



INVERTER

E800-SCE

INVERTER SAFETY GUIDELINE

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

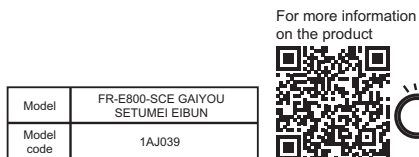
FR-E840-0016(0.4K) to 0440(22K)SCE

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

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

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.

Please forward this Safety Guideline to the end user.



IB-0600921ENG-H(2405)MEE

Specifications subject to change without notice.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BUILDING 2-7-3, MARUNOUCHI, CHYODOKU, TOKYO 100-8510, JAPAN

◆ Related manuals

Manual name	Manual number	Model code	Details
FR-E800 Instruction Manual (Connection)	IB-0600865ENG	1AJ048	Manuals describing installation, wiring, specifications, outline dimensions, standards, and how to connect options.
FR-E800 Instruction Manual (Function)	IB-0600868ENG	1AJ045	Manual describing details of the functions.
FR-E800 Instruction Manual (Communication)	IB-0600871ENG	1AJ051	Manual describing details of the communications.
FR-E800 Instruction Manual (Maintenance)	IB-0600874ENG	1AJ054	Manual describing how to identify causes of faults and warnings.
FR-E800-SCE Instruction Manual (Functional Safety)	BCN-A2348S-004	1AJ036	Manual describing details of the safety communication parameters.
FR Configurator2 Instruction Manual	IB-0600516ENG	—	Manual describing details of the software used to set inverter parameters using a personal computer.
PLC Function Programming Manual	IB-0600492ENG	—	Manual describing details of the PLC function.

Safety Information

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 the following conditions:

- 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".

WARNING Incorrect handling may cause hazardous conditions, resulting in death or severe injury.

CAUTION 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 personnel safety.

Read this Guideline before use. In addition, scan the 2D code below to download the FR-E800 Instruction Manual (Connection) and read "Safety Instructions". The PDF manual can also be downloaded from the Mitsubishi Electric FA Global Website.

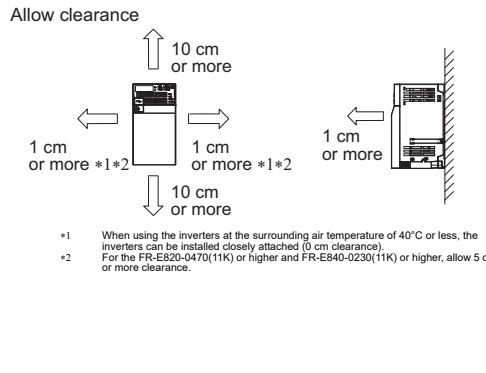
For more information on the product



1 INVERTER INSTALLATION AND PRECAUTIONS

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

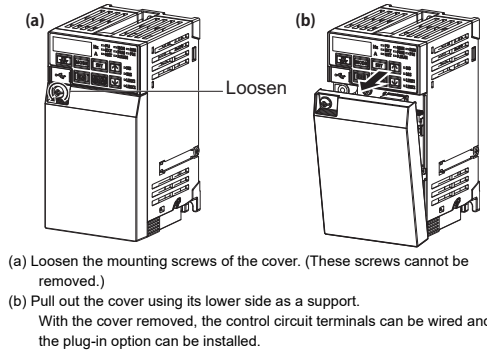
- Install the inverter on a strong surface securely with screws.
- Leave enough clearances and take cooling measures.
- Avoid places where the inverter is subjected to direct sunlight, high temperature and high humidity.
- Install the inverter on a nonflammable wall surface.
- When tightening screws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



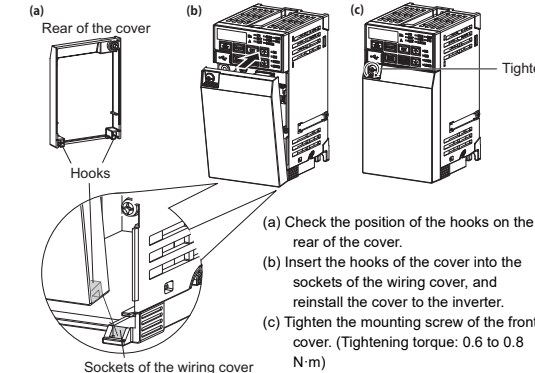
2 INSTALLATION AND WIRING

2.1 Removal and reinstallation of covers

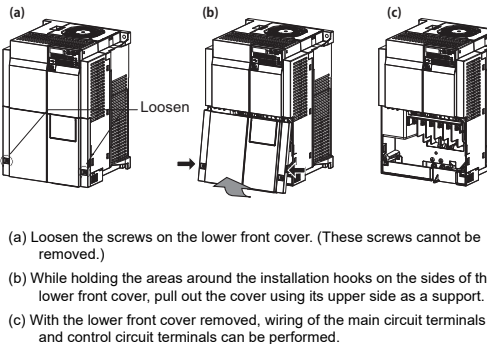
◆ Removal of the front cover



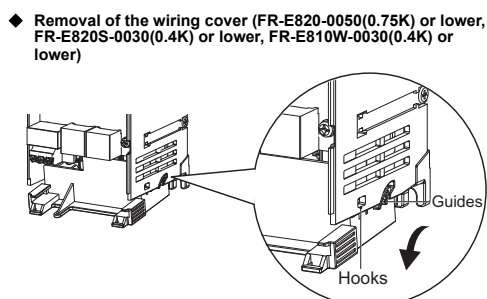
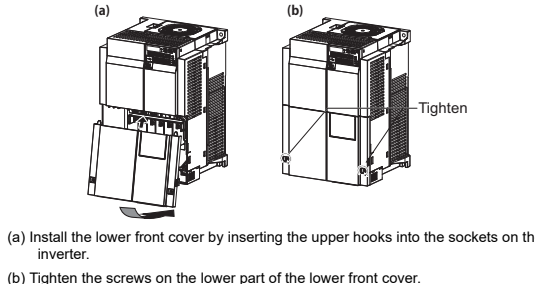
◆ Reinstallation of the front cover



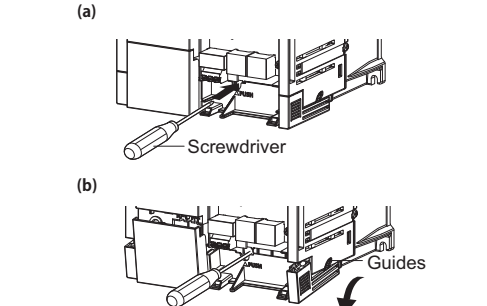
◆ Removal of the lower front cover (FR-E820-0240(5.5K) or higher, FR-E840-0230(11K) or higher)



◆ Reinstallation of the lower front cover (FR-E820-0240(5.5K) or higher, FR-E840-0230(11K) or higher)



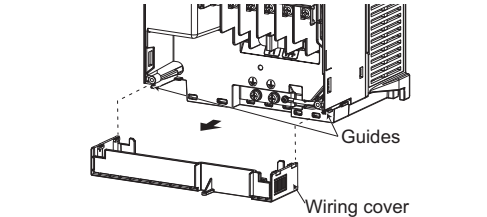
Pull out the cover along the guides in the direction shown by the arrow in the figure above.



(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 cover approx. 3 mm.

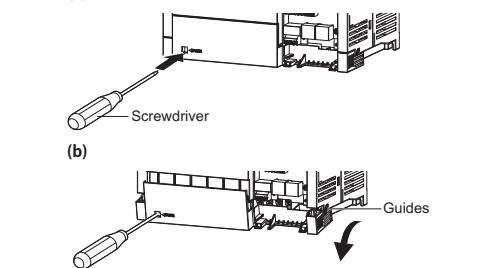
(b) Pull out the cover along the guides in the direction shown by the arrow in the figure above.

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



Pull out the cover along the guides in the direction shown by the arrow in the figure above.

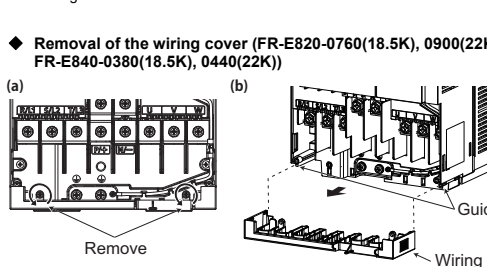
◆ Removal of the wiring cover (FR-E840-0120(5.5K), 0170(7.5K))



(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 cover approx. 3 mm.

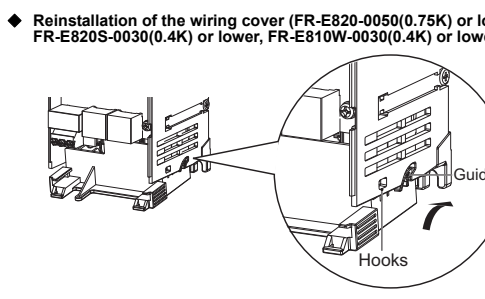
(b) Pull out the cover along the guides in the direction shown by the arrow in the figure above.

◆ Removal of the wiring cover (FR-E820-0760(18.5K), 0900(22K), FR-E840-0300(18.5K), 0440(22K))

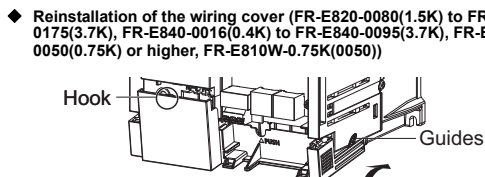


(a) Remove the mounting screws of the wiring cover.

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

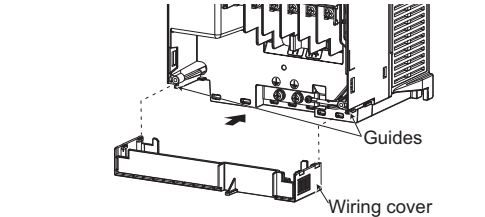


Fit the cover to the inverter along the guides.



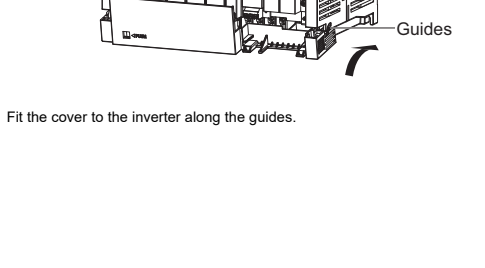
Fit the cover to the inverter along the guides, and push the hook into the socket.

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



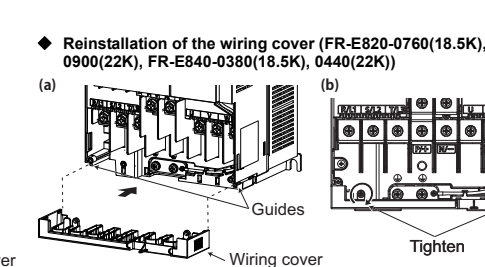
Fit the cover to the inverter along the guides.

◆ Reinstallation of the wiring cover (FR-E840-0120(5.5K), 0170(7.5K))



Fit the cover to the inverter along the guides.

◆ Reinstallation of the wiring cover (FR-E820-0760(18.5K), 0900(22K), FR-E840-0300(18.5K), 0440(22K))

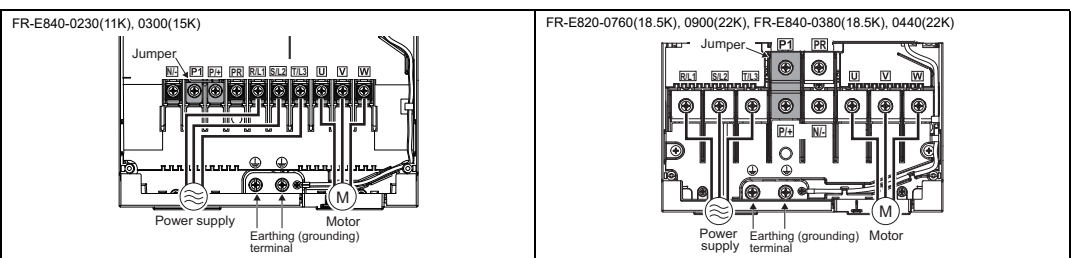
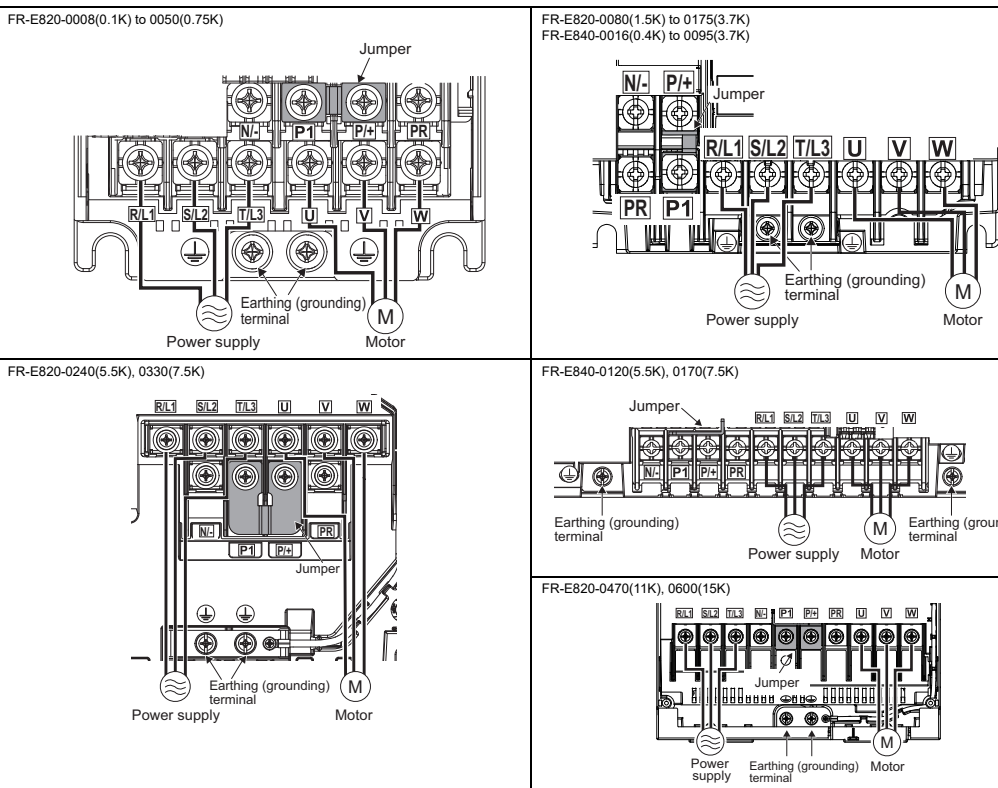


(a) Fit the cover to the inverter along the guides.

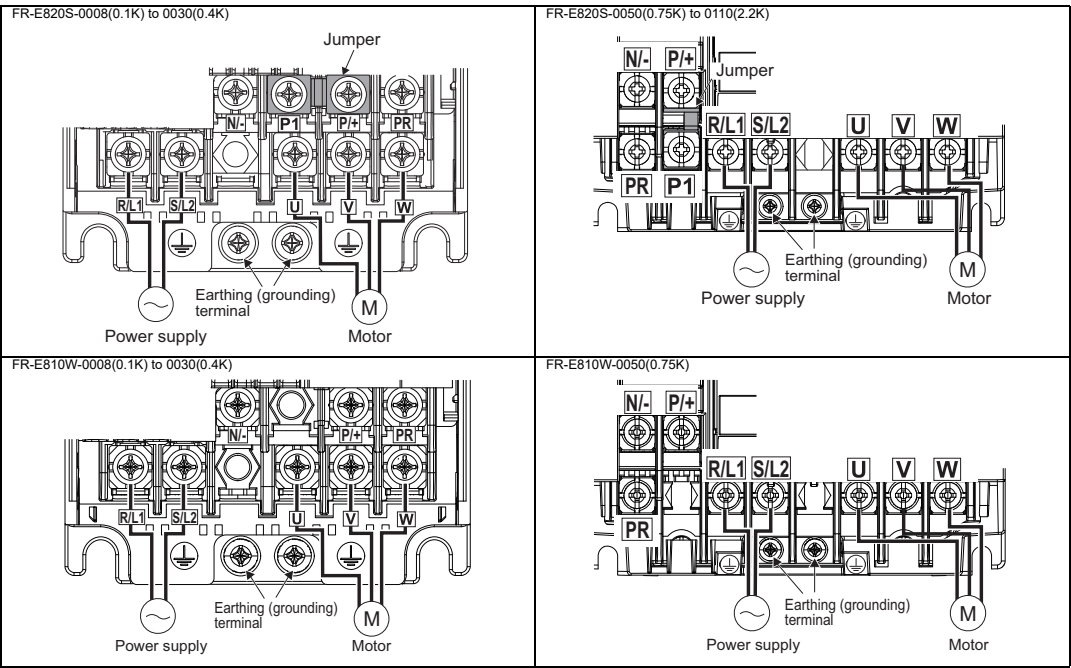
(b) Tighten the mounting screws of the wiring cover (tightening torque: 0.6 to 0.8 N·m).

2.2 Main circuit terminal layout and wiring to power supply and motor

◆ Three-phase 200/400 V class



◆ Single-phase 200 V class / Single-phase 100 V class



• Make sure the power cables are connected to terminals R/L1, S/L2, and T/L3 (the phases need not be matched). Never connect the power cable to terminals U, V, or W of the inverter. Doing so will damage the inverter.

• Connect the motor to terminals U, V, and W. The motor rotates counterclockwise when viewed from the motor load side when the forward rotation switch (signal) turns ON.

2.3 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-E800 Instruction Manual (Connection).

Applicable inverter model	Terminal screw size +4	Tightening torque N·m	Crimp terminal						Cable gauge					
			R/L1, S/L2, T/L3 +5	U, V, W	Earth (grounding) cable	R/L1, S/L2, T/L3 +5	U, V, W	Earth (grounding) cable	R/L1, S/L2, T/L3 +5	U, V, W	Earth (grounding) cable	R/L1, S/L2, T/L3 +5	U, V, W	Earth (grounding) cable
FR-E820-0008(0.1K) to 0050(0.75K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E820-0080(1.5K), 0110(2.2K)	M4	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E820-0175(3.7K)	M4	1.5	5-5.4	5-5.4	3.5	3.5	3.5	3.5	12	12	4	4	4	4
FR-E820-0240(5.5K)	M5	2.5	5-5.5	5-5.5	5.5	5.5	5.5	5.5	10	10	6	6	6	6
FR-E820-0300(7.5K)	M5	2.5	14-5	8-5	14	8	5.5	6	8	16	10	6	6	6
FR-E820-0470(11K)	M5	2.5	14-5	14-5	14	14	8	6	6	16	16	16	16	16
FR-E820-0600(15K)	M6(M5)	4.4	22-6	22-6	22	22	14	4	4	25	25	16	16	16
FR-E820-0760(18.5K)	M8(M6)	7.8	38-8	22-6	38	22	14	2	4	35	25	25	25	25
FR-E820-0900(22K)	M8(M6)	7.8	38-8	38-8	38	38	22	2	2	35	35	25	25	25
FR-E840-0016(0.4K) to 0095(3.7K)	M4	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E840-0120(5.5K)	M4	1.5	5-5.4	2-4	3.5	2	3.5	12	12	14	4	2.5	4	4
FR-E840-0170(7.5K)	M4	1.5	5-5.4	5-5.4	3.5	3.5	3.5	12	12	14	4	4	4	4
FR-E840-0230(11K)	M4	1.5	5-5.4	5-5.4	5.5	5.5	5.5	10	10	6	6	6	6	6
FR-E840-0300(15K)	M5	2.5	8-5	8-5	8	8	5.5	8	8	10	10	10	10	10
FR-E840-0380(18.5K)	M6	4.4	14-6	8-6	14	8	8	6	6	16	10	16	16	16
FR-E840-0440(22K)	M6	4.4	14-6	14-6	14	14	8	6	6	16	16	16	16	16
FR-E820S-0008(0.1K) to 0030(0.4K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E820S-0050(0.75K)	M4	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E820S-0080(1.5K)	M4	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E820S-0110(2.2K)	M4	1.5	5-5.4	2-4	3.5	2	2	12	12	14	4	2.5	2.5	2.5
FR-E810W-0008(0.1K) to 0030(0.4K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	2	14	14	2.5	2.5	2.5	2.5
FR-E810W-0050(0.75K)	M4	1.5	5-5.4	2-4	3.5	2	2	2	14	14	2.5	2.5	2.5	2.5

- +1 Hiv cable (800 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 50°C and the wiring distance is 20 m or shorter.
- +2 Teflon 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 "2" instructions for UL and cUL.
- +3 PVC cable with continuous maximum permissible temperature of 70°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 (select example mainly for use in Europe).
- +4 The screw size for terminals R/L1, S/L2, T/L3, U, V, W, PR, P+, N-, and P1, and the earthing (grounding) terminal is shown. For the single-phase 200 V power input models, the screw size for terminals R/L1, S/L2, U, V, W, PR, P+, and N-, and the earthing (grounding) terminal is shown. The screw size for the earthing (grounding) terminal on FR-E820-0600(15K) to FR-E820-0900(22K) is indicated in parentheses. When using a single-phase power input model, terminals are R/L1 and S/L2.
- +5

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

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

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

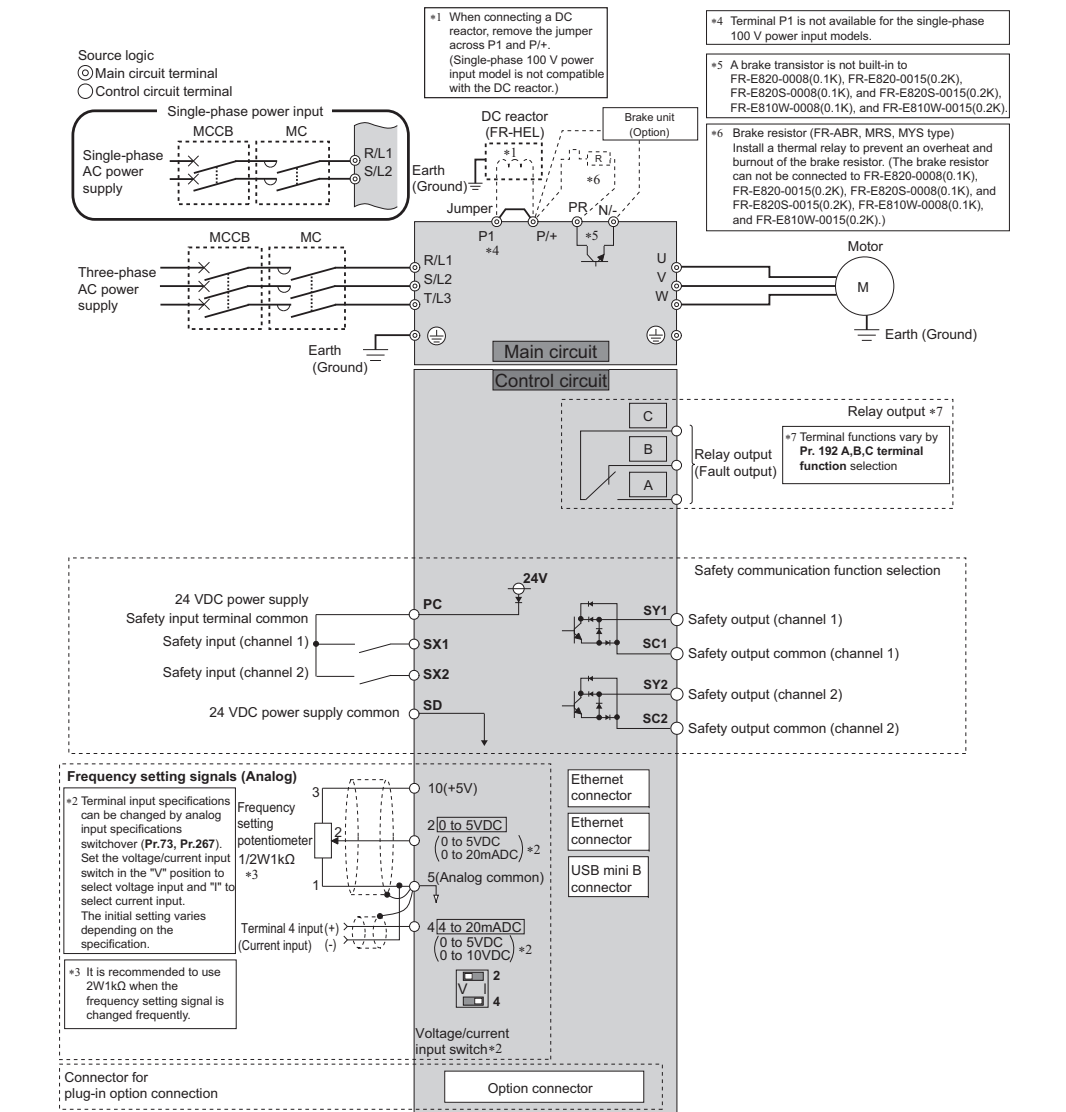
Connect one or more motors within the total wiring length (sum of the wiring lengths of the motor and the inverter) shown in the following table.

Cable type	Pr.72 setting (carrier frequency)	Voltage class	0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K or higher
Shielded-1	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)	100 m (500 m)	100 m (500 m)	100 m (500 m)
	2 (2 kHz) or higher	100 V, 200 V	—	—	50 m (200 m)	75 m (300 m)	100 m (500 m)	100 m (500 m)	100 m (500 m)

+1 The value in the parentheses is the total wiring length when unshielded cables are used.

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 m.

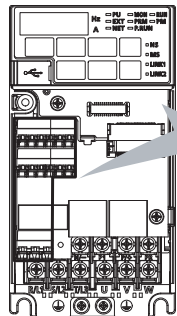
2.4 Terminal connection diagram



2.5 Details on the main circuit terminals and the control circuit terminals

Type	Terminal symbol	Common	Terminal name	Terminal function description
Main circuit	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 FM motor.
	P/+, PR	—	Brake resistor connection	Connect an optional brake transistor (MRS, MYS, FR-ABR) between terminal P/+ and PR. (Not available for FR-E820-0008(0.1K), FR-E820-0015(0.2K), FR-E820S-0008(0.1K), and FR-E810W-0015(0.2K).)
	P/+, N/-	—	Brake unit connection	Connect the brake unit (FR-BU2, FR-BU, or BU) or the multifunction regenerative converter (FR-XC in power regeneration mode) to these terminals.
	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 jumper across terminals P/+ and P1 should not be removed.
Input signal	—	—	Earth (ground)	For earthing (grounding) the inverter chassis. Be sure to earth (ground) the inverter.
	10	5	Power supply for a frequency setting potentiometer	Used as the power supply for an external frequency setting (speed setting) potentiometer.
	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 Pr.73 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).
	4	5	Frequency setting (current)	Inputting 4 to 20 mA DC (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 Pr.178 to Pr.189 (input terminal function selection) before turning ON the AU signal. The initial setting varies depending on the specification.
	—	—	Earth (ground)	Use Pr.267 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).
Output signal	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 A and C (discontinuity across A and C).
	SX1	PC	Safety input (channel 1)	Input resistance: 4.7 kΩ, voltage when contacts are open: 21 to 26 VDC, current when contacts are short-circuited: 4 to 8 mA DC
	SX2	PC	Safety input (channel 2)	Terminal functions can be selected using Pr.S051 SX1/SX2 terminal function selection . For details, refer to the FR-E800-SCE Instruction Manual (Functional Safety).
	SY1	SC1	Safety output (channel 1)	Permissible load: 24 VDC (27 VDC at maximum), 0.1 A (The voltage drop is 3.4 V at maximum while the signal is ON.)
	SY2	SC2	Safety output (channel 2)	Terminal functions can be selected using Pr.S055 SY1/SY2 terminal function selection . For

2.6 Control circuit terminal layout



Wiring method
Use crimp terminals and stripped wire for the control circuit wiring. If only a single wire is used, the wire can be stripped and used without a ferrule.
Connect the end of wires (crimp terminal or stranded wire) to the terminal block.

Crimp terminals commercially available (as of April 2023).
Phoenix Contact Co., Ltd.

Wire gauge (mm ²)	With insulation sleeve	Ferrule part No.	For UL wire ¹⁾	Crimping tool model No.
0.3	AI 0.34-10TG	—	—	—
0.5	AI 0.5-10WH	—	AI 0.5-10WH-GB	—
0.75	AI 0.75-10GY	—	AI 0.75-10GY-GB	—
1	AI 1-10RD	A 1-10	AI 1-10RD/100GB	—
1.25, 1.5	AI 1, 5-10BK	A 1.5-10	AI 1.5-10BK/100GB ²⁾	—
0.75 (for wires 2)	AI-TWIN 2x0.75-10GY	—	—	—

¹⁾ A ferrule terminal with an insulation sleeve compatible with the MTW wire which has a thick insulation.
²⁾ Applicable for terminals A, B, C.

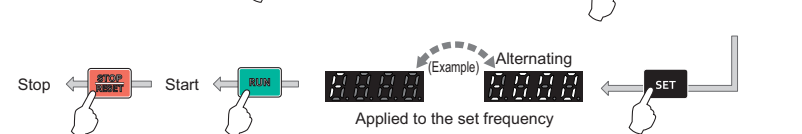
3 BASIC OPERATION

3.1 Components of the operation panel

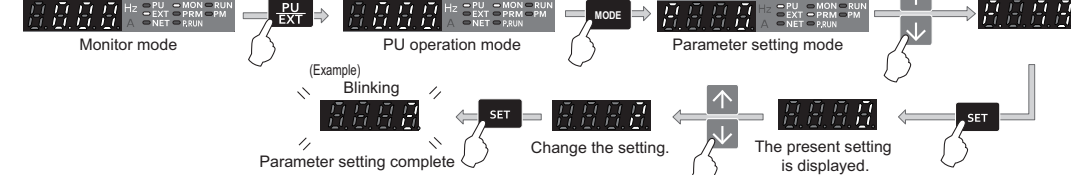
The operation panel cannot be removed from the inverter.

	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.
	SET key	Used to confirm each selection. Switches the monitor screen in the monitor mode.
	RUN key	Start command The direction of motor rotation depends on the Pr.40 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.

Starting/stopping the inverter on the operation panel



Parameter setting



4 PARAMETERS

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



5 LIST OF FAULT DISPLAYS

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



6 SPECIFICATIONS

6.1 Inverter rating

Three-phase 200 V class

Model FR-E820-□		0008	0015	0030	0050	0080	0110	0175	0240	0330	0470	0600	0760	0900		
		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⁾		LD	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	
		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	
Output	Rated capacity (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	35.5	
	Rated current (A) ³⁾	LD	1.3	2.0	3.5	6.0	9.6	12.0	19.6	30.0	40.0	56.0	69.0	88.0	115.0	
		ND	0.8	1.1	1.7	3.0	4.5	5.8	9.2	14.0	18.5	25.4	31.4	39.6	50.0	
	Overload current rating ³⁾	LD	0.8	1.5	3.0	5.0	8.0	11.0	17.5	24.0	33.0	47.0	60.0	76.0	97.8	
		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	97.8	
	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C															
	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C															
	Voltage ⁴⁾		Three-phase 200 to 240 V													
	Regenerative braking	Brake transistor	Not installed													
Maximum brake torque (ND reference) ⁵⁾		Built-in														
		150%	100%			50%		20%								
Rated input AC (DC) voltage / frequency		Three-phase 200 to 240 V 50/60 Hz (283 to 339 VDC ¹⁹⁾)														
Permissible AC (DC) voltage fluctuation		170 to 264 V, 50/60 Hz (240 to 373 VDC ¹⁹⁾)														
Permissible frequency fluctuation		±5%														
Power supply	Rated input current (A) ⁶⁾	Without DC reactor	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	
		LD	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	
		With DC reactor	1.3	2.0	3.5	6.0	9.6	12.0	20.0	30.0	40.0	56.0	88.0	115.0		
	Power supply capacity (kVA) ⁶⁾	Without DC reactor	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	
		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	
		With DC reactor	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	
		ND	0.5	0.8	1.3	2.3	3.7	4.6	7.5	11.0	15.0	21.0	26.0	34.0		
		ND	0.3	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)														
Cooling system		Natural							Forced air							
Approx. mass (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		

Three-phase 400 V class

Model FR-E840-□		0016	0026	0040	0060	0095	0120	0170	0230	0300	0380	0440		
Applicable motor capacity (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	
		ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5	22.0	
Output	Rated capacity (kVA)*2	LD	1.6	2.7	4.2	5.3	8.5	13.3	17.5	26.7	31.2	34.3	45.7	
		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 (A)*3	LD	2.1	3.5	5.5	6.9	11.1	17.5	23.0	35.0	41.0	45.0	60.0	
		ND	1.8	3.0	4.7	5.9	9.4	14.3	19.6	29.6	34.9	38.3	51.0	
	Overload current rating*3	LD	1.6	2.6	4.0	6.0	9.5	12.0	17.0	23.0	30.0	38.0	44.0	
		ND	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C 150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C											
Voltage*4		Three-phase 380 to 480 V												
Regenerative braking	Brake transistor	Built-in												
	Maximum brake torque (ND reference)*5	100%	50%	20%										
Rated input AC (DC) voltage/frequency		Three-phase 380 to 480 V 50/60 Hz (537 to 679VDC*9)												
Permissible AC (DC) voltage fluctuation		323 to 528 V, 50/60 Hz (457 to 740VDC*9)												
Permissible frequency fluctuation		±5%												
Power supply	Rated input current (A)*8	Without DC reactor	LD	3.3	6.0	8.9	10.7	16.2	24.9	32.4	46.7	54.2	59.1	75.6
		With 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
		Without DC reactor	ND	2.1	3.5	5.5	6.9	11.0	18.0	23.0	35.0	41.0	45.0	60.0
	Power supply capacity (kVA)*6	Without DC reactor	ND	1.6	2.6	4.0	6.0	9.5	12.0	17.0	23.0	30.0	38.0	44.0
		With DC reactor	LD	2.5	4.5	6.8	8.2	12.4	19.0	25.0	36.0	42.0	45.0	58.0
		With 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
Protective structure		LD	1.6	2.7	4.2	5.3	8.5	13.0	18.0	27.0	31.0	34.0	46.0	
Cooling system		Open type (IP20 for IEC 60529 only)												
Approx. mass (kg)		Natural			Forced air									
		1.2	1.2	1.4	1.8	1.8	2.4	2.4	4.8	4.9	11.0	11.0		

Single-phase 200 V class

Model FR-E820S-I			0008	0015	0030	0050	0080	0110	
Applicable motor capacity (kW) ¹⁾	Rated capacity (kVA) ²⁾	ND	0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	
	Rated current (A) ³⁾	ND	0.1	0.2	0.4	0.75	1.5	2.2	
	Overload current rating ³⁾	ND	0.3	0.6	1.2	2.0	3.2	4.4	
	Rated input AC voltage/frequency	ND	0.8	1.5	3.0	5.0	8.0	11.0	
	Permissible AC voltage fluctuation	ND	(0.8)	(1.4)	(2.5)	(4.1)	(7.0)	(10.0)	
Output	Permissible frequency fluctuation	ND	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C						
	Rated input AC voltage/frequency	ND	Three-phase 200 to 240 V						
	Permissible AC voltage fluctuation	ND	Not installed						
	Permissible frequency fluctuation	ND	Built-in						
	Rated input AC voltage/frequency	ND	150%						
Power supply	Permissible AC voltage fluctuation	ND	100%						
	Permissible frequency fluctuation	ND	50%						
	Rated input current (A) ⁴⁾	ND	20%						
	Power supply capacity (kVA) ⁶⁾	ND	170 to 264 V, 50/60 Hz						
	Protective structure	ND	±5%						
Cooling system	Rated input current (A) ⁴⁾	ND	2.3	4.1	7.9	11.2	17.9	25.0	
	Power supply capacity (kVA) ⁶⁾	ND	1.4	2.6	5.2	8.7	13.9	19.1	
	Protective structure	ND	0.4	0.6	1.1	1.9	3.0	4.2	
	Cooling system	ND	Open type (IP20 for IEC 60529 only)						
	Approx. mass (kg)	ND	Natural						
Approx. mass (kg)	Cooling system	ND	Forced air						
	Approx. mass (kg)	ND	0.5	0.5	0.8	1.3	1.4	1.9	

Single-phase 100 V class

Model FR-E810W-I			0008	0015	0030	0050
			0.1K	0.2K	0.4K	0.75K
Applicable motor capacity (kW) ¹⁾		ND	0.1	0.2	0.4	0.75
	Rated capacity (kVA) ²⁾	ND	0.3	0.6	1.2	2.0
	Rated current (A) ³⁾	ND	0.8	1.5	3.0	5.0
			(0.6)	(1.4)	(2.5)	(4.1)
	Overload current rating ³⁾		150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C			
	Voltage ¹⁰⁾ 11		Three-phase 200 to 240 V			
Output	Brake transistor		Not installed		Built-in	
	Regenerative braking	Maximum brake torque (ND reference) ⁵⁾	150%	100%		
	Rated input AC voltage/frequency		Single-phase 100 to 120 V 50/60 Hz			
	Permissible AC voltage fluctuation		90 to 132 V, 50/60 Hz			
Power supply	Permissible frequency fluctuation		±5%			
	Rated input current (A) ⁴⁾	ND	3.7	6.8	12.4	19.6
	Power supply capacity (kVA) ⁶⁾	ND	0.5	0.9	1.5	2.5
	Protective structure		Open type (IP20 for IEC 60529 only)			
Cooling system			Natural			
Approx. mass (kg)			0.5	0.6	0.8	1.4

¹⁾ The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard efficiency motor. ²⁾ To drive a Mitsubishi Electric high-performance energy-saving motor, use the 200 V class 0.75 kW inverter for a 1.1 kW motor, or 200/600 V class 2.2 kW inverter for a 3 kW motor. ³⁾ The rated output capacity assumes that the output voltage is 230 V for three-phase 200 V class and single-phase 200/100 V class, and 400 V for three-phase 400 V class. ⁴⁾ The percentage of the overload current rating is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load. In a single-phase 200 V class inverter with the automatic restart after the instantaneous power failure (Pr.87) and the power failure stop (Pr.261) functions are set, a voltage drop at the power supply and a large load may bring down the low voltage to the level recognized as a power failure, disabling the inverter to drive a load 100% or higher. ⁵⁾ The maximum output voltage can be changed within the setting range. The maximum point of the voltage waveform at the output side of the inverter is approximately the power supply voltage multiplied by 1.2. ⁶⁾ The amount of braking torque is the average short-term torque (which varies depending on motor load) that is generated when the motor decelerates in the shortest time by itself from 60 Hz. It is not continuous regeneration torque. The average deceleration torque becomes lower when a motor decelerates from a frequency higher than the base frequency. The inverter is not equipped with a built-in I/O power supply and a large load may bring down the low voltage to the level recognized as a power failure, disabling the inverter to drive a load 100% or higher. ⁷⁾ The power capacity is the rated output current when the low acoustic noise insulation is performed with the surrounding air temperature exceeding 40°C while 2 Hz or higher value is selected at P1.7 PWM frequency selection. ⁸⁾ The rated input current is the value at a rated output current. The input power impedances (including those of the input reactor and cables) affect the value. ⁹⁾ When the energy is regenerated from the motor, the voltage between terminals P+ and N+ may temporarily rise to 415 V or more (810 V or more for the 400 V class). Use a DC power supply resistant to the regenerative voltage. When a power supply that cannot resist the regenerative voltage is used, correct a reverse current prevention diode in series. ¹⁰⁾ For the single-phase 100 V power input models, the maximum output voltage is twice the amount of the power supply voltage. ¹¹⁾ For the single-phase 100 V power input models, the maximum output voltage is twice the amount of the power supply voltage. The load must be reduced so that output current does not exceed the rated motor current.	
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6.2 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.)
Ambient humidity	95% RH or less (non-condensing) (With circuit board coating (IEC 60721-3-3:1994 3C2 compatible)) 80% RH or less (non-condensing) (Without circuit board coating)
Storage temperature	-40°C to +70°C
Atmosphere	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
Altitude/vibration	Maximum 3000 m, 5.9 m/s ² or less (For installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.)

¹⁾ Surrounding air temperature is a temperature measured at a measurement position in an enclosure. Ambient temperature is a temperature outside an enclosure.

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

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 appropriate measures and ensure the conformity of the inverter used in the residential area.
- Radio frequency interference is expected to be 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-A2041-204) 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

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

- Low Voltage Directive: 2014/35/EU
- Standard: EN 61800-5-1