

**INVERTER** 

E800



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

Please forward this Safety Guideline to the end user.

**INVERTER SAFETY GUIDELINE** 

FR-E820-0008(0.1K) to 0900(22K) FR-E840-0016(0.4K) to 0440(22K) FR-E820S-0008(0.1K) to 0110(2.2K) FR-E810W-0008(0.1K) to 0050(0.75K)

For more information on the product

IB-0600857ENG-G(2305)IP

## MITSUBISHI ELECTRIC CORPORATION

Troidica mandais			
Manual name	Manual number	Model code	Details
FR-E800 Instruction Manual (Connection)	IB-0600865ENG	1A2-P89	Manuals describing installation, wiring, specifications, outline dimensions, standards, and how to connect options.
FR-E800 Instruction Manual (Function)	IB-0600868ENG	1A2-P91	Manual describing details of the functions.
FR-E800 Instruction Manual (Communication)	IB-0600871ENG	1A2-P93	Manual describing details of the communications.
FR-E800 Instruction Manual (Maintenance)	IB-0600874ENG	1A2-P95	Manual describing how to identify causes of faults and warnings.
FR-E800 Instruction Manual (Functional Safety)	BCN-A23488-000	-	Manual describing the functional safety.
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.

an the following conductors.

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.

n this Safety Guideline, the safety instruction levels are classified into "WARNING" and "CAUTION".

**∴** CAUTION

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

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".



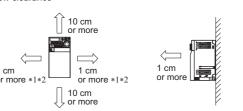
## INVERTER INSTALLATION AND PRECAUTIONS

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)





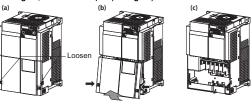
## 2 INSTALLATION AND WIRING

# Removal and reinstallation of covers

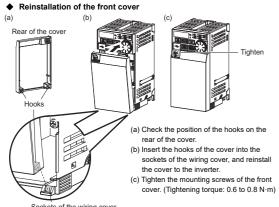
(a) Loosen the mounting screws of the cover. (These screws cannot be

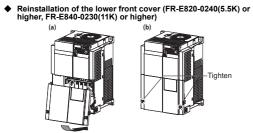
(b) Pull out the cover using its lower side as a support. With the cover removed, the control circuit terminals can be wired and the plug-in option can be installed.

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



(b) While holding the areas around the installation hooks on the sides of the lower front cover, pull out the cover using its upper side as a support.





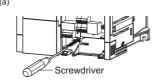
(a) Install the lower front cover by inserting the upper hooks into the sockets on the

(c) With the lower front cover removed, wiring of the main circuit terminals

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)) 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

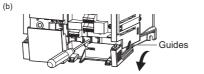
Pull out the cover along the guides in the direction shown by the arrow in the Fit the cover to the inverter along the guides

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-E820S-0050(0.75K) or higher, FR-E810W-0050(0.75K))



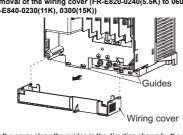
Reinstallation of the wiring cover (FR-E820-0080(1.5K)) to FR-E820-0175(3.7K), FR-E840-0016(0.4K) to FR-E840-0095(3.7K), FR-E820S-0050(0.75K) or higher, FR-E810W-0050(0.75K))

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



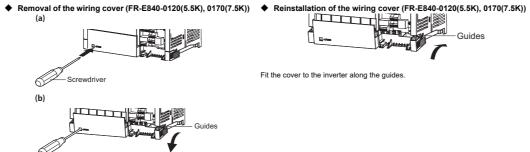
- (a) Insert a tool such as a flathead screwdriver into the half-hole above the "PUSH" mark on the wiring cover to push the stopper behind the wiring cover approx. 3 mm.
- (b) Pull out the cover along the guides in the direction shown by the arrow in

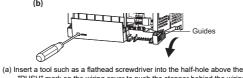
Removal of the wiring cover (FR-E820-0240(5.5K) to 0600(15K),



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

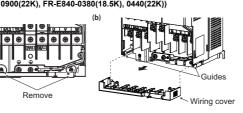
Pull out the cover along the guides in the direction shown by the arrow in the Fit the cover to the inverter along the guides

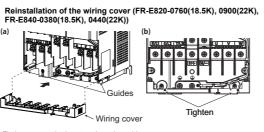




- "PUSH" mark on the wiring cover to push the stopper behind the wiring
- (b) Pull out the cover along the guides in the direction shown by the arrow in the figure above.

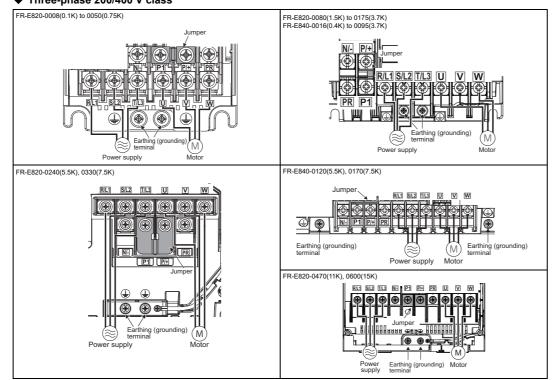
♠ Removal of the wiring cover (FR-E820-0760(18.5K), 0900(22K), FR-E840-0380(18.5K), 0440(22K))

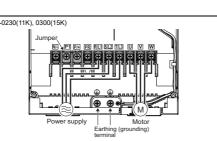


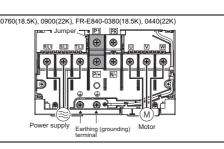


(a) Remove the mounting screws of the wiring cover. (a) Fit the cover to the inverter along the guides (b) Pull out the cover along the guides in the direction shown by the arrow in (b) Tighten the mounting screws of the wiring cover (tightening torque: 0.6 to 0.8

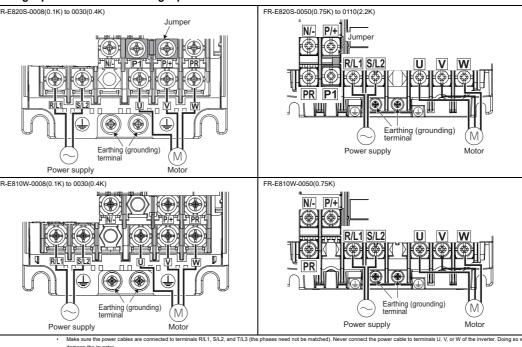
## 2.2 Main circuit terminal layout and wiring to power supply and motor ◆ Three-phase 200/400 V class







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



### 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

			0		Cable gauge							
Applicable Inverter	Terminal	Tightening	Crimp t	terminal	HIV c	ables, etc	c. (mm²) *1	AW	G *2	PVC cables, etc. (mm <sup>2</sup> ) *3		
model	screw size *4	torque N·m	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
FR-E820-0008(0.1K) 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
FR-E820-0080(1.5K), 0110(2.2K)	M4	1.5	2-4	2-4	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	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	10	10	6	6	6
FR-E820-0330(7.5K)	M5	2.5	14-5	8-5	14	8	5.5	6	8	16	10	6
FR-E820-0470(11K)	M5	2.5	14-5	14-5	14	14	8	6	6	16	16	16
FR-E820-0600(15K)	M6(M5)	4.4	22-6	22-6	22	22	14	4	4	25	25	16
FR-E820-0760(18.5K)	M8(M6)	7.8	38-8	22-8	38	22	14	2	4	35	25	25
FR-E820-0900(22K)	M8(M6)	7.8	38-8	38-8	38	38	22	2	2	35	35	25
FR-E840-0016(0.4K) to 0095(3.7K)	M4	1.5	2-4	2-4	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	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	12	12	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	10
FR-E840-0300(15K)	M5	2.5	8-5	8-5	8	8	5.5	8	8	10	10	10
FR-E840-0380(18.5K)	M6	4.4	14-6	8-6	14	8	8	6	8	16	10	16
FR-E840-0440(22K)	M6	4.4	14-6	14-6	14	14	14	6	6	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	14	14	2.5	2.5	2.5
FR-E820S-0050(0.75K)	M4	1.5	2-4	2-4	2	2	2	14	14	2.5	2.5	2.5
FR-E820S-0080(1.5K)	M4	1.5	2-4	2-4	2	2	2	14	14	2.5	2.5	2.5
FR-E820S-0110(2.2K)	M4	1.5	5.5-4	2-4	3.5	2	2	12	14	4	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	14	14	2.5	2.5	2.5
FR-E810W-0050(0.75K)	M4	1.5	5.5-4	2-4	3.5	2	2	14	14	2.5	2.5	2.5

- The cable size is that of the HIV cable (600 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. The cable size is that of the THIM 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 Camada, refer to the section 7.2 "Instructors for UL and cUL".)

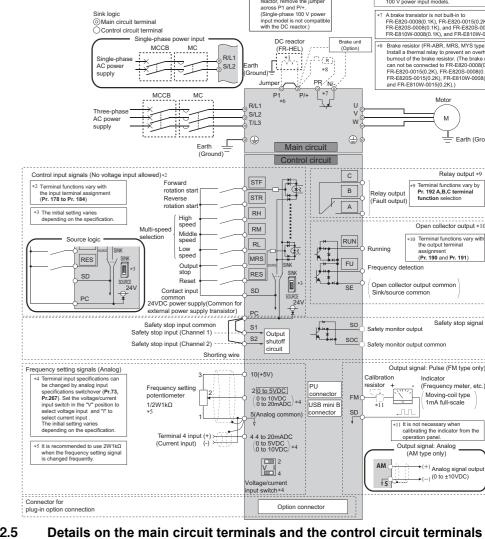
  The cable size is that of the Price Cable with continuous maximum permissible temperature of 70°C. It assumes a surrounding air temperature of 40°C or lower and the wiring distance of 20 m or responsible to the proper permissible temperature of 70°C. It assumes a surrounding air temperature of 40°C or lower and the wiring distance of 20 m or responsible to the Price 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 responsible to the first of the first of the single shape surrounding air temperature of 40°C or lower and the wiring distance of 20 m or responsible to the price of the single shape surrounding air temperature of 40°C or lower and the wiring distance of 20 m or responsible to the price of the single shape surrounding air temperature of 40°C or lower and the wiring distance of 20 m or responsible temperature of 40°C or lower and the wiring distance of 20 m or responsible to the single shape some price of 40°C or lower and the wiring distance of 20 m or responsible temperature of 40°C or lower and the wiring distance of 20 m or responsible to the single shape some price of 40°C or lower and the wiring distance of 20 m or responsible temperature of 40°C or lower and the wiring distance of 20 m or responsible temperature of 40°C or lower and the wiring distance of 20 m or responsible temperature of 40°C or lower and the wiring distance of 20 m or responsible te

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

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
	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)			
Shielded *1		400 V	<u> </u>	_	50 m (200m)	50 m (200m)	75 m (300m)	100 m (500m)	100 m (500m)
Snielded *1	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 vollages attributable to the wining 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.

### Terminal connection diagram



	e	symbol	Common	Terminal name	lerm	inal function description	
		R/L1, S/ .2, T/L3*1	_	AC power input	Connected to the commercial power supply. Do factor converter (FR-HC2) or the multifunction		
		J, V, W	_	Inverter output	Connected to a three-phase squirrel cage mote		in common bus regeneration mou
Ħ	F	P/+, PR	_	Brake resistor connection	Connect an optional brake transistor (MRS, M' E820-0008(0.1K), FR-E820-0015(0.2K), FR-E8 FR-E810W-0015(0.2K).)		
Main circuit	F	P/+, N/-	_	Brake unit connection	Connect the brake unit (FR-BU2, FR-BU, or BI converter (FR-HC2) to these terminals.	J), multifunction regeneration co	onverter (FR-XC), or high power fac
Mai	F	P/+, P1*2	_	DC reactor connection	Remove the jumper across terminals P/+ and I the single-phase 100 V power input models.) V and P1 should not be removed.		
	-		=	Earth (ground)	For earthing (grounding) the inverter chassis. I	Be sure to earth (ground) the inv	verter.
T	5	STF*3		Forward rotation start	Turn ON the STF signal to start forward rotation and turn it OFF to stop.	When the STF and STR signals are turned ON	
	5	STR*3	SD (sink	Reverse rotation start	Turn ON the STR signal to start reverse rotation and turn it OFF to stop.	simultaneously, the stop command is given.	
1	t E	RH, RM, RL*3	(negative common))	Multi-speed selection	Multi-speed can be selected according to the o signals.	combination of RH, RM and RL	Input resistance: 4.7 kΩ Voltage when contacts are open:
	act	MRS*3	PC (source (positive	Output stop	Turn ON the MRS signal (5 ms or more) to sto Use this signal to shut off the inverter output w electromagnetic brake.		21 to 26 VDC Current when contacts are short- circuited: 4 to 6 mADC
	F	RES*3	common))	Reset	Use this signal to reset a fault output provided activated. Turn ON the RES signal for 0.1 second in the initial setting, reset is always enabled. Benabled only at an inverter fault occurrence. To second after reset.	ond or longer, then turn it OFF. y setting <b>Pr.75</b> , reset can be	4 10 0 111/200
200	1	10	5	Power supply for a frequency setting potentiometer	Used as the power supply for an external frequence potentiometer.	uency setting (speed setting)	5 ±0.5 VDC, Permissible load current: 10 mA
	ting	2	5	Frequency setting (voltage)	Inputting 0 to 5 VDC (or 0 to 10 VDC) provides at 5 V (or 10 V) and makes input and output pr among input 0 to 5 VDC (initial setting), 0 to 10 The initial setting varies depending on the sper Set the voltage/current input switch to the "1" position	oportional. Use <b>Pr.73</b> to switch VDC, and 0 to 20 mA. cification.	For voltage input,
L	Frequency setting	ı	5	Frequency setting (current)	Inputting 4 to 20 mADC (or 0 to 5 VDC, 0 to 10 output frequency at 20 mA and makes input ar input signal is valid only when the AU signal is To use the terminal 4 (current input at initial se parameter from Pr.178 to Pr.184 (Input termit turning ON the AU signal. The initial setting varies depending on the specuse Pr.267 to switch among input 4 to 20 mA 0 to 10 VDC. Set the voltage/current input swit voltage input (0 to 5 V / 0 to 10 V).	VDC) provides the maximum do utput proportional. This ON (terminal 2 input is invalid). titing), assign "4" to any nal function selection) before cification. (initial setting), 0 to 5 VDC, and	Input resistance: 10 to 11 kΩ Maximum permissible voltage: 20 VDC For current input, Input resistance: 245 ±5 Ω Permissible maximum current: 30 mA
ſ	Relay	A, B, C	_	Relay output (fault output)	1 changeover contact output indicates that the activated and the outputs are stopped. Fault: discontinuity across B and C (continuity continuity across B and C (discontinuity across	across A and C), Normal:	240 VAC 2 A (power factor = 0.4) 30 VDC 1 A
	Open collector	RUN	SE	Inverter running	The output is in LOW state when the inverter of higher than the starting frequency (initial values state during stop or DC injection brake operation	0.5 Hz). The output is in HIGH on. *4	Permissible load: 24 VDC (maximum 27 VDC) 0.1 A
2	Open	ŧυ	SE	Frequency detection	The output is in LOW state when the inverter of higher than the preset detection frequency, and than the preset detection frequency. *4		(The voltage drop is 3.4 V at maximum while the signal is ON.
, [	Pulse	FM*5	SD	For indication on external meters	Among several monitor items such as output frequency, select one to output it via these terminals.		Permissible load current: 1 mA 1440 pulses/s at 60 Hz
-	Analog	AM*5	5	Analog voltage output	(The signal is not output during an inverter reset.) The size of output signal is proportional to the magnitude of the corresponding monitor item.	Output item: Output frequency (initial setting)	Output signal: 0 ±10 VDC, permissible load current: 1 mA (load impedance 10 kΩ or more), resolution: 12 bits
_	5	S1	PC	Safety stop input (Channel 1)	Use terminals S1 and S2 to receive the safety s relay module. Terminals S1 and S2 can be use		Input resistance: 4.7 kΩ
Safety stop function		S2	PC	Safety stop input (Channel 2)	Inverter judges the condition of the internal saf (shorted/opened) between terminals \$1 and \$1 When the status is opened, the inverter output In the initial status, terminal \$1 and \$2 are sho shorting wires. Remove the shorting wires and module when using the safety stop function.	ety circuit from the status C, or between S2 and PC. is shut off. orted with terminal PC by	Voltage when contacts are open: 21 to 26 VDC Current when contacts are short- circuited: 4 to 6 mADC
Safety sto		60	SOC	Safety monitor output (open collector output)	The output status varies depending on the input The output is in HIGH state during occurrence fault. The output is in LOW state otherwise. (The open collector transistor is ON (conductiv is OFF (not conductive) in HIGH state). Refer to the FR-E800 instruction Manual (Fund 000) when the signal is switched to HIGH while open. (Please contact your sales representative).	of the internal safety circuit  e) in LOW state. The transistor ctional Safety) (BCN-A23488- e both terminals S1 and S2 are	Permissible load: 24 VDC (27 VDC at maximum), 0.1A (The voltage drop is 3.4 V at maximum while the signal is ON.
				Contact input common (sink (negative common))	Common terminal for the contact input terminal	I (sink logic) and terminal FM.	
	5	SD	_	External transistor common (source (positive common))	Connect this terminal to the power supply com		
				24 VDC power supply common	as a programmable controller, in the source log  Common output terminal for 24 VDC 0.1 A pov		
minal				External transistor common (sink (negative common))	Connect this terminal to the power supply com- output (open collector output) device, such as the sink logic to avoid malfunction by undesiral	a programmable controller, in	
on tel	F	С	_	Safety stop input terminal common	Common terminal for safety stop input termina	ls	Power supply voltage range: 22 to 26.5 VDC
Common terminal				Contact input common (source (positive common))	Common terminal for the contact input terminal	I (source logic).	Permissible load current: 100 mA
			SD	24 VDC power supply common	Can be used as a 24 VDC 0.1 A power supply.	·	
	F	5	-	Frequency setting common	Common terminal for the frequency setting sig	nal (terminal 2 or 4). Do not eart	th (ground).
	- 1	SE	_	Open collector output common	Common terminal for terminals RUN and FU.		
	Ľ			Safety monitor output			1

Туре	Terminal symbol	Common	Terminal name	Terminal function description
ication			PU connector	With the PU connector, communication can be made through RS-485  Conforming standard: EIA-485 (RS-485) Transmission format: Multidrop link  Communication speed: 300 to 115200 bps: Overall length: 500 m
Commun				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)

the single-phase 100 V power input models. ted using **Pr.178 to Pr.184 (Input terminal function selection)**. (Refer to the FR-E800 Instruction Manual (Function). ow State. The available for the AM type inverter.

um SCCR is 500 mA. A PU connector cannot be used during USB bus power connection.

Control circuit terminal layout ◆FM type inverter S1 S2 PC RUN FU SE RL RM RH SD MRS RES SD STF STR SOSOC FM SD • Crimp terminals commercially available (as of October 2020.)

10 2 5 4 Phoenix Contact Co., Ltd. ABC ◆AM type inverter S1 S2 PC RUN FU SE RL RM RH SD MRS RES SD STF STR

A B C

BASIC OPERATION

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.

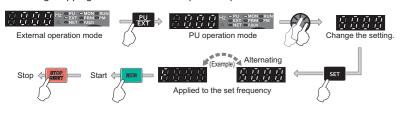
_	FIIDEIIIX COITIACI	,	N	1-	
		r	errule part N	10.	Crimping
	Wire gauge (mm <sup>2</sup> )	With insulation sleeve	Without insulation sleeve	For UL wire*1	tool mode No.
	0.3	AI 0,34-10TQ	_	=	
]	0.5	AI 0,5-10WH	_	AI 0,5-10WH-GB	
╛	0.75	AI 0,75-10GY	A 0,75-10	AI 0,75-10GY-GB	CRIMPFOX
	1	AI 1-10RD	A 1-10	AI 1-10RD/1000GB	CRIMPFOX
	1.25, 1.5	Al 1, 5-10BK	A 1,5-10	AI 1,5-10BK/1000GB*2	
	0.75 (for 2 wires)	AI-TWIN 2×0,75-10GY	_	=	

A ferrule terminal with an insulation sleeve compatible with the MTW wire which has a thick wire insulation. Applicable for terminals A1, B1, C1, A2, B2, C2.

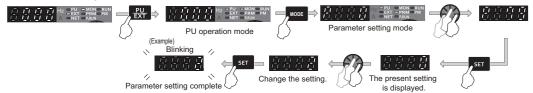
## Components of the operation panel

The operation panel cannot be removed from the inverter.		
	Name	Description
PU MON RUN	PU/EXT key	Switches between the PU operation mode, the PUJOG operation mode, and the External operation mode.
HZ EXT PRM PM	MODE key	Switches the operation panel to a different mode.
DOLDO A - NET - PRUN	SET key	Used to confirm each selection. Switches the monitor screen in the monitor mode.
PU MODE SET	RUN key	Start command The direction of motor rotation depends on the <b>Pr.40</b> setting.
RUN STOP	STOP/RESET key	Used to stop operation commands. Used to reset the inverter when the protective function is activated.
RESET!	Setting dial	The setting dial of the Mitsubishi Electric inverters. Turn the setting dial 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

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





5 LIST OF FAULT DISPLAYS

## 6 SPECIFICATIONS

# Inverter installation environment

Item	Description	
	-20°C to +60°C (The rated current must be reduced at a temperature above 50°C. 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 5 cm 5 cm
Storage temperature	-40°C to +70°C	Measurement x 5 cm
Atmosphere	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)	
Altitude/vibration		on in the rated current per 500 m increase in

## 6.2 Inverter rating

# ◆ Three-phase 200 V class

	Model FR-	E020 II		8000	0015	0030	0050	0080	0110	0175	0240	0330	0470	0600	0760	0900	
	Wiodei FK-	E020-[]		0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	
Applied	able motor capa	oity /k\A/\*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	
Applica	able illotor capa	City (KVV)	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 capac	/L\/A\*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	
	Rateu capac	ity (KVA)*2	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	
	Betad aure	(A)*7	LD	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)	
	Rated curre	ent (A)" /	ND	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	0		LD	120% 60	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C												
-	Overload curr	ent rating"3	ND	150% 60	50% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C												
	Ve	oltage*4		Three-ph	ree-phase 200 to 240 V												
		Brake tran	nsistor	Not insta	lled	Built-in											
	Regenerative braking torqu (ND refere		ie	150%		100%		50%	20%								
		AC (DC) vol	tage/	Three-ph	Three-phase 200 to 240 V 50/60 Hz (283 to 339 VDC *9)												
		AC (DC) vol	Itage	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	
	Dawer aug : b	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	
	capacity (kVA)*6	With DC	LD	0.5	8.0	1.3	2.3	3.7	4.6	7.5	11.0	15.0	21.0	26.0	34.0	44.0	
		reactor	ND	0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.1	13.0	18.0	23.0	29.0	34.0	
Pı	rotective structu	re (IEC 6052	9)	Open typ	e (IP20)												
	Cooling s	ystem		Natural				Forced a	ir								

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

	Madel ED	F040 F3		0016	0026	0040	0060	0095	0120	0170	0230	0300	0380	0440
	Model FR-	E840-[]		0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K
Annline	able motor capa	aite / /c/A/\*4	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	City (KVV)*1	ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5	22.0
	Rated capaci	tv (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
	Rateu capaci	ty (KVA) Z	ND	1.2	2.0	3.0	4.6	7.2	9.1	13.0	17.5	22.9	29.0	33.5
	Rated cur	rent (A)	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)
	*7		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 curre	ont rating *3	LD	120% 60	s, 150% 3	s (inverse-	time chara	acteristics)	at surroun	ding air ter	nperature	of 50°C		
	Overload curre	intrating 5	ND	150% 60	s, 200% 3	s (inverse-	time chara	acteristics)	at surroun	ding air ter	nperature	of 50°C		
	Vo	ltage *4		Three-ph	ase 380 to	480 V								
		Brake tran	sistor	Built-in										
	Regenerative braking	Maximum torqu (ND refere	е	100%		50%	20%							
		AC (DC) vol	age/	Three-ph	ase 380 to	480 V 50/	60 Hz (537	to 679VD	C *9)					
		AC (DC) vol	tage	323 to 52	28 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
	Power supply capacity	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
	(kVA) *6	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
	, ,	reactor	ND	1.2	2.0	3.0	4.6	7.2	9.1	13.0	18.0	23.0	29.0	34.0
Pr	rotective structu	re (IEC 60529	9)	Open typ	e (IP20)									
	Cooling s	ystem		Natural	•	Forced a	ir	,	,	,	•	•	•	
	Approx. ma	ass (ka)		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-E	2000 11		8000	0015	0030	0050	0080	0110
	Model FK-E	:8205-[]		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)	1.5 (1.4)	3.0 (2.5)	5.0 (4.1)	8.0 (7.0)	11.0 (10.0)
	Overload curre	ent rating*3	ND		s, 200% 3 ing air tem		time chara 50°C	cteristics)	at
Output	Vo	oltage*4		Three-ph					
		Brake tran	sistor	Not installed Built-in					
	Regenerative braking	Maximum torqu (ND refere	е	150% 100%				50%	20%
	Rated input A	C voltage/free	quency	Single-ph	ase 200 to	240 V 50/	60 Hz		
	Permissible A	C voltage fluo	uctuation 170 to 264 V, 50/60 Hz						
	Permissible fr	equency fluc	tuation	±5%					
Power	Rated input	Without DC reactor	ND	2.3	4.1	7.9	11.2	17.9	25.0
supply	current (A)*8	With DC reactor	ND	1.4	2.6	5.2	8.7	13.9	19.1
	Power supply capacity	Without DC reactor	ND	0.5	0.9	1.7	2.5	3.9	5.5
	(kVA)*6	With DC reactor	140	0.3	0.6	1.1	1.9	3.0	4.2
Pr	otective structu	re (IEC 60529	9)	Open typ	e (IP20)				
	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

	Madal ED E	04014/ []		8000	0015	0030	0050	
	Model FR-E	810W-[]		0.1K	0.2K	0.4K	0.75K	
Applica	able motor capa	city (kW)*1	ND	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		0% 3 s (inverse-time ) at surrounding air 50°C		
	Volta	age*10*11		Three-phase 200 to 240 V				
		Brake tran	sistor	Not instal	led	Built-in		
	Regenerative braking	Maximum torqu (ND refere	е	150%		100%		
	Rated input A	C voltage/fre	quency	Single-ph	ase 100 to	120 V 50	/60 Hz	
Power	Permissible AC	voltage fluc	tuation	90 to 132	V, 50/60 F	łz		
supply	Permissible from	equency fluc	tuation	±5%				
	Rated input cu	rrent (A) *8	ND	3.7	6.8	12.4	19.6	
Pr	otective structu	re (IEC 6052	9)	Open typ	e (IP20)	-		
	Cooling s	ystem		Natural				
	Approx. ma	ass (kg)		0.5	0.6	0.8	1.4	

- continuous regenerative torque. The average deceleration torquis becomes lower when a motor decelerates from a frequency higher than the base frequency. The inverter is not equipped with a builtbrake resistor. Use an opinion brake resistor for an operation with large regenerative power (Not available) for FR-E820-008(0,1K), FR-E820-005(0,2K), FR-E810W-008(0,1K), and FR-E810W-0015(0,2K). Brake unit (FR-BUZ) can be also used.

  The power supply capacity varies with the value of the power supply side impedance (including those of the input reactor and cables).

  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.

  PF.72 PWM frequency selection.

## 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.

♦ EMC Directive

- We declare that this inverter conforms with the EMC Directive and affix the CE marking on the inverter

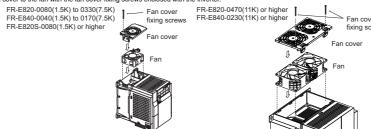
  EMC Directive: 2014/30/EU
- Standard: IEC 61800-3:2017 (Category "C3" / Second environment
- This inverter is not intended to be used on a low-voltage public network which supplies domestic premises. When using the inverter in a residential area, take appropriate measure and ensure the conformity of 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.
- 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

- 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 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 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.
- 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.



Fuse selection for branch circuit protection
To select fuses for branch circuit protection, refer to ◆ Fuse selection in 7.2 Instructions for UL and cUL.

For details, refer to 

Motor overload protection in 7.2 Instructions for III, and cIII

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

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 additional local code.

Precautions for opening the branch-circuit protective device / Précautions pour ouvrir le dispositif de protection du circuit de dérivation

down or the trip before replacing the fuse or resetting the tripped breaker (or before applying the power to the inverter again). -AVERTISSEMENT--AVERTI INSCIMENT 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).

### Fuse selection

Fuses are selected based on IEC/EN/UL 61800-5-1 and CSA C22.2 No. 274.

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

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	Bussmann	700 V, 50 A
FR-E820-0030(0.4K)	170M1409, 170M1309 or 170M1359	Bussmann	700 V, 16 A	FR-E840-0120(5.5K), 0170(7.5K)	170M1416	Bussmann	700 V, 80 A
FR-E820-0050(0.75K)	170M1411, 170M1311 or 170M1361	Bussmann	700 V, 25 A	FR-E840-0230(11K)	170M1419, 170M1319 or 170M1469	Bussmann	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	Bussmann	700V, 10A
FR-E820-0330(7.5K)	170M1419, 170M1319 or 170M1369	Bussmann	700 V, 160 A	FR-E820S-0015(0.2K)	170M1409	Bussmann	700V, 16A
FR-E820-0470(11K)	170M1420, 170M1320 or 170M1370	Bussmann	700 V, 200 A	FR-E820S-0030(0.4K)	170M1411	Bussmann	700V, 25A
FR-E820-0600(15K)	170M1421, 170M1321 or 170M1471	Bussmann	700 V, 250 A	FR-E820S-0050(0.75K)	170M1413	Bussmann	700V, 40A
FR-E820-0760(18.5K)	170M1422, 170M1322 or 170M1472	Bussmann	700 V, 315 A	FR-E820S-0080(1.5K)	170M1415	Bussmann	700V, 63A
FR-E820-0900(22K)	170M1422, 170M1322 or 170M1472	Bussmann	700 V, 315 A	FR-E820S-0110(2.2K)	170M1417	Bussmann	700V, 100A
FR-E840-0016(0.4K)	170M1408	Bussmann	700 V, 10 A	FR-E810W-0008(0.1K)	170M1409, 170M1309 or 170M1359	Bussmann	700V, 16A
FR-E840-0026(0.75K)	170M1410	Bussmann	700 V, 20 A	FR-E810W-0015(0.2K)	170M1410, 170M1310 or 170M1360	Bussmann	700V, 20A
FR-E840-0040(1.5K)	170M1411	Bussmann	700 V, 25 A	FR-E810W-0030(0.4K)	170M1413, 170M1313 or 170M1363	Bussmann	700V, 40A
FR-E840-0060(2.2K)	170M1412	Bussmann	700 V, 32 A	FR-E810W-0050(0.75K)	170M1415, 170M1315 or 170M1365	Bussmann	700V, 63A

### ♦ Capacitor discharge time / Temps de décharge du condensateur CAUTION - Risk of Electric Shock

Before writing 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, 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

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 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.

			Crimp terminal		Cable gauge AWG	
Applicable inverter model	Terminal screw size	Tightening torque (N·m)				
		(14 111)	R/L1, S/L2, T/L3	U, V, W	R/L1, S/L2, T/L3	U, V, W
FR-E820-0008(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-NK4	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	6	8
FR-E820-0470(11K)	M5	2.5	38-S5	22-5	3	4
FR-E820-0600(15K)	M6(M5)	4.4	38-S6	38-S6	2	3
FR-E820-0760(18.5K)	M8(M6)	7.8	60-8	38-8	1/0	2
FR-E820-0900(22K)	M8(M6)	7.8	60-8	60-8	1/0×2	1/0
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-NK4	5.5-4	8	10
FR-E840-0230(11K)	M4	1.5	14-4	8-4	6	8
FR-E840-0300(15K)	M5	2.5	22-S5	14-5	4	6
FR-E840-0380(18.5K)	M6	4.4	22-6	14-6	4	6
FR-E840-0440(22K)	M6	4.4	38-6	22-6	3	4

\*1 The screw size for terminals RL1, SL2, T/L3, U, V, W, PR, P/+, N/-, and P1, and the earthing (grounding) terminal is shown. The screw size for the earthing (grounding) terminal on FR-E820-0800/15K\ to FR-E820-0800/12K\ is indicated in carentheses.

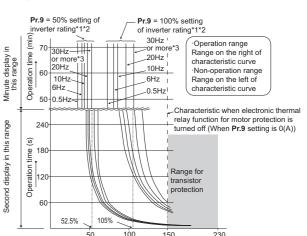
The following table shows examples when the inverter rating is 125% of the ND rating, when the cable is the THHW cable with continuous maximum permissible temperature of 75°C, when the surrounding air temperature is 40°C or less, and when the wiring length is 20 m or shorter.

			Crimp term	inal	Cable gauge		
Applicable inverter model	Terminal screw size	Tightening torque (N·m)	Crimp term	IIIai	AWG		
	_	(14 111)	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	

\*2 For the single-phase 200 V power input models, the screw size for terminals R/L1, S/L2, 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 R/L1, S/L2, U, V, W, PR, P/+, 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 Inis function detects the overload (overneat) of the motor and shut off 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

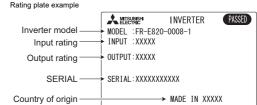
1) Set one of "10, 13, 15, 16, 50, 53, 70, 73, 1800, or 1803" in Pr.71. (This setting enables the 100%

- - constant-torque characteristic in the low-speed range.

    2) Set the rated motor current in **Pr.9**.
  - When setting **Pr.9** to a value (current value) of 50% of the inverter rated output current. The % value denotes the percentage to the inverter rated output current. It is not the percentage to the rated motor current. When the electronic thermal relay function dedicated to the Mitsubishi Electric constant-
- Inverter output current (%) (% to the rated output current . The internal accumulated heat 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.
   When using a Vector-control-dedicated motor (SF-V5RU) with built-in thermal protector, set 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.

SERIAL number check The SERIAL number can be checked on the inverter rating plate or package

7.3





The last two digits of the production year are indicated as the Year, and the Month is

indicated by 1 to 9, X (October), Y (November), or Z (December) 7.4 The power loss data according to Ecodesign Directive

and month, and six characters indicating the control number

The following table shows the power loss data according to Ecodesign Directive. The regulation covers 3-phase variable speed drives from  $0.12~\text{kW} \le \text{Pn} \le 1~000~\text{kW}$ .

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

Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products. (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks