

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 800 nechanism, safety information and instructions. Please forward this Safety Guideline to the end use

INVERTER E800-HVC **INVERTER SAFETY GUIDELINE**

IB-0600944ENG-C(2405)MEE

FR-E800-HVC Instruction Manual (Connection) IB-0600950ENG

Specifications subject to change without notice.

Related manuals

FR-E800 Instruction Manual (Function

FR-E800 Instruction Manual (Con

R-E800 Instruction Manual (Ma

A WARNING

Note that even th

FR-E820-0011(0.2K) to 0978(30K)-HVC FR-E840-0018(0.75K) to 0510(30K)-HVC FR-E820S-0011(0.2K) to 0082(2.2K)-HVC

For more information

on the product

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Manual number

IB-0600871ENG 1AJ051

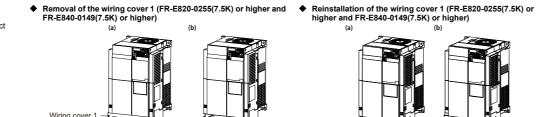
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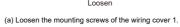
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IB-0600874ENG

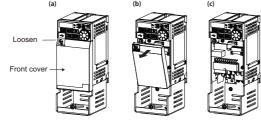
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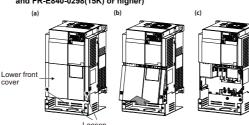


(b) Slide up the cover and pull it out.

Removal of the front cover



cover. (The screw cannot be removed.) (b) Put a finger on the recess for the screw of the cover and pull out the cover

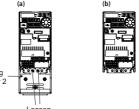


(a) With the wiring cover 1 removed, loosen the mounting screws on the lower front cover. (These screws cannot be removed.)

(b) While holding the areas around the installation hooks on the sides of the

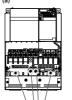
(c) With the cover removed, the control circuit terminals (connector) can be

Removal of the wiring cover 2 (FR-E820-0340(11K) or lower and FR-E840-0196(11K) or lower and FR-E820S-0082(2.2K) or lower)



Tight	en the mounting screws of the v	viring cover 2.
	Inverter	Tightening torque
	FR-E820-0167(5.5K) or lower	
	FR-E840-0094(5.5K) or lower	0.9 to 1.3 N·m
	FR-E820S-0082(2.2K) or lower	
	FR-E840-0149(7.5K), FR-E840-0196(11K)	1.4 to 1.9 N·m
	FR-E820-0255(7.5K), FR-E820-0340(11K)	2.8 to 3.6 N m

Removal of the wiring cover 2 (FR-E820-0476(15K) or higher and
 Reinstallation of the wiring cover 2 (FR-E820-0476(15K) or higher



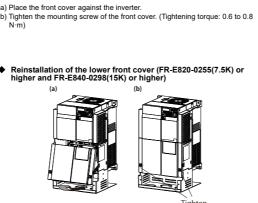
0-0587(18.5k

20-0748(22K) R-E820-0978(30K)

FR-E840-0018(0.75K

2.3





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

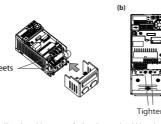
Tighter

(b)

JOE:

torque: 0.6 to 0.8 N·m)

Reinstallation of the wiring cover 2 (FR-E820-0340(11K) or lower and FR-E840-0196(11K) or lower and FR-E820S-0082(2.2K) or



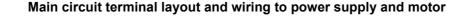
en the mounting screws of the v	viring cover 2.
Inverter	Tightening torque
FR-E820-0167(5.5K) or lower	
FR-E840-0094(5.5K) or lower	0.9 to 1.3 N·m
FR-E820S-0082(2.2K) or lower	
FR-E840-0149(7.5K), FR-E840-0196(11K)	1.4 to 1.9 N·m
FR-E820-0255(7.5K), FR-E820-0340(11K)	2.8 to 3.6 N·m

and FR-E840-0298(15K) or higher)

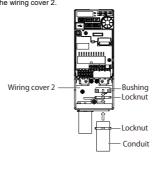
nting screws of the wiring cover 2. Tightening torque Inverter 0298(15K) 1.4 to 1.9 N·n -0476(15K) 587(18.5K) 2.8 to 3.6 N·m 0349(18 5K)



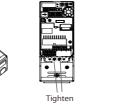
748(22K) or higher FR-E840-0383(22K) or higher 4.7 to 6.4 N·m

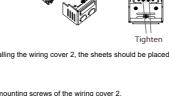


(1) To punch out the knockout holes in the wiring cover 2 put a screwdrive (1) to put of our the knockout holes in the wining cover 2, put a screwarder against the knockout's edge and firmly tap it with a hammer or other object.
 (2) Pass conduits through the round knockout holes. Fix the conduits with locknuts both inside and outside the cover. Then tighten bushings to fix the conduits to the wiring cover 2.





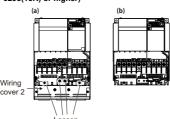




Wiring cover 2	Loosen
	ng cover 1 and the front cov

) After removing the wiring cover 1 and the front cover (FR-E820-0167(5.5K) or lower and FR-E840-0196(11K) or lower) or the lower front cover (FR-E820-0255(7.5K) or higher), remove the mounting screws of the wiring cover

FR-E840-0298(15K) or higher)

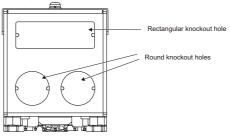


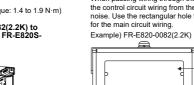
(a) After removing the wiring (b) With the wiring cover 2 ren

cover 1 and the lower front cover, remove the iring cover 2.	(a) Tighte	en the moun
moved, the main circuit can be wired.		
		FR-E840-02
		FR-E820-04 FR-E820-04
		FR-E840-03
		FR-E820-0

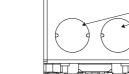
Main circuit terminal layout and wiring to power supply and motor 2.2

When passing wiring through the knockout holes on the wiring cover 2, separate the control circuit wiring from the main circuit wiring to reduce the influence of noise. Use the rectangular hole for the control circuit wiring and the round holes for the main circuit wiring.



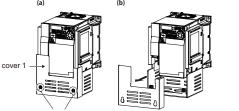






(a) Align the screw holes of the wiring cover 1 with the screw holes of the

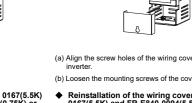
(a) Loosen the mounting screws of the wiring cover 1. (b) Slide up the cover and pull it out. (b)



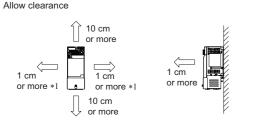
(a) Loosen the mounting screws of the wiring cover 1

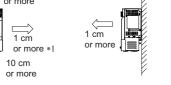
(b) Slide up the cover and pull it out

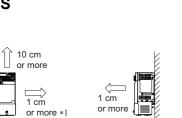
higher)











2 INSTALLATION AND WIRING

2.1 Removal and reinstallation of covers

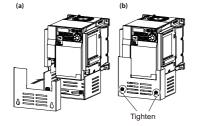
Removal of the wiring cover 1 (FR-E820-0051(1.1K) or lower and Reinstallation of the wiring cover 1 (FR-E820-0051(1.1K) or lower FR-E820S-0017(0.4K) or lower) and FR-F820S-0017(0.4K) or lower

Viring cove

Tighter (a) Align the screw holes of the wiring cover 1 with the screw holes of the

(b) Loosen the mounting screws of the cover. (Tightening torque: 1.4 to 1.9 $\textrm{N}{\cdot}\textrm{m})$

Removal of the wiring cover 1 (FR-E820-0082(2.2K) to 0167(5.5K) and FR-E840-0094(5.5K) or lower and FR-E820S-0030(0.75K) or 0167(5.5K) and FR-E840-0094(5.5K) or lower and FR-E820S-0030(0.75K) 0030(0.75K) or higher)



(b) Loosen the mounting screws of the cover. (Tightening torque: 1.4 to 1.9 N·m)

Manual describing details of the comm Manual describing how to identify causes of faults and warr Manual describing details of the PLC function. Do not attempt to install, operate, maintain or inspect this product until you have read through this Safety Guideline and supplementary documents carefully to us 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 followi 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. n this Safety Guideline, the safety instruction levels are classified into "WARNING" and "CAUTION".

MITSUBISHI ELECTRIC CORPORATION

Details

fanuals describing installation, wiring, specifications, outline dimensions, standard

Incorrect handling may cause hazardous conditions, resulting in death or severe injury. Incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause only material damage

nd how to connect options

Manual describing details of the function

CAUTION level may lead to a serious consequence depending on conditions. Be sure to follow the instructions of both

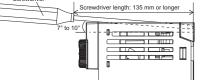
levels as they are critical to personnel Read this Guideline before use. In addition, scan the 2D code below to download the FR-E800-HVC Instruction Manual (Connection) and read "Safety Instructions" The PDF manual can also be downloaded from the Mitsubishi Electric FA Global Website

INVERTER INSTALLATION AND PRECAUTIONS

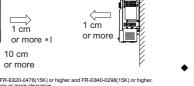
1 When installing the inverter on the enclosure surface, remove the front cover and

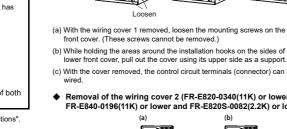
wiring cover to fix the inverter of a tree enclosure surface, rem • Install the inverter on a strong surface securely with screws

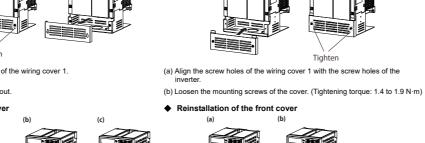
Leave enough clearances and take cooling measures. Avoid places where the inverter is subjected to direct sunlight, high temperature and high humidity. Install the inverter on a nonflammable wall surface. When tightening screws into the upper mounting holes, tilt the screwdriver seven to ten degrees (FR-E820-0051(1.1K) or lower, FR-E820S-0017(0.4K) or lower). iver length: 135 mm or longer

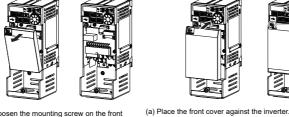












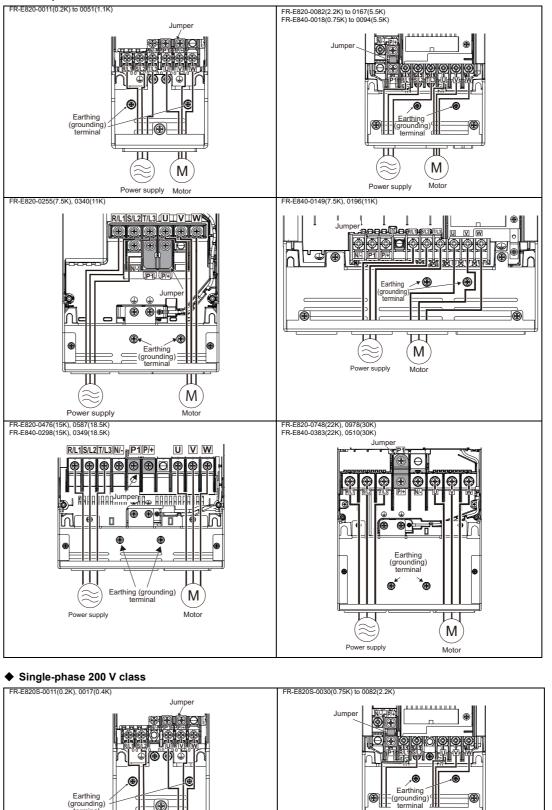
(a) With the wiring cover 1 removed, loosen the mounting screw on the front using its lower side as a support. (c) With the cover removed, the control circuit terminals (connector) can be

Removal of the lower front cover (FR-E820-0255(7.5K) or higher and FR-E840-0298(15K) or higher)
 Reinstallation of the lower front cover (FR-E820-0255(7.5K) or higher and FR-E840-0298(15K) or higher)

lower)

(b) Tighten the screws on the lower part of the lower front cover.(Tightening





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 wil samage 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

Recommended cables and wiring length

(**M**)

Power supply

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.

					Cable gauge											
inverter		Tightening	Crimp	terminal	н	IV cable	s, etc. (n	nm²) *1	AW	G *2	PVC cables, etc. (mm ²) *3					
el	screw size *4	torque N∙m	R/L1, S/L2, T/L3*5	U, V, W	R/L1, S/L2, T/L3*5		P/+, P1	Earthing (grounding) cable	R/L1, S/L2, T/L3*5	U, V, W	R/L1, S/L2, T/L3*5	U, V, W	Earthing (grounding) cable			
to 0051(1.1K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	2	14	14	2.5	2.5	2.5			
	M4 (M3.5)	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5			
1	M4 (M3.5)	1.5	5.5-4	5.5-4	3.5	3.5	3.5	3.5	12	12	4	4	4			
	M4 (M3.5)	1.5	5.5-4	5.5-4	5.5	5.5	5.5	5.5	10	10	6	6	6			
	M5	2.5	14-5	5.5-5	14	5.5	14	5.5	6	10	16	6	6			
	M5	2.5	14-5	14-5	14	14	14	8	6	6	16	16	10			
	M5	2.5	22-5	22-5	22	22	22	14	4	4	25	25	16			
()	M6(M5)	4.4	38-6	22-6	38	22	38	14	2	4	35	25	25			
	M8(M6)	7.8	38-8	38-8	38	38	38	22	2	2	35	35	25			
	M8(M6)	7.8	60-8	60-8	60	60	60	22	1/0	1/0	50	50	25			
() to 0059(3.0K)	M4 (M3.5)	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5			
1	M4 (M3.5)	1.5	2-4	2-4	2	2	3.5	2	12	14	2.5	2.5	2.5			
1	M4	1.5	5.5-4	5.5-4	3.5	3.5	3.5	3.5	12	12	4	4	4			
	M4	1.5	5.5-4	5.5-4	5.5	5.5	5.5	5.5	10	10	6	6	6			
	M4	1.5	8-4	5.5-4	8	5.5	8	5.5	8	10	10	6	10			
()	M5	2.5	14-5	8-5	14	8	14	8	6	8	16	10	16			
	M6	4.4	14-6	14-6	14	14	22	14	6	6	16	16	16			
	M6	4.4	22-6	22-6	22	22	22	14	4	4	25	25	16			
K), 0017(0.4K)	M3.5	1.2	2-3.5	2-3.5	2	2	2	2	14	14	2.5	2.5	2.5			
5K), 0051(1.1K)	M4(M3.5)	1.5	2-4	2-4	2	2	2	2	14	14	2.5	2.5	2.5			
<)	M4(M3.5)	1.5	5.5-4	2-4	3.5	2	2	2	12	14	4	2.5	2.5			

able size is that of the HIV cable (600 v grade neaf-resistant r-vu insuland wright) cable (size is that of the HIV cable (600 v grade neaf-resistant r-vu insuland wright) cable size is that of the Ti-HW cable with continuous maximum permissible temperature of 75°C. It assumes a surrounding air temperature of 40°C or lower and the writing distance of 20 m or able size is that of the Ti-HW cable with continuous maximum permissible temperature of 75°C. It assumes a surrounding air temperature of 40°C or lower and the writing distance of 20 m or able size is that of the FIV cable with continuous maximum permissible temperature of 70°C. It assumes a surrounding air temperature of 40°C or lower and the writing distance of 20 m or it (selection example mainty for use in Europe). Write the earthing (grounding) terminal is shown. For the single-phase 200 V power input models, the screw size for terminals R11, S12, T13, UV, WP, N-W, and P1, and the earthing (grounding) terminal is shown. The screw size for terminals R14, S12, and P1, and the earthing (grounding) terminal is shown. The screw size for terminals results of r047(5.5K) is indicated in parentheses.

(**M**)

The line voltage drop can be calculated by the following formula

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

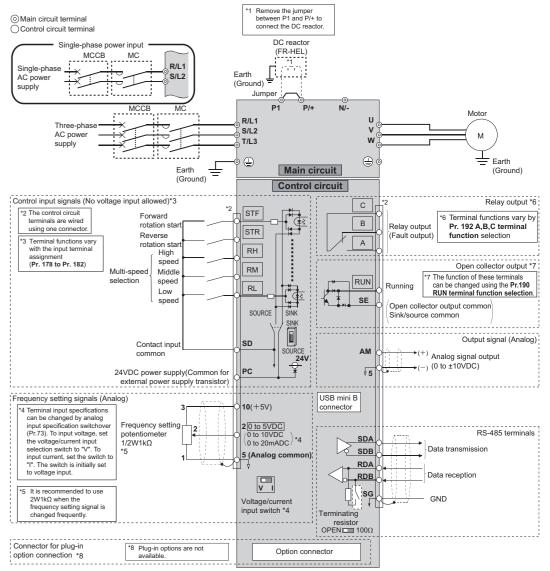
Use a larger diameter cable when the wiring distance is long or when the voltage drop (torque reduction) in the low speed range needs to be reduced.

Total wiring length

			Applicable inverter model: FR-E820-[]-HVC											
Cable type	Pr.72 setting (carrier frequency)	Voltage class	0011 (0.2K)	0017 (0.4K)	003 (0.75		00 (1.1		0082 (2.2K)		0102(3.0K)	0167 (5.5K) or higher		
Shielded	1 (1 kHz) or lower	200 V	50m(200m)	50m(200m)	75m(30	Om)	100m(5	00m)	100 m (500) m)	100 m (500 m)	100 m (500 m)		
cable*1	2 (2 kHz) or higher	200 V	10m(30m)	25m(100m)	50m(20	Om)	75m(30	0m)	100 m (500) m)	100 m (500 m)	100 m (500 m)		
			Applicable inverter model: FR-E840-[]-HVC											
Cable type	Pr.72 setting (carrier frequency)	Voltage class	0018 (0.75K)	0030 (1.5K)		004 (2.2			0059 (3.0K)		0094 (5.5K) or higher			
Shielded	1 (1 kHz) or lower	400.1/	50 m (200 m)	50 m (200 m	1) 7:	5 m (300	m)	100 m	(500 m)	100	m (500 m)			
cable*1	2 (2 kHz) or higher 400 V 10 m (30 m)		25 m (100 m) 5	50 m (200 m)		75 m (300 m)		100 m (500 m)					

When driving a 400 V class motor by the inverter, surge voltages attributable to the wiring constants may occur at the motor terminals, deteriorating the insulation of the 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 100 m cordinated in the source of the source of

2.4 Terminal connection diagram



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

Ту	pe	Terminal symbol	Common	Terminal name	Terminal func	tion description	
		R/L1, S/L2, T/L3*1	_	AC power input	Connected to the commercial power supply. Do not c power factor converter (FR-HC2) or the multifunction regeneration mode.		
	3	U, V, W	_	Inverter output	Connected to a three-phase squirrel cage motor or a	PM motor.	
Moio oicout		P/+, P1	-	DC reactor connection	Remove the jumper across terminals P/+ and P1, and connected, the jumper across terminals P/+ and P1 s		a DC reactor is not
-	-		_	Earth (ground)	For earthing (grounding) the inverter chassis. Be sure	e to earth (ground) the inverte	r.
	Ħ	STF*2	SD (sink (negative	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	Input resistance: 4.7 kg Voltage when contacts
	Contact input	STR*2	common))	Reverse rotation start	Turn ON the STR signal to start reverse rotation and turn it OFF to stop.	simultaneously, the stop command is given.	are open: 21 to 26 VDC
	Cont	RH, RM, RL*2	PC (source (positive common))	Multi-speed selection	Multi-speed can be selected according to the combin signals.	ation of RH, RM and RL	Current when contacts are short-circuited: 4 to 6 mADC
Input signal		10	5	Power supply for a frequency setting potentiometer	Used as the power supply for an external frequency s potentiometer.	setting (speed setting)	5 ±0.5 VDC, Permissible load curren 10 mA
Ing	Frequency setting	2	5	Frequency setting (voltage)	Inputting 0 to 5 VDC (or 0 to 10 VDC) provides the ma V (or 10 V) and makes input and output proportional. input 0 to 5 VDC (initial setting), 0 to 10 VDC, and 0 t Set the voltage/current input switch to the "I" position 20 mA).	Use Pr.73 to switch among o 20 mA. to select current input (0 to	For voltage input, Input resistance: 10 to 1 $k\Omega$ Maximum permissible voltage: 20 VDC For current input, Input resistance: 245 \pm Ω Permissible maximum current: 30 mA
	Relay	A, B, C	_	Relay output (fault output)	1 changeover contact output indicates that the inverte activated and the outputs are stopped. Fault: discontinuity across B and C (continuity across across B and C (discontinuity across A and C)		30 VDC 1 A
Output signal	Open collector	RUN	SE	Inverter running	The output is in LOW state when the inverter output fr than the starting frequency (initial value: 0.5 Hz). The during stop or DC injection brake operation."3		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.)
0	Analog	АМ	5	Analog voltage output	Among several monitor items such as output frequency, select one to output it via this terminals. (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 to ±10 VDC Permissible load curren 1 mA (load impedance 10 kΩ or more) Resolution: 12 bits
				Contact input common (sink (negative common))	Common terminal for the contact input terminal (sink	logic).	
		SD	_	External transistor common	Connect this terminal to the power supply common te		
_	_			(source (positive common)) 24 VDC power supply	device, such as a programmable controller, in the source autout terminal for 24 V/DC 0.1.4 power autout		
in a second	5			common	Common output terminal for 24 VDC 0.1 A power sup		m terminais 5 and 5E.
Common torminal		PC		External transistor common (sink (negative common)) Contact input common	Connect this terminal to the power supply common te (open collector output) device, such as a programmat to avoid malfunction by undesirable current.	rminal of a transistor output ole controller, in the sink logic	Power supply voltage range: 22 to 26.5 VDC
ĉ	3			(source (positive common))	Common terminal for the contact input terminal (sour	ce logic).	Permissible load curren 100 mA
			SD	24 VDC power supply	Can be used as a 24 VDC 0.1 A power supply.		TUUTIIA
		5	—	Frequency setting common	Common terminal for the frequency setting signal (ter	minal 2) . Do not earth (grour	ıd).
		SE	_	Open collector output common	Common terminal for terminal RUN.		
_	minals	SDA SDB		Inverter transmission terminal	RS-485 communication can be made through the RS Conforming standard: EIA-485 (RS-485)	-485 terminals.	
Communication	RS-485 terminals	RDA RDB	-				
nmu	RS	SG					
Cor	USB	_	_	USB connector*4	Use the USB connector to communicate with a perso · Interface: conforms to USB 1.1 · Transmission spee · Connector: USB mini B connector (receptacle mini I	d: 12 Mbps	

Control circuit terminals (connector) layout 2.6

Viewed from the bottom of the inverter 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 Terminal symbol Pin number Terminal symbo SDB (RS-485 RDA (RS-485) SG (RS-48 STR RUN · Making connection cables It is recommended to use a cable of 0.2 to 0.8 mm² for the connection to the control circuit terminals. For the cable parts to be used, refer to the following ailable products (as of July 2021 ne Model Manufacturer Product name 2-1586019-2 TE Connectivity 1586315-1 Connecting the cable to the connector onnect the cable to the connector of the control circuit terminal on the inverte BASIC OPERATION 3 3.1 Components of the operation panel mass (kg) The operation panel cannot be removed from the inverte Switches between the PU operation mode, the PUJOG operation mode, and th HAND/AUTO key HAND MON RU AUTO PRM PM NET PRUN ches the operation panel to a different mode MODE ke Used to confirm each selection. SET key witches the monitor screen in the monitor mode Start command RUN key The direction of motor rotation depends on the **Pr.40** setting. Used to stop operation commands. STOP/RESET key Used to reset the inverter when the protective function is activated. STOP RESET RUN The setting dial of the Mitsubishi Electric inverters. Turn the setting dial to change the setting of frequency or parameter. Setting dial **♦**Starting/stopping the inverter on the operation panel External operation mode PU operation mode Change the setting 7.2 888 8888 🛏 SET Stop (= STOP) == Start (= RUN == 🛃 \int Applied to the set frequency Parameter setting PU operation mode \mathcal{S} (Example) Blinking 8888 -**A** = 8888 - 8888 SET Parameter setting complete Change the setting is displayed. 4 Differences in the functions 5 PARAMETERS For details, refer to the FR-E800 Instruction Manual (Function). The PDF manual can also be downloaded from the Mitsubishi Electric FA Global from the standard inverter The authorized representative in the EU For details, refer to the FR-E800-HVC Instruction Manual (Connection). Website. The PDF manual can also be downloaded from the Mitsubishi Electric FA Global Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, German ation on the product Compliance with EN 60730-1 Automatic action: Type 1 action Control function:Class A Control purpose:Operating Control 6 LIST OF FAULT DISPLAYS Construction:Incorporated control For details, refer to the FR-E800 Instruction Manual (Maintenance). The PDF manual can also be downloaded from the Mitsubishi Electric FA Global EMC Directive We declare that this inverter conforms with the EMC Directive and affix the CE marking on the inverter Website. mation on the produc Notes 7 SPECIFICATIONS 7.1 Inverter rating Low Voltage Directive: 2014/35/EU Standard: EN 61800-5-1 Three-phase 200 V class Model: FR-E820-[]-HVC 0011 0017 0030 0051 0082 0102 0167 0255 0340 0476 0587 0748 0978

	Model. The Lord		0011	0000		0001	0102	0.01	0200	0040	0410	0007	0140	0010			
Applicable motor capacity (kW)*1 LD Rated capacity (kVA)*2 LD				0.2	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11	15	18.5	22	30	
	Rated capacity	r (kVA)*2	LD	0.4	0.7	1.2	2.0	3.3	4.1	6.7	10.2	13.5	19.0	23.4	29.8	39.0	
Output	Rated curren	t (A)*3	LD	1.1	1.7	3.0	5.1	8.2	10.2	16.7	25.5	34.0	47.6	58.7	74.8	97.8	
Output	Overload current rating*4 LD Voltage*5 Rated input AC (DC) voltage/frequency			120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C													
				Three-phase 200 to 240 V													
				Three-phase 200 to 240 V, 50/60 Hz (283 to 339 VDC*8)													
	Permissible AC (DC) voltage fluctuation			170 to 3	170 to 264 V, 50/60 Hz (240 to 373 VDC*8)												
	Permissible frequency fluctuation			±5%	±5%												
Power	Rated input	Without Rated input DC reactor	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	
supply		With DC reactor		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	
	Power supply	Without DC reactor	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	
	capacity (kVA)*6	With DC reactor		0.5	0.8	1.3	2.3	3.7	4.6	7.5	11.0	15.0	21.0	26.0	34.0	44.0	
	Protective strue		UL Typ	e 1 (Encl	osed Typ	e*9)(UL5	0)/IP20 (f	or IEC 60	529 only)	-	-	-				
	Cooling syste	em		Natural	l			Forced	air								
	Approx. mass (kg)				0.7	0.9	1.1	1.9	1.9	2.3	4.2	4.2	6.6	6.8	12.3	12.3	

Three-phase 400 V class

	Model: FR-E840-[]-HVC		0018	0030	0047	0059	0094	0149	0196	0298	0349	0383	0510		
App	plicable motor capacity	/ (kW)*1	LD	0.75	1.5	2.2	3.0	5.5	7.5	11.0	15.0	18.5	22	30		
	Rated capacity	Rated capacity (kVA)*2 LD			2.3	3.6	4.5	7.2	11.4	14.9	22.7	26.6	29.2	38.9		
Output	Rated current (A)*3 LD			1.8	3.0	4.7	5.9	9.4	14.9	19.6	29.8	34.9	38.3	51.0		
Output	Overload curren	t rating*4	LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C												
	Volta	•		Three-phase 380 to 480 V												
	Rated input AC (DC)			Three-phase 380 to 480 V, 50/60 Hz (537 to 679 VDC*8)												
	Permissible AC (DC) voltage fluctuation			323 to 528 V, 50/60 Hz (457 to 740 VDC*8) ±5%												
	Permissible frequ	Permissible frequency fluctuation														
Power	Rated input DC reactor current (A)*7 With 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			
supply		reactor		2.1	3.5	5.5	6.9	11.0	18.0	23.0	35.0	41.0	45.0	60.0		
	Power supply	Without DC reactor	LD	2.5	4.5	6.8	8.2	12.0	19.0	25.0	36.0	42.0	45.0	58.0		
	capacity (kVA)*6	capacity (kVA)*6 With DC reactor			2.7	4.2	5.3	8.5	13.0	18.0	27.0	31.0	34.0	46.0		
	Protective struc	ture		UL Type	1 (Enclos	ed Type*9)	(UL50)/IP2	20 (for IEC	60529 only	()						
	Cooling syste	m		Natural		Forced a	air									
	Approx. mass (kg)		1.6	1.6	1.8	2.4	2.4	3.2	3.2	6.0	6.1	12.3	12.3		

Single-phase 200 V class

	Model FR-E82	0S-[]-HVC		0011	0017	0030	0051	0082			
Applica	ible motor capa	city (kW)*1	0.2	0.4	0.75	1.1	2.2				
	Rated capaci	ty (kVA)*2	LD	0.4	0.7	1.2	2.0	3.3			
	Rated curre	ent (A)*3	LD	1.1	1.7	3.0	5.1	8.2			
Output	Overload curr	ent rating*4	LD		s, 200% 3 nding air tei			cteristics)			
	Ve	oltage*5		Three-pha	ase 200 to	240 V					
	Rated input A	C voltage/free	quency	Single-ph	ase 200 to	240 V 50/6	60 Hz				
	Permissible A	C voltage fluo	tuation	170 to 264 V, 50/60 Hz							
	Permissible fr	equency fluc	tuation	±5%							
Power	Rated input	Without DC reactor	LD	3.0	4.5	6.7	11.4	18.6			
supply	current (A)*7	With DC reactor		1.8	2.8	5.0	9.1	14.7			
	Power supply capacity	Without DC reactor	LD	0.9	1.7	2.5	3.9	5.5			
	(kVA)*6	With DC reactor		0.6	1.1	1.9	3.0	4.2			
	Protective s	tructure		Open type	e (IP20*9)(I	JL50)/IP20	(for IEC 6	0529 only			
	Cooling s	ystem		Natural			Forced ai	r			
	Approx. ma	ass (kg)		0.8	1.1	1.9	2.0	2.3			

or capacity indicated is the maximum capacity applicable for use of the Mitsubish Electric standard 4-pole motor. Isabishi Electric high-performance energy-saving motor, use the 2004/00 V class 2.2X inverter for 3.3 XM motor. 40 V for three-phase 400 V class. Is about the current value initially set in Pr.9 Electronic thermal OLI Laby Pr.56 Current monitoring reference. and Pr.557 Current average value monitor signal output refer is show the current value initially set in Pr.9 Electronic thermal OLI Laby Pr.56 Current monitoring reference. and Pr.557 Current average value monitor signal output refer is the table is also used as the reference current value (100% value) for Pr.22 Stall prevention operation level (Torque limit level), Pr.874 OLT level setting, Pr.150 Output

 Model: FR-E820-[]-HVC
 0011
 0017
 0030
 0051
 0082
 0102
 0167
 0255
 0340
 0476
 0587
 0748
 0978

 Current value (A)
 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

 Model: FR-E840-[]-HVC
 0018
 0030
 0047
 0059
 0094
 0149
 0196
 0298
 0349
 0383
 0510

 Current value (A)
 2.1
 3.5
 5.5
 6.9
 11.1
 17.5
 23.0
 35.0
 41.0
 45.0
 60.0

Model: FR-E820S-[]-HVC 0011 0017 0030 0051 0082 Current value (A) 1.3 2.0 3.5 6.0 9.6

- erload 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 th under 100% load. m 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 utput side of the inverter is approximately the power supply voltage multiplied by $\sqrt{2}$. he power supply capacity varies with the value of the input power impedance (including those of the input reactor and cables), he actual input current is the value at a cracter during current. The input neural impedances (including those of the input reactor is a cable). The fasted 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. Connect the DC power supply to the inverter terminals P+ and N-. Connect the positive terminal of the power supply to terminal P/+ and the negative terminal to terminal N-. When the energy is regenerated in the motion, 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
- esistant to the regenerative voltage/energy. When a power supply that cannot resist in the regenerative voltage/energy is used, connect a reverse curver for und of doel is series. Powering ON produces up to four times as large current as the inverter rated current. Prepare a DC power supply sorvide in the PR-E800 series inverter. apacity depends on the output impedance of the power supply. Select a power capacity around the AC power supply capacity. stallation in a Compartment Handling Conditioned Air (Plenum)

Inverter installation environment

ltem	Description	
Surrounding air temperature*1	-20°C to +50°C	Enclosure
Ambient humidity	95% RH or less (non-condensing)	Inverter Measurement
Storage temperature	-40°C to +70°C	5 cm 5
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 altitude.)	ction in the rated current per 500 m increase

8 APPENDIX

For information on other applicable standards not found in this document, refer to the FR-E800-HVC Instruction Manual (Connection).

8.1 Instructions for compliance with the EU Directives

The authorized representative in the EU is shown below

Name: Mitsubishi Electric Europe B.V.

This product is compliant with EN 60730-1 under the following conditions. o support the compliance, use the product in applications other than Industrial process application.

- Use the product in applications other than Industrial process application
- 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 if used on such a network.
- Set the EMC Directive compliant EMC filter to the inverter. Insert line noise filters and ferrite cores to the power and control cables as required.
- Connect the inverter to an earthed power supply. Install the motor and controller cable found in the EMC Installation Guidelines (BCN-A21041-204) and Technical News (MF-S-192) according to the instructions. (Contact
- your sales representative for the manual.)
- 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.
- 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)
- Select appropriate wire according to EN 60204-1 or IEC 60364-5-52. (Refer to the selection examples of cable sizes in 2.3 Recommended cables and wiring length.) hreads. For
- 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 for protection against electric shock and fire.
- If the cover is not fixed, the inverter protective structure is regarded as IP00. When using the relay output terminals A. B. and C with voltage of 230 VAC, use a power supply classified as overvoltage category II specified in IEC 60664.

Fuse selection for branch circuit protection For details, refer to 8.2 Instructions for UL and cUL: Fuse selection.

Motor overload protection
For details, refer to 8.2 Instructions for UL and cUL: Motor overload protection

EU RoHS Directive

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

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

-AVERTISSEMENT

Electrical Code and any applicable local codes

-AVERTISSEMENT

Fuse selection Inverter mod

FR-E820-0011(0.2K) 0017(0.4K) FR-E820-0030(0.75 FR-E820-0051(1.1K FR-E820-0082(2.2K

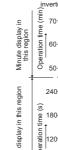
- FR-E820-0102(3.0K FR-E820-0167(5.5K
- FR-E820-0255(7.5K
- FR-E820-0340(11K) FR-E820-0476(15K
- FR-E820-0587(18.5
- FR-E820-0748(22K), 0978(30K)
- FR-E840-0018(0.75
- FR-E840-0030(1.5K) 1/0/01410, 170 or 170/01360

er OFF, and it is dangerous.

FR-E820-0011(0.2) FR-E820-0082(2.2K) FR-E820-0102(3.0K R-E820-0587(18.5k 0-0748(22K) R-E820-0978(30K R-E840-0018(0.75 R-E840-0094(5.5K FR-E840-0149(7.5K) FR-E840-0298(15K) FR-E840-0349(18.5k FR-E840-0383(22K) FR-E840-0510(30K)

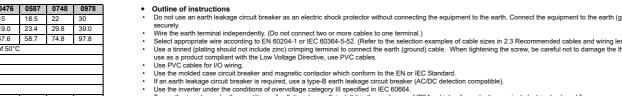


Motor overload protection





♦ Instruction for UL 60730-1



To make full use of the EMC Directive compliant noise filter, motor cable lengths should not exceed 20 m.

Wire the earth terminal independently. (Do not connect two or more cables to one terminal.)

8.2 Instructions for UL and cUL

(Standard to comply with: UL 61800-5-1, CSA C22.2 No. 274UL 60730-1, CAN/CSA E 60730-1)

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

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 local codes. For installation in Canada, branch circuit protection must be provided in accordance with the Canadian Electrical Code and any applicable local codes. Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National

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).

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).

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 local codes. Always install the following semiconductor fuses for branch circuit protection.

el	Cat. No	Manufacturer	Rating	Inverter model	Cat. No	Manufacturer	Rating
K),	170M1408, 170M1308, or 170M1358	Bussmann	700V, 10A	FR-E840-0047(2.2K)	170M1411, 170M1311, or 170M1461	Bussmann	700 V, 25 A
5K)	170M1409, 170M1309, or 170M1359	Bussmann	700V, 16A	FR-E840-0059(3.0K)	170M1312, 170M1362, or 170M1412	Bussmann	700 V, 32 A
K)	170M1411, 170M1311, or 170M1361	Bussmann	700V, 25A	FR-E840-0094(5.5K)	170M1414, 170M1314, or 170M1364	Bussmann	700 V, 50 A
K)	170M1413, 170M1313, or 170M1363	Bussmann	700 V, 40 A	FR-E840-0149(7.5K), 0196(11K)	170M1416, 170M1316, or 170M1366	Bussmann	700 V, 80 A
K)	170M1414, 170M1314, or 170M1364	Bussmann	700 V, 50 A	FR-E840-0298(15K), 0349(18.5K)	170M1419, 170M1319, or 170M1469	Bussmann	700 V, 160
K)	170M1416, 170M1316, or 170M1366	Bussmann	700 V, 80 A	FR-E840-0383(22K)	170M1420, 170M1320, or 170M1370	Bussmann	700V, 200A
K)	170M1418, 170M1318, or 170M1368	Bussmann	700 V, 125 A	FR-E840-0510(30K)	170M1421, 170M1321, or 170M1471	Bussmann	700V, 250A
()	170M1419, 170M1319, or 170M1369	Bussmann	700 V, 160 A	FR-E820S-0011(0.2K)	170M1408	Bussmann	700V, 10A
()	170M1420, 170M1320, or 170M1370	Bussmann	700 V, 200 A	FR-E820S-0017(0.4K)	170M1409	Bussmann	700V, 16A
5K)	170M1421, 170M1321, or 170M1471	Bussmann	700 V, 250 A	FR-E820S- 0030(0.75K)	170M1411	Bussmann	700V, 25A
(),	170M1422, 170M1322, or 170M1472	Bussmann	700V, 315A	FR-E820S-0051(1.1K)	170M1413	Bussmann	700V, 40A
5K)	170M1408, 170M1308, or 170M1358	Bussmann	700V, 10A	FR-E820S-0082(2.2K)	170M1415	Bussmann	700V, 63A
K)	170M1410, 170M1310, or 170M1360	Bussmann	700V, 20A				

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

Before winning or inspection, check that the LED display of the operation panel is OFF. Any person who is involved in winning 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

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 manufacture

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.

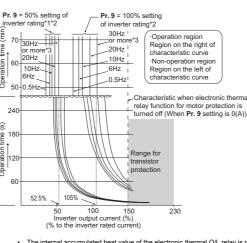
model		Tightening torque (N·m)	Crime termi	inal	Cable gauge				
	Terminal screw size*1		Crimp terminal		AWG				
	Size*1		R/L1, S/L2, T/L3*1	U, V, W	R/L1, S/L2, T/L3*1	U, V, W	Input / Output Signal		
) to 0051(1.1K)	M3.5	1.2	2-3.5	2-3.5	14	14			
.)	M4(M3.5)	1.5	3.5-4	2-4	12	14			
.)	M4(M3.5)	1.5	5.5-4	2-4	10	14			
.)	M4(M3.5)	1.5	8-NK4	5.5-4	8	10			
.)	M5	2.5	8-5	8-5	8	8			
	M5	2.5	14-5	8-5	6	8			
)	M5	2.5	38-S5	22-5	3	4			
K)	M6(M5)	4.4	38-S6	38-S6	2	3	1		
)	M8(M6)	7.8	60-8	38-8	1/0	2			
)	M8(M6)	7.8	60-8	60-8	1/0×2	1/0			
K) to 0059(3.0K)	M4(M3.5)	1.5	2-4	2-4	14	14	22 to 18		
.)	M4(M3.5)	1.5	5.5-4	2-4	10	14	22 10 16		
.), 0196(11K)	M4	1.5	8-NK4	5.5-4	8	10			
)	M4	1.5	14-4	8-4	6	8			
K)	M5	2.5	22-S5	14-5	4	6			
)	M6	4.4	22-6	14-6	4	6			
)	M6	4.4	38-6	22-6	3	4			
K)	M3.5	1.2	2-3.5	2-3.5	14	14			
K)	M3.5	1.2	2-3.5	2-3.5	14	14			
5K)	M4(M3.5)	1.5	2-4	2-4	14	14			
K)	M4(M3.5)	1.5	5.5-4	2-4	10	14			
K)	M4(M3.5)	1.5	8-NK4	2-4	8	14			

The screw size for terminals RL1, SL2, TL3, U, V, W, P/+, N-, and P1, and the earthing (grounding) terminal are shown. (For the single-phase 200 V power input models, the screw size for terminals RL1, SL2, U, V, W, P/+, N-, and P1, and the earthing (grounding) terminal is shown) The screw size for earthing (grounding) the FR-E820-0587(16.5K) is indicated in parentheses.

 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 Y / 277 V maximum

The following explains the details of the motor overload protection.

When using the electronic thermal relay function as motor overload protection, set the rated motor current in Pr.9 Electronic thermal O/L relay.



This function detects the overload (overheat) of the motor and shut off the inverter output by stopping the operation of the transistor at the inverter output side. (The operation characteristic is shown on the left.) When using the Mitsubishi Electric constant-torque moto) Set one of "10, 13, 15, 16, 50, 53, 70, 73, 1800, or

- 1803" in Pr.71. (This setting enables the 100% tant-torque characteristic in the low-speed range.)
- 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 percentage to the rated motor current.
 When the electronic thermal relay function dedicated to the Mitsubishi Electric constant. dedicated to the Mitsubishi Electric constant torque motor is set, this characteristic curve applies to operation at 6 Hz or higher.
- · 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. Use an external thermal relay
 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 functio

The controls were evaluated for mitigating inherit fire and shock hazards. The reliability of the firmware relied upon for lock rotor and thermal motor protection is outside the scope of this evaluation.

SERIAL number check 8.3

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

Rating plate example	
Inverter model ————————————————————————————————————	MODEL :FR-E820-0082-5-60HVC
Output rating	► OUTPUT : XXXXX
SERIAL	SERIAL: XXXXXXXXXXXX
Country of origin	→ MADE IN XXXXX



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

8.4 The power loss data according to Ecodesign Directive Based on the EU ErP Directive (Ecodesign Directive), the loss data of the inverters are shown in the following table. The regulation covers 3-phase variable speed drives from 0.12 kW < Pn < 1 000 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-E820-0011(0.2K)	0.5	5.1	3.6	3.6	3.7	3.1	3.1	3.1	3.1	3.1	IE2
FR-E820-0017(0.4K)	0.8	5.1	3.1	3.1	3.1	2.6	2.6	2.6	2.5	2.5	IE2
FR-E820-0030(0.75K)	1.4	5.1	2.9	2.9	3.0	2.3	2.3	2.4	2.3	2.3	IE2
FR-E820-0051(1.1K)	2.4	5.1	2.7	2.7	2.7	1.8	1.8	1.8	1.5	1.5	IE2
FR-E820-0082(2.2K)	3.8	9.2	2.7	2.7	2.7	1.8	1.8	1.9	1.5	1.5	IE2
FR-E820-0102(3.0K)	4.8	9.2	2.5	2.5	2.5	1.7	1.7	1.7	1.4	1.4	IE2
FR-E820-0167(5.5K)	7.8	10.2	2.5	2.5	2.5	1.7	1.7	1.7	1.4	1.4	IE2
FR-E820-0255(7.5K)	12	16.9	2.4	2.4	2.4	1.3	1.3	1.3	1.0	1.0	IE2
FR-E820-0340(11K)	15.9	16.9	2.4	2.4	2.4	1.3	1.3	1.3	0.9	0.9	IE2
FR-E820-0476(15K)	22.3	28.9	2.2	2.2	2.2	1.2	1.2	1.2	0.9	0.9	IE2
FR-E820-0587(18.5K)	27.5	28.9	2.3	2.3	2.3	1.2	1.2	1.2	0.9	0.9	IE2
FR-E820-0748(22K)	35.1	23.0	2.3	2.3	2.3	1.2	1.2	1.2	0.9	0.9	IE2
FR-E820-0978(30K)	45.8	23.0	2.5	2.5	2.5	1.3	1.3	1.3	0.9	0.9	IE2
FR-E840-0018(0.75K)	1.6	5.7	2.2	2.1	2.2	1.8	1.8	1.8	1.7	1.8	IE2
FR-E840-0030(1.5K)	2.7	5.7	2.2	2.1	2.2	1.4	1.4	1.4	1.2	1.2	IE2
FR-E840-0047(2.2K)	4.2	9.7	2.1	2.1	2.1	1.4	1.4	1.4	1.2	1.2	IE2
FR-E840-0059(3.0K)	5.3	9.8	1.8	1.8	1.8	1.3	1.3	1.3	1.1	1.1	IE2
FR-E840-0094(5.5K)	8.5	9.8	1.7	1.7	1.7	1.2	1.2	1.2	1.0	1.0	IE2
FR-E840-0149(7.5K)	13.3	14.5	1.7	1.6	1.7	0.9	0.9	0.9	0.7	0.7	IE2
FR-E840-0196(11K)	17.5	14.5	1.7	1.7	1.7	0.9	0.9	0.9	0.7	0.7	IE2
FR-E840-0298(15K)	26.7	26.5	1.7	1.7	1.7	0.9	0.9	0.9	0.7	0.7	IE2
FR-E840-0349(18.5K)	31.2	26.5	1.7	1.7	1.7	0.9	0.9	0.9	0.7	0.7	IE2
FR-E840-0383(22K)	34.3	26.5	1.6	1.6	1.6	0.9	0.9	0.9	0.7	0.7	IE2
FR-E840-0510(30K)	45.7	26.5	1.3	1.3	1.3	0.7	0.7	0.7	0.5	0.5	IE2

8.5 Restricted Use of Hazardous Substances in Electronic and Electrical Products

The mark of restricted use of hazardous substances in electronic and electrical products is applied to the product as follows based on the "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products" of the People's Republic of China. 电器电子产品有害物质限制使用标识要求

方宝物氏。



本产品中所含有的有害物质的名称、含量、含有部件如下表所示

产品中所含有害物质的名称及含量

铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)			
×	0	×	0	0	0			
×	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
	(Pb)	(Pb) (Hg)	(Pb) (Hg) (Cd)	铅 汞 镉 六价铬 (Pb) (Hg) (Cd) (Cr (VI))	铅 汞 镉 六价铬 多溴联苯 (Pb) (Hg) (Cd) (Cr (V1)) (PBB)			

上表依据 ST/T11364 的规定编制。 O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。

×:表示该有害物质在该部件的至少一种均质材料中的含量超出 GB/T26572 规定的限量要求。

*1 即使表中记载为×,根据产品型号,也可能会有考
 *2 根据产品型号,一部分部件可能不包含在产品中。

9 Warranty

Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi Electric shall not be liable for compensation to: (1) Damages caused by any cause found not to be the responsibility of Mitsubishi Electric. (2) Loss in opportunity, loss profits incurred to the user by Failures of Mitsubishi Electric products. (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric products. Mitsubishi Electric products. (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.