

MITSUBISHI ELECTRIC
INVERTER
E800-E
INVERTER SAFETY GUIDELINE
FR-E820-0008(0.1K) to 0330(7.5K)-E
FR-E840-0016(0.4K) to 0170(7.5K)-E



IB-0600860ENG-A(1912)JP
Specifications subject to change without notice.

Manual name	Manual number	Manual name	Manual number
FR-E800 Instruction Manual (Connection)	IB-060086SENG	FR Configurator2 Instruction Manual	IB-0600516ENG
FR-E800 Instruction Manual (Function)	IB-060086BENG	PLC Function Programming Manual	IB-0600492ENG
FR-E800 Instruction Manual (Communication)	IB-0600871ENG	FR-E800 Instruction Manual (Functional safety)	BCN-A23488-000
FR-E800 Instruction Manual (Maintenance)	IB-0600874ENG		

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.
- Each 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.

Electric shock prevention

WARNING

- Do not remove the front cover or the wiring cover while the power of this product is ON, and do not run this product with the front cover or the wiring cover removed, as the exposed high voltage terminals or the charging part of the capacitor can be touched. Doing so may cause an electric shock.
- Even if power is OFF, do not remove the front cover except for wiring or periodic inspection as the inside of this product is charged. Doing so may cause an electric shock.
- Before wiring or inspection, check that the display of the operation panel is OFF. Any person who is involved in wiring or inspection should 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 power OFF, and it is dangerous.
- Use crimp terminals with insulation sleeves to wire the power supply and the motor.
- This product body must be installed before wiring. Otherwise you may get an electric shock or be injured.
- Do not touch the keys with wet hands. Doing so may cause an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Doing so may cause an electric shock.
- Do not change the cooling fan while power is ON as it is dangerous to change the cooling fan while power is ON.
- Do not touch the printed circuit board or handle the cables with wet hands. Doing so may cause an electric shock.
- Never touch the motor terminals, etc. right after powering OFF as the DC voltage is applied to the motor for 1 second after powering OFF. If the main circuit capacitor capacity is measured. Doing so may cause an electric shock.

Fire prevention

CAUTION

- This product must be installed on a nonflammable wall without holes in it so that its components cannot be touched from behind. Installing it on or near flammable material may cause a fire.
- If this product becomes faulty, the product power must be switched OFF. A continuous flow of large current may cause a fire.
- Do not connect a resistor directly to the DC terminals P+ and N-, doing so could cause a fire.
- Across terminals P+ and PR, connect only an external brake resistor.
- Be sure to perform daily and periodic inspections as specified in the Instruction Manual. There is a possibility of explosion, damage, or fire if this product is used without inspection.

Injury prevention

CAUTION

- The voltage applied to each terminal must be as specified in the Instruction Manual. Otherwise an explosion or damage may occur.
- The cables must be connected to the correct terminals. Otherwise an explosion or damage may occur.
- The polarity (+ and -) must be correct. Otherwise an explosion or damage may occur.
- While power is ON or for some time after power OFF, do not touch the inverter as it will be extremely hot. Doing so may cause burns.

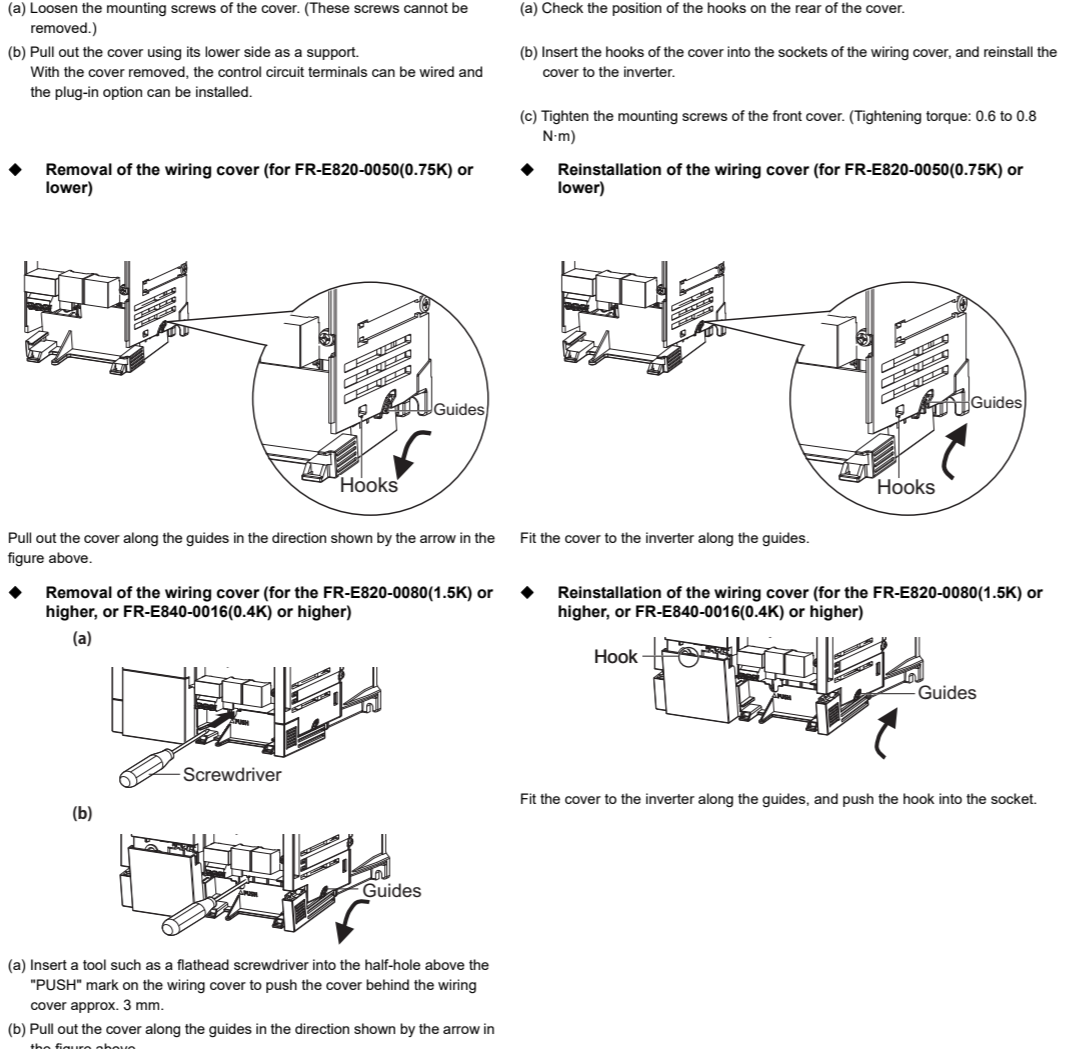
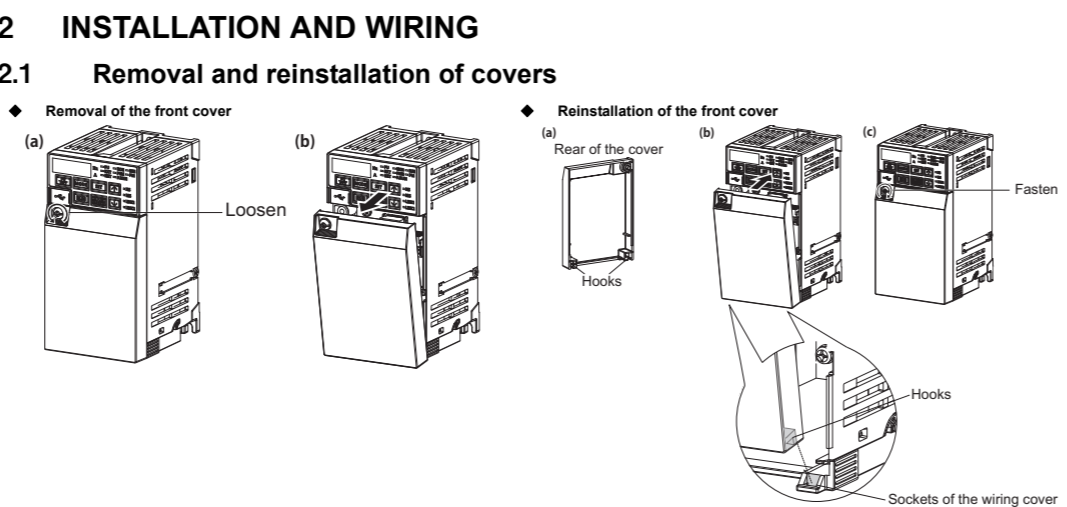
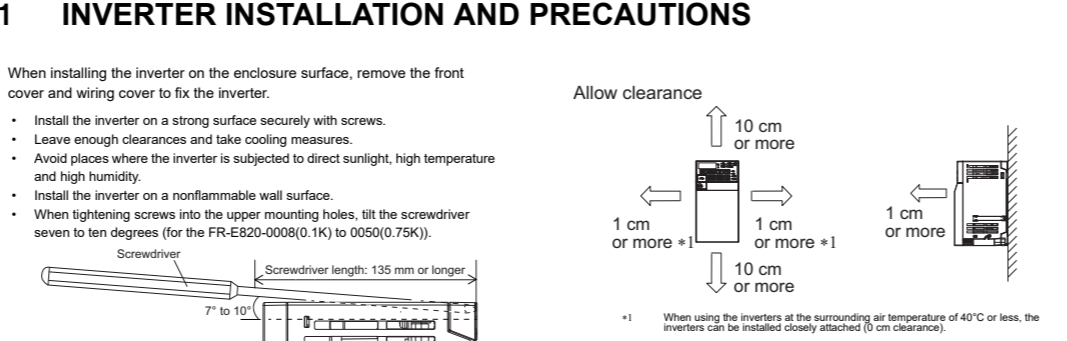
Additional instructions

The following instructions must be also followed. If the product is handled incorrectly, it may cause unexpected fault, an injury, or an electric shock.

CAUTION

Transportation and installation

- Use proper lifting techniques or a trolley when carrying products. Failure to do so may lead to injuries.
- Do not stack the boxes containing inverters higher than the number recommended.
- The product must be installed in a position where it withstands the weight of the product according to the information in the Instruction Manual.
- Do not install or operate the product if it is damaged or has parts missing.
- When carrying the inverter, do not hold it by the front cover. It may fall or break.
- Do not store or place heavy objects on the product.
- Ensure the proper orientation of this product is correct.
- Never conduct objects such as screws, metal fragments, and wire offcuts, or flammable substances such as oil from entering the inverter.
- As this product is a precision instrument, do not subject it to impact.
- The surrounding air temperature must be between -20°C and +40°C (non-freezing). The stored current must be reduced at a surrounding air temperature above 50°C. Otherwise this product may be damaged.
- The surrounding humidity must be 90% RH or less (non-condensing) for models without circuit board coating and 95% RH or less (non-condensing) for models with circuit board coating. Otherwise this product may be damaged.
- The temporary storage temperature (applicable to a short limited time such as a transportation time) must be between -10°C and +70°C. Otherwise this product may be damaged.
- This product must be used indoors without corrosive gas, flammable gas, oil mist, dust and dirt. Otherwise the product may be damaged.
- Do not use this product at an altitude above 3000 m. Vibration should not exceed 5.9 m/s² at 10 to 55 Hz in X, Y, and Z directions. Otherwise the product may be damaged.



2.3 Applicable 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 a selection example for the wiring length of 20 m 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	Tightening torque N·m	Crimp terminal		Cable gauge									
			R/L1, S/L2, T/L3	U, V, W	HIV cables, etc. (mm ² × 1)		AWG ^{*)} 2		PVC cables, etc. (mm ² × 3)		Earthing (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	
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	
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	
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	
FR-E820-0307(7.5K)	M5	2.5	14-5	8-5	14	8	5.5	6	8	16	10	6	6	
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	
FR-E840-0120(5.5K)	M4	1.5	5-5.4	2-4	3.5	2	3.5	2	12	14	4	2.5	4	
FR-E840-0170(7.5K)	M4	1.5	5-5.4	5-5.4	3.5	3.5	3.5	3.5	12	12	4	4	4	

*1 The cable size is that of the HIV cable (900 V grade heat-resistant PVC insulated wire) etc. with continuous maximum permissible temperature of 75°C. It assumes a surrounding air temperature of 50°C or lower and the wiring distance of 20 m or shorter.
*2 The cable size is that of the T19H cable with continuous maximum permissible temperature of 75°C. It assumes a surrounding air temperature of 40°C or lower and the wiring distance of 20 m or shorter. (For use in the United States or Canada, refer to the section 1.2 "Restrictions on the UL and cUL".)
*3 The cable size is that of the PVC cable with continuous maximum permissible temperature of 70°C. It assumes a surrounding air temperature of 40°C or lower and the wiring distance of 20 m or shorter. (For use in the United States or Canada, refer to the section 1.2 "Restrictions on the UL and cUL".)
*) The screw size for terminals R/L1, S/L2, T/L3, U, V, W, PR, P+, P-, and P1, and the earthing (grounding) terminal is shown.

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

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

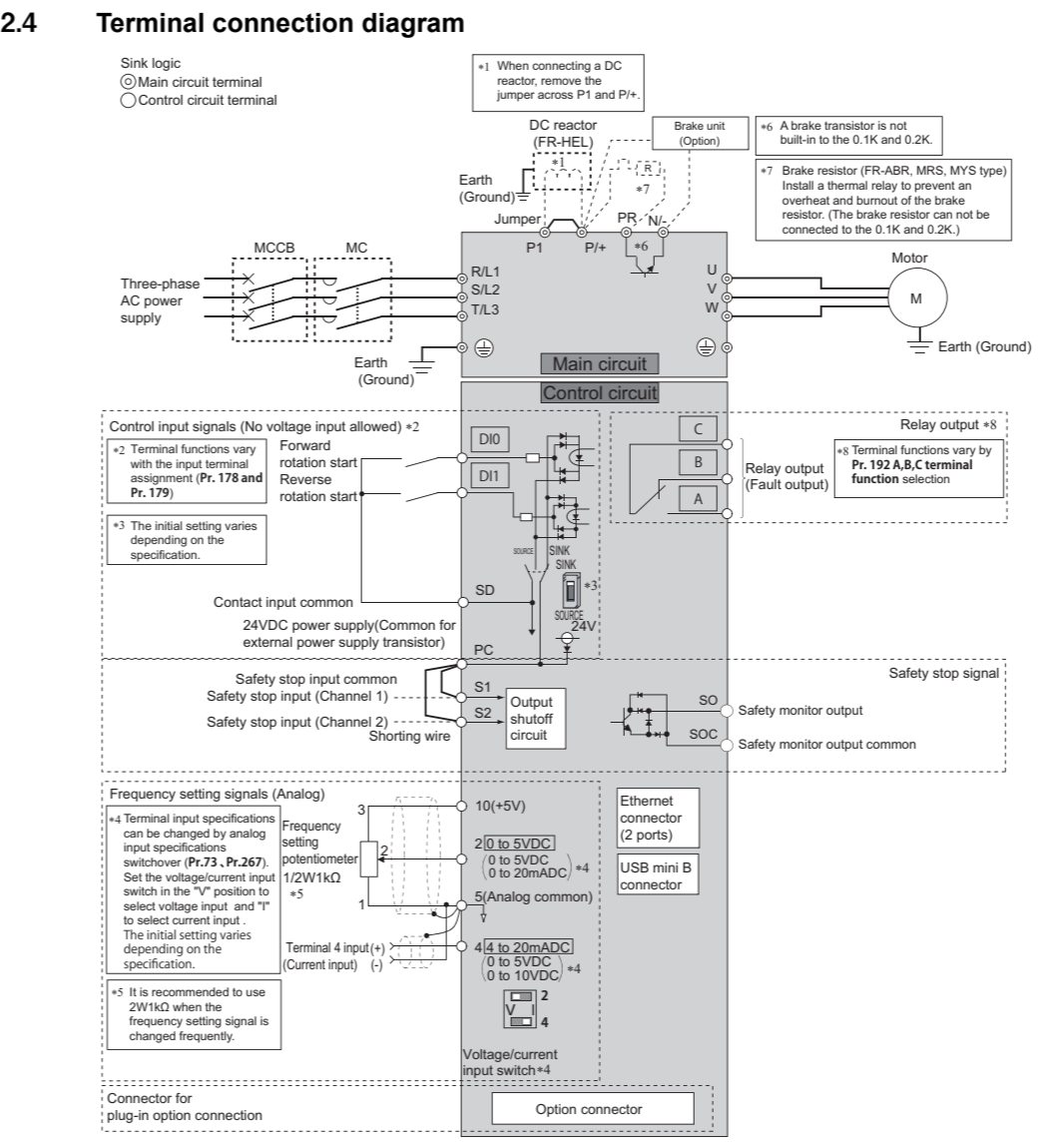
Use a larger diameter cable when the wiring distance is long or when it is desired to decrease the voltage drop (torque reduction) in the low speed range.

◆ **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.

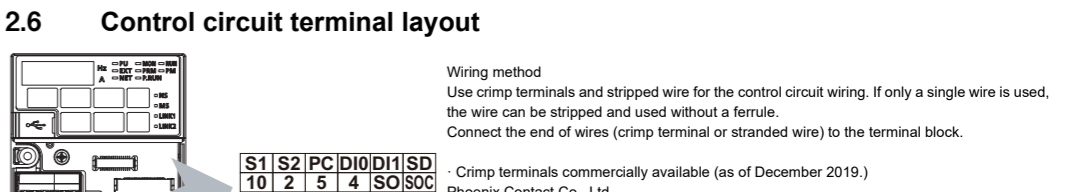
Cable type	Pr.72 setting (carrier frequency)	Voltage class	0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K or higher
Shielded *1	1 (1 kHz) or lower	200 V	50 m (200 m)	50 m (200 m)	75 m (300 m)	100 m (500 m)	100 m (500 m)	100 m (500 m)	100 m (500 m)
		400 V	—	—	50 m (200 m)	50 m (300 m)	75 m (500 m)	100 m (500 m)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

*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 10 to 100 m, or *2 kHz or less* when the wiring length is longer than 100 m.



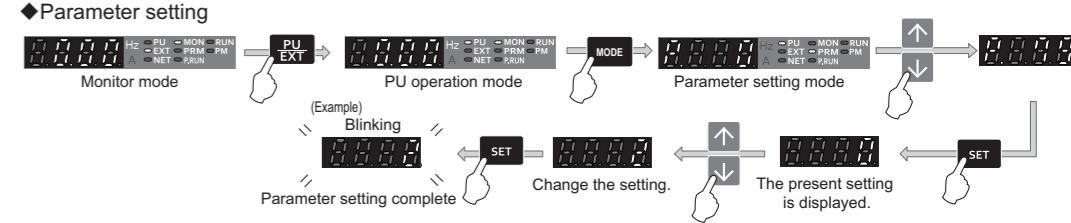
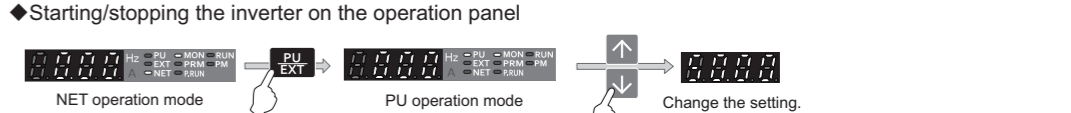
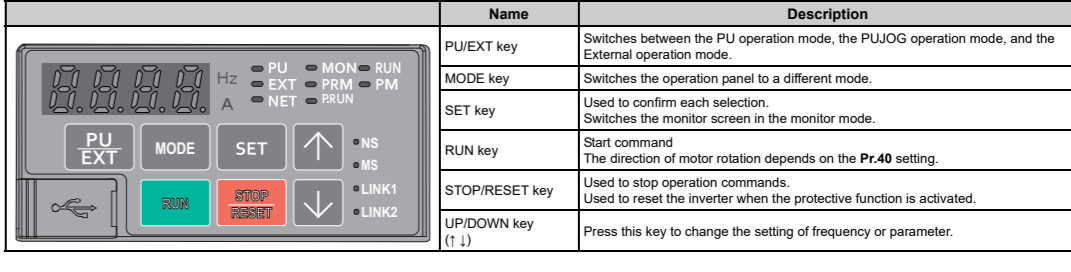
Type	Terminal symbol	Terminal name	Terminal function description
Input signal	10	Power supply for a frequency setting potentiometer	Used as the power supply for an external frequency setting (speed setting) potentiometer. 5 to 5 VDC, Permissible load current: 10 mA
	2	Frequency setting (voltage)	Inputting 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	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). Use the terminal 4 (current input at initial setting), assign "4" to Pr.178 or Pr.179 (input terminal function selection) before turning ON the AU signal. The initial setting varies depending on the specification. Use Pr.287 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).
	5	Frequency setting common	Common terminal for the frequency setting signal (terminal 2 or 4). Do not earth (ground).
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 B and C (discontinuity across A and C) Contact capacity: 240 VAC 2A (power factor = 0.4) or 30 VDC 1 A
	S1	Safety stop input (Channel 1)	Use terminals S1 and S2 to receive the safety stop signal input from the safety relay module. Terminals S1 and S2 can be used at a time (dual channel). The inverter judges the condition of the internal safety circuit from the status (shorted or opened) between terminals S1 and PC, or between S2 and PC. When the status is opened, the inverter output is shut off. In the initial status, terminal S1 and S2 are shorted with terminal PC by shorting wires. Remove the shorting wires and connect the safety relay module when using the safety stop function.
Safety stop function	S2	Safety stop input (Channel 2)	The output status varies depending on the input status of the safety stop signals. The output is in HIGH state during occurrence of the internal safety circuit fault. The output is in LOW state otherwise. (The open collector transistor is ON (conductive) in LOW state. The transistor is OFF (not conductive) in HIGH state.) Refer to the FR-E800 Instruction Manual (Functional Safety) (BCN-A23488-000) when the signal is switched to HIGH while both terminals S1 and S2 are open. (Please contact your sales representative for the manual.)
	SO	Safety monitor output (open collector output)	Permissible load: 21 to 26 VDC (27 VDC at maximum), 0.1 A (The voltage drop is 3.4 V at maximum while the signal is ON.)
	SOC	Safety monitor output terminal common	Common terminal for terminal SO.
Communication	—	Ethernet connector (2 ports)*2	Communication can be made via Ethernet. Category: 10BASE-TX/10BASE-T Transmission method: Baseband Data transmission speed: 100 Mbps (10BASE-TX/10 Mbps (10BASE-T)) Maximum segment length: 100 m between the hub and the inverter Interface: RJ-45 Number of cascade connection stages: Up to 2 (10BASE-TX) up to 4 (10BASE-T) Number of interfaces available: 1 (IP version: IPv4)
	—	USB connector*3	Use the USB connector to communicate with a personal computer. Setting and monitoring of the inverter is enabled using FR Configurator2. Interface: conforms to USB 1.1 Transmission speed: 12 Mbps Connector: USB mini B connector (receptacle mini B type)



3 BASIC OPERATION

3.1 Components of the operation panel

The operation panel cannot be removed from the inverter.



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	
					0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	
Applicable motor capacity (kW) *1			LD	0.2 <td>0.4</td> <td>0.75</td> <td>1.1</td> <td>2.2</td> <td>3.0</td> <td>5.5</td> <td>7.5</td> <td>11</td> <td></td>	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11		
			ND	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5		
Output	Rated capacity (kVA) *2			LD	0.5	0.8	1.4	2.4	3.8	4.8	7.8	12.0	15.9	
				ND	0.3	0.6	1.2	2.0	3.2	4.4	7.0	9.6	13.1	
	Rated current (A) *7			LD	1.3 (1.1)	2 (1.7)	3.5 (3.0)	6.0 (5.1)	9.6 (8.2)	12 (10.2)	19.6 (16.7)	30 (25.5)	40 (34)	
				ND	0.8 (0.8)	1.5 (1.4)	3 (2.5)	5 (4.1)	8 (7)	11 (10)	17.5 (16.5)	24 (23)	33 (31)	
	Overload current rating *3			LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C									
				ND	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C									
	Voltage *4			Three-phase 200 to 240 V										
				Brake transistor			Built-in							
	Regenerative braking			Maximum brake torque (ND reference) *5		150%		100%		50%		20%		
Rated input AC voltage/frequency			Three-phase 200 to 240 V 50/60 Hz											
			Permissible AC voltage fluctuation			170 to 264 V, 50/60 Hz								
Permissible frequency fluctuation			±5%											
			Rated input current (A) *8			Without DC reactor		1.9	3.0	5.1	8.2	13	16	26
With DC reactor		1.3						2.0	3.5	6.0	9.6	12	20	30
		Without DC reactor				1.4	2.3	4.5	7.0	11	15	23	30	41
With DC reactor						0.8	1.5	3.0	5.0	8.0	11	17.5	24	33
		Power supply capacity (kVA) *6			Without DC reactor		0.7	1.1	1.9	3.1	4.8	6.2	9.7	14
With DC reactor							0.5	0.8	1.3	2.3	3.7	4.6	7.5	11
					Without DC reactor		0.5	0.9	1.7	2.7	4.1	5.7	8.8	12
With DC reactor							0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.1
		Protective structure (IEC 60529)			Enclosed type (IP20)									
Cooling system			Natural <td colspan="5">Forced air</td>					Forced air						
Approx. mass (kg)			0.5	0.5	0.7	1.0	1.4	1.4	1.8	3.3	3.3			

◆ Three-phase 400 V class

Model FR-E840-[]			0016	0026	0040	0060	0095	0120	0170	
			0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	
Applicable motor capacity (kW) *1		LD	0.75	1.5	2.2	3.0	5.5	7.5	11	
		ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	
Rated capacity (kVA) *2		LD	1.6	2.7	4.2	5.3	8.5	13.3	17.5	
		ND	1.2	2.0	3.0	4.6	7.2	9.1	13.0	
Rated current (A) *7		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 (19.6)	
		ND	1.6 (1.4)	2.6 (2.2)	4 (3.8)	6 (5.4)	9.5 (8.7)	12	17	
Output	Overload current rating *3	LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C							
		ND	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 voltage/frequency			Three-phase 380 to 480 V 50/60 Hz							
Permissible AC voltage fluctuation			323 to 528 V, 50/60 Hz							
Permissible frequency fluctuation			±5%							
Power supply	Rated input current (A) *8	LD	Without DC reactor	3.3	6.0	8.9	11	16	25	32
			With DC reactor	2.1	3.5	5.5	6.9	11	18	23
		ND	Without DC reactor	2.7	4.4	6.7	9.5	14	18	25
			With DC reactor	1.6	2.6	4.0	6.0	9.5	12	17
	Power supply capacity (kVA) *6	LD	Without DC reactor	2.5	4.5	6.8	8.2	12	19	25
			With DC reactor	1.6	2.7	4.2	5.3	8.5	13	18
		ND	Without DC reactor	2.1	3.4	5.1	7.2	11	14	19
			With DC reactor	1.2	2.0	3.0	4.6	7.2	9.1	13
	Protective structure (IEC 60529)			Enclosed type (IP20)						
	Cooling system			Natural			Forced air			
Approx. mass (kg)			1.2	1.2	1.4	1.8	1.8	2.4	2.4	

- *1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard efficiency motor.
*2 The rated output of the output voltage is 230 V for three-phase 230 V class and 440 V for three-phase 400 V class.
*3 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.
*4 The maximum output voltage does not exceed the power supply voltage. 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 √2.
*5 The amount of braking torque is the average short-term torque (which varies depending on motor loss) that is generated when a motor decelerates in the shortest time by itself from 60 Hz. It is not continuous regenerative 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 brake resistor. Use an option brake resistor for an operation with large regenerative power (not available for 0.1K and 0.2K). Brake unit (FR-BU2) can be also used.
*6 The power supply capacity varies with the value of the power supply side impedance (including those of the input reactor and cables).
*7 The value in parentheses is the rated output current when the low acoustic noise operation is performed with the surrounding air temperature exceeding 40°C while 2 kHz or higher value is selected in **Pr.72 PWH** frequency selection.
*8 The rated input current is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

6.2 Inverter installation environment

Item	Description	Enclosure
Surrounding air temperature *1	-20°C to +50°C (The rated current must be reduced at a temperature above 50°C. To meet the UEN 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 3C2/3S2 compatible)) 90% 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

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: 2014/53/EU
- Standard: IEC 61800-3:2017 (Category "C3" / Second environment) 2017 (category C3, 2nd 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 if used on such a network.
- The installer shall provide a guide for installation and use, including recommended mitigation devices.

◆ 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, EU Directive compliant EMC filter, and controller cable found in the EMC Installation Guidelines (BCN-A21041-204) 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

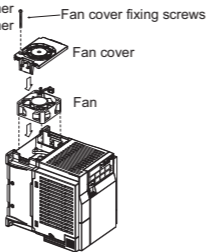
We have self-confirmed our inverters as products compliant to the Low Voltage Directive and affix the CE marking on the inverters.

- Low Voltage Directive: 2014/35/EU
- Standard: EN 61800-5-1:2007

◆ Outline of instructions

- 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.)
- Use the cable whose size is indicated in Section 2.3 at the surrounding air temperature up to 40°C.
- If conditions are different from above, select appropriate wire according to EN 60204.
- Use a tinneal (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 cable whose size is indicated in Section 2.3.
- 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 (AC/DC 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 IP54 or higher.
- Attach the fan cover to the fan with the fan cover fixing screws enclosed with the inverter.

FR-E820-0080(1.5K) or higher
FR-E840-0040(1.5K) or higher



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

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

7.2 Instructions for UL and cUL

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

◆ Product handling information / Informations sur la manipulation du produit

-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.

-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, branch circuit protection must be provided in accordance with the National Electrical Code and any applicable provincial codes. For installation in Canada, branch circuit protection must be provided in accordance with the Canadian Electrical Code and any applicable provincial codes. Short circuit protection of the inverter cannot be used as branch circuit protection. 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 applicable local codes.

◆ 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).

-AVERTISSEMENT-

Si le fusible fond ou si le disjoncteur se déclenche du côté entrée de ce produit, vérifiez 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).

◆ Fuse selection

For installation in the United States, the semiconductor fuses shown in the following table must be provided, in accordance with the National Electrical Code and any applicable local codes. For installation in Canada, the semiconductor fuses shown in the following table must be provided, in accordance with the Canadian Electrical Code and any applicable local codes. The following semiconductor fuses cannot be used as branch circuit protection. For branch circuit protection, use appropriate fuses or install a breaker.

Inverter model	Cat. No	Manufacturer	Rating
FR-E820-0080(0.1K), 0015(0.2K)	170M1408	Bussmann	700 V, 10 A
FR-E820-0030(0.4K)	170M1409	Bussmann	700 V, 16 A
FR-E820-0050(0.75K)	170M1410	Bussmann	700 V, 20 A
FR-E820-0080(1.5K)	170M1312	Bussmann	700 V, 32 A
FR-E820-0110(2.2K)	170M1414	Bussmann	700 V, 50 A
FR-E820-0175(3.7K)	170M1416	Bussmann	700 V, 80 A
FR-E820-0240(5.5K)	170M1417	Bussmann	700 V, 100 A

Inverter model	Cat. No	Manufacturer	Rating
FR-E820-0330(7.5K)	170M1419	Bussmann	700 V, 160 A
FR-E840-0016(0.4K)	170M1408	Bussmann	700 V, 10 A
FR-E840-0026(0.75K), 0040(1.5K)	170M1409	Bussmann	700 V, 16 A
FR-E840-0060(2.2K)	170M1312	Bussmann	700 V, 32 A
FR-E840-0095(3.7K)	170M1413	Bussmann	700 V, 40 A
FR-E840-0120(5.5K)	170M1414	Bussmann	700 V, 50 A
FR-E840-0170(7.5K)	170M1416	Bussmann	700 V, 80 A

◆ Capacitor discharge time / Temps de décharge du condensateur

CAUTION - Risk of Electric Shock

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 power OFF, and it is dangerous.

ATTENTION - Risque de choc électrique -

Avant le câblage ou l'inspection, vérifiez 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

- Refer to the National Electrical Code (Article 310) regarding 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 wiring 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 the LD rating, when the cable is the THHW cable with continuous maximum permissible temperature of 75°C, when the surrounding air temperature is 30°C or less, and the wiring length is 20 m or shorter.

Applicable inverter model	Terminal screw size *1	Tightening torque (N·m)	Crimp terminal			
			R/L1, S/L2, T/L3	U, V, W	R/L1, S/L2, T/L3	U, V, W
FR-E820-0080(0.1K) to 0050(0.75K)	M3.5	1.2	2-3.5	2-3.5	14	14
FR-E820-0080(1.5K)	M4	1.5	3-5-4	2-4	12	14
FR-E820-0110(2.2K)	M4	1.5	5-5-4	2-4	10	14
FR-E820-0175(3.7K)	M4	1.5	8-4	5-5-4	8	10
FR-E820-0240(5.5K)	M5	2.5	8-5	8-5	8	8
FR-E820-0330(7.5K)	M5	2.5	14-5	8-5	8	8
FR-E840-0016(0.4K) to 0060(2.2K)	M4	1.5	2-4	2-4	14	14
FR-E840-0095(3.7K)	M4	1.5	5-5-4	2-4	10	14
FR-E840-0120(5.5K), 0170(7.5K)	M4	1.5	8-4	5-5-4	8	10

*1 The screw size for terminals R/L1, S/L2, T/L3, U, V, W, PR, P1, N, and P1, and the earthing (grounding) terminal is shown.

◆ Short circuit ratings

- 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 V / 277 V maximum.

◆ Motor overload protection