

**E800-SCE** 

**INVERTER SAFETY GUIDELINE** 

SETUMEI EIBUN

1AJ039

IB-0600921ENG-H(2405)MEE

Manual name

FR-E800 Instruction Manual (Connection

FR-E800 Instruction Manual (Maintenance

FR-E800-SCE Instruction Manual (Functional Safety

FR-E800 Instruction Manual (Function

FR Configurator2 Instruction Manual

PLC Function Programming Manual

the following cond

🛕 WARNING

FR-E800 Instruction Manual (Com

Related manuals

ions subject to change without notice

FR-E820-0008(0.1K) to 0900(22K)SCE

FR-E840-0016(0.4K) to 0440(22K)SCE

FR-E820S-0008(0.1K) to 0110(2.2K)SCE

FR-E810W-0008(0.1K) to 0050(0.75K)SCE

For more informatio

lanual numbe

B-0600868ENG 1AJ045

IB-0600871ENG 1AJ051

IB-0600874ENG 1AJ054

BCN-A23488-004 1AJ036

1AJ048

B-0600865ENG

IB-0600516ENG

IB-0600492ENG

on the product 回続後回

Thank you for choosing Mitsubishi Electric inverter. This Inverter Safety Guideline provides handling information and precautions for use of this product. Do not use this product until you have full knowledge of the product mechanism, safety information and instructions

MITSUBISHI ELECTRIC CORPORATION

Details

uals describing installation, wiring, specifications, outline dimensi tards, and how to connect options.

Manual describing how to identify causes of faults and warning

Manual describing details of the safety communication para

Manual describing details of the functions.

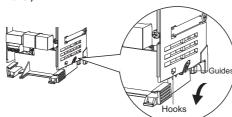
Manual describing details of the PLC function

lanual describing details of the commu

sonal comput

Please forward this Safety Guideline to the end user.

Removal of the wiring cover (FR-E820-0050(0.75K) or lower, FR-E820S-0030(0.4K) or lower, FR-E810W-0030(0.4K) or



(a) Insert a tool such as a flathead screwdriver into the half-hole above the

(b) Pull out the cover along the guides in the direction shown by the arrow in

Removal of the wiring cover (FR-E820-0240(5.5K) to 0600(15K),

(a) Insert a tool such as a flathead screwdriver into the half-hole above the "PUSH" mark on the wiring cover to push the stopper behind the wiring

(b) Pull out the cover along the guides in the direction shown by the arrow in

Removal of the wiring cover (FR-E820-0760(18.5K), 0900(22K), FR-E840-0380(18.5K), 0440(22K))

Wiring cover

Pull out the cover along the guides in the direction shown by the arrow in the Fit the cover to the inverter along the guide

"PUSH" mark on the wiring cover to push the stopper behind the wiring

figure above.

(a)

(b)

cover approx. 3 mm.

FR-E840-0230(11K), 0300(15K)

the figure above.

figure above

6

cover approx. 3 mm.

the figure above.

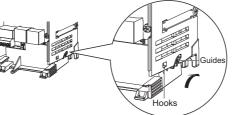
figure above

<u>اروجيدة فارون</u>

(a) Remove the mounting screws of the wiring cover.

(b)

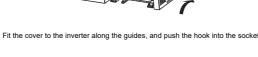
Reinstallation of the wiring cover (FR-E820-0050(0.75K) or lower, FR-E820S-0030(0.4K) or lower, FR-E810W-0030(0.4K) or lower)



Pull out the cover along the guides in the direction shown by the arrow in the Fit the cover to the inverter along the guides.

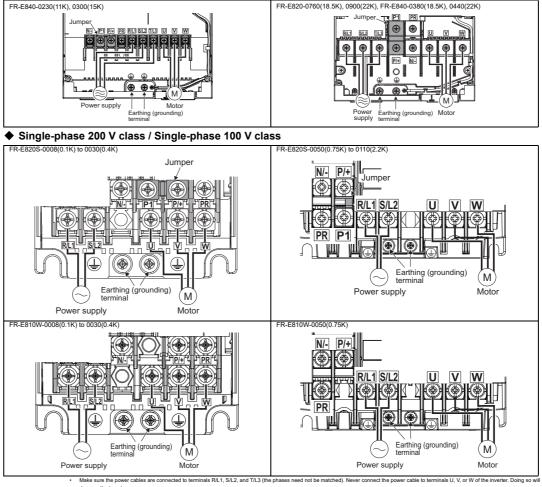
 Removal of the wiring cover (FR-E820-0080(1.5K) to FR-E820-0175(3.7K), FR-E840-0016(0.4K) to FR-E840-0095(3.7K), FR-E820-0175(3.7K), FR-E840-0016(0.4K) to FR-E820-0050(0.75K) or higher, FR-E810W-0.75K(0050))
 Reinstallation of the wiring cover (FR-E820-0080(1.5K) to FR-E820-0175(3.7K), FR-E840-0016(0.4K) to FR-E820-0050(0.75K) or higher, FR-E810W-0.75K(0050)) 0050(0.75K) or higher, FR-E810W-0.75K(0050))

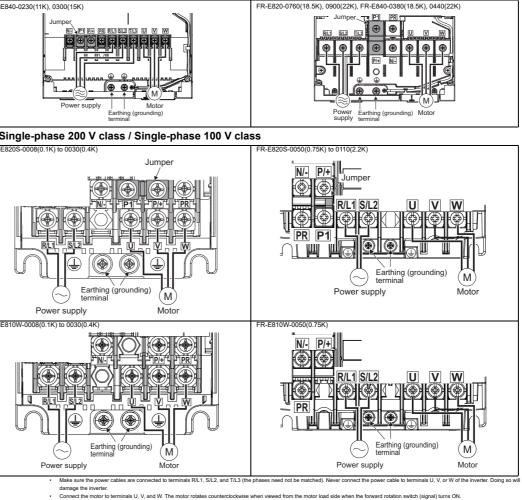




Reinstallation of the wiring cover (FR-E820-0240(5.5K) to 0600(15K), FR-E840-0230(11K), 0300(15K))

Wiring cover





# 2.3

E800 Instruction Manual (Connection)





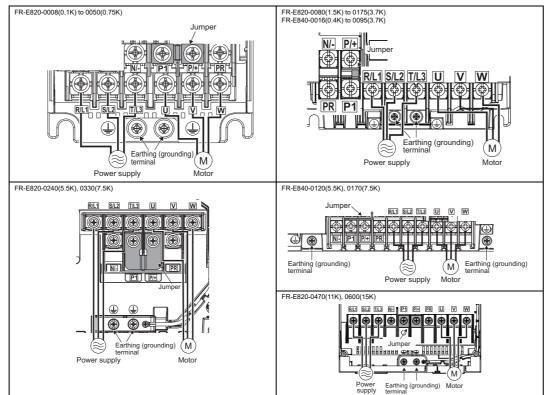
- Cable type



- ◆ Removal of the wiring cover (FR-E840-0120(5.5K), 0170(7.5K)) ◆ Reinstallation of the wiring cover (FR-E840-0120(5.5K), 0170(7.5K)) —Guides Fit the cover to the inverter along the guides
  - Reinstallation of the wiring cover (FR-E820-0760(18.5K), 0900(22K), FR-E840-0380(18.5K), 0440(22K)) Wiring cover Wiring cover

(a) Fit the cover to the inverter along the guides. (b) Pull out the cover along the guides in the direction shown by the arrow in the (b) Tighten the mounting screws of the wiring cover (tightening torque: 0.6 to 0.8 N·m)

## 2.2 Main circuit terminal layout and wiring to power supply and motor Three-phase 200/400 V class



Do not attempt to install, operate, maintain or inspect this product until you have read through this Safety Guideline and supplementary documents carefully to use the equipment correctly. Do not use the product until you have full knowledge of the product mechanism, safety information and instructions. Installation, operation, maintenance and inspection must be performed by qualified personnel. Here, qualified personnel means a person who meets all A person who possesses a certification in regard with electric appliance handling, or person took a proper engineering training. Such training may be available at your local Mitsubishi Electric office. Contact your local sales office for schedules and locations.
A person who can access operating manuals for the protective devices (for example, light curtain) connected to the safety control system, or a person who has read these manuals thoroughly and familiarized themselves with the protective devices. In this Safety Guideline, the safety instruction levels are classified into "WARNING" and "CAUTION". Incorrect handling may cause hazardous conditions, resulting in death or severe injury. Incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause only material damage. Note that even the CAUTION level may lead to a serious consequence depending on conditions. Be sure to follow the instructions of both levels as they are critical to perso Read this Guideline before use. In addition, scan the 2D code below to download the FR-E800 Instruction Manual (Connection) and read "Safety Instruction: The PDF manual can also be downloaded from the Mitsubishi Electric FA Global Website. 回続機回

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Allow clearance

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nore \*1\*2L

For the F

10 cm

or more

1 cm

10 cm

√ or more

more \*1\*?

1 cm

or more

ature of 40°C or less, the

) or higher, allow 5 cr

- B.1

### INVERTER INSTALLATION AND PRECAUTIONS 1

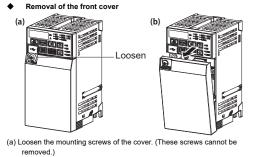
When installing the inverter on the enclosure surface, remove the front cover and wiring cover to fix the inverter.

- · Install the inverter on a strong surface securely with screws.
- Leave enough clearances and take cooling measures. Avoid places where the inverter is subjected to direct sunlight, high temperature
- and high humidity. Install the inverter on a nonflammable wall surface.
- When tightening screws into the upper mounting holes, tilt the screwdrive seven to ten dearees (FR-E820-0050(0.75K) or lower, FR-E820S-0030(0.4K) or lower, FR-E810W-0030(0.4K) or lower) Screwdrive

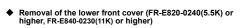




### 2.1 Removal and reinstallation of covers



(b) Pull out the cover using its lower side as a support. With the cover removed, the control circuit terminals can be wired and the plug-in option can be installed.

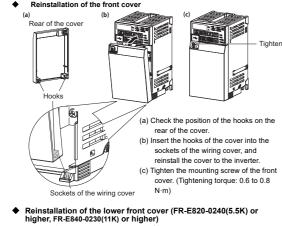


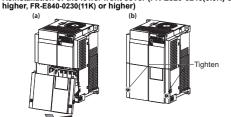


(a) Loosen the screws on the lower front cover. (These screws cannot be (b) While holding the areas around the installation hooks on the sides of the (b) Tighten the screws on the lower part of the lower front cover.

lower front cover, pull out the cover using its upper side as a support.

(c) With the lower front cover removed, wiring of the main circuit terminals and control circuit terminals can be performed.





(a) Install the lower front cover by inserting the upper hooks into the sockets on the inverter

### Recommended cables and wiring length Select cables of recommended gauge size to ensure that the voltage drop will be 2% or less.

If the wiring distance is long between the inverter and motor, the voltage drop in the main circuit will cause the motor torque to decrease especially at a low speed. The following table shows the recommended cable size for cables that are 20 m in length at the ND rating. When using the inverter with the LD rating, refer to the FR-

					Cable gauge								
Inverter	Terminal	Tightening torque N∙m	Crimp	terminal	HIV cables, etc. (mm <sup>2</sup> ) *1			AWG *2		PVC c	ables, etc	<b>:. (mm<sup>2</sup>)</b> *3	
lel	screw size *4		R/L1, S/L2, T/L3 *5	U, V, W	R/L1, S/L2, T/L3 *5	U, V, W	Earthing (grounding) cable	R/L1, S/L2, T/L3 *5	U, V, W	R/L1, S/L2, T/L3 *5	U, V, W	Earthing (grounding) cable	
) to 0050(0.75K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	14	14	2.5	2.5	2.5	
), 0110(2.2K)	M4	1.5	2-4	2-4	2	2	2	14	14	2.5	2.5	2.5	
)	M4	1.5	5.5-4	5.5-4	3.5	3.5	3.5	12	12	4	4	4	
)	M5	2.5	5.5-5	5.5-5	5.5	5.5	5.5	10	10	6	6	6	
)	M5	2.5	14-5	8-5	14	8	5.5	6	8	16	10	6	
	M5	2.5	14-5	14-5	14	14	8	6	6	16	16	16	
	M6(M5)	4.4	22-6	22-6	22	22	14	4	4	25	25	16	
<)	M8(M6)	7.8	38-8	22-8	38	22	14	2	4	35	25	25	
	M8(M6)	7.8	38-8	38-8	38	38	22	2	2	35	35	25	
) to 0095(3.7K)	M4	1.5	2-4	2-4	2	2	2	14	14	2.5	2.5	2.5	
)	M4	1.5	5.5-4	2-4	3.5	2	3.5	12	14	4	2.5	4	
)	M4	1.5	5.5-4	5.5-4	3.5	3.5	3.5	12	12	4	4	4	
	M4	1.5	5.5-4	5.5-4	5.5	5.5	5.5	10	10	6	6	10	
	M5	2.5	8-5	8-5	8	8	5.5	8	8	10	10	10	
<)	M6	4.4	14-6	8-6	14	8	8	6	8	16	10	16	
	M6	4.4	14-6	14-6	14	14	14	6	6	16	16	16	
K) to 0030(0.4K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	14	14	2.5	2.5	2.5	
5K)	M4	1.5	2-4	2-4	2	2	2	14	14	2.5	2.5	2.5	
K)	M4	1.5	2-4	2-4	2	2	2	14	14	2.5	2.5	2.5	
K)	M4	1.5	5.5-4	2-4	3.5	2	2	12	14	4	2.5	2.5	
K) to 0030(0.4K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	14	14	2.5	2.5	2.5	
′5K)	M4	1.5	5.5-4	2-4	3.5	2	2	14	14	2.5	2.5	2.5	

HIV cable (600 V grade heat-resistant PVC insulated wire) with a continuous maximum permissible temperature of 75°C. It is assumed that the cables will be used in a surrounding air temperature of 40°C or less and the wiring distance of 20 m or shorter. THYW cable with a continuous maximum permissible temperature of 75°C. It is assumed that the cables will be used in a surrounding air temperature of 40°C or less and the wiring distance of 20 m or shorter. (For use in the United States or Canada, refer to the section 7.2 "Instructions for UL and cUL".) PVC cable will be used in a surrounding air temperature of 40°C or less and the wiring distance of 20 m or shorter (selection exact for temperature) for (20°C, 10°C, 10°C, 10°C, 20°C, 2 shotter (selection example mainly for use in Europe). The screw size for terminals RU, 1, SL2, TL3, U, W, PR, P/+, N-, and P1, and the earthing (grounding) terminal is shown. For the single-phase 100 V power input models, the screw size for terminals RL1, SL2, U, V, W, PR, P/+, N-, and P1, and the earthing (grounding) terminal is shown. For the single-phase 100 V power input models, the screw size for terminals RL1, SL2, U, V, W, PR, P/+, N-, and P1, and the earthing (grounding) terminal is shown. For the single-phase 100 V power input models, the screw size for terminals RL1, SL2, U, V, W, PR, P/+, N-, and P1, and the earthing (grounding) terminal on FR-e2e2-000(SU(S)) is indicated in parentheses. When using a single-phase nower input model terminals are RL1 and RL2.

The line voltage drop can be calculated by the following formula:

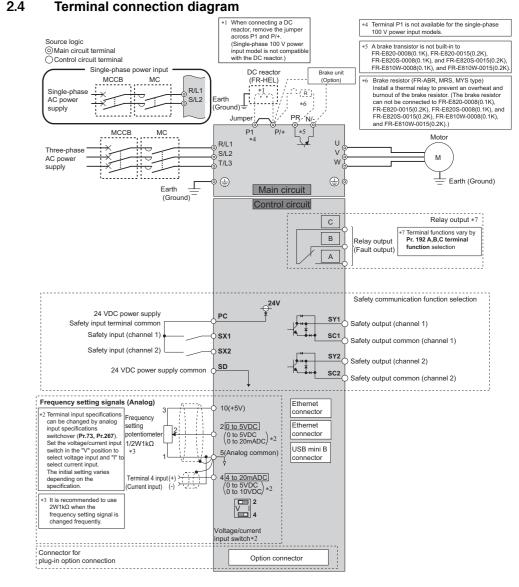
Line voltage drop [V] =  $\sqrt{3}$  × wire resistance [mΩ/m] × wiring distance [m] × current [A] / 1000

Use a larger diameter cable when the wiring distance is long or when the voltage drop (torque reduction) in the low speed range needs to be reduced.

Total wiring length Connect one or more motors within the total wiring length (sum of the wiring lengths of the motor and the inverter) shown in the following table.

Pr.72 setting (carrier frequency)	Voltage class	0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K or higher
1 (1 kHz) or lower	100 V, 200 V	50 m (200 m)	50 m (200 m)	75 m (300 m)	100 m (500 m)			
	400 V	—	—	50 m (200 m)	50 m (200 m)	75 m (300 m)	100 m (500 m)	100 m (500 m)
2 (2 kHz) or higher	100 V, 200 V	10 m (30 m)	25 m (100 m)	50 m (200 m)	75 m (300 m)	100 m (500 m)	100 m (500 m)	100 m (500 m)
	400 V	-	_	10 m (30 m)	25 m (100 m)	50 m (200 m)	75 m (300 m)	100 m (500 m)

When driving a 400 V class motor by the inverter, surge voltages attributable to the wiring constants may occur at the motor terminals, deteriorating the insulation of the motor. In this case, use a "400 V class inverter-driven insulation-enhanced motor" and set Pr.72 PWM frequency selection according to the wiring length: "14.5 kHz or less" when the wiring length is 50 m or shorter, "8 kHz or less" when the wiring length is from 50 m to 100 m, or "2 kHz or less" when the wiring length is longer than 100



Details on the main	circuit terminals and the	control circuit terminals
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Ту	/pe	Terminal symbol	Common	Terminal name	Terminal function description							
		R/L1, S/L2, T/L3*1	-	AC power input	Connected to the commercial power supply.							
		U, V, W	-	Inverter output	Connected to a three-phase squirrel cage motor or a PM motor.							
-	linc	P/+, PR	_	Brake resistor connection	Connect an optional brake transistor (MRS, MYS, FR-ABR) between terminal P. FR-E820-0008(0.1K), FR-E820-0015(0.2K), FR-E820S-0008(0.1K), and FR-E8 0008(0.1K), and FR-E810W-0015(0.2K).)							
-	Main circuit	P/+, N/-	-	Brake unit connection	Connect the brake unit (FR-BU2, FR-BU, or BU) or the multifunction regeneratio regeneration mode) to these terminals.	n converter (FR-XC in pow						
	Σ	P/+, P1*2	-	DC reactor connection	Remove the jumper across terminals P/+ and P1, and connect a DC reactor. (A DC reactor cannot be connected to the single-phase 100 V power input models.) When a DC reactor is not connected, the jump across terminals P/+ and P1 should not be removed.							
			-	Earth (ground)	For earthing (grounding) the inverter chassis. Be sure to earth (ground) the inverter	rter.						
		10	5	Power supply for a frequency setting potentiometer	Used as the power supply for an external frequency setting (speed setting) potentiometer.	5 ±0.5 VDC, Permissible load current 10 mA						
signal	sy setting	2	5	Frequency setting (voltage)	Inputting 0 to 5 VDC (or 0 to 10 VDC) provides the maximum output frequency at 5 V (or 10 V) and makes input and output proportional. Use <b>Pr.73</b> to switch among input 0 to 5 VDC (initial setting), 0 to 10 VDC, and 0 to 20 mA. * The initial setting varies depending on the specification. Set the voltage/current input switch to the "I" position to select current input (0 to 20 mA).	For voltage input, Input resistance: 10 to 1 kΩ						
Input signa	2 5 (voltage) stating (voltage) 4 5 Frequency setting (current)			Inputting 4 to 20 mADC (or 0 to 5 VDC, 0 to 10 VDC) provides the maximum output frequency at 20 mA and makes input and output proportional. This input signal is valid only when the AU signal is ON (terminal 2 input is invalid). To use terminal 4 (current input at initial setting), assign "4" to <b>Pr.178 to Pr.178</b> (Input terminal function selection) before turning ON the AU signal. " The initial setting varies depending on the specification. Use <b>Pr.267</b> to switch among input 4 to 20 mA (initial setting), 0 to 5 VDC, and 0 to 10 VDC. Set the voltage/current input switch in the "V" position to select voltage input (0 to 5 V/ 0 to 10 V).	Maximum permissible voltage: 20 VDC For current input, Input resistance: 245 ±£ Permissible maximum current: 30 mA							
Output signal	Relay	A, B, C	_	Relay output (fault output)	1 changeover contact output indicates that the inverter protective function has activated and the outputs are stopped. Fault: discontinuity across B and C (continuity across A and C), Normal: continuity across B and C (discontinuity across A and C)	Contact capacity: 240 VAC 2A (power factor = 0.4) or 3 VDC 1 A						
		SX1	PC	Safety input (channel 1)		Input resistance: 4.7 kΩ						
Safety input/output signal	Contact input	SX2	PC	Safety input (channel 2)	Terminal functions can be selected using <b>Pr.S051 SX1/SX2 terminal</b> function selection. For details, refer to the FR-E800-SCE Instruction Manual (Functional Safety).	voltage when contacts a open: 21 to 26 VDC, current when contacts a short-circuited: 4 to 6 mADC						
nput	ro	SY1	SC1	Safety output (channel 1)		Permissible load: 24 VE						
Safety ir	Open collector	SY2	SC2	Safety output (channel 2)	Terminal functions can be selected using <b>Pr.S055 SY1/SY2 terminal</b> function selection. For details, refer to the FR-E800-SCE Instruction Manual (Functional Safety).	(27 VDC at maximum), 0.1 A (The voltage drop 3.4 V at maximum while the signal is ON.)						
			-	24 VDC power supply common								
		SD	-	External transistor common (source (positive common))	Common output terminal for 24 VDC 0.1A power supply (terminal PC). Isolated	from terminal 5.						
	rminal		-	Safety input terminal common	Common terminal for terminals SX1 and SX2.	Power supply voltage range:						
	Common terminal	PC	SD	24 VDC power supply	Can be used as a 24 VDC 0.1 A power supply.	22 to 26.5 VDC Permissible load currer 100 mA						
ç	Col	5	-	Frequency setting common	Common terminal for the frequency setting signal (terminal 2 or 4). Do not earth	(ground).						
		SC1		Safety output common (channel 1)	Common terminal for terminals SY1 and SY2. For details, refer to the FR-E800-	SCE Instruction Manual						
		SC2	-	Safety output common (channel 2)	(Functional Safety).							
	Communication	_	-	Ethernet connector (2 ports)*3	Communication can be made via Ethernet. Category: 100BASE-TX/10BASE-T Transmission method: Baseband Data transmission speed: 100 Mbps (100BASE-TX) / 10 Mbps (10BASE-T) Maximum segment length: 100 m between the hub and the inverter Interface: Number of cascade connection stages: Up to 2 (100BASE-TX) / up to 4 (10BA Number of interfaces available: 2: IP version: IPv4							
0	Comr	_	_	USB connector*4	By connecting an inverter to the personal computer through USB, FR Configura the inverter and monitoring the operation. Interface: conforms to USB 1.1 "Transmission speed: 12 Mbps	tor2 can be used for setti						

1 Ierminal 1/L3 is not available for the single-phase power input mod
 2 Terminal P 1 is not available for the single-phase 100 V power input
 3 Do not connect the parameter unit. The inverter may be damaged.

### 2.6 Control circuit terminal layout

## HE OFU ONON OFUN A ONEY OF ANN <u>de</u> == SX1SX2 PC SD SY1SC 10 2 5 4 SY2SC E\_ ABC

	can be stripped an Connect the end of	d used without a ferrule. f wires (crimp terminal or commercially available (as	stranded wire) to t	ing. If only a single wire is he terminal block.	used, the wire
C1 C2			Crimping		
	Wire gauge (mm <sup>2</sup> )	With insulation sleeve	Without insulation sleeve	For UL wire*1	Crimping tool model No.
	0.3	AI 0,34-10TQ	—	-	
	0.5	AI 0,5-10WH	—	AI 0,5-10WH-GB	

A 1-10

A 1,5-10

5 LIST OF FAULT DISPLAYS

The PDF manual can also be downloaded from the Mitsubishi Electric FA Global

For more information on the product 

For details, refer to the FR-E800 Instruction Manual (Maintenance).

A 0,75-10 AI 0,75-10GY-GB

AI 1-10RD/1000GB

AI 1,5-10BK/1000GB

mpatible with the MTW wire which has a thick wi

AI 0,75-10GY

AI 1-10RD

AI 1, 5-10BK

A ferrule terminal with an insulation insulation. Applicable for terminals A, B, C.

0.75 (for 2 wires) AI-TWIN 2×0,75-10GY -

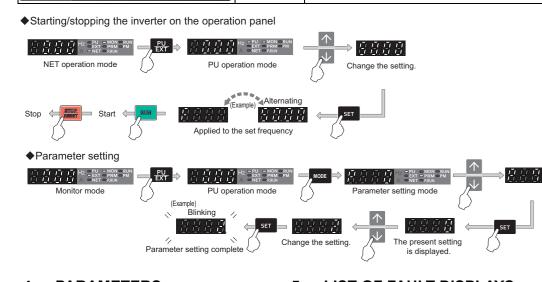
25.1.5

### BASIC OPERATION 3

The operation panel cannot be removed from the inverter

3.1 Components of the operation panel

	Name	Description
	PU/EXT key	Switches between the PU operation mode, the PUJOG operation mode, and the External operation mode.
	MODE key	Switches the operation panel to a different mode.
<u><u><u><u></u></u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u></u>	SET key	Used to confirm each selection. Switches the monitor screen in the monitor mode.
PU MODE SET A NS	RUN key	Start command The direction of motor rotation depends on the <b>Pr.40</b> setting.
	STOP/RESET key	Used to stop operation commands. Used to reset the inverter when the protective function is activated.
	UP/DOWN key	Used to change the setting of frequency or parameter.



Website.

### 4 PARAMETERS

Global Website.

For details, refer to the FR-E800 Instruction Manual (Function). The PDF manual can also be downloaded from the Mitsubishi Electric FA



## 6 SPECIFICATIONS

### 6.1 Inverter rating

Three-phase 200 V class

	Madal ED	E920 II		0008	0015	0030	0050	0080	0110	0175	0240	0330	0470	0600	0760	0900
Model FR-E820-[]				0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K
Applicable motor capacity (kW)*1			0.2	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11.0	15.0	18.5	22.0	30.0	
, abbuild	ND ND		0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5	22.0	
	Rated capaci	itv (kVA)*2	LD	0.5	0.8	1.4	2.4	3.8	4.8	7.8	12.0	15.9	22.3	27.5	35.1	45.8
			ND	0.3	0.6	1.2	2.0	3.2	4.4	7.0	9.6	13.1	18.7	23.9	30.3	35.9
	Rated current (A)*7		1.3 (1.1)	2.0 (1.7)	3.5 (3.0)	6.0 (5.1)	9.6 (8.2)	12.0 (10.2)	19.6 (16.7)	30.0 (25.5)	40.0 (34.0)	56.0 (47.6)	69.0 (58.7)	88.0 (74.8)	115.0 (97.8)	
			0.8 (0.8)	1.5 (1.4)	3.0 (2.5)	5.0 (4.1)	8.0 (7.0)	11.0 (10.0)	17.5 (16.5)	24.0 (23.0)	33.0 (31.0)	47.0 (44.0)	60.0 (57.0)	76.0 (72.0)	90.0 (86.0)	
Output	Overload curr	ont ratina*3	LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C												
	ovenoud curr	ND	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C													
	Ve		Three-phase 200 to 240 V													
		Brake tran		Not insta	illed	Built-in										
	Regenerative braking Maximum brake torque (ND reference)*5		ND	150%		100%		50%	20%							
		AC (DC) volt	age/	Three-ph	nase 200 t	o 240 V 5	0/60 Hz (2	83 to 339	VDC *9)							
		e AC (DC) vol	tage	170 to 264 V, 50/60 Hz (240 to 373 VDC *9)												
	Permissible fr	equency fluc	tuation	±5%												
		Without	LD	1.9	3.0	5.1	8.2	12.5	16.1	25.5	37.1	48.6	74.3	90.5	112.9	139.5
Power	Rated input	DC reactor	ND	1.4	2.3	4.5	7.0	10.7	15.0	23.1	30.5	41.0	63.6	79.9	99.0	114.3
supply	current (A)*8	With DC	LD	1.3	2.0	3.5	6.0	9.6	12.0	20.0	30.0	40.0	56.0	69.0	88.0	115.0
		reactor	ND	0.8	1.5	3.0	5.0	8.0	11.0	17.5	24.0	33.0	47.0	60.0	76.0	90.0
	Dowerownah	Without	LD	0.7	1.1	1.9	3.1	4.8	6.2	9.7	15.0	19.0	29.0	35.0	43.0	54.0
	Power supply capacity	DC reactor	ND	0.5	0.9	1.7	2.7	4.1	5.7	8.8	12.0	16.0	25.0	31.0	38.0	44.0
	(kVA)*6	With DC	LD	0.5	0.8	1.3	2.3	3.7	4.6	7.5	11.0	15.0	21.0	26.0	34.0	44.0
	reactor ND				0.6	1.1	1.9	3.0	4.2	6.7	9.1	13.0	18.0	23.0	29.0	34.0
Protective structure Open type (IP20 for IEC 60529 only					29 only)											
	Cooling s			Natural				Forced a								
	Approx. ma	ass (kg)		0.5	0.5	0.7	1.0	1.4	1.4	1.8	3.3	3.3	5.4	5.6	11.0	11.0

	Model FR-	0016	0026	0040	0060	0095	0120	0170	0230	0300	0380	0440			
	WOUGH FR-	⊑0 <del>4</del> 0-[]		0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	
Applic	able motor capa	city (kW)*1	LD	0.75	1.5	2.2	3.0	5.5	7.5	11.0	15.0	18.5	22.0	30.0	
Applica	able motor capa	ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5	22.0		
	Rated capacity (kVA)*2				2.7	4.2	5.3	8.5	13.3	17.5	26.7	31.2	34.3	45.7	
	Nated capaci	(KVA) 2	ND	1.2	2.0	3.0	4.6	7.2	9.1	13.0	17.5	22.9	29.0	33.5	
	Rated current		LD	2.1 (1.8)	3.5 (3.0)	5.5 (4.7)	6.9 (5.9)	11.1 (9.4)	17.5 (14.9)	23.0 (19.6)	35.0 (29.8)	41.0 (34.9)	45.0 (38.3)	60.0 (51.0)	
	Nated Curre	ND		1.6 (1.4)	2.6 (2.2)	4.0 (3.8)	6.0 (5.4)	9.5 (8.7)	12.0	17.0	23.0	30.0	38.0	44.0	
Output	Overload curr	ont rating*3	LD	120% 60	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C										
	Overioad curre	sint rating 5	ND	150% 60	50% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C										
	Voltage*4			Three-ph	ase 380 to	480 V									
		Brake tran	sistor	Built-in											
	Regenerative braking	Regenerative braking torque (ND reference)*5		100% 50% 20%											
		AC (DC) volt equency	age/	Three-phase 380 to 480 V 50/60 Hz (537 to 679VDC *9)											
		AC (DC) vol ctuation	tage	323 to 52	8 V, 50/60	Hz (457 to	740VDC	'9)							
	Permissible fr	equency fluc	tuation	±5%											
		Without	LD	3.3	6.0	8.9	10.7	16.2	24.9	32.4	46.7	54.2	59.1	75.6	
Power	Rated input	DC reactor	ND	2.7	4.4	6.7	9.5	14.1	17.8	24.7	32.1	41.0	50.8	57.3	
supply	current (A)*8	With DC	LD	2.1	3.5	5.5	6.9	11.0	18.0	23.0	35.0	41.0	45.0	60.0	
		reactor	ND	1.6	2.6	4.0	6.0	9.5	12.0	17.0	23.0	30.0	38.0	44.0	
	Without		LD	2.5	4.5	6.8	8.2	12.4	19.0	25.0	36.0	42.0	45.0	58.0	

2.0 Open type (IP20 for IEC 60529 o

Forced ai

0016 0026 0040 0060 0095 0120 0170 0230 0300 0380 0440

 DC reactor
 ND
 2.1
 3.4
 5.1
 7.2
 10.8
 14.0
 19.0
 25.0
 32.0
 39.0
 44.0

 With DC
 LD
 1.6
 2.7
 4.2
 5.3
 8.5
 13.0
 18.0
 27.0
 31.0
 34.0
 46.0

3.0 4.6 7.2 9.1 13.0 18.0 23.0

 1.2
 1.2
 1.4
 1.8
 1.8
 2.4
 2.4
 4.8
 4.9
 11.0
 11.0

Cooling system	
Approx. mass (kg)	
Single-phase 200 V class	

Three-phase 400 V class

				0008	0015	0030	0050	0080	0110
	Model FR-E	820S-[]		0.1K	0.2K	0.4K	0.75K	1.5K	2.2K
Applica	able motor capa	city (kW)*1	ND	0.1	0.2	0.4	0.75	1.5	2.2
	Rated capaci	ty (kVA)*2	ND	0.3	0.6	1.2	2.0	3.2	4.4
	Rated curre	ent (A)*7	ND	0.8 (0.8)	1.6 (1.4)	3.0 (2.5)	5.0 4.1)	8.0 (7.0)	11.0 (10.0)
Quant	Overload curre	ent rating*3	ND	150% 60 s, 200% 3 s (inverse-time ch surrounding air temperature of 50 $^{\circ}\mathrm{C}$				acteristics)	at
Output	Vo		Three-ph	ase 200 to	240 V				
		Brake tran	nsistor	Not instal	led	Built-in			
	Regenerative braking	Maximum torque reference	(ND	150% 100%				50%	20%
	Rated input A	C voltage/free	Single-ph	ase 200 to	240 V, 50	/60 Hz			
	Permissible A	C voltage flue	ctuation	170 to 26	4 V, 50/60	Hz			
	Permissible fr	±5%							
Power	Rated input	Without DC reactor	ND	2.3	4.1	7.9	11.2	17.9	25.0
supply	current (Å)*8	With DC reactor	ND	1.4	2.6	5.2	8.7	13.9	19.1
	Power supply capacity	Without DC reactor	ND	0.4	0.8	1.5	2.5	4.5	5.5
	(kVA)*6 With DC reactor			0.3	0.6	1.1	1.9	3.0	4.2
	Protective s	Open typ	e (IP20 for	IEC 60529	9 only)				
	Cooling s	ystem		Natural				Forced a	ir
	Approx. ma	ass (kg)		0.5	0.5	0.8	1.3	1.4	1.9

### Single-phase 100 V class

▼ 300	gie-phase		55					
	Madel 5D 5	04004 13	0008	0015	0030	0050		
	Model FR-E	81044-[]		0.1K	0.2K	0.4K	0.75K	
Applica	able motor capa	0.1	0.2	0.4	0.75			
	Rated capaci	ty (kVA)*2	ND	0.3	0.6	1.2	2.0	
	Rated curre	ent (A)*7	ND	0.8 (0.8)	1.5 (1.4)	3.0 (2.5)	5.0 (4.1)	
Output	Overload curre	ent rating*3	ND	character	s, 200% 3 istics) at si ure of 50°C	urrounding		
	Volt	age*10*11		Three-phase 200 to 240 V				
		Brake tran	nsistor	Not instal	led	Built-in		
	Regenerative braking	Maximum torqu (ND refere	e	150%		100%		
	Rated input A	C voltage/free	quency	Single-phase 100 to 120 V 50/60 Hz				
	Permissible A	C voltage flue	ctuation	90 to 132 V, 50/60 Hz				
Power	Permissible fr	equency fluc	tuation	±5%				
supply	Rated input cu	irrent (A) *8	ND	3.7	6.8	12.4	19.6	
	Power supply (kVA)	ND	0.5 0.9 1.5			2.5		
	Protective s	Open typ	e (IP20 for	IEC 60529	) only)			
	Cooling system							
	Approx. mass (kg)				0.6	0.8	1.4	

## icable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard efficiency motor. a Mitsubishi Electric high-performance energy-saving motor, use the 200 V class 0.75K inverter for a 1.1 kW motor, or 2004/00 V class 2.2 K inverter for a 0 output capacity as sums that the output voltage is 230 V for three-phase 200 V class and single-phase 200/100 V class, and 440 V for three-phase 400 energies and single-phase 200/100 V class, and 440 V for three-phase 400 energies of the overload current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow time for the inverter faults of the overload current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow time for the inverter faults of the overload current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow time for the inverter faults of the overload current taking is the ratio of the overload current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow time for the inverter faults of the overload current taking is the ratio of the overload current taking is the ratio of the overload current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow the ratio of the overload current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow the repeated as the overload output current taking is the ratio of the overload current to the inverter's rated output current. For repeated duy, allow takes 2010 V class 2

- a auty, allow time for the inverter and motor to return to or below the irre (Pr.57) and the power failure stop (Pr.261) functions are set valid abiling the inverter to drive a load 100% or higher. setting range. The maximum point of the voltage waveform at the temperatures under 100% load. In a single-phase 200 V class inverter with the automatic restant after the instantaneous power fa a voltage drop at the power supply and a large load may bring down the bus voltage to the level recognized as a power failure, or The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the
- continuous regenerative torque. The averaged vacceleration torque because the sequences of the sequences when a request when a request when a request plant requeres the sequence of the interfer is not expression on easy uses a generative torque the request interfer is not expression. The average of experimentary is not expression on easy uses a generative torque the request plant reperts in the generative the reperts of th
- The power supply detailed years will nee value of the input ower impediated (including those of the input needed will clause). In Pr.22 WM frequency selection. In Pr.22 WM frequency selection. The rated input current is the value at a rated output current. The input power impediances (including those of the input reactor and cables) affect the value. Connect the DC power supply to the inverter terminals PH and Nr. Connect the possible terminal of the power supply to terminal PH and the negative terminal to terminal Nr. When the energy is regenerated from the motor, the voltage between terminals PH and Nr. Connect the resolute terminal or to 15 V or more (610 V or more for the 400 V class). Use a DI resistant to the regenerative voltage/energy. When a power supply that cannot resist the regenerative voltage/energy is used, connect a reverse current prevention idode in sale \* Powering ON produces up to four times as large current as the inverter rated current. Prepare a DC power supply esistant to the invush current at power ON, although an invus is privided in the R-Ex800 sense inverter.
- is provided in the FR-E800 series inverter. The power capacity depends on the output impedance of the power supply. Select a power capacity around the AC power supply capacity. 10 For the single-phase 100 V power input models, the maximum output votage is twice the amount of the power supply votage. 11 For the single-phase 100 V power input models, output votage decreases by applying motir to add, and output current increases compared to 11 For the single-phase 100 V power input models, output votage decreases by applying motir to add, and output current increases compared to

### Inverter installation environment

Item	Description	
Surrounding air temperature*1	-20°C to +60°C (The rated current must be reduced at a temperature above 50°C. For details, refer to the FR-E800 Instruction Manual (Connection). To meet the UL/EN standards, use the product at temperatures from -20°C to 50°C.)	Enclosure
Ambient humidity	95% RH or less (non-condensing) (With circuit board coating (IEC 60721-3-3:1994 3C2 compatible)) 90% RH or less (non-condensing) (Without circuit board coating)	Inverter Measurement position
Storage temperature	-40°C to +70°C	5 cm Measurement ↓ 5 cm position
Atmosphere	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)	
Altitude/vibration	Maximum 3000 m, 5.9 m/s <sup>2</sup> or less (For installation at an altitude above 1000 m, consider a 3% reduction in the	rated current per 500 m increase in altitude.)

Maximum 3000 m, 5.9 m/s<sup>2</sup> or less (For installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.

### 7 APPENDIX

### For information on other applicable standards not found in this document, refer to the FR-E800 Instruction Manual (Connection). 7.1 Instructions for compliance with the EU Directives

### The authorized representative in the EU

The authorized representative in the EU is shown below. Name: Mitsubishi Electric Europe B.V.

Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

### EMC Directive

6.2

We declare that this inverter conforms with the EMC Directive and affix the CE marking on the inverter EMC Directive: 2014/30/EU

- Standard: IEC 61800-3 Category "C3" / Second environment
- This inverter is not intended to be used on a low-voltage public network which supplies domestic premises. When using the inverter in a residential area, take appropriat and ensure the conformity of the inverter used in the residential area. Radio frequency interference is expected if used on such a network

Notes Set the EMC Directive compliant EMC filter to the inverter. Insert line noise filters and ferrite cores to the power and control cables as required.

- Connect the inverter to an earthed power supply. Install the motor and controller cable found in the EMC Installation Guidelines (BCN-A21041-204) and Technical News (MF-S-175 and 176) according to the instructions.
- (Contact your sales representative for the manual.) To make full use of the EMC Directive compliant noise filter, motor cable lengths should not exceed 20 m. Ensure that the finalized system which includes an inverter complies with the EMC Directive.

## Low Voltage Directive: 2014/35/EU

Standard: EN 61800-5-1

Outline of instructions

Inverter model	Cat. No	Manufacturer	Rating	Inverter model	Cat. No	Manufacturer	Rating	
FR-E820-0008(0.1K), 0015(0.2K)	170M1408, 170M1308 or 170M1358	Bussmann	700 V, 10 A	FR-E840-0095(3.7K)	170M1414, 170M1314 or 170M1364	Bussmann	700 V, 50 A	
FR-E820-0030(0.4K)	170M1409, 170M1309 or 170M1359	Bussmann	700 V, 16 A	FR-E840-0120(5.5K), 170M1416, 170M1316 or 0170(7.5K) 170M1366		Bussmann	700 V, 80 A	
FR-E820-0050(0.75K)	170M1411, 170M1311 or 170M1361	Bussmann	700 V, 25 A	FR-E840-0230(11K)	840-0230(11K) 170M1419, 170M1319 or 170M1469		700 V, 160 A	
FR-E820-0080(1.5K)	170M1413, 170M1313 or 170M1363	Bussmann	700 V, 40 A	FR-E840-0300(15K)	170M1419, 170M1319 or 170M1469	Bussmann	700 V, 160 A	
FR-E820-0110(2.2K)	170M1414, 170M1314 or 170M1364	Bussmann	700 V, 50 A	FR-E840-0380(18.5K)	170M1420, 170M1320 or 170M1370	Bussmann	700 V, 200 A	
FR-E820-0175(3.7K)	170M1416, 170M1316 or 170M1366	Bussmann	700 V, 80 A	FR-E840-0440(22K)	170M1421, 170M1321 or 170M1471	Bussmann	700 V, 250 A	
FR-E820-0240(5.5K)	170M1418, 170M1318 or 170M1368	Bussmann	700 V, 125 A	FR-E820S-0008(0.1K)	170M1408, 170M1308 or 170M1358	Bussmann	700 V, 10 A	
FR-E820-0330(7.5K)	170M1419, 170M1319 or 170M1369	Bussmann	700 V, 160 A	FR-E820S-0015(0.2K)	170M1409, 170M1309 or 170M1359	Bussmann	700 V, 16 A	
FR-E820-0470(11K)	170M1420, 170M1320 or 170M1370	Bussmann	700 V, 200 A	FR-E820S-0030(0.4K)	170M1411, 170M1311 or 170M1361	Bussmann	700 V, 25 A	
FR-E820-0600(15K)	170M1421, 170M1321 or 170M1471	Bussmann	700 V, 250 A	FR-E820S-0050(0.75K)	170M1413, 170M1313 or 170M1363	Bussmann	700 V, 40 A	
FR-E820-0760(18.5K)	170M1422, 170M1322 or 170M1472	Bussmann	700 V, 315 A	FR-E820S-0080(1.5K)	170M1415, 170M1315 or 170M1365	Bussmann	700 V, 63 A	
FR-E820-0900(22K)	170M1422, 170M1322 or 170M1472	Bussmann	700 V, 315 A	FR-E820S-0110(2.2K)	170M1417, 170M1317 or 170M1367	Bussmann	700 V, 100 A	
FR-E840-0016(0.4K)	170M1408, 170M1308 or 170M1358	Bussmann	700 V, 10 A	FR-E810W-0008(0.1K)	170M1409, 170M1309 or 170M1359	Bussmann	700 V, 16 A	
FR-E840-0026(0.75K)	170M1410, 170M1310 or 170M1360	Bussmann	700 V, 20 A	FR-E810W-0015(0.2K)	170M1410, 170M1310 or 170M1360	Bussmann	700 V, 20 A	
FR-E840-0040(1.5K)	170M1411, 170M1311 or 170M1361	Bussmann	700 V, 25 A	FR-E810W-0030(0.4K)	170M1413, 170M1313 or 170M1363	Bussmann	700 V, 40 A	
FR-E840-0060(2.2K)	170M1312, 170M1362 or 170M1412	Bussmann	700 V, 32 A	FR-E810W-0050(0.75K)	170M1415, 170M1315 or 170M1365	Bussmann	700 V, 63 A	

-AVERTISSEMENT-L'utilisation de ce produit nécessite des instructions détaillées d'installation et d'utilisation fournies dans le présent document de la Directive de sécurité et le Manuel d'instructions (Connexion) destiné à être utilisé avec ce produit. Veuillez transmettre les manuels correspondants à l'utilisateur final. Les manuels peuvent également être téléchargés au format PDF sur Mitsubishi Electric FA Global Website. Pour commander des manuels, veuillez contacter votre représentant commercial.

 Branch circuit protection
For installation in the United States, use the branch circuit protection equipment specified in Technical News MF-S-187, in accordance with the National Electrical Code and any applicable local codes. any applicable local codes

-AVERTISSEMENT-Si le fusible fond ou si le disjoncteur se déclenche du côté entrée de ce produit, vérifier les défauts de câblage (tels que les courts-circuits). Identifier et éliminer la cause de la fonte ou du déclenchement avant de remplacer le fusible ou de réinitialiser le disjoncteur déclenché (ou avant de remettre sous tension l'onduleur). Capacitor discharge time / Temps de décharge du condensateur CAUTION - Risk of Electric Shock -

power OFF, and it is dangerous. ATTENTION - Risque de choc électrique -

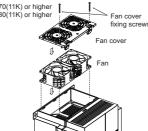
Applica



## Low Voltage Directive We have self-confirmed our inverters as products compliant to the Low Voltage Directive and affix the CE marking on the inverters.

- Do not use an earth leakage circuit breaker as an electric shock protector without connecting the equipment to the earth. Connect the equipment to the earth (ground)
- securely. Wire the earth terminal independently. (Do not connect two or more cables to one terminal.) Select appropriate wire according to EN 60204-1 or IEC 60364-5-52. (Refer to the selection examples of cable sizes in 2.3 Applicable cables and wiring length.) Use a tinned (plating should not include zinc) crimping terminal to connect the earth (ground) cable. When tightening the screw, be careful not to damage the threads. For use as a product compliant with the Low Voltage Directive, use PVC cables.
- as a product compliant with the Low Voltage Directive, use PVC cables. Use PVC cables for I/O wiring. Use the molded case circuit breaker and magnetic contactor which conform to the EN or IEC Standard. If an earth leakage circuit breaker is required, use a type-B earth leakage circuit breaker (ACDC detection compatible). Use the inverter under the conditions of overvoltage category III specified in IEC 60664. To use the inverter under the conditions of pollution degree 3, install it in the enclosure of IPS4 or higher for protection against electric shock and fire. Attach the fan cover to the fan with the fan cover fixing screws enclosed with the inverter. FRE E200.0090/14/EV1 to 0390/7 EV1 to 1500/1500 FRE 420-0470(11K) or higher 1 FR-E820-0080(1.5K) to 0330(7.5K) FR-E840-0040(1.5K) to 0170(7.5K) FR-E840-0040(1.5K) to 0170(7.5K) FR-E840-0230(11K) or higher Fan cove
  - FR-E820S-0080(1.5K) or higher





If the cover is not fixed, the inverter protective structure is regarded as IP00

Motor overload protection
 For details, refer to 7.2 Instructions for UL and cUL: Motor overload protection.

EU RoHS Directive
 We have declared that our inverters are compliant to the EU RoHS Directive and affix the CE marking on the inverters

## 7.2 Instructions for UL and cUL

For other information, refer to the FR-E800 Instruction Manual (Connection).

(Standard to comply with: UL 61800-5-1, CSA C22.2 No. 274)

 Product handling information / Informations sur la manipulation du product
 -WARNING- Operation of this product requires detailed installation and operation instructions provided in this Safety Guideline and the Instruction Manual (Connection intended for use with this product. Please forward relevant manuals to the end user. The manuals can also be downloaded in PDF form from the Mitsubishi Electric FA Global Website. To order manuals, please contact your sales representative.

For installation in Canada, use the branch circuit protection equipment specified in Technical News MF-S-187, in accordance with the Canadian Electrical Code and

Integral solid state short circuit protection does not provide branch circuit protection.

Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

The installation/operation manual is available via the internet at https://www.mitsubishielectric.com/fa/products/drv/inv/support/e800/e800sce.html A hard copy of this information may be ordered at +1 (847) 478-2100 (Mitsubishi Electric Automation, Inc. in USA).

• Precautions for opening the branch-circuit protective device / Précautions pour ouvrir le dispositif de protection du circuit de dérivation -WARNING- If the fuse melts down or the breaker trips on the input side of this product, check for wiring faults (such as short circuits). Identify and remove the cause of melting down or the trip before replacing the fuse or resetting the tripped breaker (or before applying the power to the inverter again).

Before wiring or inspection, check that the LED display of the operation panel is OFF. Any person who is involved in wiring or inspection shall wait for 10 minutes or longer after power OFF, and check that there are no residual voltage using a digital multimeter or the like. The capacitor is charged with high voltage for some time after

Avant le câblage ou l'inspection, vérifier que le témoin LED s'éteint. Toute personne impliquée dans le câblage ou l'inspection doit attendre 10 minutes ou plus après la mise hors tension et vérifier l'absence de tension résiduelle à l'aide d'un multimètre numérique ou similaire. Le condensateur est chargé avec une haute tension pendant un certain temps après la mise hors tension, ce qui est dangereux. Précautions pour ouvrir le dispositif de protection du circuit de dérivation

### Wiring to the power supply and the motor

ding the allowable current of the cable. Select the cable size for 125% of the rated current according to the National Electrical Code (Article 430). For wining the input (R/L1, S/L2, T/L3) and output (U, V, W) terminals of the inverter, use the UL listed copper, stranded wires (rated at 75°C) and round crimp terminals. Crimp the terminals with the crimping tool recommended by the terminal manufacturer.

The following table shows examples when the inverter rating is 125% of the LD rating, when the cable is the THHW cable with continuous maximum permissible temperature of 75°C, when the surrounding air temperature is 40°C or less, and when the wiring length is 20 m or shorter.

			Original form		Cable gauge AWG		
ble inverter model	Terminal screw size	Tightening torque (N·m)	Crimp term	inai			
		(11)	R/L1, S/L2, T/L3	U, V, W	R/L1, S/L2, T/L3	U, V, W	
to 0050(0.75K)	M3.5	1.2	2-3.5	2-3.5	14	14	
	M4	1.5	3.5-4	2-4	12	14	
	M4	1.5	5.5-4	2-4	10	14	
	M4	1.5	8-NK4	5.5-4	8	10	
	M5	2.5	8-5	8-5	8	8	
	M5	2.5	14-5	8-5	6	8	
	M5	2.5	38-S5	22-5	3	4	
	M6(M5)	4.4	38-S6	38-S6	2	3	
)	M8(M6)	7.8	60-8	38-8	1/0	2	
	M8(M6)	7.8	60-8	60-8	1/0×2	1/0	
to 0060(2.2K)	M4	1.5	2-4	2-4	14	14	
	M4	1.5	5.5-4	2-4	10	14	
, 0170(7.5K)	M4	1.5	8-NK4	5.5-4	8	10	
	M4	1.5	14-4	8-4	6	8	
	M5	2.5	22-S5	14-5	4	6	
.)	M6	4.4	22-6	14-6	4	6	
	M6	4.4	38-6	22-6	3	4	

The screw size for terminals RL1, SL2, TL3, U, V, W, PR, P/+, N-, and P1, and the earthing (grounding) terminal is shown. For single-phase power input, the terminal screw size indicates the size of terminal screw for RL1, SL2, U, V, W, PR, P/+, N-, P1 and a screw for earthing (grounding). The screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-9600(25K) is different screw size for the earthing (grounding) terminal on FR-E820-9600(15K) to FR-E820-96

The following table shows examples when the inverter rating is 125% of the ND rating, when the cable is the THHW cable with continuous maximum permissible temperature of 75°C, when the surrounding air temperature is 40°C or less, and when the wiring length is 20 m or shorter.

			Orderen to m		Cable gauge		
Applicable inverter model	Terminal screw size	Tightening torque (N·m)	Crimp tern	nnai	AWG		
		(R III)	R/L1, S/L2	U, V, W	R/L1, S/L2	U, V, W	
FR-E820S-0008(0.1K) to 0030(0.4K)	M3.5	1.2	2-3.5	2-3.5	14	14	
FR-E820S-0050(0.75K)	M4	1.5	2-4	2-4	14	14	
FR-E820S-0080(1.5K)	M4	1.5	5.5-4	2-4	10	14	
FR-E820S-0110(2.2K)	M4	1.5	8-NK4	2-4	8	14	
FR-E810W-0008(0.1K), 0015(0.2K)	M3.5	1.2	2-3.5	2-3.5	14	14	
FR-E810W-0030(0.4K)	M3.5	1.2	5.5-S3	2-3.5	12	14	
FR-E810W-0050(0.75K)	M4	1.5	5.5-4	2-4	10	14	

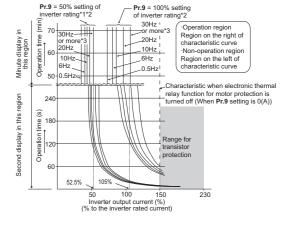
For the single-phase 200 Y power input models, the scow size for terminals RU1, StL2, U, W, WF, PL+ Nv, and P1, and the earthing (grounding) terminal is shown. For the single-phase 100 V power input models, the screw size for terminals RU1, StL2, U, W, WF, PL, Pt+, and N+, and the earthing (grounding) terminal is shown.

Short circuit ratings
 100 V class: Suitable for use in a circuit capable of delivering not more than 65 kA rms symmetrical amperes, 120 V maximum.
 200 V class: Suitable for use in a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 240 V maximum.

400 V class: Suitable for use in a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 480 Y / 277 V maximum.

Motor overload protection

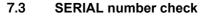
The following explains the details of the motor overload protection. When using the electronic thermal relay function as motor overload protection, set the rated motor current in Pr.9 Electronic thermal O/L relay. This function detects the overload (overheat) of the motor and shut off the



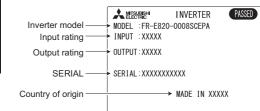
Inverter output by stopping the operation of the transistor at the inverter output by stopping the operation of the transistor at the inverter output side. (The operation characteristic is shown on the left.) • When using the Mitsubishi Electric constant-torque motor

- 1) Set one of "10, 13, 15, 16, 50, 53, 70, 73, 1800 or 1803" in **Pr.71**. (This setting enables the 100% constant-torque characteristic in the low-speed range.)
- Set the rated motor current in Pr.9.

- Set the rated mixed called in the r.s.
   \*1
   When setting Pre1s to a value (current value) of 50% of the inverter rated
   output current.
   \*2
   \*1
   When setting Pre1s to a value (current value) of 50% of the inverter rated
   output current.
   \*3
   When the electronic thermal relay function dedicated to the Mitsubishi
   lectric constant-forque motor is set, this characteristic curve applies to
   output value of the of the electronic thermal Accumulated the electronic the electronic thermal Accumulated the value of the electronic thermal O/L relay is reset to the initial value by the inverter's power reset or reset signal input. Avoid unnecessary reset and power-OFF. Install an external thermal relay (OCR) between the inverter and motors to
- operate several motors, a multi-pole motor or a dedicated motor with one inverter. When configuring an external thermal relay, note that the current indicated on the motor rating plate is affected by the line-to-line leakage current (Refer to the Instruction Manual (Function).) The cooling effect of the motor drops during low-speed operation. Use a motor with built-in thermal protector. When the difference between the inverter and motor capacities is large and the set value is small, the protective characteristics of the electronic thermal relay function will be deteriorated. Use an external thermal relay in such cases. The cooling effect of the motor drops during low-speed operation. Use a motor
- with built-in thermal protector. A dedicated motor cannot be protected by the electronic thermal relay. Use an external thermal relay.
- · When using a Vector-control-dedicated motor (SF-V5RU) with built-in thermal protector, set  $\mathbf{Pr.9} = "0"$  if another thermal protector is connected. Motor over temperature sensing is not provided by the drive.
- The electronic thermal memory retention function is not provided by the drive.
- The electronic thermal relay function is not a speed sensing function



The SERIAL number can be checked on the inverter rating plate or package. Rating plate example



### Symbol Year Month Control numb SERIAL The SERIAL consists of two symbol, three characters indicating the production year

and month, and six characters indicating the control number. The last two digits of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December)

### 7.4 EU ErP Directive (Ecodesign Directive)

The following table shows the power loss data according to Ecodesign Directive. The regulation covers 3-phase variable speed drives from 0.12 kW ≤ Pn ≤ 1 000 kW. (LD rated / ND rated)

Model name	Rated Apparent power (kVA)	Stand by loss (W)	load point 1 (90;100) (%)	load point 2 (50;100) (%)	load point 3 (0;100) (%)	load point 4 (90;50) (%)	load point 5 (50;50) (%)	load point 6 (0;50) (%)	load point 7 (50;25) (%)	load point 8 (0;25) (%)	IE class
FR-E820-0015(0.2K)	0.8 / 0.6	5.1	3.1 / 3.2	3.1 / 3.2	3.1/3.3	2.6 / 2.8	2.6/2.8	2.6 / 2.8	2.5 / 2.7	2.5 / 2.8	IE2
FR-E820-0030(0.4K)	1.4 / 1.2	5.1	2.9 / 2.9	2.9 / 2.9	3.0 / 2.9	2.3/2.3	2.3/2.3	2.4 / 2.4	2.3 / 2.3	2.3 / 2.3	IE2
FR-E820-0050(0.75K)	2.4 / 2	5.1	2.7 / 2.6	2.7 / 2.6	2.7 / 2.7	1.8 / 1.8	1.8 / 1.8	1.8 / 1.8	1.5 / 1.5	1.5 / 1.5	IE2
FR-E820-0080(1.5K)	3.8 / 3.2	9.2	2.7 / 2.6	2.7 / 2.6	2.7 / 2.7	1.8 / 1.8	1.8 / 1.8	1.9 / 1.9	1.5 / 1.5	1.5 / 1.5	IE2
FR-E820-0110(2.2K)	4.8 / 4.4	9.2	2.5 / 2.5	2.5 / 2.5	2.5/2.5	1.7 / 1.7	1.7 / 1.7	1.7 / 1.7	1.4 / 1.4	1.4 / 1.4	IE2
FR-E820-0175(3.7K)	7.8/7	10.2	2.5 / 2.5	2.5 / 2.5	2.5/2.5	1.7 / 1.7	1.7 / 1.7	1.7 / 1.7	1.4 / 1.3	1.4 / 1.4	IE2
FR-E820-0240(5.5K)	12 / 9.6	16.9	2.4 / 2.3	2.4 / 2.3	2.4/2.3	1.3 / 1.3	1.3/1.3	1.3 / 1.3	1.0 / 1.0	1.0 / 1.0	IE2
FR-E820-0330(7.5K)	15.9 / 13.1	16.9	2.4 / 2.3	2.4 / 2.3	2.4/2.3	1.3 / 1.3	1.3/1.3	1.3 / 1.3	0.9 / 0.9	0.9 / 0.9	IE2
FR-E820-0470(11K)	22.3 / 18.7	28.9	2.2 / 2.2	2.2 / 2.2	2.2/2.2	1.2 / 1.2	1.2/1.2	1.2 / 1.2	0.9 / 0.9	0.9 / 0.9	IE2
FR-E820-0600(15K)	27.5 / 23.9	28.9	2.3 / 2.2	2.3 / 2.2	2.3/2.2	1.2 / 1.2	1.2/1.2	1.2 / 1.2	0.9 / 0.9	0.9 / 0.9	IE2
FR-E820-0760(18.5K)	35.1 / 30.3	23.0	2.3 / 2.3	2.3 / 2.2	2.3/2.2	1.2 / 1.2	1.2/1.2	1.2 / 1.2	0.9 / 0.9	0.9 / 0.9	IE2
FR-E820-0900(22K)	45.8 / 35.9	23.0	2.5 / 2.3	2.5 / 2.3	2.5/2.3	1.3 / 1.2	1.3/1.2	1.3 / 1.2	0.9 / 0.9	0.9 / 0.9	IE2
FR-E840-0016(0.4K)	1.6 / 1.2	5.7	2.2 / 2.2	2.1 / 2.2	2.2/2.2	1.8 / 1.9	1.8/1.9	1.8 / 1.9	1.7 / 1.8	1.8 / 1.9	IE2
FR-E840-0026(0.75K)	2.7 / 2	5.7	2.2 / 2.0	2.1 / 2.0	2.2/2.0	1.4 / 1.5	1.4 / 1.4	1.4 / 1.5	1.2 / 1.2	1.2 / 1.2	IE2
FR-E840-0040(1.5K)	4.2/3	9.7	2.1 / 2.0	2.1 / 2.0	2.1/2.0	1.4 / 1.4	1.4 / 1.4	1.4 / 1.4	1.2 / 1.2	1.2 / 1.2	IE2
FR-E840-0060(2.2K)	5.3 / 4.6	9.8	1.8 / 1.8	1.8 / 1.8	1.8 / 1.8	1.3 / 1.3	1.3/1.3	1.3 / 1.3	1.1 / 1.1	1.1 / 1.1	IE2
FR-E840-0095(3.7K)	8.5 / 7.2	9.8	1.7 / 1.7	1.7 / 1.7	1.7 / 1.7	1.2 / 1.2	1.2/1.2	1.2 / 1.2	1.0 / 1.1	1.0 / 1.1	IE2
FR-E840-0120(5.5K)	13.3 / 9.1	14.5	1.7 / 1.6	1.6 / 1.6	1.7 / 1.6	0.9/0.9	0.9/0.9	0.9 / 0.9	0.7 / 0.7	0.7 / 0.7	IE2
FR-E840-0170(7.5K)	17.5 / 13	14.5	1.7 / 1.6	1.7 / 1.6	1.7 / 1.6	0.9 / 0.9	0.9/0.9	0.9 / 0.9	0.7 / 0.7	0.7 / 0.7	IE2
FR-E840-0230(11K)	26.7 / 17.5	26.5	1.7 / 1.6	1.7 / 1.6	1.7 / 1.6	0.9/0.9	0.9 / 0.9	0.9 / 0.9	0.7 / 0.7	0.7 / 0.7	IE2
FR-E840-0300(15K)	31.2 / 22.9	26.5	1.7 / 1.6	1.7 / 1.6	1.7 / 1.6	0.9 / 0.9	0.9/0.9	0.9 / 0.9	0.7 / 0.7	0.7 / 0.7	IE2
FR-E840-0380(18.5K)	34.3 / 29	26.5	1.6 / 1.2	1.6 / 1.2	1.6 / 1.2	0.9/0.7	0.9/0.7	0.9 / 0.7	0.7 / 0.5	0.7 / 0.5	IE2
FR-E840-0440(22K)	45.7 / 33.5	26.5	1.3 / 1.2	1.3 / 1.2	1.3/1.2	0.7 / 0.7	0.7 / 0.7	0.7 / 0.7	0.5 / 0.5	0.5 / 0.5	IE2

### WARRANTY 8

Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi Electric shall not be liable for compensation to: (1) Damages caused by any cause found not to be the responsibility of Mitsubishi Electric

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi Electric products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than

Mitsubishi Electric products. (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.