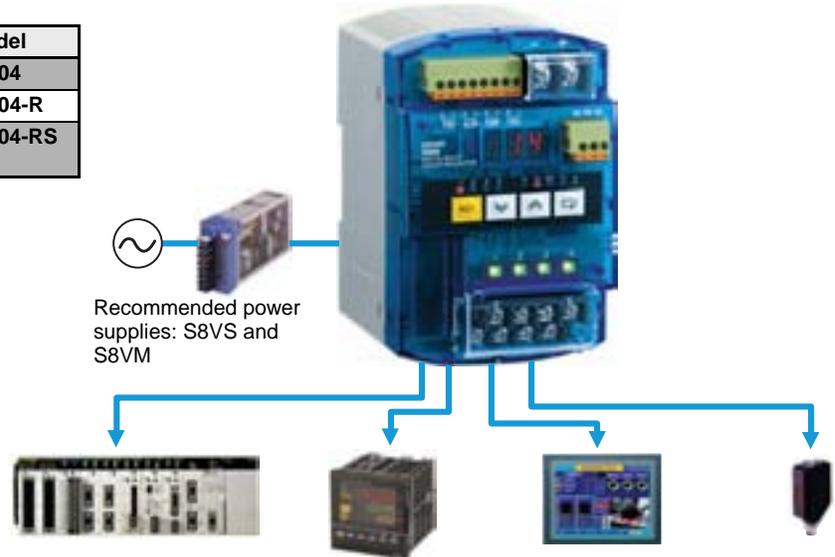
- Reduce installation time and costs for powering and protecting your panels
- Four circuit protectors in one package
- S8M-CP04-RS model provides UL Class 2 compliant output on 4 branches (3.8 A per branch)
- Simple setting of current tripping values for each branch output in .1 A units, between .5 A and 4 A
- Easy set-up of startup and shutdown sequences for optimized power supply requirements and stable operation
- Cutoff performance that eliminates the effect on other branch outputs
- Monitoring and display of input voltage, output current, peak hold current, total input current, load run-time, internal panel temperature
- Signal output for alarm and external signal tripping function
- Models with RS-232C communication terminal for set-up and monitoring with free software, also remote monitoring and control operations from a network



## Specifications

- Input: DC only, 19.2 to 26.4 V
- Output: 4 branches
- Output current tripping setting range: 0.5 to 4.0 A (in 0.1 A units), RS type 0.5 to 3.8 A
- Tripping speed: 100 ms or 20 ms selectable
- Ambient temperature: -10° to 60°C with de-rating
- Approved standards: UL508 listing, UL60950, cUL, VDE, CE
- Approved standards: UL508 listing Class 2 per UL1310 (\_RS type only), UL60950, cUL, VDE, CE
- H x W x D inches (mm): 4.53 x 2.95 x 3.7 (115 x 75 x 94)
- RoHS compliant and backed by a 3-year warranty

Description	Model
Standard model	<b>S8M-CP04</b>
Includes RS-232 communication terminal	<b>S8M-CP04-R</b>
UL Class 2 compliant outputs and RS-232 communication terminal	<b>S8M-CP04-RS</b>



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