

Variable Torque Load Inverters for Fans and Pumps

# **FRENIC-ECO** Series

## **Options & Accessories**



# FRENIC **ECO**



FUJI ELECTRIC INVERTERS

GREAT PERFORMANCE THROUGH DEDICATED DESIGNS

## Options and Accessories



- NEMA 1 KITS
- REACTORS
- OPTION BOARDS



## ■ NEMA1 kit (NEMA1-□□□F1-□□)

NEMA1 kit, when fitted to the FRENIC-Eco series, protects the inverter body with the structure the conforms to the NEMA1 standard (approved as UL TYPE1). Using NEMA1 kit, ambient temperature is -10 to 40°C (14 to 104F)

### • Combination between F1S Series Inverter and NEMA1 Cover

Optional type	Inverter type	Dimensions [inch(mm)]								Outside figure	
		W	H	D	A	B	C	E	Conduit dia × pcs		
NEMA1-5.5F1-24	FRN001 to 005F1S-2U	5.91 (150)	10.24 (260)	6.42 (163)	—	—	—	—	—	φ 1.06(27) × 3	A
	FRN001 to 007F1S-4U										
NEMA1-11F1-24	FRN007 to 010F1S-2U	8.66 (220)	10.24 (260)	8.47 (215)	—	—	—	—	—	φ 1.06(27) × 1 φ 1.34(34) × 2	A
	FRN010 to 015F1S-4U										
NEMA1-15F1-24	FRN015F1S-2U	8.66 (220)	10.24 (260)	8.47 (215)	1.18 (30)	3.57 (90.7)	6.55 (166.4)	—	—	φ 1.34(34) × 1 φ 1.65(42) × 2	B
	FRN020F1S-4U										
NEMA1-22F1-24	FRN020 to 025F1S-2U	9.84 (250)	15.75 (400)	8.47 (215)	—	—	—	—	—	φ 1.34(34) × 1 φ 1.65(42) × 2	A
	FRN025 to 030F1S-4U										
NEMA1-30F1-24	FRN030F1S-2U	9.84 (250)	15.75 (400)	8.47 (215)	3.94 (100)	7.21 (183.2)	8.07 (205)	—	—	φ 1.34(34) × 1 φ 1.89(48) × 2	C
	FRN040F1S-4U										
NEMA1-45F1-24	FRN040F1S-2U	12.60 (320)	21.65 (550)	10.04 (255)	4.92 (125)	4.35 (110.5)	12.73 (323.4)	5.90 (150)	—	φ 1.89(48) × 1 φ 2.52(64) × 3	D
	FRN050 to 060F1S-4U										
NEMA1-75F1-2	FRN050 to 60F1S-2U	13.98 (355)	24.21 (615)	10.63 (270)	7.48 (190)	4.35 (110.5)	14.11 (358.4)	8.47 (215)	—	φ 1.89(48) × 1 φ 3.03(77) × 3	D
	FRN075 to 100F1S-2U										
NEMA1-75F1-4	FRN075F1S-4U	13.98 (355)	21.65 (550)	10.63 (270)	3.54 (90)	4.35 (110.5)	14.11 (358.4)	4.53 (115)	—	φ 1.89(48) × 1 φ 2.52(64) × 3	D
	FRN100F1S-4U										
NEMA1-110F1-4	FRN125 to 150F1S-4U	13.98 (355)	29.13 (740)	11.81 (300)	3.74 (95)	5.53 (140.5)	14.11 (358.4)	4.72 (120)	—	φ 1.89(48) × 1 φ 2.52(64) × 3	D
NEMA1-132F1-4	FRN200F1S-4U	20.87 (530)	29.13 (740)	12.40 (315)	3.74 (95)	5.24 (133)	21.00 (533.4)	5.12 (130)	—	φ 1.89(48) × 1 φ 2.52(64) × 3	D
NEMA1-110F1-2	FRN125F1S-2U	26.77 (680)	34.65 (880)	15.55 (395)	14.02 (356)	10.04 (255)	26.90 (683.2)	15.16 (385)	—	φ 1.89(48) × 1 φ 3.54(90) × 3	D
NEMA1-220F1-4	FRN250 to 350FIS-4U	20.87 (530)	39.37 (1000)	14.17 (360)	5.12 (130)	7.01 (178)	21.00 (533.4)	6.50 (165)	—	φ 1.89(48) × 1 φ 4.33(110) × 3	D
NEMA1-280F1-4	FRN400 to 450F1S-4U	26.77 (680)	39.37 (1000)	14.96 (380)	9.65 (245)	5.58 (141.6)	26.94 (684.2)	11.02 (280)	—	φ 1.89(48) × 1 φ 4.33(110) × 3	D
NEMA1-400F1-4	FRN500 to 60FIS-40	26.77 (680)	55.12 (1400)	17.32 (440)	9.95 (240)	7.94 (201.6)	26.94 (684.2)	10.83 (275)	—	φ 1.89(48) × 1 φ 5.63(14) × 3	D
NEMA1-560F1-4	FRN700 to 900FIS-40	34.65 (880)	55.12 (1400)	17.32 (440)	9.95 (240)	7.94 (201.6)	34.81 (884.2)	10.83 (275)	—	φ 1.89(48) × 1 φ 5.63(14) × 3	D

Fig. A

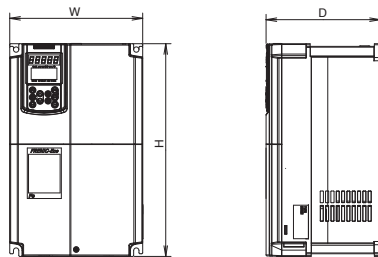


Fig. B

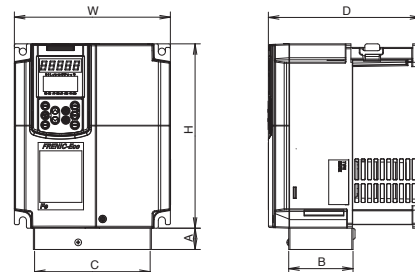


Fig. C

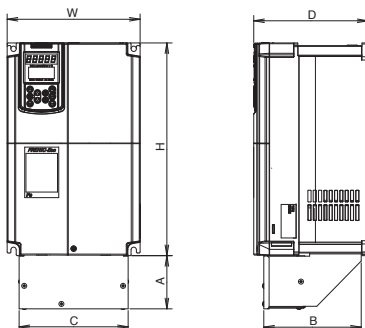
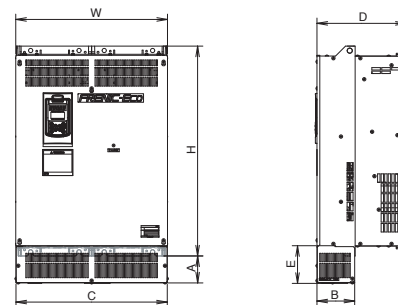
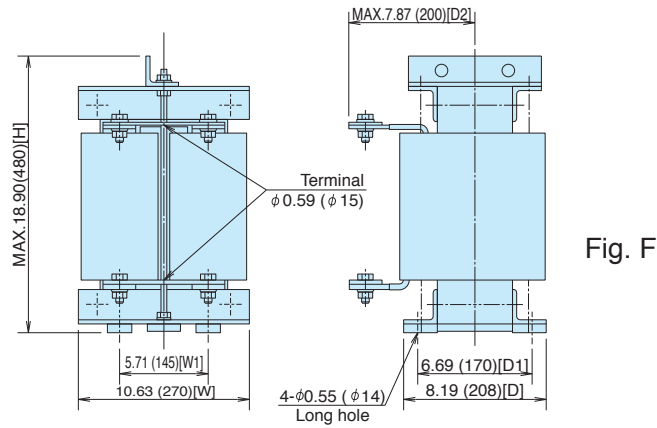
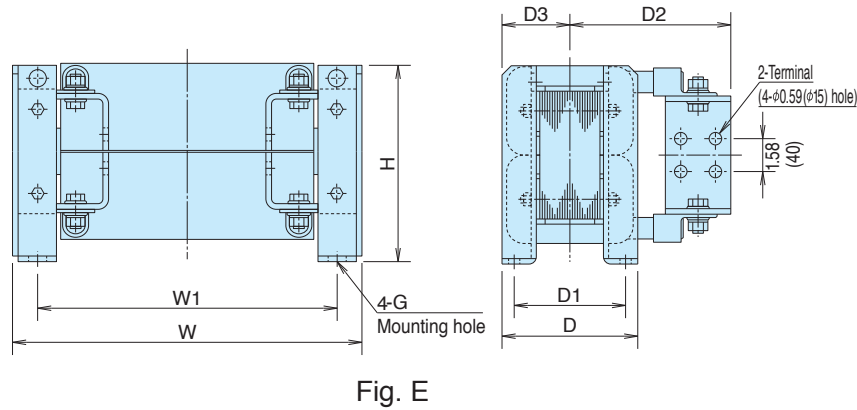
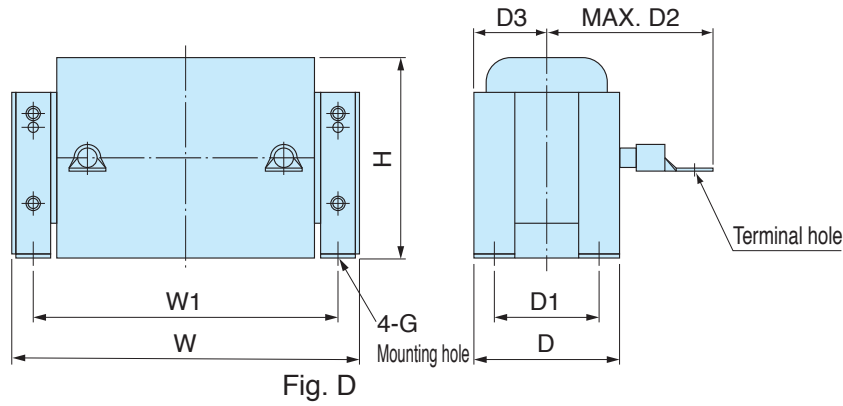


Fig. D





Power supply voltage	Applicable motor rating (HP)	Inverter type	REACTOR type	Fig.	Dimensions [inch (mm)]								Terminal hole	Mass [lbs(Kg)]
					W	W1	D	D1	D2	D3	H	Mounting hole		
3-phase 208V	75	FRN075F1S-2U	DCR2-75C	D	10.04(255)	8.86(225)	4.17(106)	3.39(86)	5.71(145)	2.09(53)	5.71(145)	0.24(6)	M12	25(11.4)
	100	FRN100F1S-2U	DCR2-110C	D	11.81(300)	10.43(265)	4.57(116)	3.54(90)	7.28(185)	2.28(58)	6.30(160)	M8	M12	37(17)
	125	FRN125F1S-2U	DCR2-110C	D	11.81(300)	10.43(265)	4.57(116)	3.54(90)	7.28(185)	2.28(58)	6.30(160)	M8	M12	37(17)
3-phase 460V	100	FRN100F1S-4U	DCR4-75C	D	10.04(255)	8.86(225)	4.17(106)	3.39(86)	4.92(125)	2.09(53)	5.71(145)	0.24(6)	M10	27(12.4)
	125	FRN125F1S-4U	DCR4-90C	D	10.08(256)	8.86(225)	4.57(116)	3.78(96)	5.12(130)	2.28(58)	5.71(145)	0.24(6)	M12	32(14.7)
	150	FRN150F1S-4U	DCR4-110C	D	12.05(306)	10.43(265)	4.57(116)	3.54(90)	5.51(140)	2.28(58)	6.10(155)	0.31(8)	M12	41(18.4)
	200	FRN200F1S-4U	DCR4-132C	D	12.05(306)	10.43(265)	4.96(126)	3.94(100)	5.91(150)	2.48(63)	6.30(160)	0.31(8)	M12	49(22)
	250	FRN250F1S-4U	DCR4-200C	D	14.06(357)	12.20(310)	5.55(141)	4.45(113)	6.50(165)	2.78(70.5)	7.48(190)	0.39(10)	M12	65(29.5)
	300	FRN300F1S-4U	DCR4-220C	D	14.06(357)	12.20(310)	5.75(146)	4.65(118)	7.28(185)	2.87(73)	7.48(190)	0.39(10)	M12	72(32.5)
	350	FRN350F1S-4U	DCR4-280C	D	13.78(350)	12.20(310)	6.34(161)	5.24(133)	8.27(210)	3.17(80.5)	7.48(190)	M10	M16	79(36)
	400	FRN400F1S-4U	DCR4-355C	E	15.75(400)	13.58(345)	6.14(156)	5.04(128)	7.87(200)	3.07(78)	8.86(225)	M10	-	104(47)
	450	FRN450F1S-4U	DCR4-400C	E	17.52(445)	15.16(385)	5.71(145)	4.61(117)	8.39(213)	2.85(72.5)	9.65(245)	M10	-	115(52)
	500	FRN500F1S-4U	DCR4-450C	E	17.32(440)	15.16(385)	5.91(150)	4.80(122)	8.46(215)	2.95(75)	9.65(245)	M10	-	132(60)
	600	FRN600F1S-4U	DCR4-500C	E	17.52(445)	15.35(390)	6.50(165)	5.39(137)	8.66(220)	3.25(82.5)	9.65(245)	M10	-	154(70)
	700	FRN700F1S-4U	DCR4-560C	F	10.63(270)	5.71(145)	8.19(208)	6.69(170)	7.87(200)	-	18.90(480)	∅0.55(∅14) long hole"	∅0.59(∅15)	154(70)

Note: 60HP for 208V, 75HP for 460V or below, DC Reactor is optional.

## • Interface card

### DeviceNet card (OPC-F1-DEV)

Use this interface card to enter or monitor operation commands or frequency or to change or check the settings of function codes necessary for operation at the master station of DeviceNet.  
Number of connectable nodes: Max. 64 (including the master)  
MAC ID: 0 to 63  
Insulation: 500V DC (by photocoupler)  
Transmission speed: 500kbps/250kbps/125kbps  
Network power consumption: Max. 50mA at 24V DC

### BACnet card (OPC-F1-BAC)

Use this interface card with BACnet building automation controllers for monitoring and control of the inverter.

- 32 nodes per segment
- Transmission speed = 9600, 28400, 7680

### Relay output card (OPC-F1-RY)

Use this option card to convert the transistor outputs issued from the terminals Y1 to Y3 of the main body of FRENIC-Eco into relay outputs.  
Note: FRENIC-Eco's terminals Y1 to Y3 cannot be used while this card is installed.  
Relay outputs: Built-in three circuits  
Contact: SPDT contact  
Contact capacity: 250V AC, 0.3A  $\cos\phi=0.3$   
48V DC, 0.5A (resistance load)

### PROFIBUS card (OPC-F1-PDP)

With this interface card, you can do the following operations from the PROFIBUS-DP master: issuing the inverter operation command, issuing the frequency command, monitoring the operating status, and changing the settings in all the function codes of FRENIC-Eco.  
Transmission speed: 9.6kbps to 12Mbps  
Transmission distance: Max. 3900ft (1200m)  
Connector: 6-pole terminal base

### LONWORKS interface card (OPC-F1-LNW)

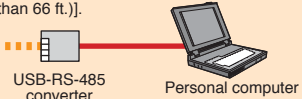
With use of this interface card, the peripheral devices (including a master) linked through LONWORKS can be connected to FRENIC-Eco. This allows you to issue an operation command or a frequency setting command from the master.  
No. of network variables: 62  
No. of connectable devices: 24  
Transmission speed: 78kbps

# Peripheral Equipment Connection Diagrams

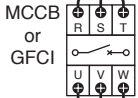
**Multi-function keypad  
TP-G1W-J1**  
This multi-function keypad has a large 5-digit 7-segment LED with backlit LCD.

**Extension cable for remote operation**  
This cable is required 10 BASE-T /100BASE-TX straight cable compliant to us ANSI TIA/EIA-586A Category 5. (Less than 66ft (20m))

**Inverter loader software for Windows**  
This software is used to set function codes in the inverter from a personal computer, to manage data, etc.  
**USB-RS-485 converter, USB cable**  
[This cable requires 10BASE-TX straight cable compliant to US ANSL TSA/EIA-586A. Cat5e/5. (Less than 66 ft.).]



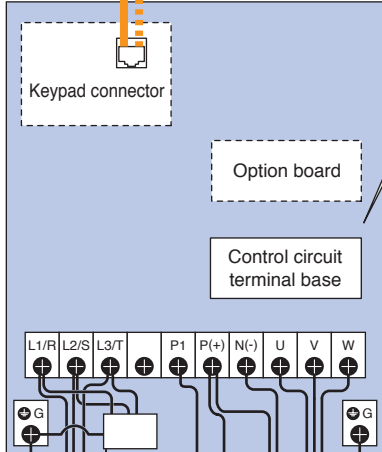
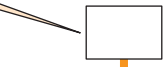
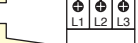
Power supply



**Arrestor**  
Used to absorb lightning surges that come in from the power supply to protect all the equipment that is connected to the power supply.  
[Handled by Fuji Electric Technica Co., Ltd.]

**Radio noise reducing zero phase reactor**  
This is used to reduce noise. For the most part, control effects can be obtained in frequency band of 1MHz or higher. Since the frequency band where effects can be obtained is broad, it is effective as a simple countermeasure against noise. If the wiring distance between a motor and the inverter is short (66ft (20m) is a good guideline), it is recommended that it be connected to the power supply side, and if the distance exceeds 66ft (20m), connect it to the output side.

**EMC compliant filter  
EFL-□□□**  
This is an exclusive filter used to comply with European regulations in the EMC Directives (emissions). For details, make connections in accordance with the "Installation Manual."



Interface card
DeviceNet card OPC-F1-DEV
PROFIBUS card OPC-F1-PDP
LONWORKS card OPC-F1-LNW
BACnet card OPC-F1-BAC
Relay output card OPC-F1-RY
This option card is used to convert the transistor outputs from the FRENIC Eco's terminals Y1 to Y3 into the relay outputs. Caution: FRENIC Eco's terminals Y1 to Y3 cannot be used while this card is installed.
• Relay output: Built-in three circuits
• Signal type: SPDT contact
• Contact capacity: 250V AC, 0.3A cosφ=0.3 48V DC, 0.5A (resistance load)
• EtherNet card(3rd Company) OPC-F1_ETH/OPC-F1-WIE

**DC Reactor  
DCR□-□□□**  
(For power supply coordination)  
1) Used when the power supply's transformer capacity is 500kVA or higher and is 10 or more times the rated capacity of the inverter.  
2) Used in cases where a thyristor converter is connected as a load on the same transformer.  
\* If a commutating reactor is not used in the thyristor converter, it is necessary to connect an AC reactor on the inverter's input side, and so be sure to verify that this is done.  
3) Used to prevent tripping in cases where an inverter overvoltage trip is caused by opening and closing of the phase advancing capacitor in the power supply system  
4) Used when there is a phase unbalance of 2% or greater in the power supply voltage.  
(For improving input power factor, reducing harmonics)  
• Used to reduce the input harmonics current (or improve power factor).  
\* Concerning reduction effects, please refer to the accompanying guidelines.

**Filter capacitor for radio noise reduction  
NFM□□M315KPD□**  
Used to reduce noise.  
It is effective in the AM radio frequency band.  
\* Do not use this in the inverter output side.  
[Made by NIPPON CHEMI-CON, handled by Fuji Denki Technica Co., Ltd.]

**NEMA1 kit (NEMA1-□□□F1-□□)**  
NEMA1 kit, when fitted to the FRENIC-Eco series, protects the inverter body with the structure that conforms to the NEMA1 standard (approved as UL TYPE1).



Motor

## To all our customers who purchase Fuji Electric products included in this catalog:

Please take the following items into consideration when placing your order.

When requesting an estimate and placing your orders for the products included in these materials, please be aware that any items such as specifications which are not specifically mentioned in the contract, catalog, specifications or other materials will be as mentioned below.

In addition, the products included in these materials are limited in the use they are put to and the place where they can be used, etc., and may require periodic inspection. Please confirm these points with your sales representative or directly with this company.

Furthermore, regarding purchased products and delivered products, we request that you take adequate consideration of the necessity of rapid receiving inspections and of product management and maintenance even before receiving your products.

### 1. Free of Charge Warranty Period and Warranty Range

#### 1-1 Free of charge warranty period

- (1) The product warranty period is " Three years from shipment"
- (2) However, in cases where the use environment, conditions of use, use frequency and times used, etc., have an effect on product life, this warranty period may not apply.
- (3) Furthermore, the warranty period for parts restored by Fuji Electric's Service Department is "6 months from the date that repairs are completed."

#### 1-2 Warranty range

- (1) In the event that breakdown occurs during the product's warranty period which is the responsibility of Fuji Electric, Fuji Electric will replace or repair the part of the product that has broken down free of charge at the place where the product was purchased or where it was delivered. However, if the following cases are applicable, the terms of this warranty may not apply.
  - 1) The breakdown was caused by inappropriate conditions, environment, handling or use methods, etc. which are not specified in the catalog, operation manual, specifications or other relevant documents.
  - 2) The breakdown was caused by the product other than the purchased or delivered Fuji's product.
  - 3) The breakdown was caused by the product other than Fuji's product, such as the customer's equipment or software design, etc.
  - 4) Concerning the Fuji's programmable products, the breakdown was caused by a program other than a program supplied by this company, or the results from using such a program.
  - 5) The breakdown was caused by modifications or repairs affected by a party other than Fuji Electric.
  - 6) The breakdown was caused by improper maintenance or replacement using consumables, etc. specified in the operation manual or catalog, etc.
  - 7) The breakdown was caused by a chemical or technical problem that was not foreseen when making practical application of the product at the time it was purchased or delivered.
  - 8) The product was not used in the manner the product was originally intended to be used.
  - 9) The breakdown was caused by a reason which is not this company's responsibility, such as lightning or other disaster.
- (2) Furthermore, the warranty specified herein shall be limited to the purchased or delivered product alone.
- (3) The upper limit for the warranty range shall be as specified in item (1) above and any damages (damage to or loss of machinery or equipment, or lost profits from the same, etc.) consequent to or resulting from breakdown of the purchased or delivered product shall be excluded from coverage by this warranty.

#### 1-3. Trouble diagnosis

As a rule, the customer is requested to carry out a preliminary trouble diagnosis. However, at the customer's request, this company or its service network can perform the trouble diagnosis on a chargeable basis. In this case, the customer is asked to assume the burden for charges levied in accordance with this company's fee schedule.

### 2. Exclusion of Liability for Loss of Opportunity, etc.

Regardless of whether a breakdown occurs during or after the free of charge warranty period, this company shall not be liable for any loss of opportunity, loss of profits, or damages arising from special circumstances, secondary damages, accident compensation to another company, or damages to products other than this company's products, whether foreseen or not by this company, which this company is not be responsible for causing.

### 3. Repair Period after Production Stop, Spare Parts Supply Period (Holding Period)

Concerning models (products) which have gone out of production, this company will perform repairs for a period of 7 years after production stop, counting from the month and year when the production stop occurs. In addition, we will continue to supply the spare parts required for repairs for a period of 7 years, counting from the month and year when the production stop occurs. However, if it is estimated that the life cycle of certain electronic and other parts is short and it will be difficult to procure or produce those parts, there may be cases where it is difficult to provide repairs or supply spare parts even within this 7-year period. For details, please confirm at our company's business office or our service office.

### 4. Transfer Rights

In the case of standard products which do not include settings or adjustments in an application program, the products shall be transported to and transferred to the customer and this company shall not be responsible for local adjustments or trial operation.

### 5. Service Contents

The cost of purchased and delivered products does not include the cost of dispatching engineers or service costs. Depending on the request, these can be discussed separately.

### 6. Applicable Scope of Service

Above contents shall be assumed to apply to transactions and use of the country where you purchased the products. Consult the local supplier or Fuji for the detail separately.