Fuji Electric

Innovating Energy Technology

INVERTER LINE-UP

Selection Guide

Extensive line-up ranges from simplified performance to high performance models.
Fuji Electric inverter family plays an active part worldwide.

CE c UL us LISTED

INV-SG-FAP-202301

Fuji Electric, a renowned manufacturer of power electronics, drive engineering and automation technology.

Innovating Energy Technology

Brand Promise

Through our pursuit of innovation in electric and thermal energy technology, we develop products that maximize energy efficiency and lead to a responsible and sustainable society

Fuji Electric is a world leader in electronics manufacturing and energy technology with more than 90 years of accumulated technology and experience. Through our innovation in energy and environment technology, we are contributing to the creation of responsible and sustainable societies.

Fuji Electric, the pioneer in the industry to develop general purpose Variable Speed Drive in 1976. Since then, the company continues to design and develop an energy efficient low & medium voltage drives and extensive increase it's product line-up that suit to the industrial and commercial needs.

Fuji Electric Asia Pacific (Singapore) was established in 1989 as a regional headquarter and sales company, provides innovative energy technology products and solutions across the Southeast Asia, Oceania and Middle East, covering Singapore, Malaysia, Thailand, Indonesia, Philippines, Vietnam, Myanmar, Cambodia, Sri Lanka, Bangladesh, Australia, New Zealand and Gulf Corporation Council.

In this Selection Guide, you will find Fuji Electric's Low Voltage Inverter and their peripheral devices.

INVERTER LINE-UP

Selection Guide

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Speak to your local Fuji Electric.

Access more detail online:
www.fujielectric.com

Inverter

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to discover more!

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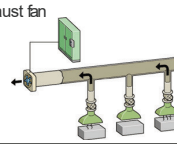
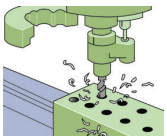
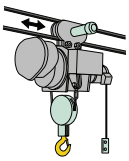
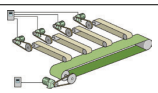
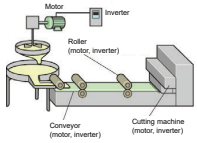
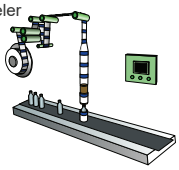
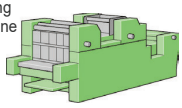
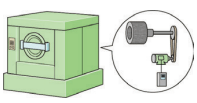
Content

Application selection

Specislized models can maximize the performance for each application

Diversifying applications

◎ : Best suitable　○ : Suitable

Classification	Representative instrument image	Application example	FVR-Micro	FRENIC-Mini	FRENIC-eHVAC	FRENIC-Ace	FRENIC-HVAC	FRENIC-AQUA	FRENIC-MEGA	FRENIC-VG
Fluid machine	Exhaust fan 	Fan	○	○	◎	○	◎	◎	◎	
		Pump	○	○	◎	○	◎	◎	◎	
		Blower	○	○	◎	○	◎	◎	◎	
		Compressor	○	○	◎	○	◎	◎	◎	
		Gear pump				○			◎	
Machine tool	Drilling machine 	Drilling machine				○			◎	
		Turning machine				○			◎	
		Grinding machine				○			◎	
		Tool changer	○	○		◎				
		Milling machine							○	◎
		Machining centre							○	◎
Metal processing machine	Pressing machine 	Pressing machine							○	◎
		Winder							○	◎
		Wire drawing machine				○				◎
		Shearing machine				○				◎
		Dicer								◎
Conveyor machine (vertical)	Hoist crane 	Elevator				○			○	◎
		Escalator				○			○	◎
		Multi-level storage				○			○	◎
		Multi-level parking lot				○			○	◎
		Crane							○	◎
		Hoist crane				◎			○	◎
Conveyor machine (horizontal)	Conveyor 	Conveyor transport	○	○		◎			◎	
		Chain transport	○	○		◎			◎	
		Ball screw	○	○		◎			◎	
Food processing machine	Noodle making machine 	Noodle making machine	○	○		◎			◎	
		Confectionery machine	○	○		◎			◎	
		Tea making machine	○	○		◎			◎	
		Bread making machine	○	○		◎			◎	
		Mixer	○	○		◎			◎	
		Slicer	○	○		◎			◎	◎
Packing and bookbinding machine	Labeler 	Labeler	○	○		○			◎	◎
		Inner packing machine	○	○		○			◎	◎
		Outer packing machine	○	○		○			◎	◎
		Bookbinding machine	○	○		○			◎	◎
		Wrapping machine	○	○		○			◎	◎
		Paper machine	○	○		○			◎	◎
Printing machine	Printing machine 	Winder				○			○	◎
		Slitter							○	◎
		Offset printing machine							○	◎
		Rotary printing machine							○	◎
Health, medical, welfare care instruments	Treadmill 	Stair lift	○	○		◎				
		Treadmill	○	○		◎				
		Care bed	○	○		◎				
		Bubble bath	○	○	○	◎	○	○		
Others	Commercial laundry machine 	Commercial laundry machine	○	○		○			◎	
		Car washing machine	◎	◎		○				
		Food waste disposer	◎	◎		○				
		Conveyor-belt sushi	◎	◎		○				
		Stage installation				○				◎
		Pachinko ball feeder	◎	◎		○			◎	

* Options may be required for application.

Power Selection

Select the right overload capability and control terminal to suit your application.

Major specifications of series

Inverter Series		Input voltage class	Motor capacity range [kW]	Overload capability	Digital input X terminal including FWD /REV terminal	Digital output Y terminal + Relay output	Analog input *1	Analog output *1	Output frequency range
FVR-Micro		Single-phase 200V	0.4 to 2.2kW	150% for 1min.	5	1 + 1	2	1	0.1 to 400Hz
		Three-phase 400V	0.4 to 3.7kW						
FRENIC-Mini		Three-phase 200V	0.1 to 15kW	150% for 1min. 200% for 0.5sec.	5	1 + 1	2	1	0.1 to 400Hz
		Three-phase 400V	0.4 to 15kW						
		Single-phase 200V	0.1 to 2.2kW						
		Single-phase 100V	0.1 to 0.75kW						
FRENIC-eHVAC		Three-phase 400V	0.75 to 280kW	120% for 1min.	7	3 + 2	3	2	0.1 to 120Hz
FRENIC-Ace		Single-phase 200V (HND)	0.1 to 30kW	120% for 1min.	7	2 + 1	2	2	0.1 to 500Hz
		Three-phase 400V (ND)	0.4 to 315kW						0.1 to 120Hz
		Single-phase 200V (HHD)	0.1 to 2.2kW	150% for 1min.					0.1 to 500Hz
FRENIC-HVAC		Three-phase 200V	0.75 to 90kW	110% for 1min.	9	4 + 2	3	2	0.1 to 120Hz
		Three-phase 400V	0.75 to 710kW						
FRENIC-AQUA		Three-phase 400V	0.75 to 710kW						
FRENIC-MEGA		Three-phase 200V (HD)	0.4 to 90kW	150% for 1min.	11	4 + 2	3	2	0.1 to 599Hz *3
		Three-phase 400V (HD)	0.4 to 630kW	200% for 3sec.					
		Three-phase 200V (LD)	7.5 to 110kW	120% for 1min.					0.1 to 599Hz *3
		Three-phase 400V (LD)	7.5 to 710kW						
FRENIC-VG	Unit Type	Three-phase 200V (HD)	0.75 to 90kW	150% for 1min.	11	4 + 2	3	3	0.1 to 500Hz
		Three-phase 400V (HD)	3.7 to 630kW	200% for 3sec.					
		Three-phase 400V (MD)	110 to 450kW	150% for 1min.					
		Three-phase 200V (LD)	37 to 110kW	120% for 1min.					
		Three-phase 400V (LD)	37 to 710kW						
	Stack Type	Three-phase 400V (MD)	30 to 800kW	150% for 1min.					0.1 to 150Hz
		Three-phase 690V (MD)	90 to 450kW						
		Three-phase 400V (LD)	37 to 1000kW	110% for 1min.					
		Three-phase 690V (LD)	110 to 450kW						

Functionality selection

	Control function																					
	Auto-restart after momentary power failure	Slip compensation control	PID control	Automatic energy saving operation	Regeneration prevention control	Overload prevention control	Torque limiter	Preventing condensation in motor	Number of motor switching options	Pick-up operation, draw operation	Commercial power supply switching operation	Customizable logic function	Hit-and-stop control	Dancer roll control	Velocity zero control	Servo lock	Synchronous motor driving	Calendar function	Traceback function	Online tuning	Functional safety (STO)	Pattern operation, timer operation	Pump control
	○	○	○	○	○	○			2								○					○	
	○		○	○	○	○		○		○	○												
	○	○	○	○	○	○	○		2	○		○	○*2	○	○	○	○			○	○	○	
	○	○	○	○	○	○	○	○		○	○	○						○		○		○	○
	○	○	○	○	○	○	○	○	4	○	○	○		○	○	○	○			○	○	○	
	○	○	○	○			○		3	○	○	○	○	○	○	○	○	○	○	○	○		

*1 The behaviour of analog input and output can be switched by settings. Refer to the catalogue of each series.
*2 Consult our sales representatives.
*3 The inverter trips when the output frequency upper limit of 599Hz is exceeded due to a review of export control regulations (frequency converter).

Optional item selection

The optional item provide flexibility on interfacing and communication

Special option

○ : Optional

Applicable Inverter			FVR-Micro	FRENIC-Mini	FRENIC-eHVAC	FRENIC-Ace	FRENIC-HVAC	FRENIC-AQUA	FRENIC-MEGA	FRENIC-VG
Item	Control option card	Relay Output Interface Card			○		○	○	○	
		Digital Interface Card				○			○	○
		Analog Interface Card				○	○	○	○	○
		PG Interface Card				○			○	○
		Analog Current Output Interface Card					○	○	○	
		Synchronize Interface Card								○
	Communication option card	RS-485 Communications Card	Built-in	Built-in	Built-in	Built-in*1	Built-in	Built-in	Built-in	Built-in
		T-Link Communications Card							○	○
		SX-bus Communications Card							○	○
		E-SX-bus Communications Card								○
		PROFIBUS-DP Communications Card			○	○	○	○	○	○
		DeviceNet Communications Card			○	○	○	○	○	○
		CANopen Communications Card				○	○	○	○	
		CC-Link Communications Card			○	○	○	○	○	○
		LonWorks Communications Card			○		○	○		
		Ethernet Communications Card				○	○	○	○	
		Resistance Temperature Detector Input Card			○		○	○		
		ProfiNet-RT Communications Card				○				
		ProfiNet-IRT Communications Card								○
		User Programming Card (UPAC)								○
		Functional Safety Card								○
	Software	Inverter support loader software	○	○	○	○	○	○	○	○
	Operation option	Remote touch panel		○	Standard	Standard				
		Remote touch panel with USB		○		○			○	
		Multifunctional touch panel			○	○	Standard	Standard	○	Standard

*1 The number of connectors of the RS-485 port can be changed from 1 to 2 by mounting an option card.

Peripheral devices & solution

The diagram shows the complete solution peripheral structure and option

Wiring diagram of peripheral equipment of inverter

For main power input and inverter output

*1 If not using an R0, T0 terminal, connect a connector at this location.

AC Reactor [ACR□-□□□]

Used when the power supply voltage is unstable.

Arrester [CN513□□□] Consult Fuji Electric

Suppresses induced lightning surges from the power source to protect entire equipment connected to the power source.

Ferrite ring for reducing radio noise [ACL-40B, ACL-74B, F200160]

Used to reduce radio noise. Suppressive effect to the frequency band is available by approximately 1MHz or more. This is appropriate as a simple measure against noise since it affects broad range in the frequency band.

EMC compliance filter [EFL-□□□, FS□□, FN□□] Consult Fuji Electric

Dedicated filter to comply with the European EMC Directive (Emission). Install the filter while referring to the details in the installation manual.

Power filter for input circuit [RNF□C□□-□□] Consult Fuji Electric

This filter can be used for the same purpose as the EMC compliance filter, but is not an EMC compliance.

*2 If using an R0, T0 terminal, connect a connector at this location.

Filter capacitor for reducing radio noise [NFM□□M315KPD□] Consult Fuji Electric

Used to reduce radio noise. This is effective for the AM radio frequency band.
*Do not use it on the inverter output side.

Power filter for output circuit [RNF□S□□-□□] Consult Fuji Electric

This will become more effective in noise reduction if used together with the power filter for input circuit.

Output circuit filter [OFL- □□□-4A]

Connected to the output of an inverter to:
- Suppress fluctuations of motor terminal voltage.
- Prevent damages to the motor insulation due to surge voltage in 400V series inverter.

*This filter is not limited by carrier frequency. Also, motor can be tuned while this option is installed.

Surge supperession unit [SSU □□□TA-NS] Consult Fuji Electric

Surge voltage is generated if the cable between an inverter and a motor is several ten meters long. This product suppresses the surge voltage, preventing the motor from being damaged. (Can be used for motors of 75kW or lower.)

Surge killer Consult Fuji Electric

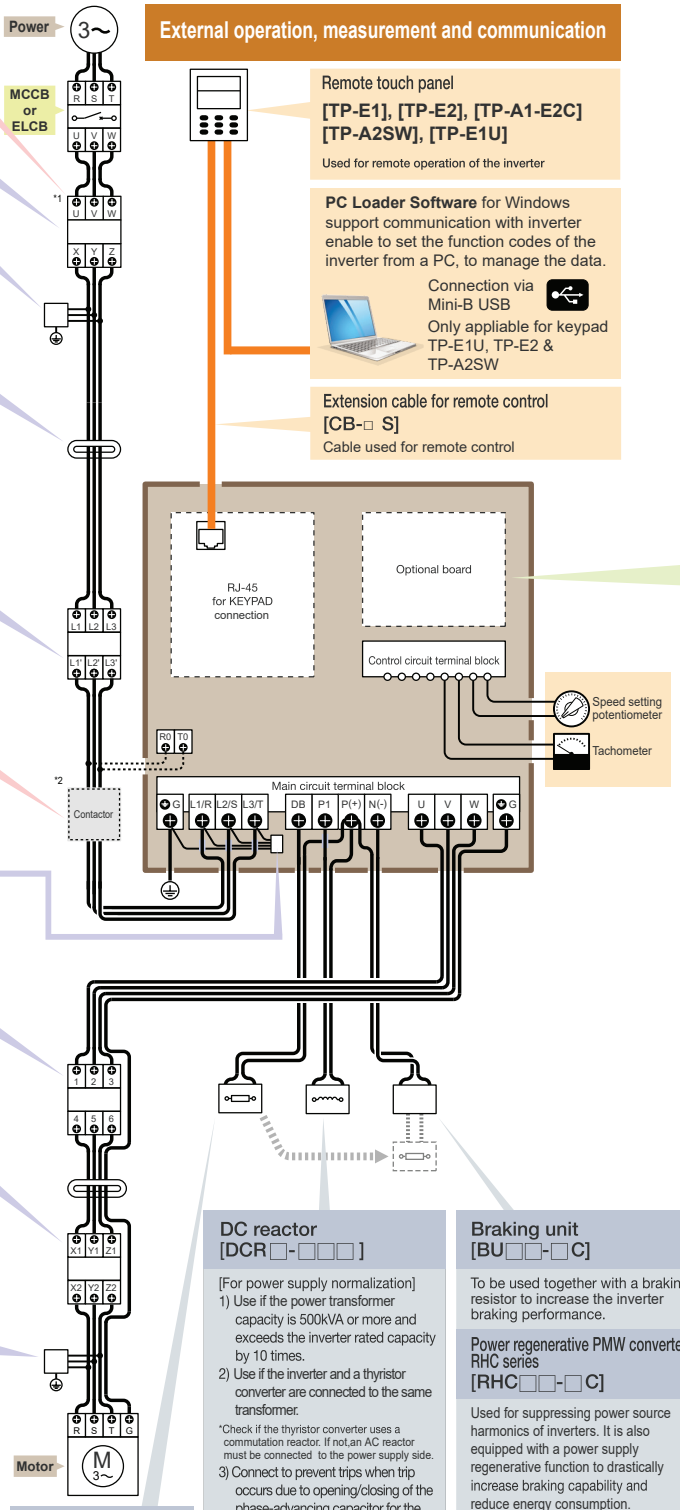
Absorbs surge voltage coming from L-load of magnetic contactor and solenoid valve to protect electronic devices from malfunctioning.

Surge absorber Consult Fuji Electric
(Connect in parallel to the coil that is a generation source of surge.)

[S2-A-O (for magnetic contactor and solenoid valve)]
[S1-B-O (for mini control relay and timer)]

Surge killer for L-load Consult Fuji Electric
(Connect to the power circuit that is a generation source of surge.)

[FSL-323 (for 3-phase)]
[FSL-123 (for single -phase)]



Built-in option card

Control option card

- **Relay Output Interface Card [OPC-■ -RY]**
  Conversion of transistor outputs of the inverter to relay output signals
- **Digital Interface Card [OPC-■ -DIO], [OPC-G1-DI/DO]**
  Frequency setting with binary or BCD digital signals
- **Analog Interface Card [OPC-■ -AIO]**
  Torque control with external analog signals
- **PG Interface Card [OPC-■ -PG□]**
  PG vector control with feedback signals by the encoder [OPC-■ -PMPG]
  Synchronized motor operation with sensors enabled by combination with MEGA (synchronized motor drive type)
- **Resistance Temperature Detector Input Card [OPC-PT]**
  Resistance temperature detectors (RTD) can be connected directly to the inverter without a converter, converting temperatures to digital values.

Communication option card

- **RS-485 Communications Card [OPC-■ -RS]**
  Data link between a computer with an RS-485 interface and the inverter
- **T-Link Communications Card [OPC-■ -TL]**
  Datalink between PLC (MICREX-F) and the inverter

Open bus card

Data link between various open buses and the inverter

- **PROFIBUS-DP Communications Card [OPC-■ -PDP]**
- **DeviceNet Communications Card [OPC-■ -DEV]**
- **CANopen Communications Card [OPC-■ -COP]**
- **CC-Link Communications Card [OPC-■ -CCL]**
- **LONWORKS Communications Card [OPC-■ -LNW]**

Braking resistor [DB□□-□,DB□□-□C]

Increases braking capability for highly frequent stopping and large moment of inertia. When used together with a braking unit, connect this to the connection terminal of the braking unit.

DC reactor [DCR□-□□□]

[For power supply normalization]
1) Use if the power transformer capacity is 500kVA or more and exceeds the inverter rated capacity by 10 times.
2) Use if the inverter and a thyristor converter are connected to the same transformer.
*Check if the thyristor converter uses a commutation reactor. If not,an AC reactor must be connected to the power supply side.
3) Connect to prevent trips when trip occurs due to opening/closing of the phase-advancing capacitor for the power supply lines.
4) Use if the voltage unbalance exceeds 2%.

[For improving the input power-factor and reducing harmonics]
- Used to reduce the input harmonic current (correcting power-factor)

* For the drop effect, refer to the guideline appendix.

Braking unit [BU□□-□C]

To be used together with a braking resistor to increase the inverter braking performance.

Power regenerative PMW converter, RHC series [RHC□□-□C]

Used for suppressing power source harmonics of inverters. It is also equipped with a power supply regenerative function to drastically increase braking capability and reduce energy consumption.

* Use in combination with the RHC Series dedicated pressurization reactor, resistor, and capacitor.

Dedicated filter for RHC series
A filter dedicated for RHC series, which is used when other electronic devices are connected to the same power supply.

* Use this filter in combination with the dedicated filter reactor, filter condenser and filter resistor as a set.

Attachment for IP40 [P40■ -□□]

Converting the protection structure of the inverter to all-closed form (IP40)

NEMA 1 kit [NEMA1-□□□■ -□]

Converting the protection structure of the inverter to NEMA 1 standards (certified for UL TYPE 1)

Compatibility attachment [MA-■ -□□]

An attachment for providing mount compatibility with old models manufactured by our company

Rail mount base [RMA-■ -□□]

An attachment for mounting to IEC rail with a width of 35 mm

An attachment for external cooling [PB-■ -□□]

An attachment for taking the cooling fin of the inverter out of the board

Peripheral and structure options

* The series names (C2, E2, F2, G2, AR1, AQ1, VG1) are put in the place of ■ in the type names.

NOTE: Some accessories not feature in this selection guide, please consult your local Fuji Electric.

Overview

It's small and strong. The design is held especially simple, so the user benefits from an easy installation and smooth operations. Its conceptual design ensures saving space and energy, as well as costs.
FRENIC-Micro AS1S is a highly economic inverter for general purpose applications. It matches perfectly any application with limited space and where small capacities are needed, such as e.g. conveyor transports, mixer machines, or small woodworking machineries with basic functions.

- **Model variations**

STD
Standard type

- **Major functions**

Frequency potentiometer control

- **International standards**

CE cULus LISTED RoHS

- **Input voltage class / capacity range**

Three-phase - Class 400V / 0.4 to 3.7kW
Single-phase - Class 200V / 0.4 to 2.2kW

FVR-Micro
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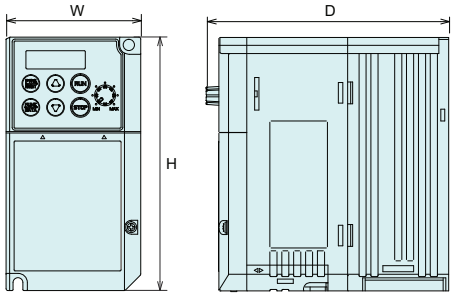
Features

- Overload capability: 150% of rated current for 1 min
- Adoption of control system to minimize motor loss
- Built-in RS485 communications port as standard
- Multi-stage frequency (16 stages)
- Sink/source selectable
- PID control function
- Built-in braking transistor
- Potentiometer built-in keypad (for frequency or PID command)
- Analog input / analog output / jog operation / remote / local

Dimensions (External)

Power supply voltage	Standard Motor (kW)	Inverter Model	Dimensions (mm)			Ingress Protection
			W	H	D	
3-phase 50/60 Hz Class 400 VAC	0.4	FVR0.4AS1S-4E	108	128	146	IP20
	0.75	FVR0.75AS1S-4E				
	1.5	FVR1.5AS1S-4E				
	2.2	FVR2.2AS1S-4E				
	3.7	FVR3.74AS1S-4E	140			
1-phase 50/60Hz Class 200 VAC	0.4	FVR0.4AS1S-7E	68	128	123	
	0.75	FVR0.75AS1S-7E				
	1.5	FVR1.5AS1S-7E	108		146	
	2.2	FVR2.2AS1S-7E				



For more detail, please refer to model series catalog.

Overview

With its rich functionality, compact design, simple operation and global compatibility, the new FRENIC-Mini C2 series elevates the performance of a wide range of devices and equipment which include conveyors, fans, pumps, centrifugal separators and food processing machines. It enables system integration, energy efficiency, reduced labour, lower overall costs and achieve competitiveness.

- **Model variations**
  - STD — Standard Type
  - EMC — Built-in EMC filter
- **Major functions**
  - Side by side installation
  - Frequency potentiometer control
  - Synchronous motor driving
- **International standards**

- **Input voltage class / capacity range**

  Three-phase - Class 400V / 0.4 to 15kW
  Three-phase - Class 200V / 0.1 to 15kW
  Single-phase - Class 200V / 0.1 to 2.2kW
  Single-phase - Class 100V / 0.1 to 0.75kW

FRENIC-Mini
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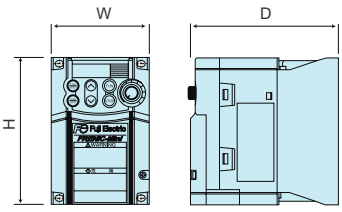
Features

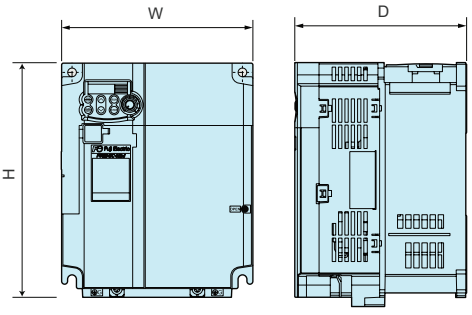
- Overload capability: 150% of rated current for 1min or 200% of rated current for 0.5s
- Dynamic torque vector control
- Fastest CPU processor in its class
- External dimensions same as last series (C1 series)
- Optional USB keypad available Energy use optimizer
- PID control function
- Cooling fan ON/OFF control function
- Synchronous motor control
- RS-485 communications port ready
- Easier maintenance

Dimensions (External)

Power supply voltage	Standard Motor (kW)	Inverter Model	Dimensions (mm) W	H	D	Ingress Protection
3-phase 50/60Hz Class 400 VAC	0.4	FRN0002C2☐- 4A	110	130	158	IP20
	0.75	FRN0004C2☐- 4A			182	
	1.5	FRN0005C2☐- 4A	140	180		
	2.2	FRN0007C2☐- 4A				
	3.7	FRN0011C2☐- 4A				
	5.5	FRN0013C2☐- 4A	180	230	158	
	7.5	FRN0018C2☐- 4A				
	11	FRN0024C2☐- 4A	220	270	190	
	15	FRN0030C2☐- 4A				
3-phase 50/60Hz Class 200 VAC	0.1	FRN0001C2S - 2A	80	120	80	IP20
	0.2	FRN0002C2S - 2A				
	0.4	FRN0004C2S - 2A			95	
	0.75	FRN0006C2S - 2A			120	
	1.5	FRN0010C2S - 2A	110	130	139	
	2.2	FRN0012C2S - 2A				
	3.7	FRN0020C2S - 2A	140	180		
	5.5	FRN0025C2S - 2A	180	220	158	
	7.5	FRN0033C2S - 2A				
	11	FRN0047C2S - 2A	220	260	190	
	15	FRN0060C2S - 2A				
1-phase 50/60Hz Class 200 VAC	0.1	FRN0001C2☐- 7A	80	120	100	IP20
	0.2	FRN0002C2☐- 7A				
	0.4	FRN0004C2☐- 7A			115	
	0.75	FRN0006C2☐- 7A	110	130	139	
	1.5	FRN0010C2☐- 7A	140	180	182	
	2.2	FRN0012C2☐- 7A				



Low capacity



High capacity

For more detail, please refer to model series catalog.

[S]: Standard /[E]: EMC Filter

Overview

Offers optimum capability in terms of energy saving for fans and pumps used in HVAC applications, eliminates waste through appropriate flow rate and air flow adjustments, and greatly influences power conservation and cost reductions through energy saving. An EMC filter is built-in as standard, catering to a variety of environments. PM Motor drive with sensorless vector control is now possible. Unique functions tailored to the application can be constructed.

- **Model variations**

STD
Standard Type

- **Major functions**

Optimized minimum power control

Customisable logic

- **International standards**

CE cULus LISTED RoHS

- **Input voltage class / capacity range**

Three-phase - Class 400V / 0.75 to 280kW

FRENIC-eHVAC
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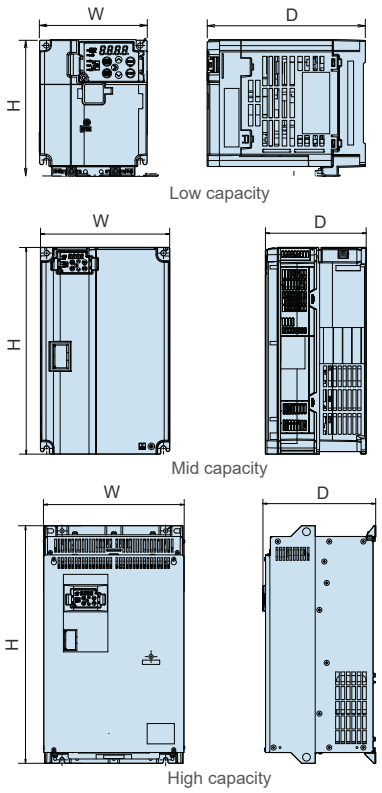
Features

- Overload capability: 120% of rated current for 1min.
- Dedicated functionality for HVAC application: Fire mode for fan, built-in PID/Cascade operation for pump, etc.
- Built-in category C2/C3 EMC filter as standard, catering for a variety of environments.
- PM motor drive is now possible with PM sensorless vector control.
- Equipped with customized logic as standard to facilitate the free programming of up to 200 steps Unique functions tailored to the application or usage method can constructed.
- Equipped with BACnet communication protocol as standard to facilitate the productization of a variety of control and communication options.

Dimensions (External)

Power supply voltage	Standard Motor (kW)	Inverter Model	Dimensions (mm)			Ingress Protection
			W	H	D	
3-phase 50/60 Hz Class 400 VAC	0.75	FRN0002F2E-4G	110	130	162	IP20
	1.1	FRN0003F2E-4G			186	
	2.2	FRN0005F2E-4G	140	130	199	
	3	FRN0006F2E-4G				
	5.5	FRN0011F2E-4G				
	7.5	FRN0018F2E-4G	181.5	285	208	
	11	FRN0023F2E-4G				
	15	FRN0031F2E-4G	220	332	245	
	18.5	FRN0038F2E-4G				
	22	FRN0045F2E-4G	250	400	195	
	30	FRN0060F2E-4G				
	37	FRN0075F2E-4G	320	550	255	IP20
	45	FRN0091F2E-4G				
	55	FRN0112F2E-4G	355	615	270	
	75	FRN0150F2E-4G		675		
	90	FRN0176F2E-4G		740		
	110	FRN0210F2E-4G	530	740	315	
	132	FRN0253F2E-4G				
	160	FRN0304F2E-4G	530	1000	360	
	200	FRN0377F2E-4G				
	220	FRN0415F2E-4G	680	1000	360	
	280	FRN0520F2E-4G				

For more detail, please refer to model series catalog.



Overview

Inverter that produces excellent cost-performance, maintaining high performance through optimal design.
In this way, it can be applied to various machines and devices. The FRENIC-ACE is standard inverter for the next generation and can be used in almost any type of application from fans and pumps to specialized machinery. Whether it is simple logic functions or full-scale programming. It can be used for dedicated purposes such as wire drawing machines, spinning machines and hoists with the appropriate programming templates.

- **Model variations**

STD Standard Type

EMC Built-in EMC filter

- **Major functions**

Side-by-side installation; Synchronous motor driving; Detachable keypad; Pulse train input; Customizable logic; Four ratings (HHD / HND HD / ND); Functional safety STO

- **International standards**

CE; c UL us LISTED; RoHS; KC

- **Input voltage class/capacity range**

Three-phase - Class 400V / 0.4 to 315kW (enable ND, HD, HND & HHD)
Three-phase - Class 200V / 0.1 to 30kW (enable HHD)
Single-phase - Class 200V / 0.1 to 2.2kW (enable HHD)

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Features

- ND, HND - 120% of nominal current for 1min
- HD - 150% of nominal current for 1min
- HHD - 150% of nominal current for 1min or 200% of nominal current for 0.5s
- Customizable logic (aka, mini PLC, 200 steps), superior flexibility
- Sensorless dynamic torque vector control, PM synchronous motor control
- Safety enable input STO (compliant to EN/ISO13849-1, SIL3, PL=e, cat. 3)
- Closed loop for IM and Sensorless PMSM control modes
- 2-channel on-board RS485 communication port
- 10 years' lifetime design

(ND - Normal Duty) (HD - High Duty) (HND - High carrier frequency Normal Duty) (HHD - High carrier frequency Heavy Duty)

Dimensions (External)

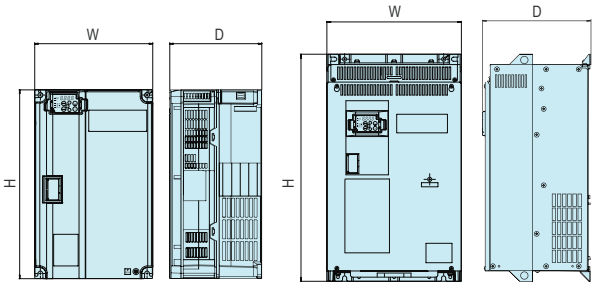
Power supply voltage	Standard Motor (kW)				Inverter Model	Dimensions (mm)			Ingress Protection
	HHD	HND	HD	ND		W	H	D	
3-phase 50/60 Hz Class 400 VAC	0.4	0.75	0.75	0.75	FRN0002E2☐-4GB	110	140	162	IP20
	0.75	1.1	1.1	1.5	FRN0004E2☐-4GB			186	
	1.5	2.2	2.2	2.2	FRN0006E2☐-4GB	140		199	
	2.2	3.0	3.0	3.0	FRN0007E2☐-4GB				
	3.7	5.5	5.5	5.5	FRN0012E2☐-4GB				
	5.5	7.5	7.5	11	FRN0022E2☐-4GB	1802	30	158	
	7.5	11	11	15	FRN0029E2☐-4GB				
	11	15	15	18.5	FRN0037E2☐-4GB	220	270	190	
	15	18.5	18.5	22	FRN0044E2☐-4GB				
	18.5	22	22	30	FRN0059E2☐-4GB	250	400	195	
	22	30	30	37	FRN0072E2☐-4GB				
	30	37	37	45	FRN0085E2☐-4GB	326.2	550	261	
	37	45	45	55	FRN0105E2☐-4GB				IP00
	45	55	55	75	FRN0139E2☐-4GB	361.2	615	276	
	55	75	75	90	FRN0168E2☐-4GB		675		
	75	90	90	110	FRN0203E2☐-4GB		740		
	90	110	110	132	FRN0240E2☐-4GB	536.4		321	
	110	132	132	160	FRN0290E2☐-4GB				
	132	160	160	200	FRN0361E2☐-4GB		1000	366	
	160	200	200	220	FRN0415E2☐-4GB				
	200	220	220	280	FRN0520E2☐-4GB	686.4			
	220	280	250	315	FRN0590E2☐-4GB				
1-phase 50/60 Hz Class 200 VAC	0.1	-	-	-	FRN0001E2☐-7GB	68	127	85	IP20
	0.2	-	-	-	FRN0002E2☐-7GB				
	0.4	-	-	-	FRN0003E2☐-7GB			107	
	0.75	-	-	-	FRN0005E2☐-7GB			152	
	1.5	-	-	-	FRN0008E2☐-7GB	110	130	153	
	2.2	-	-	-	FRN0011E2☐-7GB	140		143	

For more detail, please refer to model series catalog.

Ⓢ: Standard / Ⓔ: EMC Filter

Power supply voltage	Standard Motor (kW)		Inverter Model	Dimensions (mm)			Ingress Protection
	HHD	HND		W	H	D	
3-phase 50/60 Hz Class 200 VAC	0.1	0.2	FRN0001E2☐-2GB	68	127	85	IP20
	0.2	0.4	FRN0002E2☐-2GB				
	0.4	0.75	FRN0004E2☐-2GB			100	
	0.75	1.1	FRN0006E2☐-2GB			132	
	1.5	2.2	FRN0010E2☐-2GB	110	130	143	
	2.2	3.0	FRN0012E2☐-2GB				
	3.7	5.5	FRN0020E2☐-2GB	140			
	5.5	7.5	FRN0030E2S-2GB	180	220	158	
	7.5	11	FRN0040E2S-2GB				
	11	15	FRN0056E2S-2GB	220	260	190	
	15	18.5	FRN0069E2S-2GB				
	18.5	22	FRN0088E2S-2GB	250	400	195	
	22	30	FRN0115E2S-2GB				

Ⓢ: Standard / Ⓔ: EMC Filter



Low capacity High capacity

Overview

Fuji Electric's first slim type inverter dedicated for a variety of HVAC applications.
This series follows European trends and is keeping high Japanese reliability. Specific functions to manage fan and compressor applications and new energy saving functions are installed as standard, positioning FRENIC-HVAC as a high performance inverter on the HVAC and compressor market.

- **Model variations**
  - STD — Standard Type
  - EMC — Built-in EMC filter
- **Major functions**
  - Calendar function
  - Linearization function
  - Customizable logic
  - Optimized minimum power control
- **International standards**
  - CE
  - c UL us LISTED
  - RoHS

- **Input voltage class / capacity range**

Three-phase - Class 400V / 0.75 to 710kW
Three-phase - Class 200V / 0.75 to 90kW

FRENIC-HVAC
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Features

- Overload capability: 110% of rated current for 1min
- IP21 & IP55 with same dimensions.
- DCR and EMC filter built-in up to 90 kW. Built-in EMC filter for all capacities
- Customizable Logic (mini PLC), 14 steps, manageable digital or analog signals with Real Time Clock (RTC)
- Overload capability 110% with Torque Vector Control
- Modbus RTU, BACnet MS/TP, Metasys N2; integrated as standard
- Specific macros for common fan and compressor applications
- Unit conversion function (kPa, bar, l/min, etc.)
- 4 PID, Fire mode (forced operation), Password function

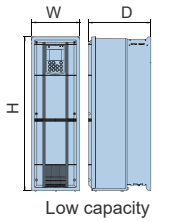
Dimensions (External)

Power supply voltage	Standard Motor (kW)	Inverter Model	Dimensions (mm) W	H	D	Ingress Protection
3-phase 50/60 Hz Class 400 VAC	0.75	FRN0.75AR1☐-4A	150	465	262	IP21/IP55
	1.5	FRN1.5AR1☐-4A				
	2.2	FRN2.2AR1☐-4A				
	3.7	FRN3.7AR1☐-4A				
	5.5	FRN5.5AR1☐-4A				
	7.5	FRN7.5AR1☐-4A				
	11	FRN11AR1☐-4A	203	585		
	15	FRN15AR1☐-4A				
	18.5	FRN18.5AR1☐-4A				
	22	FRN22AR1☐-4A				
	30	FRN30AR1☐-4A	203	645		
	37	FRN37AR1☐-4A				
	45	FRN45AR1☐-4A	265	736	284	
	55	FRN55AR1☐-4A				
	75	FRN75AR1☐-4A	300	885	368	
	90	FRN90AR1☐-4A				
	110	FRN110AR1S-4A	530	740	315	IP00
	132	FRN132AR1S-4A				
	160	FRN160AR1S-4A		1000	360	
	200	FRN200AR1S-4A				
	220	FRN220AR1S-4A	680			
	280	FRN280AR1S-4A				
	315	FRN315AR1S-4A		1400	440	
	355	FRN355AR1S-4A				
	400	FRN400AR1S-4A				
	500	FRN500AR1S-4A	880			
	630	FRN630AR1S-4A	1000	1550	500	
	710	FRN710AR1S-4A				

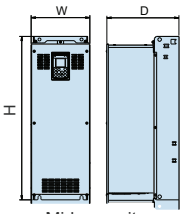
For more detail, please refer to model series catalog.
M:IP21 L:IP55

Power supply voltage	Standard Motor (HP)	Inverter Model	Dimensions (mm) W	H	D	Ingress Protection
3-phase 50/60 Hz Class 200 VAC	1	FRN001AR1☐-2U	150	465	262	IP21/IP55
	2	FRN002AR1☐-2U				
	3	FRN003AR1☐-2U				
	5	FRN005AR1☐-2U				
	7	FRN007AR1☐-2U	203	585		
	10	FRN010AR1☐-2U				
	15	FRN015AR1☐-2U				
	20	FRN020AR1☐-2U		645		
	25	FRN025AR1☐-2U				
	30	FRN030AR1☐-2U	265	736	284	
	40	FRN040AR1☐-2U				
	50	FRN050AR1☐-2U	300	885	367.9	
	60	FRN060AR1☐-2U				
	75	FRN075AR1S-2U	355	740	270	IP00
	100	FRN100AR1S-2U				
	125	FRN125AR1S-2U	530	750	285	

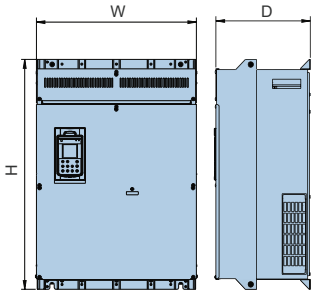
America Model
M: UL Type1 (IP21) / L: UL Type12 (IP55)



Low capacity



Mid capacity



High capacity

Overview

The slim type inverter dedicated for a variety of applications of water supply and wastewater treatment system from Fuji Electric. This series follows European trends keeping high Japanese reliability. Specific functions to protect damage of pump systems and new energy saving functions are installed as standard, positioning FRENIC-AQUA as a high performance inverter on the pumping application market.

- **Model variations**

STD Standard Type

EMC Built-in EMC filter

- **Major functions**

Calendar function

Linearization function

Customizable logic

Optimized minimum power control

Cascade control

- **International standards**

CE

c UL us LISTED

RoHS

- **Input voltage class / capacity range**

Three-phase - Class 400V / 0.75 to 710kW

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Features

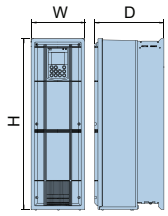
- IP21 & IP55 with same dimension
- DCR and EMC filter built-in up to 90 kW. Built-in EMC filter for all capacities
- Customizable Logic (mini PLC), 14 steps, manageable digital and analog signals with Real Time Clock (RTC)
- 4 PID, Anti jam function, Pipe fill mode, Password function and Unit conversion function (kPa, bar, l/min, etc.)
- Overload capability 110% with Torque Vector Control
- Modbus RTU, BACnet MS/TP, Metasys N2; integrated as standard
- Large LCD display, 19 languages + user customizable language
- Specific macros for common pump applications
- Fire mode (forced operation)
- New energy saving functions (sleep mode)
- Multi-pump control (Cascade control) (up to 9 pumps with one inverter)

Dimensions (External)

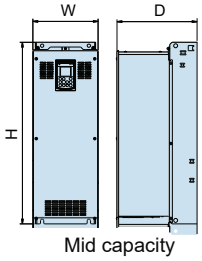
Power supply voltage	Standard Motor (kW)	Inverter Model	Dimensions (mm) W	H	D	Ingress Protection
3-phase 50/60 Hz Class 400 VAC	0.75	FRN0.75AQ1☐ - 4A	150	465	262	IP21/ IP55
	1.5	FRN1.5AQ1☐ - 4A				
	2.2	FRN2.2AQ1☐ - 4A				
	3.7	FRN3.7AQ1☐ - 4A				
	5.5	FRN5.5AQ1☐ - 4A				
	7.5	FRN7.5AQ1☐ - 4A				
	11	FRN11AQ1☐ - 4A	203	585		
	15	FRN15AQ1☐ - 4A				
	18.5	FRN18.5AQ1☐ - 4A				
	22	FRN22AQ1☐ - 4A				
	30	FRN30AQ1☐ - 4A	203	645		
	37	FRN37AQ1☐ - 4A				
	45	FRN45AQ1☐ - 4A	265	736	284	
	55	FRN55AQ1☐ - 4A				
	75	FRN75AQ1☐ - 4A	300	885	368	
	90	FRN90AQ1☐ - 4A				
	110	FRN110AQ1S - 4A	530	740	315	IP00
	132	FRN132AQ1S - 4A				
	160	FRN160AQ1S - 4A		1000	360	
	200	FRN200AQ1S - 4A				
	220	FRN220AQ1S - 4A	680			
	280	FRN280AQ1S - 4A				
	315	FRN315AQ1S - 4A		1400	440	
	355	FRN355AQ1S - 4A				
	400	FRN400AQ1S - 4A				
	500	FRN500AQ1S - 4A	880			
	630	FRN630AQ1S - 4A	1000	1550	500	
	710	FRN710AQ1S - 4A				

For more detail, please refer to model series catalog.

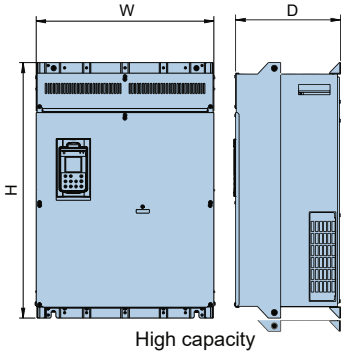
M:IP21 L:IP55



Low capacity



Mid capacity



High capacity

Overview

Inherits the excellent performance specifications and functionality of the G1 series while providing a more stylish design. Unrelenting pursuit of performance and functionality to further enhance adaptability. The new FRENIC-MEGA G2 series takes core capabilities, responsiveness, environmental awareness and easy maintenance to the next level. It's smarter, faster and resulting in significantly better efficiency.

- **Model variations**

STD Standard type; EMC Built-in EMC filter; DCR Integrated DC reactor
PM Synchronous motor driving type; PS Position control type; SF Safety-enabled type

- **Major functions**

Optimized minimum power control; Detachable keypad; Built-in USB terminal; Pulse train input
Ratio operation; Customizable logic; HD/MD/LD Triple ratings

- **International standards**

CE; c UL us LISTED; RoHS; KC

- **Input voltage class/capacity range**

Three-phase - Class 200V / 0.4 to 90kW (HD - High Duty), 7.5 to 110kW (LD - Low Duty)
Three-phase - Class 400V / 0.4 to 630kW (HD - High Duty), 7.5 to 710kW (LD - Low Duty)

FRENIC-MEGA G2
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Features

- Overload capability: 150% of rated current for 1min or 200% of rated current for 3.0s
- Safety enable input (compliant to EN/ISO13849- PL=d, cat. 3)
- Built-in EMC filter for all capacities (compliant to EN 61800-3, category C3)
- Faster operating speeds of up to 599Hz even on V/F mode
- Enhanced response on speed up to 200Hz, Enhanced response on current up to 1000Hz.
- Permanent Magnet Synchronous Motor (PMSM) ready.
- Load adaptive control enable significantly better efficiency.
- Same mounting dimensions as G1 series for easy replacement.
- Optional smart multi-function keypad TP-A2SW, enable battery backup, memory card and Bluetooth function.

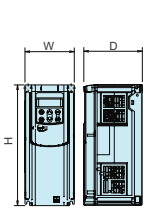
Dimensions (External)

Power supply voltage	Standard Motor kW (HHD)	Standard Motor HP (HHD)	Standard Motor kW (HND)	Standard Motor HP (HND)	Inverter model	Dimensions (mm) W	H	D	IP
3-phase 50/60 Hz Class 400 VAC	0.4	1/2	-	-	FRN0002G2□-4G	110	260	130	IP20
	0.75	1	-	-	FRN0003G2□-4G			145	
	1.5	2	-	-	FRN0004G2□-4G	150			
	2.2	3	-	-	FRN0006G2□-4G				
	3.7	5	-	-	FRN0009G2□-4G				
	5.5	7.5	7.5	10	FRN0018G2□-4G	220		195	
	7.5	10	11	15	FRN0023G2□-4G				
	11	15	15	20	FRN0031G2□-4G				
	15	20	18.5	25	FRN0038G2□-4G	250	400		
	18.5	25	22	30	FRN0045G2□-4G				
	22	30	30	40	FRN0060G2□-4G				IP00
	30	40	37	50	FRN0075G2□-4G	326.2	550	261.3	
	37	50	45	60	FRN0091G2□-4G				
	45	60	55	75	FRN0112G2□-4G	361.2	615	276.3	
	55	75	75	100	FRN0150G2□-4G		675		
	75	100	90	125	FRN0180G2□-4G		740		
	90	125	110	150	FRN0216G2□-4G	535.8		321.3	
	110	150	132	200	FRN0260G2□-4G				
	132	200	160	250	FRN0325G2□-4G	536.4	1000	366.3	
	160	250	200	300	FRN0377G2□-4G				
	200	300	220	350	FRN0432G2□-4G	686.4			
	220	350	280	400	FRN0520G2□-4G				
	280	400	355	500	FRN0650G2□-4G		1400	445.5	
	315	450	400	600	FRN0740G2□-4G				
	355	500	500	700	FRN0960G2□-4G	886.4		446.3	
	400	600	560	800	FRN1040G2□-4G				
	500	700	630	900	FRN1170G2□-4G	1006	1550	505.9	
	630	900	710	1000	FRN1386G2□-4G				

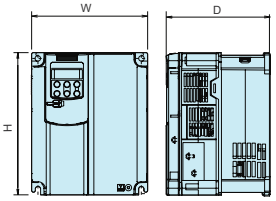
For more detail, please refer to model series catalog.

Power supply voltage	Standard Motor kW (HHD)	Standard Motor HP (HHD)	Standard Motor kW (HND)	Standard Motor HP (HND)	Inverter model	Dimensions (mm) W	H	D	IP
3-phase 50/60 Hz Class 200 VAC	0.4	1/2	-	-	FRN0003G2S-2G	110	260	130	IP20
	0.75	1	-	-	FRN0005G2S-2G			145	
	1.5	2	-	-	FRN0008G2S-2G	150			
	2.2	3	-	-	FRN0011G2S-2G				
	3.7	5	-	-	FRN0018G2S-2G				
	5.5	7.5	7.5	10	FRN0032G2S-2G	220		195	
	7.5	10	11	15	FRN0046G2S-2G				
	11	15	15	20	FRN0059G2S-2G				
	15	20	18.5	25	FRN0075G2S-2G	250	400		
	18.5	25	22	30	FRN0088G2S-2G				
	22	30	30	40	FRN0115G2S-2G				
	30	40	37	50	FRN0146G2S-2G	326.2	550	261.3	
	37	50	45	60	FRN0180G2S-2G	361.2	615	276.3	IP00
	45	60	55	75	FRN0215G2S-2G		740		
	55	75	75	100	FRN0288G2S-2G				
	75	100	90	125	FRN0346G2S-2G	535.8	750	291.3	
	90	125	110	150	FRN0432G2S-2G	686.4	880	366.3	

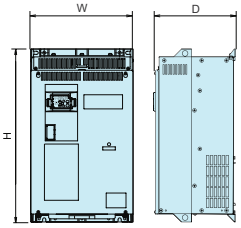
For more detail, please refer to model series catalog.



Low capacity



Mid capacity



High capacity

[S]: Standard / [E]: EMC Filter

Overview

Fuji Electric has concentrated its technologies to deliver the best-performing inverter on the market. In addition to its basic performance, this model features the following great improvements: support for previously difficult applications due to technical and capability limitations, easier and more user-friendly maintenance, as well as environmental friendliness and safety. The FRENIC-VG series now proudly introduces the inverter as a unit type as well as a stack type.

- **Model variations**

STD
Standard type

- **Major functions**

Detachable keypad · UPAC · Synchronous motor driving · HD/MD/LD Triple ratings
Functional safety STO · Position control · Load compensating control · SMTW 1 2 3 4 Calendar function

- **International standards**

CE · c UL us LISTED · RoHS · KC · DNV·GL

- **Input voltage class/capacity range**

Three-phase - Class 400V / 3.7 to 630kW (HD - High Duty)
Three-phase - Class 200V / 0.75 to 90kW (HD - High Duty)

Scan me or Click me

Features

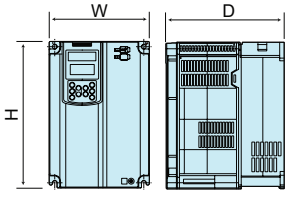
- Overload capability: 150% of rated current for 1min or 200% of rated current for 3.0s
- Powerful: from 0.75 kW to 630 kW in triple rating HD, LD and MD
- Strong: even though in hard environment such as sulfurizing gas, salty environments, dust, humidity, etc.
- Flexible: IM (open and closed loop) and PMSM (open* and closed loop) control
- Torque accuracy: +/- 3%
- Current loop bandwidth: 2000 Hz
- Speed control accuracy: +/- 0,005%
- Control response: 600Hz
- 200 VAC, 400 VAC series
- USB on board, typical field buses and Ethernet based field bus
- Functional safety: STO, SS1, SLS, SBC, SIL2 & PL=d

Dimensions (External)

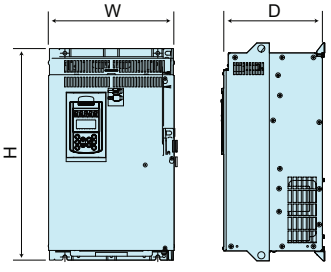
Power supply voltage	Standard motor (kW) HD	MD	LD	Inverter Model	Dimensions (mm) W	H	D	Ingress Protection
3-phase 50/60 Hz Class 400 VAC	3.7	-	-	FRN3.7VG1S-4E	205	300	245	IP20
	5.5	-	-	FRN5.5VG1S-4E				
	7.5	-	-	FRN7.5VG1S-4E				
	11	-	-	FRN11VG1S-4E	250	400		
	15	-	-	FRN15VG1S-4E				
	18.5	-	-	FRN18.5VG1S-4E				
	22	-	-	FRN22VG1S-4E				
	30	-	37	FRN30VG1S-4E	326.2	550	261.3	IP00
	37	-	45	FRN37VG1S-4E				
	45	-	55	FRN45VG1S-4E	361.2	615	276.3	
	55	-	75	FRN55VG1S-4E		675		
	75	-	90	FRN75VG1S-4E		740		
	90	110	110	FRN90VG1S-4E	536.4		321.3	
	110	132	132	FRN110VG1S-4E				
	130	160	160	FRN132VG1S-4E		1000	366.3	
	160	200	200	FRN160VG1S-4E				
	200	220	220	FRN200VG1S-4E	686.4			
	220	-	280	FRN220VG1S-4E				
	280	315	355	FRN280VG1S-4E		1400	445.5	
	315	355	400	FRN315VG1S-4E				
	355	400	450	FRN355VG1S-4E	886.4		446.3	
	400	450	500	FRN400VG1S-4E				
	500	-	630	FRN500VG1S-4E	1006	1550	505.9	
	630	-	710	FRN630VG1S-4E				

Power supply voltage	Motor (kW) HD	LD	Inverter Model	Dimensions (mm) W	H	D	Ingress Protection
3-phase 50/60 Hz Class 200 VAC	0.75	-	FRN0.75VG1S-4E	205	300	245	IP20
	1.5	-	FRN1.5VG1S-4E				
	2.2	-	FRN2.2VG1S-4E				
	3.7	-	FRN3.7VG1S-4E				
	5.5	-	FRN5.5VG1S-4E				
	7.5	-	FRN7.5VG1S-4E				
	11	-	FRN11VG1S-4E	250	400		
	15	-	FRN15VG1S-4E				
	18.5	-	FRN18.5VG1S-4E				
	22	-	FRN22VG1S-4E				
	30	37	FRN30VG1S-4E	326.2	550	261.3	IP00
	37	45	FRN37VG1S-4E	361.2	615	276.3	
	45	55	FRN45VG1S-4E		740		
	55	75	FRN55VG1S-4E				
	75	90	FRN75VG1S-4E	535.8	750	291.3	
	90	110	FRN90VG1S-4E	686.4	800	366.3	

For more detail, please refer to Catalog /Manual



Low capacity



High capacity

Overview

Fuji Electric has concentrated its technologies to deliver the best-performing inverter on the market. In addition to its basic performance, this model features the following great improvements: support for previously difficult applications due to technical and capability limitations, easier and more user-friendly maintenance, as well as environmental friendliness and safety. The FRENIC-VG series now proudly introduces the inverter as a unit type as well as a stack type.

- **Model variations**

STD
Standard type

- **Major functions**

Detachable keypad; UPAC; Synchronous motor driving; Triple ratings (HD/MD/LD); Functional safety STO; Position control; Load compensating control; Calendar function (SMTW 1 2 3 4)

- **International standards**

CE; c UL us LISTED; RoHS; KC; DNV·GL

- **Input voltage class/capacity range**

Stack Type
Three-phase - Class 400V / 30kW to 800kW (MD - Middle Duty), 37 to 1000kW (LD - Low Duty)
Three-phase - Class 690V / 90kW to 459kW (MD - Middle Duty), 110 to 450kW (LD - Low Duty)

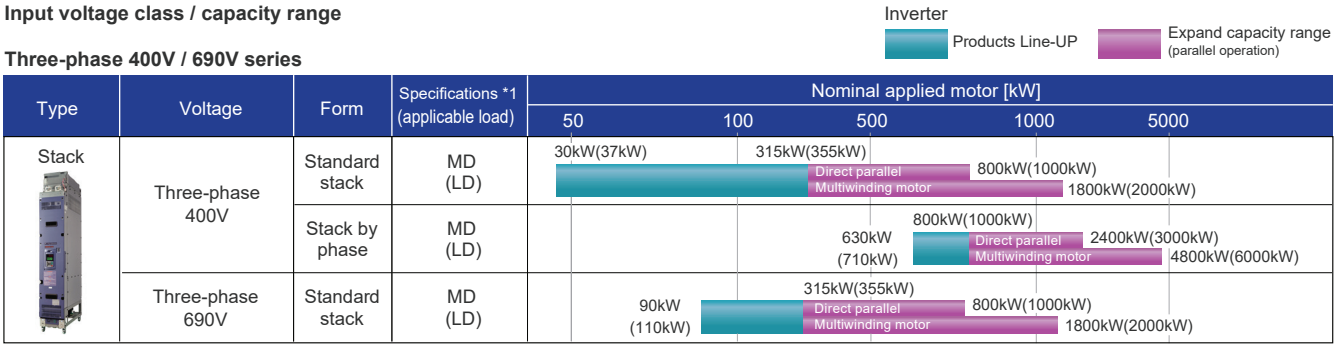
FRENIC-VG
Scan me or Click me

Features

- Overload capability: 150% of rated current for 1min or 200% of rated current for 3.0s
- Powerful: from 0.75 kW to 630 kW in triple rating HD, LD and MD
- Strong: even though in hard environment such as sulfurizing gas, salty environments, dust, humidity, etc.
- Flexible: IM (open and closed loop) and PMSM (open* and closed loop) control
- Torque accuracy: +/- 3%
- Current loop bandwidth: 2000 Hz
- Speed control accuracy: +/- 0,005%
- Control response: 600Hz
- 200 VAC, 400 VAC series
- USB on board, typical field buses and Ethernet based field bus
- Functional safety: STO, SS1, SLS, SBC, SIL2 & PL=d

Input voltage class / capacity range

Three-phase 400V / 690V series



*1 Refer to "Ratings for intended use" on page 6 for specifications (applicable load).

Dimensions and other detail please refer to FRENIC-VG Catalog.
FRENIC-VG Stack Type is an engineering inverter, kindly consult your local Fuji Electric for more information.

PWM CONVERTER *Unit Type* *High Performance Converter*

Overview

FRENIC-eRHC, RHC & RHR series *(Unit Type)*

FRENIC-eRHC & RHC series acts as an Active Front End when used together with an inverter, in which the input current is changed to a sinusoidal wave to significantly suppress the harmonic current enable meeting IEEE 519 standard. On the other hand, the regenerated energy is returned to the power source, promotes energy saving. The FRENIC-RHR only specify for regenerative.

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
Regenerative braking
PF Power Factor near unity

- **International standards**

CE c UL us LISTED RoHS

- **Input voltage class/capacity range**

Refer to table below.

Inverter
Scan me or Click me

Features

Applied Guideline for Suppressing Harmonics

PWM control reduces harmonics current significantly, due to sinusoidal wave at power supply side. According to "Guideline for Suppressing Harmonics by the Users Who Receive High Voltage or Special High Voltage" issued by the Ministry of Economy, Trade and Industry, the converter factor (Ki) can be set to "0" (meaning harmonics occurrence is 0) when combining with the inverter. Thus meeting harmonic mitigation, IEEE 519 Standard.

Possible to reduce power supply facility capacity

Its power-factor control realizes the same phase current as the power-supply phase-voltage. The equipment, thus, can be operated with the power-factor of almost "1." This makes it possible to reduce the power transformer capacity and downsize the other devices, compared with those required without the converter.

Upgraded braking performance

Regenerated energy occurring at highly frequent accelerating and decelerating operation and elevating machine operation is entirely returned to power supply side. Thus, energy saving during regenerative operation is possible. As the current waveform is sinusoidal during regenerative operation, no troubles are caused to the power supply system.

Series	Voltage	Capacity [kW] 5.5 / 22 / 75
FRENIC-eRHC Harmonic Suppression & Regenerative converter	200 V series	5.5 to 22 kW
	400 V series	5.5 to 75 kW

Series	Voltage	Capacity [kW] 30 / 45 / 90 / 630
FRENIC-RHC Harmonic Suppression & Regenerative converter	200 V series	30 to 90 kW
	400 V series	45 to 630 kW

Series	Voltage	Capacity [kW] 5.5 / 22 / 75
FRENIC-RHR Regenerative converter	200 V series	5.5 to 30 kW
	400 V series	5.5 to 75 kW

Applicable inverter: FVR-Micro, FRENIC-Mini, FRENIC-eHVAC, FRENIC-Ace, FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-VG

Continuous regeneration rating at 100%

1 minute regeneration rating: 150% MD (CT) specification
120% LD (VT) specifications **FRENIC-RHC only*

Enhanced protection and maintenance functions

1) Understand past alarm contents by LED or optional multi-function keypad, alarm factor analysis and countermeasures can be easily performed.
2) In the event of a momentary power failure, the gate is shut off so that operation can continue immediately after the power is restored.
3) Predictive signals for overload, fin overheating, life expectancy, etc. can be used to issue warnings before the converter trips.

Enhanced network compatibility, the FRENIC-RHC series can be connected to MICREX-SX and CC-Link master devices. (option)

Consult your local Fuji Electric for more detail.

RHC-D Series

Converter Stack Type

RHC-D series is the active front-end of Fuji Electric in stack type configuration.
All advantages of RHC-C series but in stack type are:

- Rating available in MD and LD
- A capacity range from 132 kW to 3 MW
- Two configurations available: - Standard stack / Phase stack
- Able to work with isolated and non-isolated transformers
- SiC Technology
- 400 VAC, 690 VAC series

RHF-D Series

Filter Stack Type

RHF series is the compact solution and dedicated filter for the PWM converter (RHC-D) in stack type.
Charging circuit, harmonic filter and boosting reaction all in one.

- Rating available in MD and LD
- A capacity range from 160 kW to 1.36 MW
- Two configurations available: Standard stack / Phase stack
- 400 VAC, 690 VAC series

RHD-D series

Diode Rectifier Stack Type

- 6 pulse drive
- Harmonic mitigation: Sinusoidal - Wave Regenerative Header, 12 pluses layout, etc.
- 400 VAC, 690 VAC series

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
Regenerative braking
PF Power Factor near unity

- **International standards**

CE
c UL us LISTED
RoHS
KC

Input voltage class / capacity range

Inverter: Products Line-up / Expand capacity range (parallel operation)
Converter: Products Line-up / Expand capacity range (parallel operation)

Three-phase 400V series

Type	Series name	Form	Specifications *1 (applicable load)	Nominal applied motor [kW] (50 / 100 / 500 / 1000 / 5000)
Stack 	Inverter (FRENIC-VG)	Standard stack	MD (LD)	30kW(37kW) – 315kW(355kW) Direct parallel Multiwinding motor – 800kW(1000kW) – 1800kW(2000kW)
		Stack by phase	MD (LD)	630kW (710kW) – 800kW(1000kW) Direct parallel Multiwinding motor – 2400kW(3000kW) – 4800kW(6000kW)
	PWM Converter (RHC-D)	Standard stack	MD (LD)	132kW(160kW) – 315kW(355kW) Isolation-less Isolation – 800kW(1000kW) – 1800kW(2000kW)
		Stack by phase	MD (LD)	630kW (710kW) – 800kW(1000kW) Isolation-less Isolation – 2400kW(3000kW) – 4800kW(6000kW)
	Filter stack (RHF-D)	Standard stack	-	160kW – 355kW
	Diode rectifier (RHD-D)	Standard stack	MD (LD)	200kW (220kW) – 315kW(355kW) Parallel connection – 1450kW(1640kW)

Three-phase 690V series

Type	Series name	Form	Specifications *1 (applicable load)	Nominal applied motor [kW] (50 / 100 / 500 / 1000 / 5000)
Stack 	Inverter (FRENIC-VG)	Standard stack	MD (LD)	90kW (110kW) – 315kW(355kW) Direct parallel Multiwinding motor – 800kW(1000kW) – 1800kW(2000kW)
	PWM Converter (RHC-D)	Standard stack	MD (LD)	132kW (160kW) – 315kW(355kW) Isolation-less Isolation – 800kW(1000kW) – 1800kW(2000kW)
	Filter stack (RHF-D)	Standard stack	-	160kW – 355kW
	Diode rectifier (RHD-D)	Standard stack	MD (LD)	220kW (250kW) – 450kW Parallel connection – 2000kW

Dimensions and other detail please refer to FRENIC-VG Catalog.

Consult your local Fuji Electric for more detail.

Overview

ecoWAVE Advance-Line Passive Harmonic Filters represent an economical solution to the challenge of load-applied harmonics mitigation in three-phase power systems. It increases the reliability and service life of electric installations, help utilize electric system the key to meet power quality standards such as IEEE 519. Guarantee result with Fuji Electric inverter.

Achieve 5%* THDi

** Achieve 5% THDi for diode rectifier without DC-link choke and thyristor rectifier.*

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
≤ 5% THDi ≤ 5% THDi at rating
PF Improve Power Factor
TDJ Module Trap capacitor disconnector

- **International standards**

CE
c UL us LISTED
RoHS
c RU us (depending on configuration)

- **Input voltage class / capacity range**

Three-phase - Class 400V / 50Hz / 0.75 to 250kW

ecoWAVE (AL1M)
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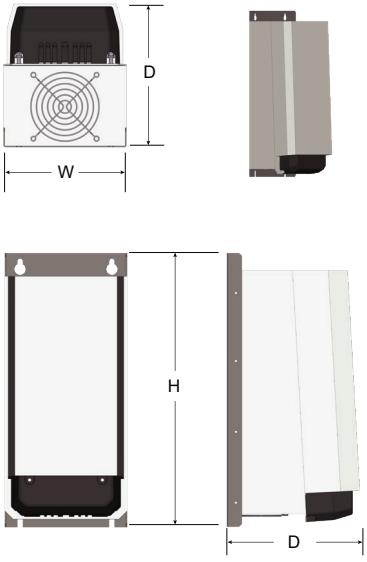
Features

- IP20 ingress protection.
- Overload capability of 1.6x rated current for 1 minute, once per hour.
- Ambient temperature range at – 25°C to +45°C fully operational.
- Flammability corresponding to UL 94 V-2.
- Filter design corresponding to UL 61800-5-1, EN 61800-5-1.
- Chokes design corresponding to EN 61558-2-20 or EN 60076-6.
- Earthing System come with TN, TT, IT.
- Mean Time Between Failures (MTBF) 45°C/415 V (Mil-HB- 217F) at >200,000 hours
- Short-Circuit Current Rating (SCCR) of 100kA
- Overvoltage category based on OV III (IEC 60664-1 / UL 61800-5-1)
- Enable capacitor isolation (TDJ module) and improve system power factor when inverter is not running

Dimensions (External)

Rated Voltage	Nominal applied motor [kW] ***	Filter	Outside dimensions (mm)		
			W	H	D
50Hz 3-Phase 380-415V Class	0.75	FN0.75AL1M-4G5 *	160	360	185
	1.5	FN1.5AL1M-4G5 *			
	2.2	FN2.2AL1M-4G5 *			
	3.7	FN3.7AL1M-4G5 *	180	425	206
	5.5	FN5.5AL1M-4G5 *	210	483	221
	7.5	FN7.5AL1M-4G5 *			
	11	FN11AL1M-4G5	260	560	252
	15	FN15AL1M-4G5			
	18.5	FN18.5AL1M-4G5			
	22	FN22AL1M-4G5	290	750	319
	30	FN30AL1M-4G5			
	37	FN37AL1M-4G5			
	45	FN45AL1M-4G5			
	55	FN55AL1M-4G5			
	75	FN75AL1M-4G5	353	960	386
	90	FN90AL1M-4G5			
	110	FN110AL1M-4G5	462	1150	456
	132	FN132AL1M-4G5 **			
	160	FN160AL1M-4G5 **			
	200	FN200AL1M-4G5 **			
	250	FN250AL1M-4G5 **	550	1400	555



* Filter rating which does not require forced cooling or fan module.

** Filter rating which does not require RC damping module for rectifiers with EMI filter.

*** Motor drive input current without harmonic filter.

Overview

ecoWAVE Advance-Line Passive Harmonic Filters represent an economical solution to the challenge of load-applied harmonics mitigation in three-phase power systems. It increases the reliability and service life of electric installations, help utilize electric system the key to meet power quality standards such as IEEE 519. Guarantee result with Fuji Electric inverter.

Achieve 5%* THDi

* Achieve 5% THDi for diode rectifier without DC-link choke and thyristor rectifier.

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
≤ 5% THDi ≤ 5% THDi at rating
PF Improve Power Factor
TDJ Module Trap capacitor disconnector

- **International standards**

CE
c UL us LISTED
RoHS
c RCM us
(depending on configuration)

- **Input voltage class / capacity range**

Three-phase - Class 400V / 60Hz / 0.75 to 220kW (1 to 300HP)

ecoWAVE (AL1M)
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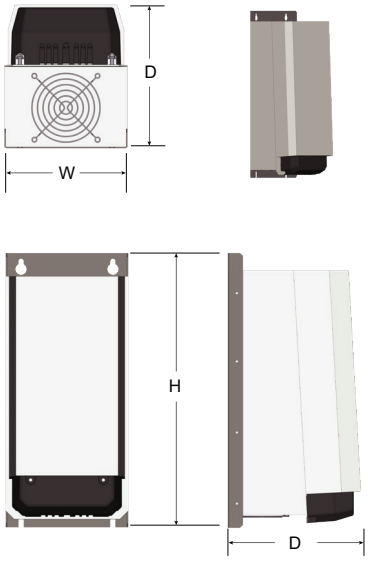
Features

- IP20 ingress protection.
- Overload capability of 1.6x rated current for 1 minute, once per hour.
- Ambient temperature range at – 25°C to +45°C fully operational.
- Flammability corresponding to UL 94 V-2.
- Filter design corresponding to UL 61800-5-1, EN 61800-5-1.
- Chokes design corresponding to EN 61558-2-20 or EN 60076-6.
- Earthing System come with TN, TT, IT.
- Mean Time Between Failures (MTBF) 45°C/415 V (Mil-HB- 217F) at >200,000 hours
- Short-Circuit Current Rating (SCCR) of 100kA
- Overvoltage category based on OV III (IEC 60664-1 / UL 61800-5-1)
- Enable capacitor isolation (TDJ module) and improve system power factor when inverter is not running

Dimensions (External)

Rated Voltage	Nominal*** applied motor		Filter	Outside dimensions (mm)		
	[kW]	[HP]		W	H	D
60Hz 3-Phase 440-480V Class	0.75	1	FN0.75AL1M-4G6 *	160	360	185
	1.5	2	FN1.5AL1M-4G6 *			
	2.2	3	FN2.2AL1M-4G6 *			
	3.7	5	FN3.7AL1M-4G6 *	180	425	206
	5.5	7 1/2	FN5.5AL1M-4G6 *			
	7.5	10	FN7.5AL1M-4G6 *	210	483	221
	11	15	FN11AL1M-4G6			
	15	20	FN15AL1M-4G6	260	560	252
	18.5	25	FN18.5AL1M-4G6			
	22	30	FN22AL1M-4G6			
	30	40	FN30AL1M-4G6	290	750	319
	37	50	FN37AL1M-4G6			
	45	60	FN45AL1M-4G6			
	55	75	FN55AL1M-4G6	340	752	434
	75	100	FN75AL1M-4G6			
	90	125	FN90AL1M-4G6	353	960	386
	110	150	FN110AL1M-4G6			
	132	200	FN132AL1M-4G6 **	462	1150	456
	160	250	FN160AL1M-4G6 **			
	220	300	FN220AL1M-4G6 **			



* Filter rating which does not require forced cooling or fan module.

** Filter rating which does not require RC damping module for rectifiers with EMI filter.

Motor drive input current without harmonic filter.

Overview

ecoWAVE Econ-Line Passive Harmonic Filters represent an economical solution to the challenge of load-applied harmonics mitigation in three-phase power systems. It increases the reliability and service life of electric installations, help utilize electric system, the key to meet power quality standards such as IEEE 519. Guarantee result* with Fuji Electric inverter.

Achieve 10%* THDi

* Inverter must incorporate with its DC Reactor.

* Achieve 10% THDi for diode rectifier with DC-link choke and thyristor rectifier.

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
≤ 10% THDi ≤ 10% THDi at rating
PF Improve Power Factor
TDJ Module Trap capacitor disconnector

- **International standards**

CE
c UL us LISTED
RoHS
c RU us
(depending on configuration)

- **Input voltage class / capacity range**

Three-phase - Class 400V / 50Hz / 3.7 to 160kW

ecoWAVE (EL1M)
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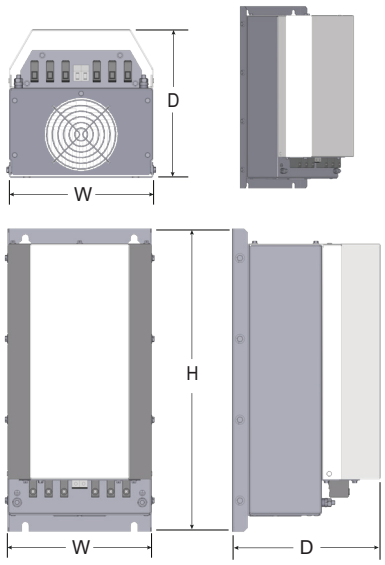
Features

- IP20 ingress protection.
- Overload capability of 1.6x rated current for 1 minute, once per hour.
- Ambient temperature range at – 25°C to +45°C fully operational.
- Flammability corresponding to UL 94 V-2.
- Filter design corresponding to UL 61800-5-1, EN 61800- 5-1.
- Chokes design corresponding to EN 61558-2-20 or EN 60076-6.
- Earthing System come with TN, TT, IT.
- Mean Time Between Failures (MTBF) 45°C/415 V (Mil-HB- 217F) at >200,000 hours
- Short-Circuit Current Rating (SCCR) of 100kA
- Overvoltage category based on OV III (IEC 60664-1 / UL 61800- 5-1)
- Enable capacitor isolation (TDJ module) and improve system power factor when inverter is not running

Dimensions (External)

Rated Voltage	Nominal** applied motor [kW]	Filter*	Outside dimensions (mm)		
			W	H	D
50Hz 3-Phase 380-415V Class	0.75	-	-	-	-
	1.5	-			
	2.2	-			
	3.7	FN3.7EL1M-4G5 *	185	390	190
	5.5	FN5.5EL1M-4G5 *			
	7.5	FN7.5EL1M-4G5 *			
	11	FN11EL1M-4G5	250	455	230
	15	FN15EL1M-4G5			
	18.5	FN18.5EL1M-4G5			
	22	FN22EL1M-4G5			
	30	FN30EL1M-4G5	280	520	248
	37	FN37EL1M-4G5			
	45	FN45EL1M-4G5		580	
	55	FN55EL1M-4G5			
	75	FN75EL1M-4G5	450	700	385
	90	FN90EL1M-4G5			
	110	FN110EL1M-4G5			
	132	FN132EL1M-4G5			
	160	FN160EL1M-4G5			



* Filter to be selected by system voltage and load (motor drive) power. Note: the harmonic filter will reduce RMS input current. Therefore, filter selection by current rating, as it is common for EMC/EMI filters, is not recommended.

Overview

ecoWAVE Econ-Line Passive Harmonic Filters represent an economical solution to the challenge of load-applied harmonics mitigation in three-phase power systems. It increases the reliability and service life of electric installations, help utilize electric system, the key to meet power quality standards such as IEEE 519. Guarantee result* with Fuji Electric inverter.

* Inverter must incorporate with its DC Reactor.

Achieve 10%* THDi

* Achieve 10% THDi for diode rectifier with DC-link choke and thyristor rectifier.

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
≤ 10% THDi ≤ 10% THDi at rating
PF Improve Power Factor
TDJ Module Trap capacitor disconnector

- **International standards**

CE
c UL us LISTED
RoHS
c RCM us
(depending on configuration)

- **Input voltage class / capacity range**

Three-phase - Class 400V / 60Hz / 3.7 to 160kW (5 to 250HP)

ecoWAVE (EL1M)
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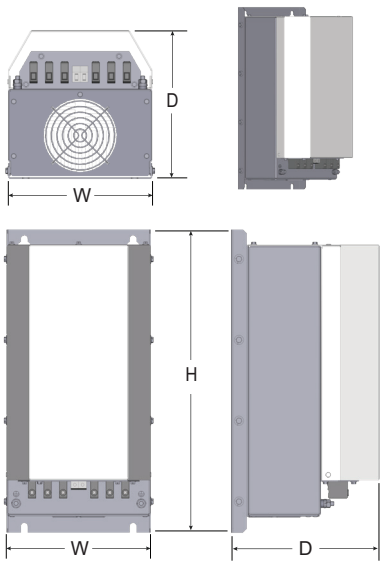
Features

- IP20 ingress protection.
- Overload capability of 1.6x rated current for 1 minute, once per hour.
- Ambient temperature range at – 25°C to +45°C fully operational.
- Flammability corresponding to UL 94 V-2.
- Filter design corresponding to UL 61800-5-1, EN 61800-5-1.
- Chokes design corresponding to EN 61558-2-20 or EN 60076-6.
- Earthing System come with TN, TT, IT.
- Mean Time Between Failures (MTBF) 45°C/415 V (Mil-HB- 217F) at >200,000 hours
- Short-Circuit Current Rating (SCCR) of 100kA
- Overvoltage category based on OV III (IEC 60664-1 / UL 61800- 5-1)
- Enable capacitor isolation (TDJ module) and improve system power factor when inverter is not running

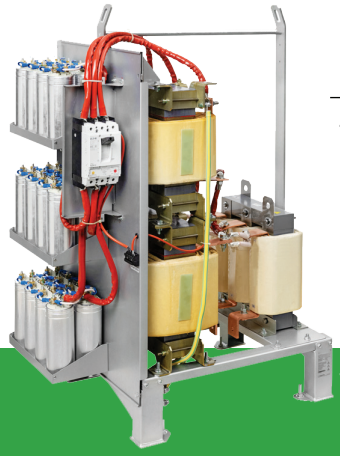
Dimensions (External)

Rated Voltage	Nominal** applied motor [kW]	[HP]	Filter*	Outside dimensions (mm) W	H	D
50Hz 3-Phase 380-480V Class	0.75	1	-	-	-	-
	1.5	2	-			
	2.2	3	-			
	3.7	5	FN3.7EL1M-4G6 *	185	390	190
	5.5	7 1/2	FN5.5EL1M-4G6 *			
	7.5	10	FN7.5EL1M-4G6 *			
	11	15	FN11EL1M-4G6	250	455	230
	15	20	FN15EL1M-4G6			
	18.5	25	FN18.5EL1M-4G6			
	22	30	FN22EL1M-4G6	280	520	248
	30	40	FN30EL1M-4G6			
	37	50	FN37EL1M-4G6			
	45	60	FN45EL1M-4G6		580	
	55	75	FN55EL1M-4G6			
	75	100	FN75EL1M-4G6	450	700	385
	90	125	FN90EL1M-4G6			
	110	150	FN110EL1M-4G6			
	132	200	FN132EL1M-4G6			
	160	250	FN160EL1M-4G6			



* Filter to be selected by system voltage and load (motor drive) power. Note: the harmonic filter will reduce RMS input current. Therefore, filter selection by current rating, as it is common for EMC/EMI filters, is not recommended.

** In case of filter accurate rating, please refer to Horsepower (HP) rating.



Overview

ecoWAVE Advance-Line Passive Harmonic Filters is a skid type engineering filter solution to challenge larger load harmonics mitigation in three-phase power systems. It increases the reliability and service life of electric installations, help utilize electric system, the key to meet power quality standards such as IEEE 519. Guarantee result with Fuji Electric inverter.

Achieve 5%* THDi

* Achieve 5% THDi for diode rectifier without DC-link choke and thyristor rectifier.

- **Model variations**
  - Engineering type
- **Major functions**
  - IEEE 519 Harmonic mitigation
  - ≤ 5% THDi ≤ 5% THDi at rating
  - PF Improve Power Factor
  - TDJ Module Trap capacitor disconnector
- **International standards**
  - CE
  - cULus LISTED
  - RoHS
  - cRUus (depending on configuration)

- **Input voltage class / capacity range**

  Three-phase - Class 400V / 50Hz / 250 to 500kW

ecoWAVE (AL1S)

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Features

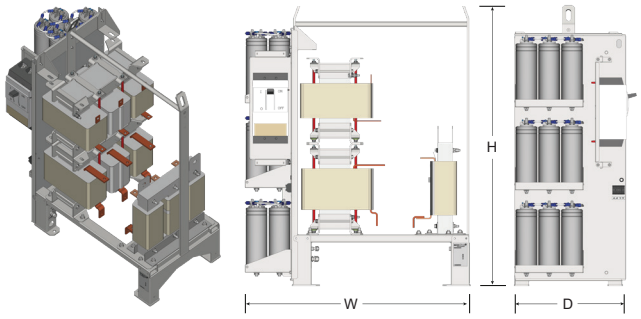
- IP00 open type (engineering filter)
- Overload capability of 1.6x rated current for 1 minute, once per hour.
- Ambient temperature range at – 25°C to +45°C fully operational.
- Flammability corresponding to UL 94 V-2.
- Filter design corresponding to UL 61800-5-1, EN 61800-5-1.
- Chokes design corresponding to EN 60076-6.
- Earthing System come with TN, TT, IT.
- Mean Time Between Failures (MTBF) 45°C/415 V (Mil-HB- 217F) at >200,000 hours
- Short-Circuit Current Rating (SCCR) of 100kA
- Overvoltage category based on OV III (IEC 60664-1 / UL 61800- 5-1)
- Enable capacitor isolation (TDJ module) and improve system power factor when inverter is not running

Dimensions (External)

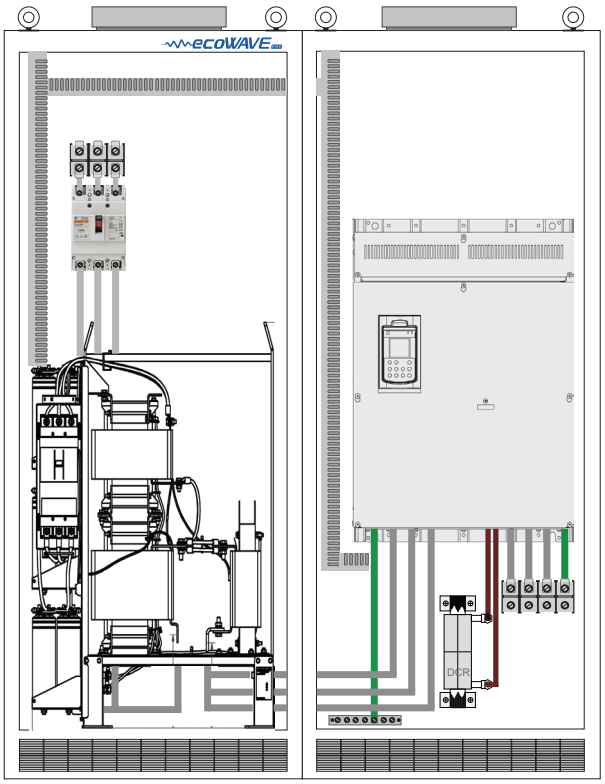
Rated Voltage	Nominal applied motor [kW] ***	Filter	Outside dimensions (mm)		
			W	H	D
50Hz 3-Phase 380-415V Class	250	FN250AL1S-4G5	890	1120	505
	315	FN315AL1S-4G5			
	355	FN355AL1S-4G5	1060		
	400	FN400AL1S-4G5	890		557
	500	FN500AL1S-4G5	1060		

*** Motor drive input current without harmonic filter.

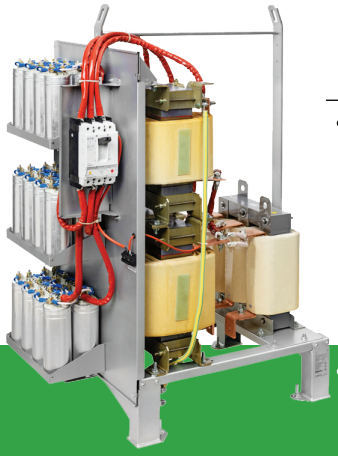
NOTE: Enclosure ventilation fan is required for these engineering filter. Recommended installation on top of cabinet.



* consult your local Fuji Electric for more informations.



Example of inverter panel integrated with the engineering filter.



Overview

ecoWAVE Advance-Line Passive Harmonic Filters is a skid type engineering filter solution to challenge larger load harmonics mitigation in three-phase power systems. It increases the reliability and service life of electric installations, help utilize electric system, the key to meet power quality standards such as IEEE 519. Guarantee result with Fuji Electric inverter.

Achieve 5%* THDi

* Achieve 5% THDi for diode rectifier without DC-link choke and thyristor rectifier.

- **Model variations**
  - Engineering type
- **Major functions**
  - IEEE 519 Harmonic mitigation
  - ≤ 5% THDi ≤ 5% THDi at rating
  - PF Improve Power Factor
  - MCCB Circuit breaker disconnector
- **International standards**
  - CE
  - c UL us LISTED
  - RoHS
  - c RU us (depending on configuration)

- **Input voltage class / capacity range**

  Three-phase - Class 400V / 60Hz / 260 to 450W (350 to 600HP)

ecoWAVE (AL1S)

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Features

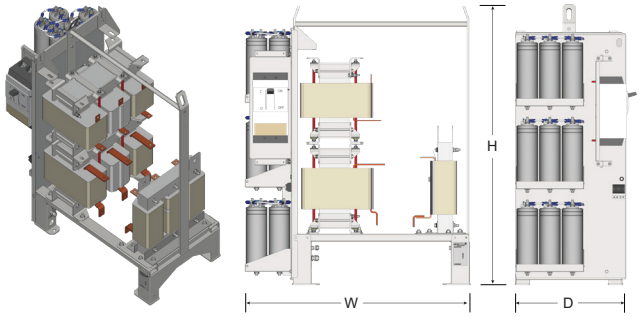
- IP00 open type (engineering filter)
- Overload capability of 1.6x rated current for 1 minute, once per hour.
- Ambient temperature range at – 25°C to +45°C fully operational.
- Flammability corresponding to UL 94 V-2.
- Filter design corresponding to UL 61800-5-1, EN 61800-5-1.
- Chokes design corresponding to EN 60076-6.
- Earthing System come with TN, TT, IT.
- Mean Time Between Failures (MTBF) 45°C/415 V (Mil-HB- 217F) at >200,000 hours
- Short-Circuit Current Rating (SCCR) of 100kA
- Overvoltage category based on OV III (IEC 60664-1 / UL 61800-5-1)
- Enable capacitor isolation (TDJ module) and improve system power factor when inverter is not running

Dimensions (External)

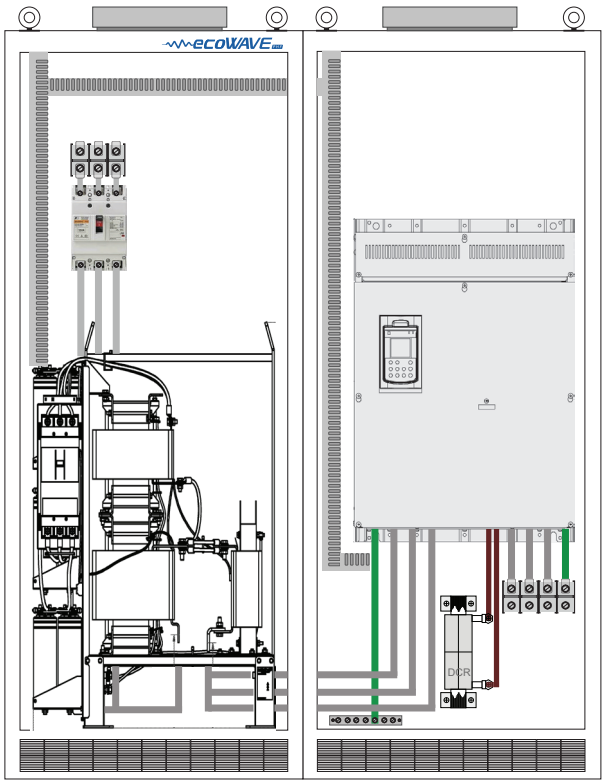
Rated Voltage	Nominal applied motor [kW] ***	Filter	Outside dimensions (mm)		
			W	H	D
60Hz 3-Phase 380-415V Class	260/350	FN260AL1S-4G6	890	1120	505
	300/400	FN300AL1S-4G6			
	335/450	FN335AL1S-4G6	1060		
	370/500	FN370AL1S-4G6	890	1320	557
	450/600	FN450AL1S-4G6	1060		

*** Motor drive input current without harmonic filter

NOTE: Enclosure ventilation fan is required for these engineering filter. Recommended installation on top of cabinet.



* consult your local Fuji Electric for more informations.



Example of inverter panel integrated with the engineering filter.

IORA 3000 *Active Harmonic Filter*

Overview

IORA 3000 Active Harmonic Filter measures the level of current harmonics in the supply line and eliminates it by generating counter harmonics in real time, using state of the art technology. It is available in ratings up to 600 Amps, the highest in the world. A higher attenuation of up to 96% of individual harmonics is possible. It employs high speed IGBTs in the power circuit and offers PF compensation, both leading and lagging.
It helps in complying with IEEE 519 power quality standard.

Achieve Below 5%* THDi

- **Model variations**

STD
Standard type

- **Major functions**

IEEE 519 Harmonic mitigation
≤ 5% THDi ≤ 5% THDi at rating
PF Improve Power Factor
MCCB Circuit breaker disconnector

- **International standards**

CE
c UL us LISTED
RoHS
intertek

- **Input voltage class / capacity range**

Three-phase - Class 400V / 50Hz, 60Hz / 60 to 800A

IORA 3000
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Features

• IP21 ingress protection (IP31, IP51 Optional).
• Ambient temperature range at 0°C to +40°C fully operational.
• Applicable Industry standard for 6-pulse rectifier & inverter and all system harmonic.
• Deliver result actively and maintain target THDi even at partial load performance.
• Parallel combination of up to 4 units of same power rating (800A x 4 = 3200A).
• Response time < 10ms.
• Modular construction, most unique design concept.
• Based on Floating point 32 bit DSP.
• Selective harmonic elimination methods. CT can be connected in load as well as in source.
• Works up to 690 VAC (Optional).
• Ethernet based Remote monitoring and 7 inch SVGA touch screen display.
• Internal CANopen communication.
• Employs high speed IGBTs in power circuit.
• Closed loop active filter with source current sensing.
• High attenuation up to 96% of individual harmonics.
• Programmable selective harmonic elimination.
• PF compensation, leading as well as lagging.
• Load balancing.
• Helps in achieving the compliance with power quality regulations like IEEE 519 standard.
• IEC/EN 62040-2 category C3.

The IORA3000 come in rating of;
60, 100, 200, 300, 400, 600 & 800 amp.
Kindly consult your local Fuji Electric for other larger rating.

Dimensions and other detail please refer to IORA3000 Catalog.
IORA3000 is an engineering active harmonic filter, kindly consult your local Fuji Electric for more information.

■ Optional Keypad

■ TP-E1

Type: 7 segment LED

Applicable inverter: FRENIC-Mini

Optional keypad enable external mounting on panel, inverter body mounting is unable.
The remote control extension cable is required.

■ TP-E1U

Type: 7 segment LED, USB (mini-B)

Applicable inverter: FRENIC-Mini, FRENIC-Ace

Optional keypad enables external mounting on panel, inverter body mounting is unable.
The remote control extension cable is required.

■ TP-E2

Type: 7 segment LED, USB (mini-B)

Applicable inverter: FRENIC-MEGA

Optional keypad enable inverter body mount or panel mount.
In case of panel mount, the remote control extension cable is required.

■ TP-A1-E2C

Type: Multi-functional HMI LCD display complete with up/down/right/left cursor key.

Applicable inverter: FRENIC-Ace, FRENIC-eHVAC

Optional keypad enables external mounting on panel, inverter body mounting is unable.
The remote control extension cable is required.

■ TP-A2SW

Type: Multi-functional HMI LCD display complete with up/down/right/left cursor key. Equipped with USB (mini-B)

Applicable inverter: FRENIC-MEGA

Optional keypad enable inverter body mount or panel mount.
In case of panel mount, the remote control extension cable is required.

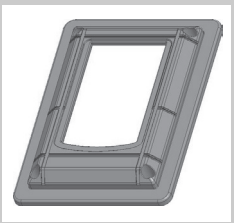
Support FRENIC Mobile Loader, Bluetooth™

■ CB-□S

Type: RS-485 communication cable for keypad remote control extension, equipped with RJ-45 connector.

Applicable inverter: FRENIC-Mini, FRENIC-eHVAC, FRENIC-Ace, FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-VG

Optional remote control extension cable for keypad external mounting on panel.
Cable come in 1m, 3m and 5m. Model: **CB-1S**, **CB-3S** and **CB-5S**.



■ CTP-A1

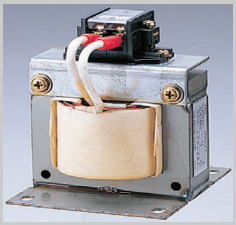
Type: IP55 Keypad mounting kit

Applicable Keypad:

- **TP-E2**
- **TP-A1-E2C**
- **TP-A2SW**
- **TP-A1** (FRENIC-HVAC / AQUA standard keypad)

Optional IP55 Keypad mounting kit for keypad external mounting on panel.
Consult your local Fuji Electric for more detail.

DC Reactor



DCR4

Type: DC Reactor

Applicable inverter: FVR-Micro, FRENIC-Mini, FRENIC-eHVAC, FRENIC-Ace, FRENIC-MEGA, FRENIC-VG

Optional DC Reactor specifications;
- DC Reactors mitigate harmonics provide harmonic attenuation and enable compliant with IEC/EN 61000-3-2 & IEC/EN 61000-3-12 (applicable building standard).
- DC Reactor has DC with a superimposed ripple current, so the iron losses are lower.

Supply Voltage	Rating (kW)	DCR Model	Dimensions (mm)		
			W	H	D
3-phase 50/60 Hz Class 400 VAC	0.4	**DCR4-0.4**	66	94	90
	0.75	**DCR4-0.75**	66	94	90
	1.5	**DCR4-1.5**	66	94	90
	2.2	**DCR4-2.2**	86	110	100
	3.7	**DCR4-3.7**	86	110	100
	5.5	**DCR4-5.5**	86	110	100
	7.5	**DCR4-7.5**	111	130	100
	11	**DCR4-11**	111	137	100
	15	**DCR4-15**	146	168	120
	18.5	**DCR4-18.5**	146	171	120
	22	**DCR4-22A**	146	171	120
	30	**DCR4-30B**	152	130	157
	● 37	**DCR4-37B**	171	150	150
	● 37	**DCR4-37C**	210	125	101
	● 45	**DCR4-45B**	171	150	165
	● 45	**DCR4-45C**	210	125	106
	● 55	**DCR4-55B**	171	150	170
	● 55	**DCR4-55C**	255	145	96
	■ 75	**DCR4-75C**	255	145	106
	■ 90	**DCR4-90C**	255	145	116
	■ 110	**DCR4-110C**	300	160	116
	■ 132	**DCR4-132C**	300	160	126
	■ 160	**DCR4-160C**	350	190	131
	■ 200	**DCR4-200C**	350	190	141
	■ 220	**DCR4-220C**	350	190	146
	■ 250	**DCR4-250C**	350	190	161
	■ 280	**DCR4-280C**	350	190	161
	■ 315	**DCR4-315C**	400	225	146
	■ 355	**DCR4-355C**	400	225	156
	■ 400	**DCR4-400C**	445	245	145
	■ 450	**DCR4-450C**	440	245	150
	■ 500	**DCR4-500C**	445	245	165
	■ 560	**DCR4-560C**	270	480	203
	■ 630	**DCR4-630C**	285	480	203
	■ 710	**DCR4-710C**	340	480	295

● Selectable type B or type C reactor.
Input power factor of DCR2/4-□□/□□A/□□B; about 90 to 95%
Compliant with IEC/EN 61000-3-2 & IEC/EN 61000-3-12.
Input power factor of DCR2/4-□□C: about 86 to 90%

■ It is necessary to include the optional DC Reactor for inverter 75kW and above rating as a standard accessory unless the inverter come with or built-in DC Reactor (eg. FRENIC-HVAC/AQUA)

Supply Voltage	Rating (kW)	DCR Model	Dimensions (mm)		
			W	H	D
3-phase 50/60 Hz Class 200 VAC	0.2	**DCR2-0.2**	66	94	90
	0.4	**DCR2-0.4**	66	94	90
	0.75	**DCR2-0.75**	66	94	90
	1.5	**DCR2-1.5**	66	94	90
	2.2	**DCR2-2.2**	86	110	100
	3.7	**DCR2-3.7**	86	110	100
	5.5	**DCR2-5.5**	111	130	100
	7.5	**DCR2-7.5**	111	130	100
	11	**DCR2-11**	111	137	100
	15	**DCR2-15**	146	180	120
	18.5	**DCR2-18.5**	146	180	120
	22	**DCR2-22A**	146	180	120
	30	**DCR2-30B**	152	130	156
	37	**DCR2-37C**	210	150	151
	● 45	**DCR2-45B**	171	150	166
	● 45	**DCR2-45C**	210	125	106
	● 55	**DCR2-55B**	190	210	131
	● 55	**DCR2-55C**	255	145	96
	■ 75	**DCR2-75C**	255	145	106
	■ 90	**DCR2-90C**	255	145	116
	■ 110	**DCR2-110C**	300	160	116

● Selectable type B or type C reactor.
Input power factor of DCR2/4-□□/□□A/□□B; about 90 to 95%
Compliant with IEC/EN 61000-3-2 & IEC/EN 61000-3-12.
Input power factor of DCR2/4-□□C: about 86 to 90%

■ It is necessary to include the optional DC Reactor for inverter 75kW and above rating as a standard accessory unless the inverter come with or built-in DC Reactor (eg. FRENIC-HVAC/AQUA)

AC Reactor

ACR □ - □□□

Type: AC Reactor

Applicable inverter: FVR-Micro, FRENIC-Mini, FRENIC-eHVAC, FRENIC-Ace, FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-VG

Optional AC Reactor specifications;
- have the significant advantage of protecting the entire inverter from power system surges and transients.
- can prevent overvoltage trips, increase the reliability and life span of the inverter, improve total power factor, and reduce nuisance tripping.

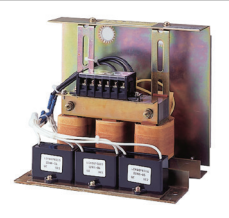
Supply Voltage	Rating (kW)	DCR Model	Dimensions (mm)		
			W	H	D
3-phase 50/60 Hz Class 400 VAC	0.75	**ACR4-0.75A**	120	85	90
	1.5	**ACR4-1.5A**	125	85	100
	2.2	**ACR4-2.2A**	125	95	100
	3.7	**ACR4-3.7A**	125	95	100
	5.5	**ACR4-5.5A**	125	95	115
	7.5	**ACR4-7.5A**	125	95	115
	11	**ACR4-11A**	180	115	110
	15	**ACR4-15A**	180	137	110
	18.5	**ACR4-18.5A**	180	137	110
	22	**ACR4-22A**	180	137	110
	37	**ACR4-37**	190	190	120
	55	**ACR4-55**	190	190	120
	75	**ACR4-75**	190	190	126
	110	**ACR4-110**	250	245	136
	132	**ACR4-132**	250	250	146
	220	**ACR4-220**	320	300	150
	280	**ACR4-280**	380	300	150
	355	**ACR4-355**	380	300	150
	450	**ACR4-450**	460	490	290
	500	**ACR4-500**	480	380	420
	630	**ACR4-630**	510	390	420

NOTE: It is not necessary to use it except when a particularly stable power supply is required, such as direct current bus connection operation (PN connection operation). Use a DC reactor (DCR) for harmonic countermeasures.

Supply Voltage	Rating (kW)	ACR Model	Dimensions (mm)		
			W	H	D
3-phase 50/60 Hz Class 200 VAC	0.4	**ACR2-0.4A**	120	115	90
	0.75	**ACR2-0.75A**	120	115	100
	1.5	**ACR2-1.5A**	120	115	100
	2.2	**ACR2-2.2A**	120	115	100
	3.7	**ACR2-3.7A**	125	125	100
	5.5	**ACR2-5.5A**	125	125	115
	7.5	**ACR2-7.5A**	125	95	115
	11	**ACR2-11A**	125	95	125
	15	**ACR2-15A**	180	115	110
	18.5	**ACR2-18.5A**	180	115	110
	22	**ACR2-22A**	180	115	110
	37	**ACR2-37**	190	190	120
	55	**ACR2-55**	190	190	120
	75	**ACR2-75**	250	250	120
	90	**ACR2-90**	285	210	158
	110	**ACR2-110**	280	270	138

NOTE: It is not necessary to use it except when a particularly stable power supply is required, such as direct current bus connection operation (PN connection operation). Use a DC reactor (DCR) for harmonic countermeasures.

■ Output Circuit Filter (OFL)



■ Output circuit filter (OFL- □□□ - 4A)

Type: Output circuit filter

Applicable inverter: FVR-Micro, FRENIC-Mini, FRENIC-eHVAC, FRENIC-Ace, FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-VG

Optional OFL specifications;
- Suppresses the surge voltage (micro-surge) that occurs at the motor connection end.
- Suppresses high-frequency leakage current between lines to prevent inverter overheating and overcurrent tripping
- No carrier frequency restrictions.
- It can also be applied to vector control inverters (auto tuning is possible).

Supply Voltage	Rating (kW)	OFL Model
3-phase 50/60 Hz Class 400 VAC	0.4	**OFL-0.4-4A**
	1.5	**OFL-1.5-4A**
	3.7	**OFL-3.7-4A**
	7.5	**OFL-7.5-4A**
	15	**OFL-15-4A**
	22	**OFL-22-4A**
	30	**OFL-30-4A**
	37	**OFL-37-4A**
	45	**OFL-45-4A**
	55	**OFL-55-4A**
	75	**OFL-75-4A**
	90	**OFL-90-4A**
	110	**OFL-110-4A**
	132	**OFL-132-4A**
	160	**OFL-160-4A**
	200	**OFL-200-4A**
	220	**OFL-220-4A**
	280	**OFL-280-4A**
	315	**OFL-315-4A**
	355	**OFL-355-4A**
	400	**OFL-400-4A**
	450	**OFL-450-4A**
	500	**OFL-500-4A**
	630	**OFL-630-4A**

NOTE: OFL-30-4A and higher models have a reactor, resistor, and condenser. The condenser is placed separately.
(Not included in the approximate mass.)
In addition, the reactor and resistor / capacitor are shipped as a set when order.

- OFL-□□□-4A is recommended for applications that do not require sine wave conversion due to carrier frequency limitations.

Supply Voltage	Rating (kW)	OFL Model
3-phase 50/60 Hz Class 400 VAC	0.4	**OFL-0.4-4**
	1.5	**OFL-1.5-4**
	3.7	**OFL-3.7-4**
	7.5	**OFL-7.5-4**
	15	**OFL-15-4**
	22	**OFL-22-4**
	30	**OFL-30-4**
	37	**OFL-37-4**
	45	**OFL-45-4**
	55	**OFL-55-4**
	75	**OFL-75-4**
	90	**OFL-90-4**
	110	**OFL-110-4**
	132	**OFL-132-4**
	160	**OFL-160-4**
	200	**OFL-200-4**
	220	**OFL-220-4**

- The output voltage waveform of the inverter is converted to a sine wave.
(It also suppresses surges and line leakage currents.)
- OFL-□□□-4 is recommended for applications that require sine wave.
- If the carrier frequency is set incorrectly, the inverter will generate an alarm, etc., and normal acceleration will not be possible. Set to 8 [kHz] or more for 22 kW or less, and 6 [kHz] or more for 30 kW or more, as it may damage the filter.
- Cannot be applied to vector control inverters.
(Auto-tuning is also not possible.)

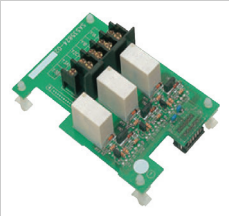
Supply Voltage	Rating (kW)	OFL Model
3-phase 50/60 Hz Class 200 VAC	0.4	**OFL-0.4-2**
	1.5	**OFL-1.5-2**
	3.7	**OFL-3.7-2**
	7.5	**OFL-7.5-2**
	15	**OFL-15-2**
	22	**OFL-22-2**
	30	**OFL-30-2**
	37	**OFL-37-2**
	45	**OFL-45-2**
	55	**OFL-55-2**
	75	**OFL-75-2**

- The output voltage waveform of the inverter is converted to a sine wave.
(It also suppresses surges and line leakage currents.)
- OFL-□□□-2 is recommended for applications that require sine wave.
- If the carrier frequency is set incorrectly, the inverter will generate an alarm, etc., and normal acceleration will not be possible. Set to 8 [kHz] or more for 22 kW or less, and 6 [kHz] or more for 30 kW or more, as it may damage the filter.
- Cannot be applied to vector control inverters.
(Auto-tuning is also not possible.)

Dimensions and other detail please refer to Catalog or consult Fuji Electric.

■ Relay Output Interface Card

Option card that converts the transistor output at the terminal point of the inverter body into a relay output.

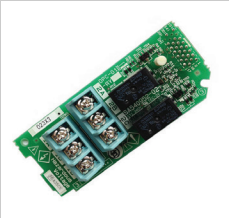


■ OPC-F1-RY

Type: Relay output: Built-in 3 circuits

Applicable inverter: FRENIC-eHVAC

Optional relay output card come with: Signal type: 1C contact,
Contact capacity: AC250V, 0.3A cosφ=0.3 DC48V, 0.5A (resistance to load)
Note: The terminals Y1 to Y3 of the FRENIC-eHVAC body cannot be used when this card is attached.

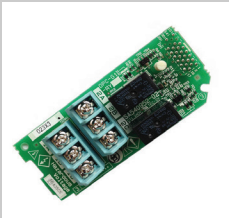


■ OPC-RY

Type: Relay output: Built-in 2 circuits If you attach 2 interface cards, 4 relay outputs are possible.

Applicable inverter: FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA

Optional relay output card come with: Signal type: 1C contact,
Contact capacity: AC250V, 0.3A cosφ=0.3 DC48V, 0.5A (resistance to load)



■ OPC-RY2

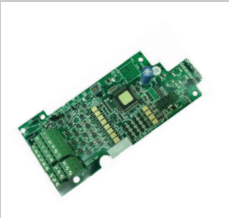
Type: Relay output: Up to 7 circuits

Applicable inverter: FRENIC-HVAC, FRENIC-AQUA

Optional relay output card 2 come with: Signal type: 1A contact,
Contact capacity: AC250V, 0.3A cosφ=0.3 DC48V, 0.5A (resistance to load)

■ Digital Interface Card

Option card that enable digital input or output interface.



■ OPC-DIO

Type: Digital Input/Output Interface Card

Applicable inverter: FRENIC-Ace

Optional Digital Input/Output Interface Card enable monitor the output frequency by binary code (8bit).
General-purpose input/output terminals can be expanded.

■ OPC-VG1-DIO

Type: Digital Input/Output Interface Card

Applicable inverter: FRENIC-VG

Optional Digital Input/Output Interface Card enable monitor the output frequency.
Come with DI/DO=16/10 points of I/O can be added.

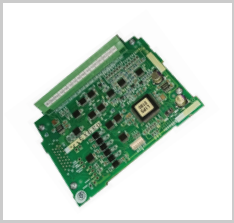
■ OPC-DI

Type: Digital Input Interface Card

Applicable inverter: FRENIC-MEGA

Optional Digital Input Interface Card enable general-purpose input terminal expansion.
Come with set the frequency by binary code (8, 12, 15, 16bit) and BCD code (4 digits).

Continue...



■ OPC-VG1-DI

Type: Digital Input Interface Card

Applicable inverter: FRENIC-VG

Optional Digital Input Interface Card enable input speed setting, torque command, torque current command, torque limit, etc. in 16bit digital quantity.

■ OPC-DO

Type: Digital Output Interface Card

Applicable inverter: FRENIC-VG

Optional Digital Output Interface Card enable monitor frequency, output voltage, output current, etc. by binary code (8bit). The general-purpose output terminal can be expanded.

■ Analog Interface Card

Torque limit value, frequency setting, and ratio tuning setting can be performed with analog input. The output frequency, current, torque, etc. of the inverter can be monitored in analog quantities.

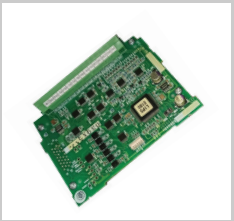
■ OPC-AIO

Type: Analog Input/Output Interface Card

Applicable inverter: FRENIC-Ace, FRENIC-eHVAC, FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA

Optional Analog Input/Output Interface card come with:
Input: 0 to ±10Vdc/0 to ±100% Input resistance: 22kΩ
Input: 0 to +10Vdc/0 to 100% input resistance 22kΩ
Input: 4 to 20mADC/0 to 100% Input impedance: 250Ω

Monitor output:
0 to ±10Vdc Analog voltmeter (input impedance: 10kΩ) can be connected up to 2 pieces.
4~20mADC Applicable load 500Ω or less



■ OPC-VG1-AIO

Type: Analog Input/Output Interface Card

Applicable inverter: FRENIC-VG

Optional Analog Input/Output Interface Card enable at most AI/AO=2/2 points of I/O can be added.

■ OPC-AO

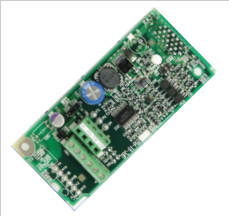
Type: Analog Output Interface Card

Applicable inverter: FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA

Optional Analog output Interface Card enable monitor output:
4~20mADC Applicable load 500Ω or less, 2 points

■ Pulse Generator Feedback Card (PG)

Option card enable feedback signal of the encoder for speed and position control.



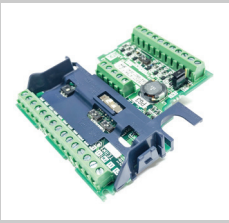
■ **OPC-PG** ■ **OPC-PG2** ■ **OPC-PG22** ■ **OPC-PMPG2**

Type: Pulse Generator Feedback Card

Applicable inverter: FRENIC-MEGA

Optional Pulse Generator Feedback Card;

Card Model	Application	Specification	PG Power Supply
OPC-PG	Speed control (vector control with PG) Pulse train input	20 to 3000P/R A/B/Z phases (incremental mental) Open collector/ Complement input method	+12Vdc±10%/120mA or less +15Vdc±10%/120mA or less
OPC-PG2	Speed control (vector control with PG)	20～3000P/R 5V line driver system (1 system)	DC+5V±10%/200mA or less
OPC-PG22	Speed control (vector control with PG, V/f control, torque vector control with PG) pulse train input Synchronous operation Positioning control, damping control	20～3000P/R 5V line driver system (2 systems)	DC+5V±10%/300mA or less
OPC-PMPG2	Synchronous motor operation (speed/ magnetic pole position sensor vector control)	20～3000P/R 5V line driver system	DC+5V±10%/300mA or less



■ **OPC-E2-PG** ■ **OPC-E2-PG3**

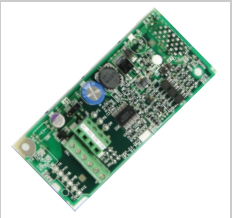
Type: Pulse Generator Feedback Card enable feedback signal of the encoder for speed and position control.

Applicable inverter: FRENIC-Ace

Optional Pulse Generator Feedback Card;

Card Model	Application	Specification	PG Power Supply
OPC-E2-PG	Speed control (vector control with PG, V/f control, torque vector control with PG) pulse train input Synchronous operation Simple positioning control	20 to 3000P/R A/B/Z phases (incremental mental) Open collector/ Complement Input method 5V	+5V: 200mA max, +5V±10%
OPC-E2-PG3	Speed control (vector control with PG, V/f control, torque vector control with PG) pulse train input Synchronous operation Simple positioning control	20 to 3000P/R A/B/Z phases (incremental mental) Open collector/ Complement Input method 12V/15V	+12V: 80mA max, +12V±10% +15V: 60mA max, +15V±10%

Continue...



■ **OPC-VG1-PG** ■ **OPC-VG1-PGo** ■ **OPC-VG1-PMPG** ■ **OPC-VG1-PMPGo** ■ **OPC-VG1-SPGT**

Type: Pulse Generator Feedback Card enable feedback signal of the encoder for speed and position control.

Applicable inverter: FRENIC-VG

Optional Pulse Generator Feedback Card;

Card Model	Application	Specification	PG Power Supply
OPC-VG1-PG	Motor speed detection Line speed detection Pulse detection Pulse command input	A, B phase 90° phase difference 2 signals A phase; command pulse, B phase; command code Phase A: Forward pulse, Phase B: Reverse pulse 5V line driver method	DC+5V±5%/250mA or less
OPC-VG1-PGo	Motor speed detection Line speed detection Pulse detection Pulse command input	A, B phase 90° phase difference 2 signals A phase; command pulse, B phase; command code Phase A: Forward pulse, Phase B: Reverse pulse Open collector/voltage output method	DC+5V±5%/250mA or less
OPC-VG1-PMPG	Synchronous motor operation (speed control)	5V line driver method	DC+5V±5%/250mA or less
OPC-VG1-PMPGo	Open collector method	5V line driver method	DC+5V±5%/250mA or less
OPC-VG1-SPGT	For 17-bit serial PG Synchronous motor operation (speed control)	A/B phase signal output (FA+/-, FB+/-) 5V line driver method	DC+5V±5%/70mA or less

■ Synchronized Interface Card

■ **OPC-VG1-SN**

Type: Synchronized Interface Card

Applicable inverter: FRENIC-VG

Optional Synchronized Interface Card is used for position control with a synchro oscillator, and can convert the synchro oscillator signal to 0 to ±10V.

■ Encoder cable for GNF2 Motor

■ **CB-VG1-PMPG-□□S** (straight type) ■ **CB-VG1-PMPG-□□A** (right angle type)

Type: Synchronized Interface Card

Applicable inverter: FRENIC-VG

Optional Encoder cable for GNF2 Motor connecting the inverter and our sensor-equipped synchronous motor "GNF2". Straight type and right angle type. There are four types of 5m, 15m, 30m, and 50m.

T-link communication card

Option card that connects our PLC (MICREX-SX, MICREX-F) and the inverter with a T-link (I/O transmission).
The following items can be performed from the PLC.

OPC-TL

Type: T-link communication card

Applicable inverter: FRENIC-MEGA

Optional T-link communication card come with;
- Transmission occupancy word count: 8 words
- Number of connected inverters: Up to 12 units
- Maximum transmission speed: 500kbps
- Enable setting the operating frequency
- Enable setting of operation commands (FWD, REV, RST, etc.)
- Enable operating status monitor
- Enable Setting/Reading data codes for each function

OPC-VG1-TL

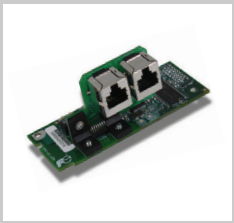
Type: T-link communication card

Applicable inverter: FRENIC-VG

Optional T-link communication card come with;
- Transmission occupancy word count: 16 words
- Number of connected inverters: Up to 12 units
- Maximum transmission speed: 500kbps
- Enable setting the operating frequency
- Enable setting of operation commands (FWD, REV, RST, etc.)
- Enable operating status monitor
- Enable Setting/Reading data codes for each function

SX bus communication card

Option card to connect our PLC (MICREX-SX, ESX) and inverter with SX bus and E-SX bus.
The following items can be performed from the PLC.



OPC-SX

Type: SX bus communication card

Applicable inverter: FRENIC-MEGA

Optional T-link communication card come with;
- Transmission occupancy word count: 16 words
- Maximum transmission speed: 25Mbps
- Enable setting the operating frequency
- Enable setting of operation commands (FWD, REV, RST, etc.)
- Enable operating status monitor
- Enable Setting/Reading data codes for each function

OPC-VG1-SX

Type: SX bus communication card

Applicable inverter: FRENIC-VG

Optional T-link communication card come with;
- Transmission occupancy word count: 16 words (51 words when using UPAC)
- Maximum transmission speed: 25Mbps
- Enable setting the operating frequency
- Enable setting of operation commands (FWD, REV, RST, etc.)
- Enable operating status monitor
- Enable Setting/Reading data codes for each function

Continue...

■ OPC-VG1-ESX

Type: E-SX Bus Communication Card

Applicable inverter: FRENIC-MEGA

Optional T-link communication card come with;
- Transmission occupancy word count: 16 words (for UPAC use, 51 words)
- Maximum transmission speed: 100Mbit/s
- Enable setting the operating frequency
- Enable setting of operation commands (FWD, REV, RST, etc.)
- Enable operating status monitor
- Enable Setting/Reading data codes for each function

■ Open Bus Communication Card

Option card for corresponding to various open buses.
The following contents can be done from a personal computer or PLC.

Picture for visual purposes only, actual card may look different.

■ OPC-☐-PDP ■ OPC-☐-DEV ■ OPC-☐-COP ■ OPC-☐-CCL ■ OPC-☐-LNW ■ OPC-☐-PNET

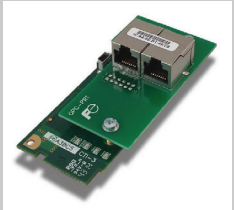
Type: T-link communication card

Optional T-link communication card enable;
- Setting the operating frequency
- Setting of operation commands (FWD, REV, RST, etc.)
- Data code setting/reading for each function code
- Operating frequency/operating status monitor

Inverter	PROFIBUS-DP	DeviceNet	CANopen	CC-Link	LONWORKS	PROFINET-IRT
FRENIC-Ace	OPC-PDP3	OPC-DEV	OPC-COP2	OPC-CCL	-	-
FRENIC-MEGA	OPC-PDP2	OPC-DEV	OPC-COP2	OPC-CCL	-	-
FRENIC-eHVAC	OPC-PDP3	OPC-DEV	-	OPC-CCL	OPC-LNW	-
FRENIC-HVAC	OPC-PDP2	OPC-DEV	OPC-COP	OPC-CCL	OPC-LNW	-
FRENIC-AQUA	OPC-PDP2	OPC-DEV	OPC-COP	OPC-CCL	OPC-LNW	-
FRENIC-VG	OPC-VG1-PDP	OPC-VG1-DEV	-	OPC-VG1-CCL	OPC-LNW	OPC-VG1-PNET

■ ProfiNet/Ethernet Communication Card

Option card for both ProfiNet and Ethernet communication.



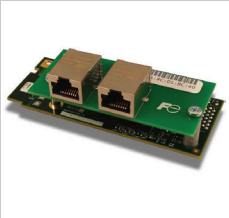
■ OPC-PRT

Type: Multiprotocol Ethernet interface Communication Card

Applicable inverter: FRENIC-Ace

Optional Multiprotocol Ethernet Interface communication card which include;
- EtherNet/IP connection
- PROFINET connection
- Modbus/TCP connection
- BACnet/IP connection
- EtherCAT connection
- Allen Bradley CSP (PCCC) connection

Continue...

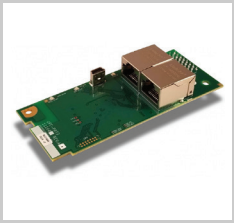


OPC-PRT2

Type: PROFINET IO Interface Communication Card

Applicable inverter: FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA

Optional PROFINET IO Interface Communication Card come with;
- two RJ-45 jacks with an embedded 10BASE-T/100BASE-TX Ethernet switch for connection to the Ethernet network. In addition to the supported fieldbus protocols, the interface also hosts a fully-customizable embedded web server, which provides access to inverter information via a standard web browser for remote monitoring and control.



OPC-PRT3

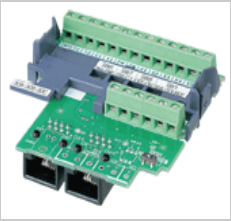
Type: PROFINET IO Interface Communication Card

Applicable inverter: FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-Ace

Optional PROFINET IO Interface Communication Card come with;
- two RJ-45 jacks with an embedded 10BASE-T/100BASE-TX Ethernet switch for connection to the Ethernet network. In addition to the supported fieldbus protocols, the interface also hosts a fully-customizable embedded web server, which provides access to inverter information via a standard web browser for remote monitoring and control.

RS-485 Communication Card

The inverter can be controlled by connecting to a computer, PLC, or other higher-level equipment (master).



OPC-E2-RS

Type: RS-485 Communication Card

Applicable inverter: FRENIC-Ace

Optional RS-485 Communication Card come with;
- Extend the FRENIC-ACE standard RS-485 Ch2 (RJ-45) to 2 nos. of RJ-45 connectors for easy multi-drop communication.

Resistance Temperature Sensor Input Card

The inverter can be controlled by connecting to a computer, PLC, or other higher-level equipment (master).

Picture for visual purposes only, actual card may look different.

OPC-PT

Type: Resistance Temperature Sensor Input Card (aka. PT-100 temperature sensor input card)

Applicable inverter: FRENIC-eHVAC, FRENIC-HVAC, FRENIC-AQUA

Optional Resistance Temperature Sensor Input Card enable;
- A resistance temperature detector (RTD), the mountable two-channel resistance temperature detector (hereinafter-called RTD) be connected directly to the inverter without the need for a converter, and the temperature value can be converted to a digital value.
  The following five type of mountable RTD are supported: JPt100, Pt100, Ni100, Pt1000 and Ni1000.

User Programming Card (UPAC)

The inverter can use the UPAC to programm function like a PLC.

Picture for visual purposes only, actual card may look different.

OPC-VG1-UPAC

Type: User Prorgramming Card

Applicable inverter: FRENIC-VG

Optional User Programming Card enable;
- The MICREX-SX high-performance CPU module is an option card that can be integrated into the inverter, and is a programming tool for SX.
  The inverter control software can be programmed with the following parameters

Continue...

Functional Safety Card

The inverter can use the Functional Safety Card to achieve safety standard.

Picture for visual purposes only, actual card may look different.

OPC-VG1-SAFE

Type: Functional Safety Card (aka. STO: Safe Torque Off)

Applicable inverter: FRENIC-VG

Optional Resistance Temperature Sensor Input Card enable;
- The safety functions specified in the functional safety standard IEC/EN61800-5-2 (STO, SS1, SLS, SBC) can be used.

Optional Mounting Adapter

The inverter needs this mounting adapter to enable optional (OPC-XXX) card to be mounted.

OPC-E2-ADP1 OPC-E2-ADP2 OPC-E2-ADP3

Type: Mounting Adapter

Applicable inverter: FRENIC-Ace FRENIC-eHVAC

Optional mounting adaptor for;
FRENIC-ACE:
- OPC-E2-ADP1 is required when option card is installed on FRENIC-Ace of 15kW or less.
- OPC-E2-ADP2 is required when installing an option card on an 18.5kW, 22kW FRENIC-Ace.

FRENICeHVAC:
FRN0002F2E-4G to FRN0038F2E-4G：OPC-E2-ADP1
FRN0045F2E-4G to FRN0060F2E-4G：OPC-E2-ADP2
FRN0075F2E-4G to FRN0520F2E-4G：OPC-E2-ADP3

Loader Software

The VG1 inverter needs this FRENIC Loader software to communicate via PC.

Picture for visual purposes only.

WPS-VG1-PCL

Type: Loader Software

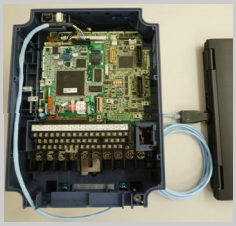
Applicable inverter: FRENIC-VG

Optional Loader Software enable;
- supports real-time tracing and historical tracing

loader software (WPS-VG1-STR) is contained in the CD-ROM provided with the product. (Can be downloaded from the Fuji Electric website too.)

UPAC Dedicated Cable

The UPAC needs this connection cable to enable communication between the VG1 inverter with FRENIC Loader software via PC.



Picture for visual purposes on the cable only.

CB-VG1-UPAC-3S

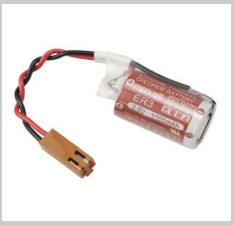
Type: UPAC Dedicated Connection Cable between FRENIC-VG1 inverter (connector) and PC (RJ-45).

Applicable inverter: FRENIC-VG

Optional UPAC Dedicated Cable
- cable for the connection of OPC-VG1-UPAC and a personal computer. It becomes the type of straight 3m.

Battery For Memory Backup

Battery to power inverter real time clock memory.



OPK-BP

Type: Battery for memory backup

Applicable inverter: FRENIC-HVAC, FRENIC-AQUA, FRENIC-VG

Optional battery specifications;

- Battery voltage/Capacity: 3.6V／1100mAh
- Varieties: Lithium Thionyl chloride battery
- Usage: 5 years (Battery ambient temperature 60°C, inverter no power)

Zero Phase Reactor (ACL)

ACL

Type: Zero Phase Reactor for Radio Noise Reduction

Applicable inverter: FVR-Micro, FRENIC-Mini, FRENIC-eHVAC, FRENIC-Ace, FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-VG

Optional Zero phase Reactor for Radio Noise Reduction specifications;

ACL Model	Number of Unit	Number of Turn	Wire size [mm^2]
ACL-40C	1	4	2.0, 3.5, 5.5
	2	2	8, 14
ACL-74C	1	4	8, 14
	2	2	22, 38, 60, 5.5×2, 8×2, 14×2, 22×2
	4	1	100, 150, 200, 250, 38×2, 60×2, 100×2
F200160 F200160PB	4	1	325, 150×2, 200×2, 250×2, 325×2, 150×3, 200×3, 250×3, 325×3, 250×4, 325×4

Note: Wire type is 600V HIV insulated wire (75°C tolerance). Please follow above content.

Inverter Migration Table (upgrade or replacement for obsolete model)

Enjoy the performance of your last Fuji Electric Inverter?
Refer to above migration guideline* for upgrade or replacement of your obsolete inverter.

Data Dated 2022/Dec

Inverter Series	Release date	Discontinuation date	Discontinued (+7 years)**	Substitute Model (current model)	Remarks
FVR-F	1980/11	(1982/07)	1989/07	FRENIC-Ace (FRN-E2)	
FRENIC5000P	1981/11	(1983/02)	1990/02	FRENIC-MEGA (FRN-G1) (LD Mode)	Format: RKNNP
FRENIC5000G	1981/12	(1983/02)	1990/02	FRENIC-MEGA (FRN-G1)	Format: RKNNG
FVR-P	1982/07	(1983/02)	1990/02	FRENIC-MEGA (FRN-G1) (LD Mode)	
FVR-G	1982/10	(1983/12)	1990/12	FRENIC-MEGA (FRN-G1)	
FVR-P2	1983/02	(1984/03)	1991/03	FRENIC-MEGA (FRN-G1) (LD Mode)	
FRENIC5000G2	1983/02	(1984/03)	1991/03	FRENIC-MEGA (FRN-G1)	
FRENIC5000P2	1983/02	(1984/03)	1991/03	FRENIC-MEGA (FRN-G1) (LD Mode)	
FRENIC5000H	1983/09	(1986/03)	1993/03	FRENIC-HF (FRN-H1)	
FVR-G2	1983/12	(1986/01)	1993/01	FRENIC-MEGA (FRN-G1)	
FVR-P3	1984/03	1985/04	1992/04	FRENIC-MEGA (FRN-G1) (LD Mode)	
FRENIC5000G3	1984/03	(1987/02)	1994/02	FRENIC-MEGA (FRN-G1)	
FRENIC5000P3	1984/03	(1987/02)	1994/02	FRENIC-MEGA (FRN-G1) (LD Mode)	
FRENIC5000V2	1983/12	1995/03	2002/03	Please consult Fuji Electric	
FRENIC5000M2	1986/04	1995/03	2002/03	Please consult Fuji Electric	
FRENIC5000VG	1986/07	1995/03	2002/03	FRENIC-VG (FRN-VG1)	
FVR-G5	1986/01	1987/12	1994/12	FRENIC-MEGA (FRN-G1)	
FVR-P5	1987/02	1987/12	1994/12	FRENIC-MEGA (FRN-G1) (LD Mode)	
FRENIC5000G5	1986/09	1990/07	1997/07	FRENIC-MEGA (FRN-G1)	
FRENIC5000P5	1986/09	1990/07	1997/07	FRENIC-MEGA (FRN-G1) (LD Mode)	
FVR-G5E	1986/01	1993/09	2000/09	FRENIC-MEGA (FRN-G1)	
FVR-G5B	1986/03	1993/09	2000/09	FRENIC-MEGA (FRN-G1)	
FVR-K5	1987/08	1993/09	2000/09	FRENIC-Mini (FRN-C2)	
FVR-G5S	1987/12	1993/09	2000/09	FRENIC-MEGA (FRN-G1)	
FVR-P5S	1987/12	1994/12	2001/12	FRENIC-MEGA (FRN-G1) (LD Mode)	
FRENIC5000G6N	1989/03	1994/03	2001/03	FRENIC-MEGA (FRN-G1)	
FRENIC5000G7	1989/12	1998/01	2005/01	FRENIC-MEGA (FRN-G1)	
FRENIC5000P7	1989/12	1998/01	2005/01	FRENIC-MEGA (FRN-G1) (LD Mode)	
FVR-G7S	1990/06	1998/01	2005/01	FRENIC-MEGA (FRN-G1)	
FVR-K7S	1990/06	1998/01	2005/01	FRENIC-Multi (FRN-E1)	
FVR-G7N	1991/05	1998/01	2005/01	FRENIC-MEGA (FRN-G1)	
FVR-E7S	1992/11	1998/01	2005/01	FRENIC-Ace (FRN-E2)	
FVR-B7S	1991/05	2002/01	2009/01	FRENIC-Ace (FRN-E2)	
FRENIC5000V3	1989/01	2002/03	2009/03	Please consult Fuji Electric	
FRENIC5000M3	1991/06	2002/03	2009/03	Please consult Fuji Electric	
FRENIC5000H2	1986/03	2007/01	2014/01	Please consult Fuji Electric	
FVR-H5	1988/08	1999/11	2006/11	FRENIC-HF (FRN-H1)	
FRENIC5000VG3	1990/12	1998/10	2005/10	FRENIC-VG (FRN-VG1)	
FRENIC5000VG3N	1992/07	1998/10	2005/10	FRENIC-VG (FRN-VG1)	
FRENIC5000G9S	1994/04	2000/05	2007/05	FRENIC-MEGA (FRN-G1)	
FRENIC5000P9S	1994/04	2000/05	2007/05	FRENIC-MEGA (FRN-G1) (LD Mode)	
FVR-C9S	1994/04	1999/11	2006/11	FRENIC-Mini (FRN-C2)	
FRENIC5000VG5S/VG5N	1995/08	2002/03	2009/03	FRENIC-VG (FRN-VG1)	
FVR-E9S	1995/08	2006/05	2013/05	FRENIC-Ace (FRN-E2)	
FRENIC5000MS5	1997/07	2012/06	2019/06	Please consult Fuji Electric	
FVR-S11S	1998/04	2003/12	2010/12	FRENIC-Mini (FRN-C2)	
FVR-C11S	1998/04	2003/12	2010/12	FRENIC-Mini (FRN-C2)	
FRENIC5000G11S	1998/07	2010/03	2017/03	FRENIC-MEGA (FRN-G1)	
FRENIC5000P11S	1998/07	2010/03	2017/03	FRENIC-MEGA (FRN-G1) (LD Mode)	
FVR-E11S	1999/04	2007/11	2014/11	FRENIC-Ace (FRN-E2)	
FVR-D (FESPAC)	1999/10	2009/06	2016/06	Please consult Fuji Electric	
FRENIC5000VG7S	1999/11	2013/09	2020/09	FRENIC-VG (FRN-VG1)	
FRENIC5000H11S	2000/06	2010/03	2017/03	FRENIC-HF (FRN-H1)	
FRENIC5000MG5	2000/11	2012/06	2019/06	Please consult Fuji Electric	
FRENIC-Mini (FRN-C1)	2002/04	2015/12	2022/12	FRENIC-Mini (FRN-C2)	
FRENIC-Eco (FRN-F1)	2003/09	2019/05 (Asia)		Please consult Fuji Electric	Only available in Japan
FRENIC-Multi (FRN-E1)	2005/04	2016/09	2023/09	FRENIC-Ace (FRN-E2)	
FRENIC-Lift (FRN-LM1)	2006/08			Not feature in this selection guide, please consult Fuji Electric	
FRENIC-MEGA (FRN-G1)	2006/10	2023/09		FRENIC-MEGA (FRN-G2)	G1 (LD) ⟶ G2 (HND)
FRENIC-VG (FRN-VG1)	2011/02				
FRENIC-HF (FRN-H1)	2011/03			Not feature in this selection guide, please consult Fuji Electric	
FRENIC-Mini (FRN-C2)	2012/09				
FRENIC-HVAC (FRN-AR)	2013/12				
FRENIC-AQUA (FRN-AQ)	2013/12				
FRENIC-Ace (FRN-E2)	2014/07				
FRENIC-eFIT (FRN-EF1)	2019/05			Not feature in this selection guide, please consult Fuji Electric	
FRENIC-MEGA (FRN-G2)	2021/03				

* Alternative models are a guideline and may vary depending on usage conditions (functions and performance).
** 7 year parts support for discontinued model depend availability. (Terms and Conditions apply for these parts support duration, consult Fuji Electric).

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