

7 APPENDIX

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

7.1 Instructions for compliance with the EU Directives

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

◆ EMC Directive

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

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

◆ Notes

- Set the EMC Directive compliant EMC filter to the inverter. Insert line noise filters and ferrite cores to the power and control cables as required.
- Connect the inverter to an earthed power supply.
- Install the motor and controller cable found in the EMC Installation Guidelines (BCN-A21041-204) and Technical News (MF-S-175 and 176) according to the instructions. (Contact your sales representative for the manual.)
- To make full use of the EMC Directive compliant noise filter, motor cable lengths should not exceed 20 m.
- Ensure that the finalized system which includes an inverter complies with the EMC Directive.

◆ Low Voltage Directive

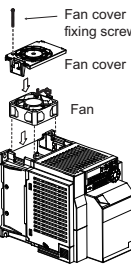
We have self-confirmed our inverters as products compliant to the Low Voltage Directive and affix the CE marking on the inverters.

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

◆ 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.)
- Select appropriate wire according to EN 60204-1 or IEC 60364-5-52. (Refer to the selection examples of cable sizes in 2.3 Applicable cables and wiring length.)
- 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 PVC cables for I/O wiring.
- 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.
- Attach the fan cover to the fan with the fan cover fixing screws enclosed with the inverter. If the cover is not fixed, the inverter protective structure is regarded as IP00.

FR-E820-1.5K to 3.7K
FR-E840-1.5K to 3.7K



◆ Fuse selection for branch circuit protection

Use the following semiconductor fuses for branch circuit protection.

Inverter model	Cat. No	Manufacturer	Rating
FR-E820-0.1K, FR-E820-0.2K	170M1408, 170M1308 or 170M1358	Bussmann	700 V, 10 A
FR-E820-0.4K	170M1409, 170M1309 or 170M1359	Bussmann	700 V, 16 A
FR-E820-0.75K	170M1411, 170M1311 or 170M1361	Bussmann	700 V, 25 A
FR-E820-1.5K	170M1413, 170M1313 or 170M1363	Bussmann	700 V, 40 A
FR-E820-2.2K	170M1414, 170M1314 or 170M1364	Bussmann	700 V, 50 A
FR-E820-3.7K	170M1416, 170M1316 or 170M1366	Bussmann	700 V, 80 A

Inverter model	Cat. No	Manufacturer	Rating
FR-E840-0.4K	170M1408, 170M1308 or 170M1358	Bussmann	700 V, 10 A
FR-E840-0.75K	170M1410, 170M1310 or 170M1360	Bussmann	700 V, 20 A
FR-E840-1.5K	170M1411, 170M1311 or 170M1361	Bussmann	700 V, 25 A
FR-E840-2.2K	170M1312, 170M1362 or 170M1412	Bussmann	700 V, 32 A
FR-E840-3.7K	170M1414, 170M1314 or 170M1364	Bussmann	700 V, 50 A

◆ Motor overload protection

For details, refer to 7.2 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 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 Japanese 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 Japanese Website. Pour commander des manuels, veuillez contacter votre représentant commercial.

◆ Branch circuit protection

For installation in the United States, use the branch circuit protection equipment specified in Technical News MF-S-187, in accordance with the National Electrical Code and any applicable local codes.

For installation in Canada, use the branch circuit protection equipment specified in Technical News MF-S-187, 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 Electrical Code and any additional local codes.

The installation/operation manual is available via the internet at <https://www.MitsubishiElectric.co.jp/fa/products/dr/mv/support/e800/e800c.html>.

A hard copy of this information may be ordered at +1 (847) 478-2100 (Mitsubishi Electric Automation, Inc. in USA).

◆ 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).

◆ 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 inverter 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.

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-E820-0.1K to 0.75K	M3.5	1.2	2-3.5	2-3.5	14	14
FR-E820-1.5K	M4	1.5	3-5.4	3-5.4	12	14
FR-E820-2.2K	M4	1.5	5-5.4	2-4	10	14
FR-E820-3.7K	M4	1.5	8-NK4	5-5.4	8	10
FR-E840-0.4K to 2.2K	M4	1.5	2-4	2-4	14	14
FR-E840-3.7K	M4	1.5	5-5.4	2-4	10	14

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

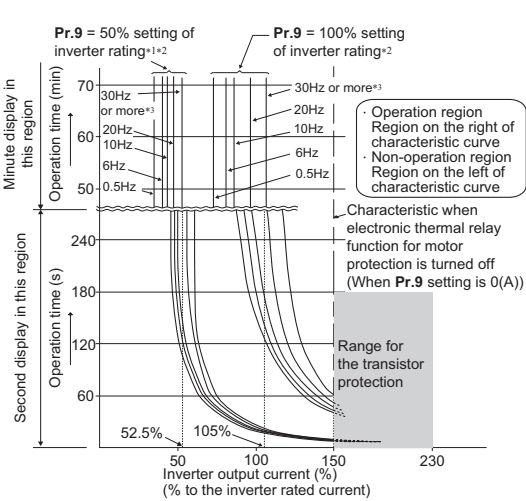
◆ Short circuit current ratings (SCCR)

- 200 V class: Suitable for use in a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 240 V maximum.
- 400 V class: Suitable for use in a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 480 V / 277 V maximum.

◆ Motor overload protection

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**.

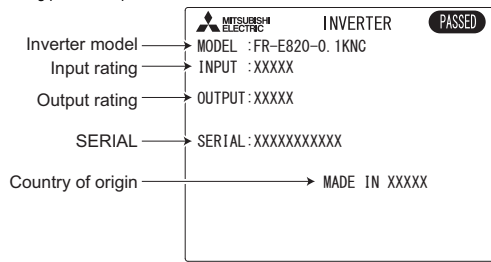


- The internal accumulated heat value of the electronic thermal O/L relay is reset to the initial value by the inverter's power reset or reset signal input. Avoid unnecessary reset and power-OFF.
- Install an external thermal relay (OCR) between the inverter and motors to operate several motors, a multi-pole 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.
- 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 function.

7.3 SERIAL number check

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

Rating plate example



Symbol Year Month Control number

SERIAL

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).

7.4 EU ErP Directive (Ecodesign Directive)

Based on the EU ErP Directive (Ecodesign Directive), the power loss data of the inverters are shown in the following table. The regulation covers 3-phase variable speed drives from 0.12 kW ≤ Pn ≤ 1000 kW.

(LD rated / ND rated)

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-E820-0.1K	0.5 / -	5.1	3.6 / -	3.6 / -	3.7 / -	3.1 / -	3.1 / -	3.1 / -	3.1 / -	3.1 / -	IE2
FR-E820-0.2K	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-E820-0.4K	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-E820-0.75K	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-E820-1.5K	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-E820-2.2K	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-E820-3.7K	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-E840-0.4K	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-E840-0.75K	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-E840-1.5K	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-E840-2.2K	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-E840-3.7K	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

8 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:

- Damages caused by any cause found not to be the responsibility of Mitsubishi Electric.
- Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi Electric products.
- Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric products.
- Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.