





## 6 SPECIFICATIONS

### 6.1 Inverter rating

#### ◆ Three-phase 200 V class

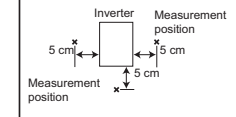
Model FR-E820-[]		0008	0015	0030	0050	0080	0110	0175	0240	0330
		0.1K	0.2K	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K
Applicable motor capacity (kW)*1	LD	0.2	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11
	ND	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5
Rated capacity (kVA)*2	LD	0.5	0.8	1.4	2.4	3.8	4.8	7.8	12.0	15.9
	ND	0.3	0.6	1.2	2.0	3.2	4.4	7.0	9.6	13.1
Rated current (A)*7	LD	1.3	2.0	3.5	6.0	9.6	12	19.6	30	40
	ND	1.1	(1.7)	(3.0)	5.1	(8.2)	(10.2)	(16.7)	(25.5)	(34)
Output	LD	0.8	1.5	3	5	8	11	17.5	24	33
	ND	(0.8)	(1.4)	(2.5)	(4.1)	(7)	(10)	(16.5)	(23)	(31)
Overload current rating*3	LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C								
	ND	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C								
Voltage*4	LD	Three-phase 200 to 240 V								
	ND	Three-phase 200 to 240 V								
Regenerative braking	LD	Not installed								
	ND	Built-in								
Rated input AC voltage/frequency	LD	Three-phase 200 to 240 V 50/60 Hz								
	ND	Three-phase 200 to 240 V 50/60 Hz								
Permissible AC voltage fluctuation	LD	±5%								
	ND	±5%								
Rated input current (A)*8	LD	1.9	3.0	5.1	8.2	13	16	26	37	49
	ND	1.3	2.0	3.5	6.0	9.6	12	20	30	40
Power supply capacity (kVA)*6	LD	1.4	2.3	4.5	7.0	11	15	23	30	41
	ND	0.8	1.5	3.0	5.0	8.0	11	17.5	24	33
Power supply capacity (kVA)*6	LD	0.7	1.1	1.9	3.1	4.8	6.2	9.7	14	19
	ND	0.5	0.8	1.3	2.3	3.7	4.6	7.5	11	15
Power supply capacity (kVA)*6	LD	0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.1	13
	ND	0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.1	13
Protective structure (IEC 60529)		Enclosed type (IP20)								
Cooling system		Natural				Forced air				
Approx. mass (kg)		0.5	0.5	0.7	1.0	1.4	1.4	1.8	3.3	3.3

#### ◆ Three-phase 400 V class

Model FR-E840-[]			0016	0026	0040	0060	0095	0120	0170	
			0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	
Applicable motor capacity (kW)*1		LD	0.75	1.5	2.2	3.0	5.5	7.5	11	
		ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	
Rated capacity (kVA)*2		LD	1.6	2.7	4.2	5.3	8.5	13.3	17.5	
		ND	1.2	2.0	3.0	4.6	7.2	9.1	13.0	
	Rated current (A)*7	LD	2.1 (1.8)	3.5 (3.0)	5.5 (4.7)	6.9 (5.9)	11.1 (9.4)	17.5 (14.9)	23 (19.6)	
		ND	1.6 (1.4)	2.6 (2.2)	4 (3.8)	6 (5.4)	9.5 (8.7)	12 (10)	17	
Output	Overload current rating*3	LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C							
		ND	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C							
Voltage*4			Three-phase 380 to 480 V							
Regenerative braking	Brake transistor	Built-in								
	Maximum brake torque (ND reference)*5	100%		50%		20%				
Rated input AC voltage/frequency			Three-phase 380 to 480 V 50/60 Hz							
Permissible AC voltage fluctuation			323 to 528 V, 50/60 Hz							
Permissible frequency fluctuation			±5%							
Power supply	Rated input current (A)*8	LD	Without DC reactor	3.3	6.0	8.9	11	16	25	32
			With DC reactor	2.1	3.5	5.5	6.9	11	18	23
		ND	Without DC reactor	2.7	4.4	6.7	9.5	14	18	25
			With DC reactor	1.6	2.6	4.0	6.0	9.5	12	17
	Power supply capacity (kVA)*6	LD	Without DC reactor	2.5	4.5	6.8	8.2	12	19	25
			With DC reactor	1.6	2.7	4.2	5.3	8.5	13	18
		ND	Without DC reactor	2.1	3.4	5.1	7.2	11	14	19
			With DC reactor	1.2	2.0	3.0	4.6	7.2	9.1	13
Protective structure (IEC 60529)			Enclosed type (IP20)							
Cooling system			Natural			Forced air				
Approx. mass (kg)			1.2	1.2	1.4	1.8	1.8	2.4	2.4	

- \*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard efficiency motor.  
\*2 The rated output capacity indicated assumes that the output voltage is 230 V for three-phase 200 V class and 480 V for three-phase 400 V class.  
\*3 The percentage of the overload current rating is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.  
\*4 The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. The maximum point of the voltage waveform at the output side of the inverter is approximately the power supply voltage multiplied by √2.  
\*5 The amount of braking torque is the average short-term torque (which varies depending on motor loss) that is generated when a motor decelerates in the shortest time by itself from 60 Hz. It is not continuous regenerative torque. The average deceleration torque becomes lower when a motor decelerates from a frequency higher than the base frequency. The inverter is not equipped with a built-in brake resistor. Use an option brake resistor for an operation with large regenerative power (not available for 0.1K and 0.2K). Brake unit (FR-BU2) can be also used.  
\*6 The power supply capacity varies with the value of the power supply side impedance (including those of the input reactor and cables).  
\*7 The rated input current is the rated output current when the low acoustic noise operation is performed with the surrounding air temperature exceeding 40°C while 2 kHz or higher value is selected in Pr.7 PWM frequency selection.  
\*8 The rated input current is the rated output current when the rated output at the power supply side (including those of the input reactor and cables) affects the rated input current.

### 6.2 Inverter installation environment

Item	Description	Enclosure
Surrounding air temperature *1	-20°C to +60°C (The rated current must be reduced at a temperature above 50°C. To meet the UJEN standards, use the product at temperatures from -20°C to 50°C.)	
Ambient humidity	95% RH or less (non-condensing) (With circuit board coating (IEC 60721-3-3 C2/S2 compatible)) 90% RH or less (non-condensing) (Without circuit board coating)	
Storage temperature	-40°C to +70°C	
Atmosphere	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)	
Altitude/vibration	Maximum 3000 m, 5.9 m/s <sup>2</sup> or less (For installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.)	

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

## 7 APPENDIX

### 7.1 Instructions for compliance with the EU Directives

- The authorized representative in the EU is shown below.  
Name: Mitsubishi Electric Europe B.V.  
Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

#### ◆ EMC Directive

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

- EMC Directive: 2014/30/EU
- Standard: IEC 61800-3:2017 (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 measures and ensure the conformity of the inverter used in the residential area.
- Radio frequency interference is expected if used on such a network.
- The installer shall provide a guide for installation and use, including recommended mitigation devices.

- Notes**
  - Set the EMC Directive compliant EMC filter to the inverter. Insert line noise filters and ferrite cores to the power and control cables as required.
  - Connect the inverter to an earthed power supply.
  - Install the motor, EU Directive compliant EMC filter, and controller cable found in the EMC Installation Guidelines (BCN-A21041-204) according to the instructions. (Contact your sales representative for the manual.)
  - To make full use of the EMC Directive compliant noise filter, motor cable lengths should not exceed 20 m.
  - Ensure that the finalized system which includes an inverter complies with the EMC Directive.

#### ◆ Low Voltage Directive

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

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

#### ◆ Outline of instructions

- Do not use an earth leakage circuit breaker as an electric shock protector without connecting the equipment to the earth. Connect the equipment to the earth (ground) securely.
- Wire the earth terminal independently. (Do not connect two or more cables to one terminal.)
- Use the cable whose size is indicated in Section 2.3 at the surrounding air temperature up to 40°C.
- If conditions are different from above, select appropriate wire according to EN 60204.
- Use a lined (plating should not include zinc) crimping terminal to connect the earth (ground) cable. When tightening the screw, be careful not to damage the threads. For use as a product compliant with the Low Voltage Directive, use PVC cable whose size is indicated in Section 2.3.
- Use the molded case circuit breaker and magnetic contactor which conform to the EN or IEC Standard.
- If an earth leakage circuit breaker is required, use a type-B earth leakage circuit breaker (AC/DC detection compatible).
- Use the inverter under the conditions of overvoltage category III specified in IEC 60664.
- To use the inverter under the conditions of pollution degree 3, install it in the enclosure of IP54 or higher.
- Attach the fan cover to the fan with the fan cover fixing screws enclosed with the inverter.

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

Fan cover fixing screws

Fan cover

Fan

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

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

### 7.2 Instructions for UL and cUL

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

#### ◆ Product handling information / Informations sur la manipulation du produit

**-WARNING-** Operation of this product requires detailed installation and operation instructions provided in this Safety Guideline and the Instruction Manual (Connection) intended for use with this product. Please forward relevant manuals to the end user. The manuals can also be downloaded in PDF form from the Mitsubishi Electric FA Global Website. 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.

#### -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**  
**-WARNING-** If the fuse melts down or the breaker trips on the input side of this product, check for wiring faults (such as short circuits). Identify and remove the cause of melting down or the trip before replacing the fuse or resetting the tripped breaker (or before applying the power to the inverter again).

**-AVERTISSEMENT-**  
Si le fusible fond ou si le disjoncteur se déclenche du côté entrée de ce produit, vérifiez les défauts de câblage (tels que les courts-circuits). Identifier et éliminer la cause de la fonte ou du déclenchement avant de remplacer le fusible ou de réinitialiser le disjoncteur déclenché (ou avant de remettre sous tension l'onduleur).

#### ◆ Fuse selection

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

Inverter model	Cat. No.	Manufacturer	Rating
FR-E820-0008(0.1K), 0015(0.2K)	170M1408	Bussmann	700 V, 10 A
FR-E820-0030(0.4K)	170M1409	Bussmann	700 V, 16 A
FR-E820-0050(0.75K)	170M1410	Bussmann	700 V, 20 A
FR-E820-0080(1.5K)	170M1312	Bussmann	700 V, 32 A
FR-E820-010(2.2K)	170M1414	Bussmann	700 V, 50 A
FR-E820-0175(3.7K)	170M1416	Bussmann	700 V, 80 A
FR-E820-0240(5.5K)	170M1417	Bussmann	700 V, 100 A

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

#### ◆ Capacitor discharge time / Temps de décharge du condensateur

**CAUTION - Risk of Electric Shock -**

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

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

#### ◆ Wiring to the power supply and the motor

- Refer to the National Electrical Code (Article 310) regarding the allowable current of the cable. Select the cable size for 125% of the rated current according to the National Electrical Code (Article 430). For wiring the input (R/L1, S/L2, T/L3) and output (U, V, W) terminals of the inverter, use the UL listed copper, stranded wires (rated at 75°C) and round crimp terminals. Crimp the terminals with the crimping tool recommended by the terminal manufacturer.

The following table shows examples when the inverter rating is the LD rating, when the cable is the THHW cable with continuous maximum permissible temperature of 75°C, when the surrounding air temperature is 30°C or less, and the wiring length is 20 m or shorter.

Applicable inverter model	Terminal screw size *1	Tightening torque (N·m)	Crimp terminal		Cable gauge	
			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-E820-010(2.2K)	M4	1.5	5-5.4	2-4	10	14
FR-E820-0175(3.7K)	M4	1.5	5-5.4	5-5.4	8	10
FR-E820-0240(5.5K)	M5	2.5	5-5	5-5	8	8
FR-E820-0330(7.5K)	M5	2.5	14-5	9-5	6	8
FR-E840-0016(0.4K) to 0060(2.2K)	M4	1.5	2-4	2-4	14	14
FR-E840-0095(3.7K)	M4	1.5	5-5.4	2-4	10	14
FR-E840-0120(5.5K), 0170(7.5K)	M4	1.5	5-4	5-5.4	8	10

\*1 The screw size for terminals R/L1, S/L2, T/L3, U, V, W, PR, PV, N1, and P1, and the earthing (grounding) terminal is shown.

#### ◆ Short circuit ratings

- 200 V class: Suitable for use in a circuit capable of delivering not more than 100 kA rms