



INVERTER

FR-F800-E

INSTALLATION GUIDELINE

Inverter for fans and pumps

FR-F846-00023(0.75K) to 03610(160K)-E2-L2

Thank you for choosing this Mitsubishi Electric Inverter.
This Installation guideline and the enclosed CD-ROM give handling information and precautions for use of this product.
Do not use this product until you have a full knowledge of the equipment, the safety information and the instructions.
Please forward this Installation guideline and the CD-ROM to the end user.

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Version check

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Version A

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect the inverter until you have read through this Installation Guideline and appended documents carefully and can use the equipment correctly. Do not use the inverter until you have a full knowledge of the equipment, safety information and instructions.

Installation, operation, maintenance and inspection must be performed by qualified personnel. Here, qualified personnel means personnel who meets all the conditions below.

- A person who took a proper engineering training. Please note if you can take a proper engineering training at your local Mitsubishi Electric office. 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 (e.g. light curtain) connected to the safety control system.
- A person who has read and familiarized himself/herself with the manuals.


In this Installation Guideline, the safety instruction levels are classified into "WARNING" and "CAUTION".

WARNING

Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

CAUTION

Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

Note that even the  **CAUTION** level may lead to a serious consequence according to conditions. Please follow strictly the instructions of both levels because they are important to personnel safety.

Electric Shock Prevention

WARNING

- While power is on or when the inverter is running, do not open the front cover. Otherwise you may get an electric shock.
- Do not run the inverter with the front cover removed. Otherwise, you may access the exposed high-voltage terminals or the charging part of the circuitry and get an electric shock.
- Even if power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged inverter circuits and get an electric shock.
- Before starting wiring or inspection, check to make sure that the LCD indication of the operation panel indicator is off, wait for at least 10 minutes after the power supply has been switched off, and check that there are no residual voltage using a tester or the like. The capacitor is charged with high voltage for some time after power off and it is dangerous.
- This inverter must be earthed (grounded). Earthing (grounding) must conform to the requirements of national and local safety regulations and electrical codes (NEC section 250, IEC 61140 class 1 and other applicable standards). A neutral-point earthed (grounded) power supply for 400V class inverter in compliance with EN standard must be used.
- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the inverter before wiring. Otherwise, you may get an electric shock or be injured.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise you may get an electric shock.
- Do not replace the cooling fan while power is on. It is dangerous to replace the cooling fan while power is on.
- Do not touch the printed circuit board or handle the cables with wet hands. You may get an electric shock.
- When measuring the main circuit capacitor capacity, the DC voltage is applied to the motor for 1s at powering OFF. Never touch the motor terminal, etc. right after powering OFF to prevent an electric shock.
- A PM motor is a synchronous motor with high-performance magnets embedded in the rotor. Motor terminals holds high-voltage while the motor is running even after the inverter power is turned OFF. Before wiring or inspection, the motor must be confirmed to be stopped. In an application, such as fan and blower, where the motor is driven by the load, a low-voltage manual motor starter must be connected at the inverter's output side, and wiring and inspection must be performed while the motor starter is open. Otherwise you may get an electric shock.

Fire Prevention

CAUTION

- Mount the inverter to incombustible material. Install the inverter on a nonflammable wall without holes (so that nobody can touch the inverter heatsink on the rear side, etc.). Mounting it to or near combustible material can cause a fire.
- If the inverter has become faulty, switch off the inverter power. A continuous flow of large current could cause a fire.
- Resistors cannot be used. Do not connect a resistor directly to the DC terminals P/+, N/-. This could cause a fire and destroy the inverter.
- The surface temperature of braking resistors can far exceed 100°C for brief periods. Make sure that there is adequate protection against accidental contact and a safe distance is maintained to other units and system parts.
- Be sure to perform daily and periodic inspections as specified in the Instruction Manual. If a product is used without any inspection, a burst, breakage, or a fire may occur.

Injury Prevention

CAUTION

- Apply only the voltage specified in the instruction manual to each terminal. Otherwise, burst, damage, etc. may occur.
- Ensure that the cables are connected to the correct terminals. Otherwise, burst, damage, etc. may occur.
- Always make sure that polarity (+ and -) is correct to prevent damage, etc. Otherwise, burst, damage, etc. may occur.
- While power is on or for some time after power-off, do not touch the inverter as it is extremely hot and you may get burnt.

Additional Instructions

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

Transportation and installation

CAUTION

- Any person who is opening a package using a sharp object, such as a knife and cutter, must wear gloves to prevent injuries caused by the edge of the sharp object.
- The product must be transported in correct method that corresponds to the weight. Failure to do so may lead to injuries.
- Do not stand or rest heavy objects on the product.
- Do not stack the inverter boxes higher than the number recommended.
- When carrying the inverter, do not hold it by the front cover or setting dial; it may fall off or fail.
- During installation, caution must be taken not to drop the inverter as doing so may cause injuries.
- Ensure that installation position and material can withstand the weight of the inverter. Install according to the information in the instruction manual.
- Do not install the product on a hot surface.
- Check the inverter mounting orientation is correct.
- The inverter must be installed on a strong surface securely with screws so that it will not drop.
- Do not install or operate the inverter if it is damaged or has parts missing. This can result in breakdowns.
- Prevent other conductive bodies such as screws and metal fragments or other flammable substance such as oil from entering the inverter.
- As the inverter is a precision instrument, do not drop or subject it to impact.
- Use the inverter under the following environmental conditions. Otherwise, the inverter may be damaged.

| Operating condition | FR-F846 |
|---------------------|--|
| Ambient temperature | -10 °C to +40 °C (non-freezing) |
| Ambient humidity | 95% RH or less (non-condensing) |
| Storage temperature | -20 °C to +65 °C *1 |
| Atmosphere | Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt) |
| Altitude | Maximum 2,500 m *2 |
| Vibration | 5.9 m/s ² *3 or less at 10 to 55Hz (directions of X, Y, Z axes) |

*1 Temperature applicable for a short time, e.g. in transit.

*2 For the installation at an altitude above 1,000 m, derate the rated current 3% per 500 m.

*3 2.9m/s² or less for the FR-F846-01160(55K) or higher

- If halogen-based materials (fluorine, chlorine, bromine, iodine, etc.) infiltrate into a Mitsubishi Electric product, the product will be damaged. Halogen-based materials are often included in fumigant, which is used to sterilize or disinfect wooden packages. When packaging, prevent residual fumigant components from being infiltrated into Mitsubishi Electric products, or use an alternative sterilization or disinfection method (heat disinfection, etc.) for packaging. Sterilization or disinfection of wooden package should also be performed before packaging the product.
- To prevent a failure, do not use the inverter with a part or material containing halogen flame retardant including bromine.

Wiring

CAUTION

- Do not install assemblies or components (e. g. power factor correction capacitors or surge suppressor/capacitor type filter) on the inverter output side, which are not approved from Mitsubishi Electric. These devices on the inverter output side may be overheated or burn out.
- The direction of rotation of the motor corresponds to the direction of rotation commands (STF/STR) only if the phase sequence (U, V, W) is maintained.
- PM motor terminals (U, V, W) hold high-voltage while the PM motor is running even after the power is turned OFF. Before wiring, the PM motor must be confirmed to be stopped. Otherwise you may get an electric shock.
- Never connect a PM motor to the commercial power supply.
Applying the commercial power supply to input terminals (U,V, W) of a PM motor will burn the PM motor. The PM motor must be connected with the output terminals (U, V, W) of the inverter.


Trial run

CAUTION

- Before starting operation, confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.

Operation

WARNING

- When you have chosen the retry function, stay away from the equipment as it will restart suddenly after a trip.
- Since pressing the  key may not stop output depending on the function setting status, provide a circuit and switch separately to make an emergency stop (power off, mechanical brake operation for emergency stop, etc).
- Make sure that the start signal is off before resetting the inverter fault. Resetting inverter fault with the start signal ON restarts the motor suddenly.
- Do not use a PM motor for an application where the PM motor is driven by its load and runs at a speed higher than the maximum motor speed.
- Use this inverter only with three-phase induction motors or with a PM motor. Connection of any other electrical equipment to the inverter output may damage the inverter as well as the equipment.
- Do not modify the equipment.
- Do not perform parts removal which is not instructed in this manual. Doing so may lead to fault or damage of the inverter.

⚠CAUTION

- The electronic thermal relay function does not guarantee protection of the motor from overheating. It is recommended to install both an external thermal and PTC thermistor for overheat protection.
- Do not use a magnetic contactor on the inverter input for frequent starting/stopping of the inverter. Otherwise, the life of the inverter decreases.
- Use a noise filter to reduce the effect of electromagnetic interference and follow the accepted EMC procedures for proper installation of frequency inverters. Otherwise nearby electronic equipment may be affected.
- Appropriate measures must be taken to suppress harmonics. Otherwise power supply harmonics from the inverter may heat/damage the power factor correction capacitor and generator.
- When driving a 400 V class motor by the inverter, the motor must be an insulation-enhanced motor or measures must be taken to suppress surge voltage. Surge voltage attributable to the wiring constants may occur at the motor terminals, deteriorating the insulation of the motor.
- When parameter clear or all clear is performed, set again the required parameters before starting operations. Each parameter returns to the initial value.
- The inverter can be easily set for high-speed operation. Before changing its setting, fully examine the performances of the motor and machine.
- The DC braking function of the frequency inverter is not designed to continuously hold a load. Use an electro-mechanical holding brake on the motor for this purpose.
- Before running an inverter which had been stored for a long period, always perform inspection and test operation.
- For prevention of damage due to static electricity, touch nearby metal before touching this product to eliminate static electricity from your body.
- Only one PM motor can be connected to an inverter.
- A PM motor must be used under PM motor control. Do not use a synchronous motor, induction motor, or synchronous induction motor.
- Do not connect a PM motor under the induction motor control settings (initial settings). Do not use an induction motor under the PM motor control settings. It will cause a failure.
- In the system with a PM motor, the inverter power must be turned ON before closing the contacts of the contactor at the output side.
- In order to protect the inverter and the system against unauthorized access by external systems via network, take security measures including firewall settings.
- Depending on the network environment, the inverter may not operate as intended due to delays or disconnection in communication. Carefully consider the conditions and safety for the inverter on site.

Emergency stop

⚠CAUTION

- A safety backup such as an emergency brake must be provided for devices or equipment in a system to prevent hazardous conditions in case of failure of the inverter or an external device controlling the inverter.
- When the breaker on the inverter primary side trips, check for the wiring fault (short circuit), damage to internal parts of the inverter, etc. Identify the cause of the trip, then remove the cause and power on the breaker.
- When the protective function is activated (i. e. the frequency inverter switches off with an error message), take the corresponding corrective action as described in the inverter manual, then reset the inverter, and resume operation.

Maintenance, inspection and parts replacement

⚠CAUTION

- Do not carry out a megger (insulation resistance) test on the control circuit of the inverter. It will cause a failure.

Disposing of the inverter

⚠CAUTION

- Treat as industrial waste.

General instructions

Many of the diagrams and drawings in instruction manuals show the inverter without a cover, or partially open. Never run the inverter in this status. Always replace the cover and follow instruction manuals when operating the inverter. For more details on the PM motor, refer to the Instruction Manual of the PM motor.

Waterproof and dustproof performances

CAUTION

- The inverter is rated with an IPX5^{*1} waterproof rating and an IP5X^{*2} dustproof rating when the operation panel (FR-LU08-01), the front cover, the wiring cover, and the cable glands are securely fixed with screws.
- Although the inverter is rated with the IPX5 waterproof and IP5X dustproof ratings, it is not intended for use in water. Also, the ratings do not guarantee protection of the inverter from needless submersion in water or being washed under strong running water such as a shower.
- Do not pour or apply the following liquids over the inverter: water containing soap, detergent, or bath additives; sea water; swimming pool water; warm water; boiling water; etc.
- The inverter is intended for indoor^{*4} installation and not for outdoor installation. Avoid places where the inverter is subjected to direct sunlight, rain, sleet, snow, or freezing temperatures.
- If the operation panel (FR-LU08-01) is not installed, if the screws of the operation panel are not tightened, or if the operation panel is damaged or deformed, the IPX5 waterproof performance and the IP5X dustproof performance are impaired. If any abnormalities are found on the operation panel, ask for an inspection and repair.
- If the screws of the front cover or the wiring cover are not tightened, if any foreign matter (hair, sand grain, fiber, etc.) is stuck between the inverter and the gasket, if the gasket is damaged, or if the front cover or the wiring cover is damaged or deformed, the IPX5 waterproof performance and the IP5X dustproof performance are impaired. If any abnormalities are found on the front cover, wiring cover, or the gasket of the inverter, ask for an inspection and repair.
- Cable glands are important components to maintain the waterproof and dustproof performances. Be sure to use cable glands of the recommended size and shape or equivalent. The standard protective bushes cannot sufficiently maintain the IPX5 waterproof performance and the IP5X dustproof performance.
- If a cable gland is damaged or deformed, the IPX5 waterproof performance and the IP5X dustproof performance are impaired. If any abnormalities are found on the cable glands, ask the manufacturer of the cable glands for an inspection and repair.
- To maintain the waterproof and dustproof performances of the inverter, daily and periodic inspections are recommended regardless of the presence or absence of abnormalities.

^{*1} IPX5 refers to protection of the inverter functions against water jets from any direction when about 12.5 liter water^{*3} is injected from a nozzle with an inside diameter of 6.3 mm from the distance of about 3 m for at least 3 minutes.

^{*2} IP5X refers to protection of the inverter functions and maintenance of safety when the inverter is put into a stirring device containing dust of 75 µm or smaller in diameter, stirred for 8 hours, and then removed from the device.

^{*3} Water here refers to fresh water at room temperature (5 to 35 °C).

^{*4} Indoor here refers to the environments that are not affected by climate conditions.

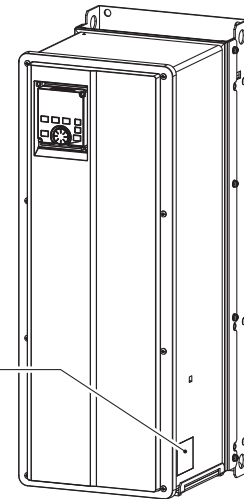
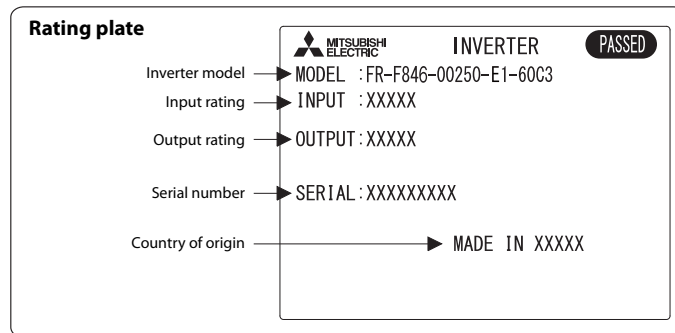
1 INSTALLATION AND INSTRUCTIONS

1.1 Inverter Type

| Symbol | Voltage class | Symbol | Structure, functionality | Symbol | Description | Symbol | Type *1 | Communication type |
|--------|---------------|--------|--------------------------|----------------|---|--------|---------|--------------------|
| 4 | 400V class | 6 | IP55 compatible model | 00023 to 03610 | Inverter rated current (SLD rated current of the F800 standard model) [A] | E2 | CA | Ethernet |

FR - F 8 4 6 - 00250 - E2 - 60 L2

| Symbol | Circuit board coating (conforming to IEC60721-3-3 3C2/3S2) | Plated conductor | Symbol | EMC filter | Operation panel |
|--------|--|------------------|--------|--------------------|-----------------|
| 60 | With | Without | L2 | Built-in C2 filter | FR-LU08-01 |
| 06 | With | With | | | |



*1 Refer to the table below for the specification of the CA type.

| Type | Monitor output | Initial setting | | | |
|---------------------------------|---|---------------------|---------------|-----------------|--|
| | | Built-in EMC filter | Control logic | Rated frequency | Pr. 19 Base frequency voltage |
| CA (terminal CA equipped model) | Terminal CA: analog current output (0 to 20 mADC) Terminal AM: analog voltage output (0 to ±10 V DC) | ON | Source logic | 50 Hz | 8888 (95% of the power supply voltage) |

Notes

- In this Installation Guideline, the inverter model name consists of the rated current value (SLD rated current value of the F800 standard model).
(Example) FR-F846-00250(11K)
- For selecting the right frequency inverter you should know details of your application and especially the load characteristic.
- For how to read the SERIAL number, refer to *page 42*.

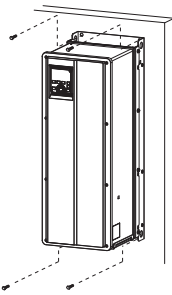
1.1.1 Accessory

- Earthing (grounding) cable (1): For connection with a communication option. (Refer to *page 3*.)
- CD-ROM (1): Including the Instruction Manual (Detailed) and other documents.



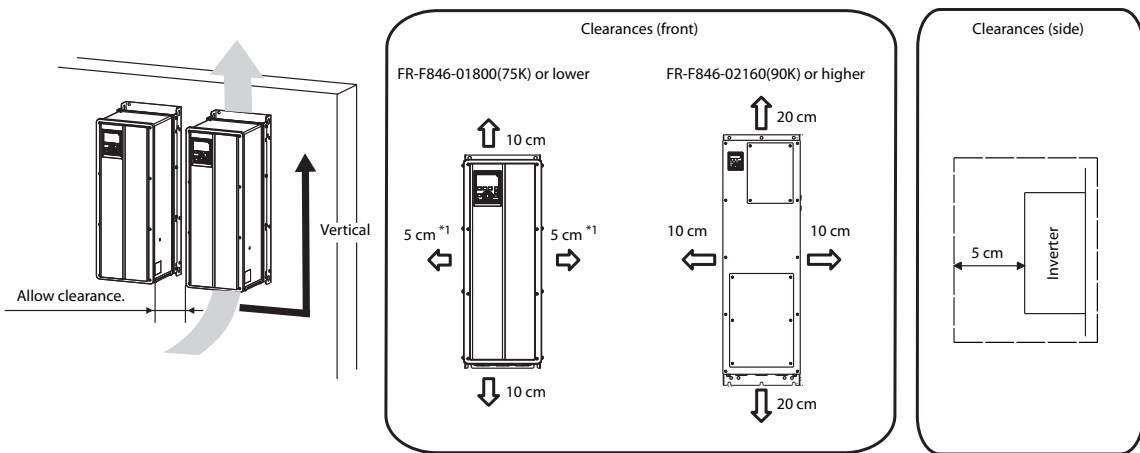
1.2 Installation of the inverter

1.2.1 Inverter placement



Fix six positions for the FR-F846-01800(75K) or higher

- Install the inverter on a strong flat 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.
- For heat dissipation and maintenance, keep clearance between the inverter and the other devices. The clearance below the inverter is required as a wiring space, and the clearance above the inverter is required as a heat dissipation space.



*1 For the FR-F846-00126(5.5K) or lower, allow 1cm or more clearance.

1.2.2 Installation orientation of the inverter

Install the inverter on a wall as specified. Do not mount it horizontally or in any other way.

1.2.3 Above the inverter

Heat is blown up from inside the inverter by the small fan built in the unit. Any equipment placed above the inverter should be heat resistant.

1.3 Environment

Before installation, check that the environment meets following specifications:

| | | |
|----------------------------|---|--|
| Ambient temperature | -10 °C to +40 °C (non-freezing) | |
| Ambient humidity | 95 % RH or less (non-condensing) | |
| Storage temperature | -20 °C to +65 °C *1 | |
| Atmosphere | Indoors (No corrosive and flammable gases, oil mist, dust and dirt) | |
| Altitude | Maximum 2,500 m *2 | |
| Vibration | 5.9 m/s ² *3 or less at 10 to 55 Hz (directions of X, Y, Z axes) | |

*1 Temperature applicable for a short time, e.g. in transit.

*2 For the installation at an altitude above 1,000 m, derate the rated current 3% per 500 m.

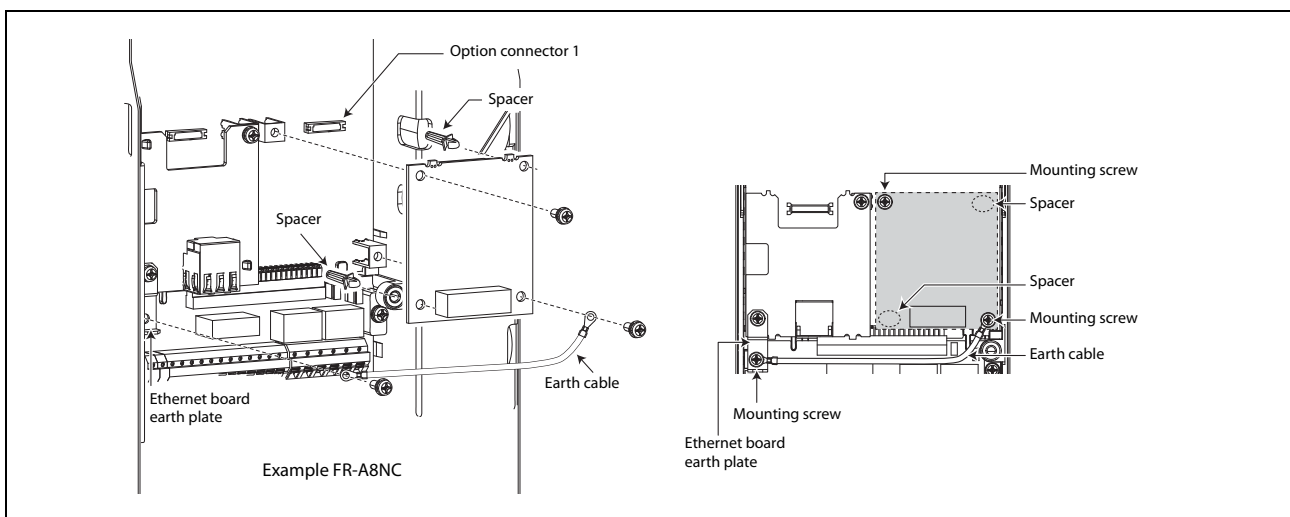
*3 2.9 m/s² or less for the FR-F846-01160(55K) or higher

1.4 Installing a communication option (FR-F846-E)

To use a communication option, the enclosed earthing (grounding) cable needs to be installed. Install the cable according to the following procedure:

- ① Insert spacers into the mounting holes that will not be tightened with the option mounting screws.
- ② Fit the connector of the communication option to the guide of the connector of the inverter, and insert the option as far as it goes. (Insert it to the inverter option connector 1.)
- ③ Remove the mounting screw (lower) of the Ethernet board earth plate. Fit the one terminal of the earthing (grounding) cable on the Ethernet board earth plate and fix it securely to the inverter with the mounting screw (tightening torque 0.33 Nm to 0.40 Nm).
- ④ Fix the left part of the communication option securely with the option mounting screw, and place another terminal of the earthing (grounding) cable on the right part of the option and fix the cable terminal and the option with the option mounting screw (tightening torque 0.33 Nm to 0.40 Nm).

If the screws are not tightened properly, the connector may not be inserted deep enough. Check the connector.



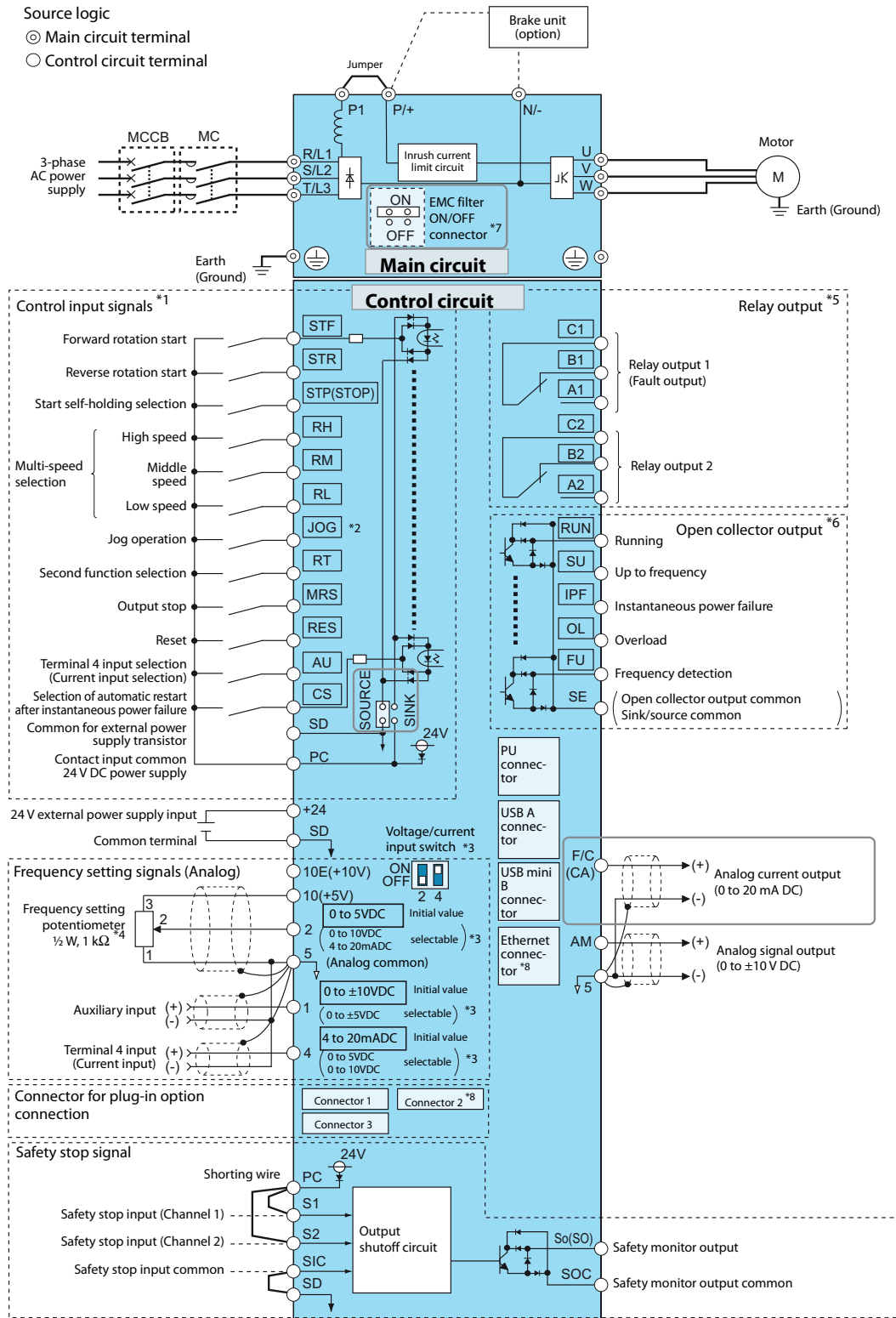
Notes

- The number and shape of the spacers used differ depending on the communication option type. Refer to the Instruction Manual of each communication option for details.
- The earth plate enclosed with a communication option is not used.

2 WIRING

2.1 Terminal connection diagrams

● CA type



For footnotes *1 to *8 refer to next page.

- *1 The function of these terminals can be changed with the input terminal assignment (Pr. 178 to Pr. 189). (Refer to *page 20*.)
- *2 Terminal JOG is also used as the pulse train input terminal. Use Pr. 291 to choose JOG or pulse.
- *3 Terminal input specifications can be changed by analog input specification switchover (Pr. 73, Pr. 267). To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal (Pr. 561). (Refer to the FR-F800 Instruction Manual (Detailed).)
- *4 It is recommended to use 2 W, 1 k Ω when the frequency setting signal is changed frequently.
- *5 The function of these terminals can be changed with the output terminal assignment (Pr. 195, Pr. 196). (Refer to *page 20*.)
- *6 The function of these terminals can be changed with the output terminal assignment (Pr. 190 to Pr. 194). (Refer to *page 20*.)
- *7 Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter. The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-F846-00250(11K)-L2 to FR-F846-00470(22K)-L2 are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.
- *8 The option connector 2 cannot be used because the Ethernet board is installed in the initial status. The Ethernet board must be removed to install a plug-in option to the option connector 2. (However, Ethernet communication is disabled in that case.)

CAUTION

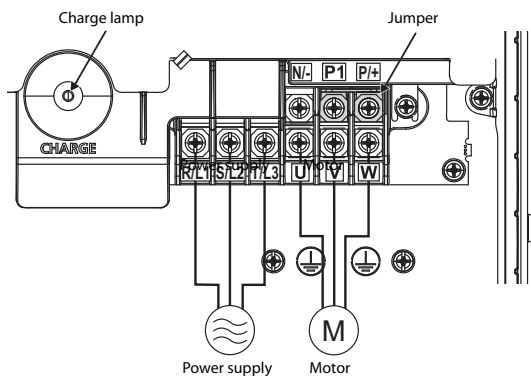
- To prevent a malfunction due to noise, keep the signal cables more than 10cm away from the power cables. Also, separate the main circuit cables at the input side from the main circuit cables at the output side.
 - After wiring, wire offcuts must not be left in the inverter.
Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean.
When drilling mounting holes in a control box etc., take care not to allow chips and other foreign matter to enter the inverter.
 - Set the voltage/current input switch in the correct position. An incorrect setting may cause a fault, failure or malfunction.
-



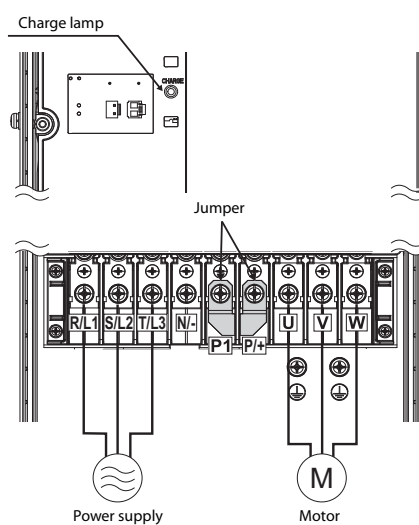
2.2 Main circuit terminal

2.2.1 Terminal layout and wiring

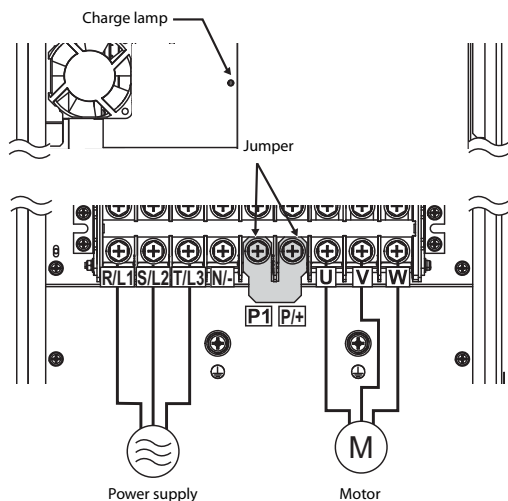
FR-F846-00023(0.75K) to FR-F846-00170(7.5K)



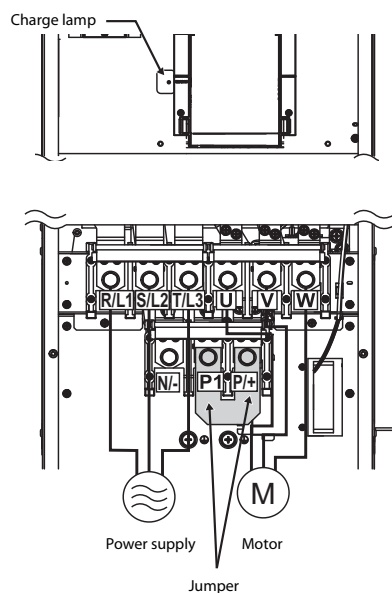
FR-F846-00250(11K) to FR-F846-00470(22K)



FR-F846-00620(30K) to FR-F846-01160(55K)



FR-F846-01800(75K) to FR-F846-03610(160K)



CAUTION

- The power supply cables must be connected to R/L1, S/L2, T/L3. Never connect the power cable to the U, V, W, of the inverter. Doing so will damage the inverter. (Phase sequence needs not to be matched.)
- Connect the motor to U, V, W. At this time turning on the forward rotation switch (signal) rotates the motor in the clockwise direction when viewed from the motor shaft. (The phase sequence must be matched.)

2.3 Wiring fundamentals

2.3.1 Cable size

Select the recommended cable size to ensure that the voltage drop will be 2% max.

If the wiring distance is long between the inverter and motor, the main circuit cable voltage drop will cause the motor torque to decrease especially at the output of a low speed.

The following tables indicate a selection example for the wiring length of 20 m.

400 V class (440 V input power supply (with 120% rated current for one minute))

| Applicable inverter type FR-F846-□ | Terminal screw size *4 | Tightening torque [Nm] | Crimping terminal | | Cable gauge | | | | | | | | |
|---------------------------------------|------------------------|------------------------|-------------------|---------|--|---------|-----|----------------------------|------------------|---------|--|---------|----------------------------|
| | | | | | HIV cables, etc. [mm ²] *1 | | | | AWG/MCM *2 | | PVC cables, etc. [mm ²] *3 | | |
| | | | R/L1, S/L2, T/L3 | U, V, W | R/L1, S/L2, T/L3 | U, V, W | P/+ | Earthing (grounding) cable | R/L1, S/L2, T/L3 | U, V, W | R/L1, S/L2, T/L3 | U, V, W | Earthing (grounding) cable |
| 00023(0.75K) to 00083(3.7K) | M4 | 1.5 | 2-4 | 2-4 | 2 | 2 | 2 | 2 | 14 | 14 | 2.5 | 2.5 | 2.5 |
| 00126(5.5K) | M4 | 1.5 | 2-4 | 2-4 | 2 | 2 | 3.5 | 3.5 | 14 | 14 | 2.5 | 2.5 | 2.5 |
| 00170(7.5K) | M4 | 1.5 | 2-4 | 2-4 | 3.5 | 3.5 | 3.5 | 3.5 | 12 | 12 | 4 | 4 | 4 |
| 00250(11K) | M6 | 4.4 | 5.5-6 | 5.5-6 | 5.5 | 5.5 | 5.5 | 5.5 | 10 | 10 | 6 | 6 | 6 |
| 00310(15K) | M6 | 4.4 | 5.5-6 | 5.5-6 | 5.5 | 5.5 | 8 | 5.5 | 10 | 10 | 6 | 6 | 6 |
| 00380(18.5K) | M6 | 4.4 | 8-6 | 8-6 | 8 | 8 | 14 | 8 | 8 | 8 | 10 | 10 | 10 |
| 00470(22K) | M6 | 4.4 | 14-6 | 14-6 | 14 | 14 | 22 | 14 | 6 | 6 | 16 | 16 | 16 |
| 00620(30K) | M6 | 4.4 | 22-6 | 22-6 | 22 | 22 | 22 | 14 | 4 | 4 | 25 | 25 | 16 |
| 00770(37K) | M6 | 4.4 | 22-6 | 22-6 | 22 | 22 | 22 | 14 | 4 | 4 | 25 | 25 | 16 |
| 00930(45K) | M8 | 7.8 | 38-8 | 38-8 | 38 | 38 | 38 | 22 | 2 | 2 | 50 | 50 | 25 |
| 01160(55K) | M8 | 7.8 | 60-8 | 60-8 | 60 | 60 | 60 | 22 | 1/0 | 1/0 | 50 | 50 | 25 |
| 01800(75K) | M10 | 14.7 | 60-10 | 60-10 | 60 | 60 | 60 | 22 | 1/0 | 1/0 | 50 | 50 | 25 |
| 02160(90K) | M10 | 14.7 | 60-10 | 60-10 | 60 | 60 | 80 | 22 | 1/0 | 1/0 | 50 | 50 | 25 |
| 02600(110K) | M10 | 14.7 | 80-10 | 80-10 | 80 | 80 | 80 | 38 | 3/0 | 3/0 | 70 | 70 | 35 |
| 03250(132K) | M10 | 14.7 | 100-10 | 100-10 | 100 | 100 | 100 | 38 | 4/0 | 4/0 | 95 | 95 | 50 |
| 03610(160K) | M10 | 14.7 | 150-10 | 150-10 | 125 | 125 | 150 | 38 | 250 | 250 | 120 | 120 | 70 |

*1 For the FR-F846-01800(75K) or lower, it is the gauge of a cable with the continuous maximum permissible temperature of 75 °C (HIV cable (600 V grade heat-resistant PVC insulated wire), etc.). It assumes a surrounding air temperature of 50 °C or lower and the wiring distance of 20 m or shorter.

For the FR-F846-02160(90K) or higher, it is the gauge of the cable with the continuous maximum permissible temperature of 90 °C or higher. (LMFC (heat resistant flexible cross-linked polyethylene insulated cable), etc.). It assumes a surrounding air temperature of 50 °C or lower.

*2 For the FR-F846-01160(55K) or lower, it is the gauge of a cable with the continuous maximum permissible temperature of 75 °C (THHW cable). It assumes a surrounding air temperature of 40 °C or lower and the wiring distance of 20 m or shorter.

For the FR-F846-01800(75K) or higher, it is the gauge of a cable with the continuous maximum permissible temperature of 90 °C (THHN cable). It assumes a surrounding air temperature of 40 °C or lower. (For the use in the United States or Canada, refer to page 41.)

*3 For the FR-F846-01160(55K) or lower, it is the gauge of a cable with the continuous maximum permissible temperature of 70 °C (PVC cable). It assumes a surrounding air temperature of 40 °C or lower and the wiring distance of 20 m or shorter.

For the FR-F846-01800(75K) or higher, it is the gauge of a cable with the continuous maximum permissible temperature of 90 °C (XLPE cable). It assumes a surrounding air temperature of 40 °C or lower. (Selection example for use mainly in Europe.)

*4 The terminal screw size indicates the size of terminal screw for R/L1, S/L2, T/L3, U, V, W, P/+, N/-, P1, and a screw for earthing (grounding).

The line voltage drop can be calculated by the following expression:

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

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.

CAUTION

- Tighten the terminal screw to the specified torque.
A screw that has been tightened too loosely can cause a short circuit or malfunction.
A screw that has been tightened too tightly can cause a short circuit or malfunction due to the unit breakage.
- Use crimping terminals with insulation sleeve to wire the power supply and motor.

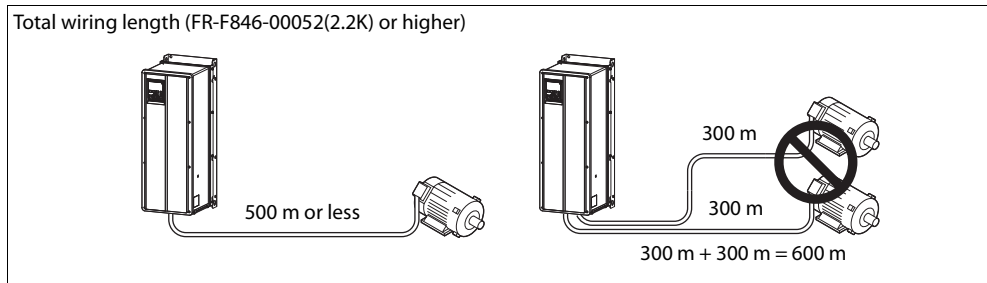


2.3.2 Total wiring length

• **With general-purpose motor**

Connect one or more general-purpose motors within the total wiring length shown in the following table.

| Pr. 72 setting (carrier frequency) | FR-F846-00023(0.75K) | FR-F846-00038(1.5K) | FR-F846-00052(2.2K) or higher |
|---------------------------------------|----------------------|---------------------|-------------------------------|
| 2 (2kHz) or lower | 300 m | 500 m | 500 m |
| 3 (3kHz) or higher | 200 m | 300 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 motor. In this case, take one of the following measure.

- Use a "400 V class inverter-driven insulation-enhanced motor" and set frequency in Pr. 72 "PWM frequency selection" according to wiring length.

| Wiring Length | | |
|------------------------|--------------------|--------------------|
| 50 m or shorter | 50 m to 100 m | longer than 100 m |
| 15 (14.5 kHz) or lower | 9 (9 kHz) or lower | 4 (4 kHz) or lower |

• **With PM motor**

Use the following wiring length or shorter when connecting a PM motor.

| Pr. 72 setting (carrier frequency) | FR-F846-00038(1.5K) or lower | FR-F846-00052(2.2K) or higher |
|---------------------------------------|------------------------------|-------------------------------|
| 5 (2 kHz) or lower | 100 m | 100 m |
| 6 to 9 (6 kHz) | 50 m | 100 m |
| 10 (10kHz) or higher | 50 m | 50 m |

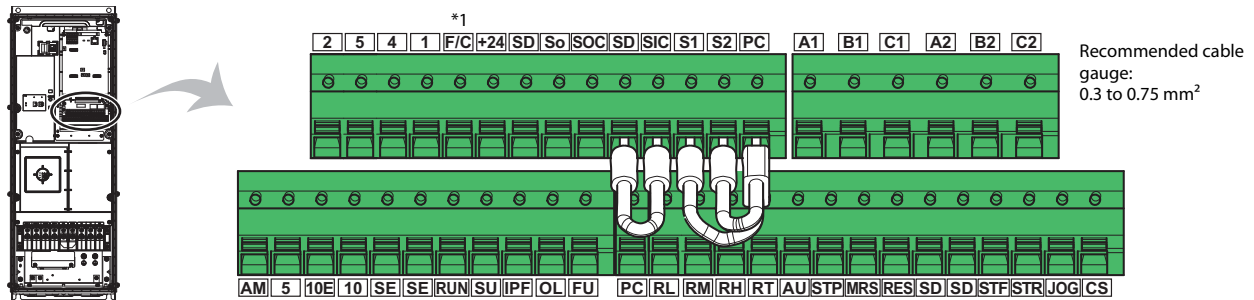
Use one PM motor for one inverter. Multiple PM motors cannot be connected to an inverter.

CAUTION

- Especially for long-distance wiring, the inverter may be affected by a charging current caused by stray capacitances of the wiring, leading to an activation of the overcurrent protection, malfunction of the fast-response current limit operation, or even to an inverter failure. If the fast-response current limit function malfunctions, disable this function. (For Pr. 156 "Stall prevention operation selection", refer to the FR-F800 Instruction Manual (Detailed).)
- A surge voltage suppression filter (FFR-DT-xxA-SS1) can be used under V/F control and Advanced magnetic flux vector control. A sine wave filter (FFR-SI-xxA-SS1) can be used under V/F control. Do not use these filters under PM control.
- For details of Pr. 72 "PWM frequency selection", refer to the FR-F800 Instruction Manual (Detailed).
- Refer to the FR-F800 Instruction Manual (Detailed) to drive a 400 V class motor by an inverter.

2.4 Control circuit terminals

2.4.1 Terminal layout



*1 The terminal functions as the terminal CA for the CA type.

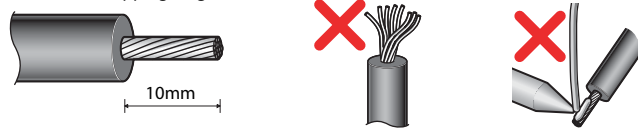
2.4.2 Wiring method

• Power supply connection

For the control circuit wiring, strip off the sheath of a cable, and use it with a blade terminal. For a single wire, strip off the sheath of the wire and apply directly. Insert the blade terminal or the single wire into a socket of the terminal.

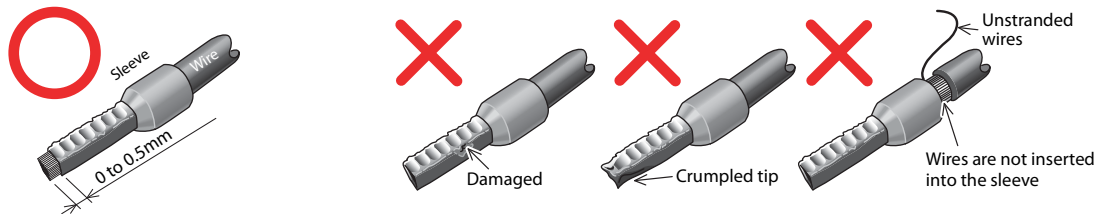
- (1) Strip off the sheath for the below length. If the length of the sheath peeled is too long, a short circuit may occur with neighbouring wires. If the length is too short, wires might come off. Wire the stripped cable after twisting it to prevent it from becoming loose. In addition, do not solder it.

Cable sheath stripping length



- (2) Crimp the blade terminal.

Insert wires to a blade terminal, and check that the wires come out for about 0 to 0.5 mm from a sleeve. Check the condition of the blade terminal after crimping. Do not use a blade terminal of which the crimping is inappropriate, or the face is damaged.



• Blade terminals commercially available (as of January 2017)

| Cable gauge (mm ²) | Blade terminal model | | | Manufacturer | Crimping tool name |
|--------------------------------|------------------------|---------------------------|----------------------|---------------------------|--------------------|
| | With insulation sleeve | Without insulation sleeve | For UL wire *2 | | |
| 0.3 | AI 0,34-10TQ | — | — | Phoenix Contact Co., Ltd. | CRIMPFOX 6 |
| 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 | | |
| 1 | AI 1-10RD | A 1-10 | AI 1-10RD/1000GB | | |
| 1.25, 1.5 | AI 1,5-10BK | A 1,5-10 | AI 1,5-10BK/1000GB*3 | | |
| 0.75 (for two wires) | AI-TWIN 2x0,75-10GY | — | — | | |

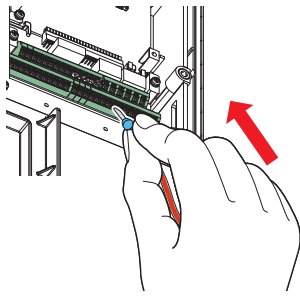
*2 A blade terminal with an insulation sleeve compatible with the MTW wire which has a thick wire insulation.

*3 Applicable for the terminal A1, B1, C1, A2, B2, C2.

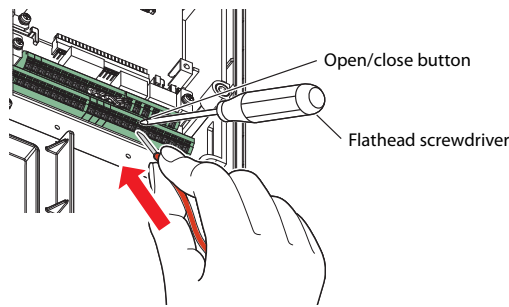
| Cable gauge (mm ²) | Blade terminal product number | Insulation product number | Manufacturer | Crimping tool product number |
|--------------------------------|-------------------------------|---------------------------|------------------|------------------------------|
| 0.3 to 0.75 | BT 0.75-11 | VC 0.75 | NICHIFU Co.,Ltd. | NH 69 |



(3) Insert the wires into a socket.



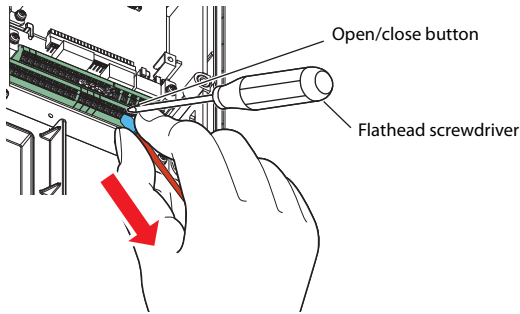
When using a single wire or stranded wires without a blade terminal, push the open/close button all the way down with a flathead screwdriver, and insert the wire.



CAUTION

- When using stranded wires without a blade terminal, twist enough to avoid short circuit with a nearby terminals or wires.
- Lead the wires through the holes for wiring. (For the details of the holes for wiring, refer to the FR-F800 Instruction Manual (Detailed).)
- Place the flathead screwdriver vertical to the open/close button. In case the blade tip slips, it may cause an inverter damage or injury.

- Wire removal
Pull the wire while pushing the open/close button all the way down firmly with a flathead screwdriver.



CAUTION

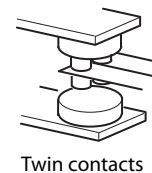
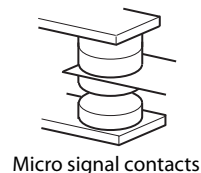
- Pulling out the wire forcefully without pushing the open/close button all the way down may damage the terminal block.
- Use a small flathead screwdriver (tip thickness: 0.4 mm, tip width: 2.5 mm). If a flathead screwdriver with a narrow tip is used, terminal block may be damaged. Commercially available products (as of February 2016).

| Name | Model | Manufacturer |
|--------|-----------------|---------------------------|
| Driver | SZF 0-0,4 x 2,5 | Phoenix Contact Co., Ltd. |

- Place the flathead screwdriver vertical to the open/close button. In case the blade tip slips, it may cause an inverter damage or injury.

2.4.3 Wiring precautions

- Terminals PC, 5, and SD are all common terminals (0 V) for I/O signals. Do not earth them.
- Use shielded or twisted cables for connection to the control circuit terminals and run them away from the main and power circuits (including the 230 V relay sequence circuit).
- It is recommended to use the cables of 0.3 to 0.75 mm² gauge for connection to the control circuit terminals.
- The wiring length should be 30 m (200 m for the terminal FM) maximum.
- Use two or more parallel micro-signal contacts or twin contacts to prevent contact faults when using contact inputs since the control circuit input signals are micro-currents.
- Always apply a voltage to the fault output terminals (A1, B1, C1, A2, B2, C2) via a relay coil, lamp, etc.
- Do not short terminal PC and SD. Inverter may be damaged.
- When using an external power supply for transistor output, note the following points to prevent a malfunction caused by undesirable current.
- Do not connect terminal PC on the inverter and the +24 V terminal of the external power supply (when the source logic is selected).
- Do not connect any terminal SD on the inverter and the 0 V terminal of the external power supply (when the sink logic is selected).
- Do not install an external power source in parallel with the internal 24 V DC power source (connected to terminals PC and SD) to use them together.



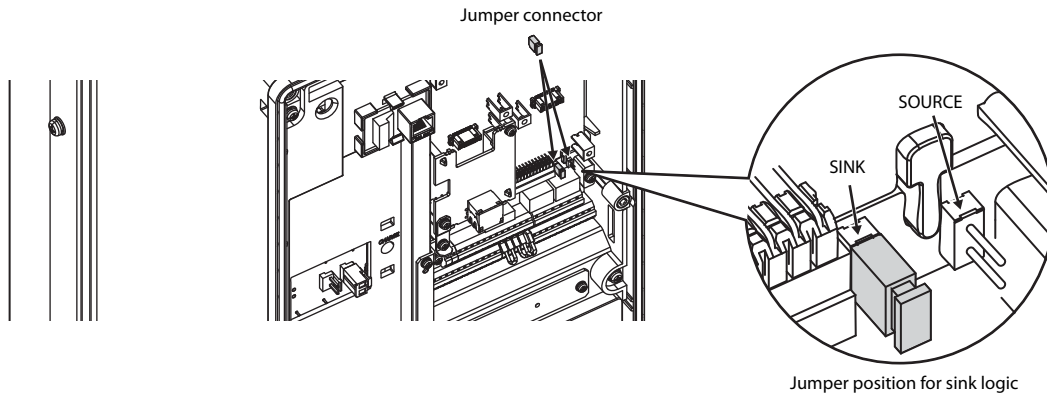
2.4.4 Control logic (sink/source) change

Change the control logic of input signals as necessary.

To change the control logic, change the jumper connector position on the control circuit board. Connect the jumper connector to the connector pin of the desired control logic.

- The control logic of input signals is initially set to the sink logic (SINK) for the FM type.
- The control logic of input signals is initially set to the source logic (SOURCE) for the CA type.

(The output signals may be used in either the sink or source logic independently of the jumper connector position.)



CAUTION

- Make sure that the jumper connector is installed correctly.
- Never change the control logic while power is ON.

2.4.5 When supplying 24 V external power to the control circuit

Connect the 24 V external power supply across terminals +24 and SD. Connecting a 24 V external power supply enables I/O terminal ON/OFF operation, operation panel displays, control functions, and communication during communication operation even during power-OFF of inverter's main circuit power supply. When the main circuit power supply is turned ON, the power supply source changes from the 24 V external power supply to the main circuit power supply.

During the 24 V external power supply operation, the 24 V external power supply operation (EV) signal is output. To use the EV signal, set "68 (positive logic) or 168 (negative logic)" in one of Pr. 190 to Pr. 196 (output terminal function selection) to assign function to an output terminal.

• Specification of the applicable 24 V external power supply

| Item | Rated specification |
|---------------|---------------------|
| Input voltage | 23 to 25.5 V DC |
| Input current | 1.4 A or less |

Commercially available products (as of February 2015)

| Model | Manufacturer |
|--|-------------------|
| S8JX-N05024C ^{*1} Specifications: Capacity 50 W, output voltage (DC) 24 V, output current 2.1 A Installation method: Front installation with cover or S8VS-06024 ^{*1} Specifications: Capacity 60 W, output voltage (DC) 24 V, output current 2.5 A Installation method: DIN rail installation | OMRON Corporation |

^{*1} For the latest information about OMRON power supply, contact OMRON corporation.



2.5 Safety stop function

2.5.1 Function description

The terminals related to the safety stop function are shown below.

| Terminal symbol | Terminal function description | | | |
|-------------------|--|-----------|--|---|
| S1 ^{*1} | For input of the safety stop | Channel 1 | Between S1 and SIC | Open: In safety stop mode Short: Other than the safety stop mode |
| S2 ^{*1} | | Channel 2 | Between S2 and SIC | |
| SIC ^{*1} | Common terminal for terminals S1 and S2 | | | |
| So (SO) | Outputs when an alarm or failure is detected. The signal is output when no internal safety circuit failure ^{*2} exists. | | OFF: Internal safety circuit failure ^{*2} ON: No internal safety circuit failure ^{*2} | |
| SOC | Terminal SO (open collector output) common | | | |

^{*1} In the initial status, terminals S1 and PC, S2 and PC, and SIC and SD are respectively shorted with shorting wires. To use the safety stop function, remove all the shorting wires, and then connect to the safety relay module as shown in the following connection diagram.

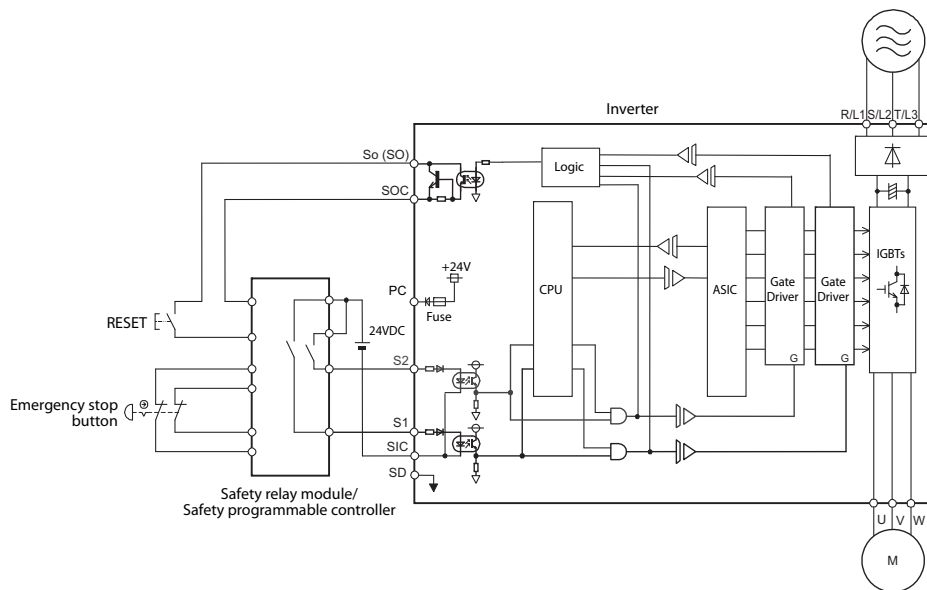
^{*2} At an internal safety circuit failure, the operation panel displays one of the faults shown on the next page.

CAUTION

Use the terminal So (SO) to output a fault and to prevent restarting of the inverter. Terminal So (SO) cannot be used as safety stop input signal to other devices.

2.5.2 Connection diagram

To prevent automatic restart after a fault occurrence, connect the reset button of a safety relay module or a safety programmable controller across the terminals So (SO) and SOC. The reset button acts as the feedback input for the safety relay module or the safety programmable controller.



2.5.3 Safety stop function operation

| Input power | Internal safety circuit status | Input terminal *1, *2 | | Output terminal | Output signal *8, *9 | | Inverter operation enable signal | Operation panel indication | |
|-------------|--------------------------------|-----------------------|-----|-----------------|----------------------|----------|----------------------------------|----------------------------|------------------|
| | | S1 | S2 | So (SO) | SAFE | E.SAF *6 | | SA *7 | |
| OFF | — | — | — | OFF | OFF | OFF | Output shutoff (Safe state) | Not displayed | Not displayed |
| ON | Normal | ON | ON | ON *3 | OFF | OFF | Drive enabled | Not displayed | Not displayed |
| | Normal | ON | OFF | OFF *4 | OFF *4 | OFF *4 | Output shutoff (Safe state) | Displayed | Displayed |
| | Normal | OFF | ON | OFF *4 | OFF *4 | OFF *4 | Output shutoff (Safe state) | Displayed | Displayed |
| | Normal | OFF | OFF | ON *3 | ON *3 | ON *3 | Output shutoff (Safe state) | Not displayed | Displayed |
| | Fault | ON | ON | OFF | OFF | OFF | Output shutoff (Safe state) | Displayed | Not displayed *5 |
| | Fault | ON | OFF | OFF | OFF | OFF | Output shutoff (Safe state) | Displayed | Displayed |
| | Fault | OFF | ON | OFF | OFF | OFF | Output shutoff (Safe state) | Displayed | Displayed |
| | Fault | OFF | OFF | OFF | OFF | OFF | Output shutoff (Safe state) | Displayed | Displayed |

*1 ON: Transistor used for an open collector output is conducted.

OFF: Transistor used for an open collector output is not conducted.

*2 When not using the safety stop function, short across terminals S1 and PC, S2 and PC, and SIC and SD to use the inverter. (In the initial status, terminals S1 and PC, S2 and PC, and SIC and SD are respectively shorted with shorting wires.)

*3 If any of the protective functions shown in the following table is activated, the terminal So (SO) and the SAFE output signal turn OFF.

| Error Definition | Operation panel indication | Error Definition | Operation panel indication |
|--|----------------------------|------------------------|----------------------------|
| Option fault | E.OPT | 24 VDC power fault | E.P24 |
| Communication option fault | E.OP1 | Safety circuit fault | E.SAF |
| Parameter storage device fault | E.PE | Overspeed occurrence | E.OS |
| Retry count excess | E.RET | CPU fault | E.CPU |
| Parameter storage device fault | E.PE2 | | E.5 to E.7 |
| Operation panel power supply short circuit | E.CTE | Internal circuit fault | E.13 |

*4 If the internal safety circuit is operated normally, the terminal So (SO) and the SAFE output signal remain ON until E.SAF is displayed, and the terminal SO and the SAFE output signal turn OFF when E.SAF is displayed.

*5 SA is displayed when the terminals S1 and S2 are identified as OFF due to the internal safety circuit failure.

*6 If another fault occurs at the same time as E.SAF, the other fault can be displayed.

*7 If another warning occurs at the same time as SA, the other warning can be displayed.

*8 The ON/OFF state of the output signal is the one for the positive logic. The ON and OFF are reversed for the negative logic.

*9 For the SAFE signal, refer to the following table and use any of Pr. 190 to Pr. 196 (output terminal function selection) to assign the function to the output terminal.

| Output signal | Pr. 190 to Pr. 196 settings | |
|---------------|-----------------------------|----------------|
| | Positive logic | Negative logic |
| SAFE | 80 | 180 |

*10 The use of the SAFE signal has not been certified for compliance with safety standards.

For more details, refer to the Safety stop function instruction manual.
(Find a PDF copy of this manual in the enclosed CD-ROM.)

3 FAILSAFE OF THE SYSTEM WHICH USES THE INVERTER

When a fault is detected by the protective function, the protective function activates and output a fault signal (ALM). However, a fault output signal may not be output at an inverter fault occurrence when the detection circuit or output circuit fails, etc. Although Mitsubishi Electric assures best quality products, provide an interlock which uses inverter status output signals to prevent accidents such as damage to machine when the inverter fails for some reason.

At the same time consider the system configuration where failsafe from outside the inverter, without using the inverter, is enabled even if the inverter fails.

Interlock method which uses the inverter status output signals

By combining the inverter status output signals to provide an interlock as shown below, an inverter alarm can be detected.

| Interlock Method | Check Method | Used Signals | Refer to |
|--|--|---|--|
| Inverter protective function operation | Operation check of an alarm contact Circuit error detection by negative logic | Fault output signal (ALM signal) | Refer to chapter "Parameter" of the FR-F800 Instruction Manual (Detailed). |
| Inverter operating status | Operation ready signal check | Operation ready signal (RY signal) | |
| Inverter running status | Logic check of the start signal and running signal | Start signal (STF signal, STR signal) Inverter running signal (RUN signal) | |
| | Logic check of the start signal and output current | Start signal (STF signal, STR signal) Output current detection signal (Y12 signal) | |

Backup method outside the inverter

Even if the interlock is provided by the inverter status signal, enough failsafe is not ensured depending on the failure status of the inverter itself. For example, if an inverter CPU fails in a system interlocked with the inverter's fault, start, and RUN signals, no fault signal will be output and the RUN signal will be kept ON because the inverter CPU is down.

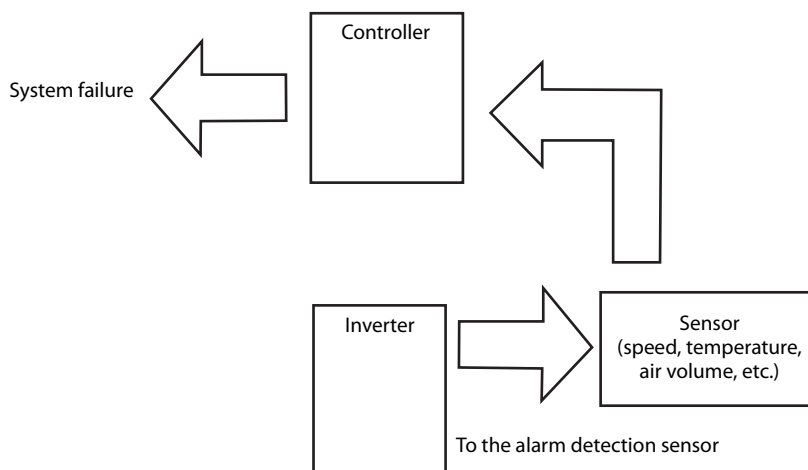
Provide a speed detector to detect the motor speed and current detector to detect the motor current and consider the backup system such as performing a check up as below according to the level of importance of the system.

- Start signal and actual operation check

Check the motor running and motor current while the start signal is input to the inverter by comparing the start signal to the inverter and detected speed of the speed detector or detected current of the current detector. Note that the current is flowing through the motor while the motor coasts to stop, even after the inverter's start signal is turned OFF. For the logic check, configure a sequence considering the inverter's deceleration time. In addition, it is recommended to check the three-phase current when using the current detector.

- Command speed and actual operation check

Check for a gap between the actual speed and commanded speed by comparing the inverter speed command and detected speed of the speed detector.

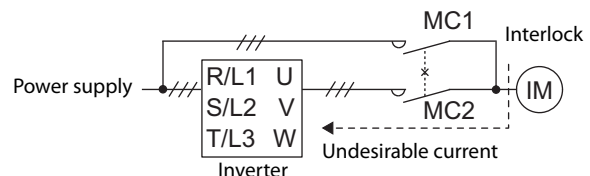


4 PRECAUTIONS FOR USE OF THE INVERTER

The FR-F800 series is a highly reliable product, but incorrect peripheral circuit making or operation/handling method may shorten the product life or damage the product.

Before starting operation, always recheck the following items:

- Use crimping terminals with insulation sleeve to wire the power supply and motor.
- Application of power to the output terminals (U, V, W) of the inverter will damage the inverter. Never perform such wiring.
- After wiring, wire offcuts must not be left in the inverter.
Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in a control box etc., take care not to allow chips and other foreign matter to enter the inverter.
- Use cables of the appropriate size to make a voltage drop of 2% maximum.
If the wiring distance is long between the inverter and motor, a voltage drop in the main circuit will cause the motor torque to decrease especially at the output of a low frequency.
Refer to *page 7* for the recommended cable size.
- Keep the total wiring length within the specified length.
In long distance wiring, charging currents due to stray capacitance in the wiring may degrade the fast-response current limit operation or cause the equipment on the inverter's output side to malfunction. Pay attention to the total wiring length. (Refer to *page 8*.)
- Electromagnetic wave interference
The input/output (main circuit) of the inverter includes high frequency components, which may interfere with the communication devices (such as AM radios) used near the inverter. In this case, activate the EMC filter (turn ON the EMC filter ON/OFF connector) to minimize interference. (Refer to the FR-F800 Instruction Manual (Detailed).)
- Electrical corrosion of the bearing
When a motor is driven by the inverter, axial voltage is generated on the motor shaft, which may cause electrical corrosion of the bearing in rare cases depending on the wiring, load, operating conditions of the motor or specific inverter settings (e.g. high carrier frequencies).
Contact your sales representative to take appropriate countermeasures for the motor.
The following shows examples of countermeasures for the inverter:
 - Decrease the carrier frequency.
 - Consider the use of a sine wave output filter.
- Do not install a power factor correction capacitor, surge suppressor or radio noise filter on the inverter output side.
This will cause the inverter to trip or the capacitor and surge suppressor to be damaged.
- Before starting wiring or other work after the inverter is operated, wait for at least 10 minutes after the power supply turns OFF, then confirm that the voltage across the main circuit terminals P/+ and N/- of the inverter is low enough using a tester, etc. The capacitor is charged with high voltage for some time after power off and it is dangerous.
- A short circuit or earth fault on the inverter output side may damage the inverter module.
 - Fully check the insulation resistance of the circuit prior to inverter operation since repeated short circuits caused by peripheral circuit inadequacy or an earth fault caused by wiring inadequacy or reduced motor insulation resistance may damage the inverter module.
 - Fully check the to-earth (ground) insulation and inter-phase insulation of the inverter output side before power-ON.
Especially for an old motor or use in hostile atmosphere, securely check the motor insulation resistance etc.
- Do not use the inverter input side magnetic contactor (MC) to start/stop the inverter.
Since repeated inrush currents at power ON will shorten the life of the converter circuit (switching life is about 1,000,000 times), frequent starts and stops of the MC must be avoided.
Always use the start signal (ON/OFF of STF and STR signals) to start/stop the inverter.
- Do not apply a voltage higher than the permissible voltage to the inverter I/O signal circuits.
Contact to the inverter I/O signal circuits or opposite polarity may damage the I/O devices. Especially check the wiring to prevent the speed setting potentiometer from being connected incorrectly to short terminals 10E and 5.
- Provide electrical and mechanical interlocks for MC1 and MC2 which are used for commercial power supply-inverter switch-over.
When the wiring is incorrect or if there is a switching circuit as shown on the right, the inverter will be damaged by leakage current from the power supply due to arcs generated at the time of switch-over or chattering caused by a sequence error. (The commercial power supply operation is not available with PM motors.) If switching to the commercial power supply operation while a failure such as an output short circuit has occurred between the magnetic contactor MC2 and the motor, the damage may further spread. If a failure has occurred between the MC2 and the motor, a protection circuit such as using the OH signal input must be provided.
- Provide a countermeasure for power restoration after a power failure.
If the machine must not be restarted when power is restored after a power failure, provide a magnetic contactor (MC) in the inverter's input side and also make up a sequence which will not switch on the start signal.
If the start signal (start switch) remains on after a power failure, the inverter will automatically restart as soon as the power is restored.



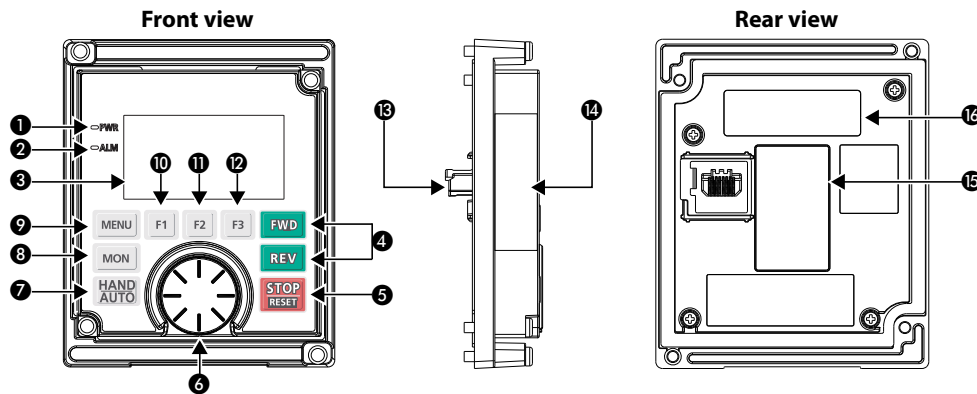
- Inverter input side magnetic contactor (MC)
On the inverter input side, connect an MC for the following purposes. (Refer to the FR-F800 Instruction Manual (Detailed).)
 - To disconnect the inverter from the power supply at activation of a protective function or at malfunctioning of the driving system (e.g. emergency stop operation).
 - To prevent any accident due to an automatic restart at restoration of power after an inverter stop made by a power failure
 - To separate the inverter from the power supply to ensure safe maintenance and inspection work.
 If using an MC for emergency stop during operation, select an MC regarding the inverter input side current as JEM1038-AC-3 class rated current.
- Handling of inverter output side magnetic contactor
Switch the magnetic contactor between the inverter and motor only when both the inverter and motor are at a stop. When the magnetic contactor is turned ON while the inverter is operating, overcurrent protection of the inverter and such will activate. When MC is provided for switching to the commercial power supply, for example, switch it ON/OFF after the inverter and motor have stopped.
- Install a low voltage manual contactor on the inverter's output side when using a PM motor.
When a failure occurs between the MC2 and motor, make sure to provide a protection circuit, such as using the OH signal input. In an application, such as fan and blower, where the motor is driven by the load, a low-voltage manual contactor must be connected at the inverter's output side, and wiring and inspection must be performed while the contactor is open. Otherwise you may get an electric shock.
- Countermeasures against inverter-generated EMI
When the motor speed is unstable, due to change in the frequency setting signal caused by electromagnetic noises from the inverter, take the following measures when applying the motor speed by the analog signal:
 - Do not run the signal cables and power cables (inverter I/O cables) in parallel with each other and do not bundle them.
 - Run signal cables as far away as possible from power cables (inverter I/O cables).
 - Use shielded cables as signal cables.
 - Install a ferrite core on the signal cable (Example: ZCAT3035-1330 by TDK).
- Instructions for overload operation
When performing frequent starts/stops by the inverter, rise/fall in the temperature of the transistor element of the inverter will repeat due to a repeated flow of large current, shortening the life from thermal fatigue. Since thermal fatigue is related to the amount of current, the life can be increased by reducing current at locked condition, starting current, etc. Reducing current may extend the service life but may also cause torque shortage, which leads to a start failure. Adding a margin to the current can eliminate such a condition.
 - For an induction motor, use an inverter of a higher capacity (up to two ranks).
 - For a PM motor, use an inverter and PM motor of higher capacities.
- Make sure that the specifications and rating match the system requirements.

5 BASIC OPERATION

5.1 Operation panel (FR-LU08-01)

5.1.1 Components of the operation panel

The operation panel (FR-LU08-01) is an IP55 compatible model that can only be installed on the FR-F806-L2 series. (It cannot be installed on the standard model or the separated converter type of the FR-F800 series.)



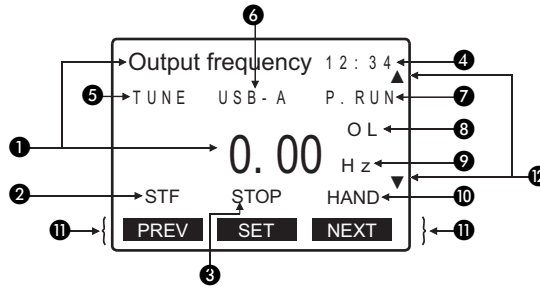
| Symbol | Name | Description |
|--------|---------------------------|--|
| ① | Power lamp | ON when the power is turned ON. |
| ② | Alarm lamp | ON when an inverter alarm occurs. |
| ③ | Monitor | Shows the frequency, parameter number, etc. (Using Pr. 52, Pr. 774 to Pr. 776, the monitor item can be changed.) |
| ④ | FWD key, REV key | FWD key: Starts the forward operation. REV key: Starts the reverse operation. |
| ⑤ | STOP/RESET key | Stop operation commands. Reset the inverter when the protective function is activated. |
| ⑥ | Setting dial | Used to change the frequency and parameter settings. Shows the details of the fault when the dial is pressed in the faults history mode. |
| ⑦ | HAND/AUTO key | Switches the operation mode between HAND (PU), HANDJOG (PUJOG), and AUTO (External). |
| ⑧ | MON key | Displays the first priority monitor. (For the details, refer to the Instruction Manual of the FR-LU08(-01).) |
| ⑨ | MENU key | Displays the Quick menu. Displays the Function menu when the key is pressed while the Quick menu is displayed. |
| ⑩ | Software key (F1) | Select an operation displayed on the monitor. |
| ⑪ | Software key (F2) | |
| ⑫ | Software key (F3) | |
| ⑬ | Connector | Connector to the inverter. Connect this connector to the PU connector of the inverter. |
| ⑭ | For manufacturer setting. | Do not use. Do not peel off the waterproof seal affixed to the operation panel. |
| ⑮ | Battery cover | Remove the battery cover when replacing the backup battery for the real time clock function. (For the details, refer to the Instruction Manual of the FR-LU08(-01).) |
| ⑯ | Rating plate | — |


CAUTION

- Do not operate the keys with sharp tools.
- Do not press the LCD part.
- Do not peel off the waterproof seal affixed to the operation panel. If the seal is peeled off, the operation panel does not conform to IP55.



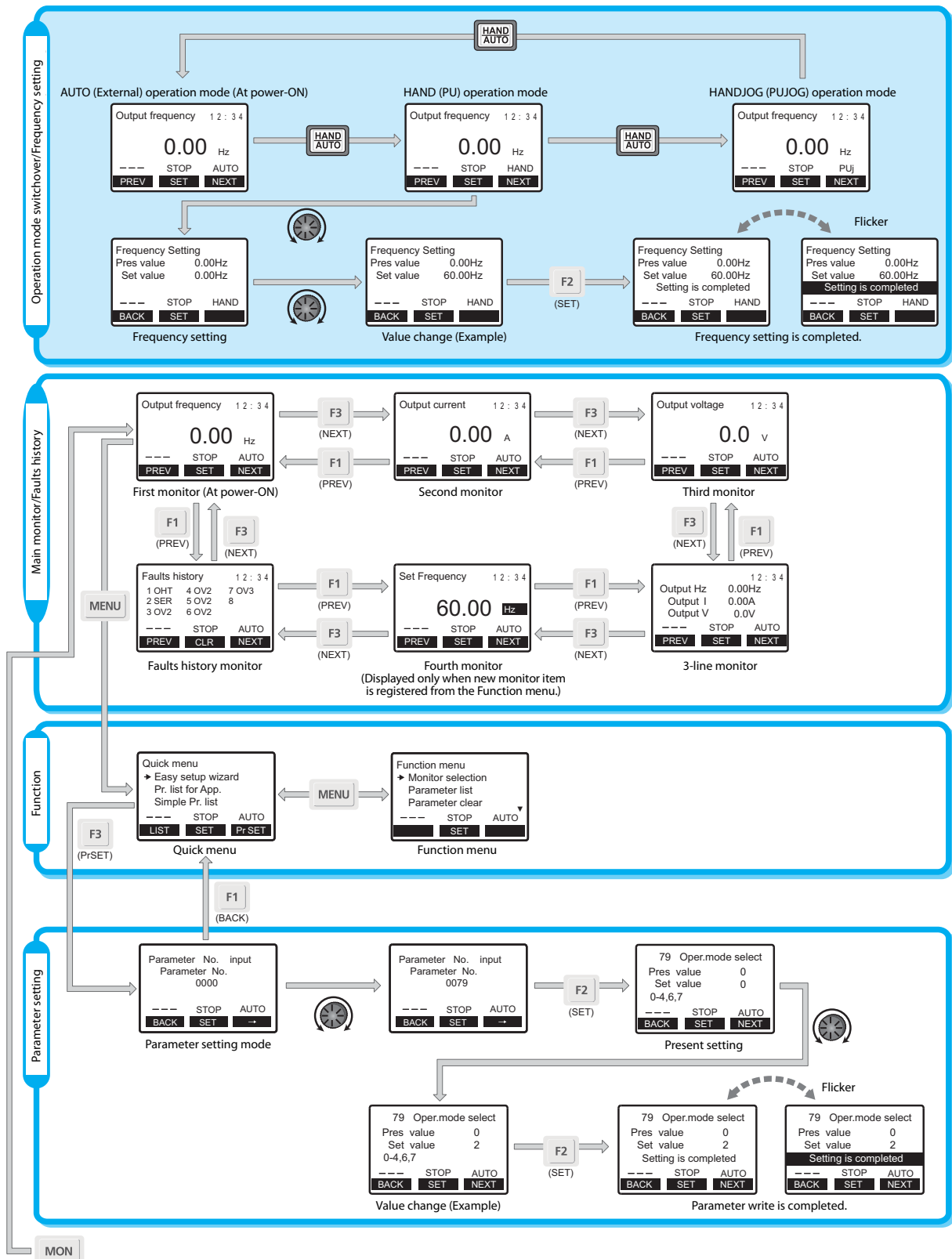
5.1.2 Outline of the Main monitor indicator



| Symbol | Name | Description |
|--------|------------------------------------|--|
| ① | Main monitor item/data | Displays the output frequency, output current, output voltage, faults history, and others. <ul style="list-style-type: none"> Shifting the Main monitor screen using $\left[\begin{smallmatrix} F1 \\ (PREV) \end{smallmatrix} \right]$ or $\left[\begin{smallmatrix} F3 \\ (NEXT) \end{smallmatrix} \right]$ Changing the main monitor item using the Function menu Changing the main monitor item using Pr. 52 "Operation panel main monitor selection" (For the details, refer to the Instruction Manual of the FR-LU08(-01).) |
| ② | Rotation direction | Displays the direction of the start command ([STF]: forward, [STR]: reverse). ([--]) shows that no start command is input, or that both forward and reverse directions are ON.) |
| ③ | Operating status | Displays the operating status of the inverter. [STOP]: During stop [FWD]: During forward rotation [REV]: During reverse rotation [JOGf]: During JOG forward rotation [JOGr]: During JOG reverse rotation [ALARM]: At fault occurrence |
| ④ | Clock | Displays time. With a battery installed, the clock keeps working even if the inverter power is turned OFF. (For the details, refer to the Instruction Manual of the FR-LU08(-01).) |
| ⑤ | Tuning status | Displays the offline auto tuning status of the inverter. [TUNE]: During turning or tuning completed [TUNE] highlighted and flickering: Tuning error |
| ⑥ | USB connection/ password locked | Displays the connection status of the USB A connector of the inverter and password function setting status. [USB-A]: USB connection recognized [USB-A] highlighted: USB ready [USB-A] flickering: During USB operation [LOCK]: Password locked |
| ⑦ | PLC function/ JOG operation | Displays the status of the PLC function and JOG operation. [PRUN]: During stop with the PLC function enabled [PRUN] highlighted: During PLC function operation [PRUN] highlighted and flickering: Operation error in the PLC function [JOG]: JOG operation enabled |
| ⑧ | Warning | Displays an inverter warning. |
| ⑨ | Unit | Shows the unit of the value on the main monitor. |
| ⑩ | Operation mode | Displays the operation mode. [AUTO]: AUTO (External) operation mode [HAND]: HAND (PU) operation mode [EXTj]: AUTOJOG (External JOG) operation mode [PUj]: HANDJOG (PUJOG) operation mode [NET]: Network operation mode [PU+E]: AUTO (External) / HAND (PU) combined operation mode |
| ⑪ | Software key | Displays operations performed by pressing the F1 (left), F2 (center), or F3 (right) keys. |
| ⑫ | Scroll | Displayed when any data can be scrolled by turning  . |

5.1.3 Basic operation of the operation panel

For the details of operating procedures for the operation panel, refer to the Instruction Manual of the FR-LU08(-01).





5.2 Parameter list

For simple variable-speed operation of the inverter, the initial values of the parameters may be used as they are. Set the necessary parameters to meet the load and operational specifications. Parameter setting, change and check can be performed from the operation panel (FR-LU08-01).

Remarks

- **Simple** indicates simple mode parameters. Use Pr. 160 "User group read selection" to indicate the simple mode parameters only.
- The changing of the parameter settings may be restricted in some operating statuses. Use Pr. 77 "Parameter write selection" to change the setting of the restriction.
- Refer to the FR-F800 Instruction Manual (Detailed) for instruction codes for communication and availability of Parameter clear, all clear, and Parameter copy.

| Parameter | Name | Setting Range | Initial Value |
|-----------|--|-------------------|------------------------|
| 0 | Torque boost Simple | 0 to 30% | 6/4/3/2/1.5/ 1% *1 |
| 1 | Maximum frequency Simple | 0 to 120 Hz | 120 Hz *2 |
| | | | 60 Hz *3 |
| 2 | Minimum frequency Simple | 0 to 120 Hz | 0 Hz |
| 3 | Base frequency Simple | 0 to 590 Hz | 50 Hz |
| 4 | Multi-speed setting (high speed) Simple | 0 to 590 Hz | 50 Hz |
| 5 | Multi-speed setting (middle speed) Simple | 0 to 590 Hz | 30 Hz |
| 6 | Multi-speed setting (low speed) Simple | 0 to 590 Hz | 10 Hz |
| 7 | Acceleration time Simple | 0 to 3600 s | 5 s *4 |
| | | | 15 s *5 |
| 8 | Deceleration time Simple | 0 to 3600 s | 10 s *4 |
| | | | 30 s *5 |
| 9 | Electronic thermal O/L relay Simple | 0 to 500 A *2 | Inverter rated current |
| | Rated motor current Simple | 0 to 3600 A *3 | |
| 10 | DC injection brake operation frequency | 0 to 120 Hz, 9999 | 3 Hz |
| 11 | DC injection brake operation time | 0 to 10 s, 8888 | 0.5 s |
| 12 | DC injection brake operation voltage | 0 to 30% | 4/2/1% *6 |
| 13 | Starting frequency | 0 to 60 Hz | 0.5 Hz |
| 14 | Load pattern selection | 0, 1, 12 to 15 | 1 |
| 15 | Jog frequency | 0 to 590 Hz | 5 Hz |
| 16 | Jog acceleration/ deceleration time | 0 to 3600 s | 0.5 s |

| Parameter | Name | Setting Range | Initial Value |
|-----------|--|----------------------------------|---------------|
| 17 | MRS input selection | 0, 2, 4 | 0 |
| 18 | High speed maximum frequency | 0 to 590 Hz | 120 Hz *2 |
| | | | 60 Hz *3 |
| 19 | Base frequency voltage | 0 to 1000 V, 8888, 9999 | 8888 |
| 20 | Acceleration/ deceleration reference frequency | 1 to 590 Hz | 50 Hz |
| 21 | Acceleration/ deceleration time increments | 0, 1 | 0 |
| 22 | Stall prevention operation level | 0 to 400% | 110% |
| 23 | Stall prevention operation level compensation factor at double speed | 0 to 200%, 9999 | 9999 |
| 24 to 27 | Multi-speed setting (4 speed to 7 speed) | 0 to 590 Hz, 9999 | 9999 |
| 28 | Multi-speed input compensation selection | 0, 1 | 0 |
| 29 | Acceleration/ deceleration pattern selection | 0 to 3, 6 | 0 |
| 30 | Regenerative function selection | 0, 2, 10, 20, 100, 102, 110, 120 | 0 |
| 31 | Frequency jump 1A | 0 to 590 Hz, 9999 | 9999 |
| 32 | Frequency jump 1B | 0 to 590 Hz, 9999 | 9999 |
| 33 | Frequency jump 2A | 0 to 590 Hz, 9999 | 9999 |
| 34 | Frequency jump 2B | 0 to 590 Hz, 9999 | 9999 |
| 35 | Frequency jump 3A | 0 to 590 Hz, 9999 | 9999 |
| 36 | Frequency jump 3B | 0 to 590 Hz, 9999 | 9999 |
| 37 | Speed display | 0, 1 to 9998 | 0 |
| 41 | Up-to-frequency sensitivity | 0 to 100% | 10% |
| 42 | Output frequency detection | 0 to 590 Hz | 6 Hz |

*1 Differs according to capacities.

- 6%: FR-F846-00023(0.75K)
- 4%: FR-F846-00038(1.5K) to 00083(3.7K)
- 3%: FR-F846-00126(5.5K) and 00170(7.5K)
- 2%: FR-F846-00250(11K) to 00770(37K)
- 1.5%: FR-F846-00930(45K) and 01160(55K)
- 1%: FR-F846-01800(75K) or higher

*2 For FR-F846-01160(55K) or lower

*3 For FR-F846-01800(75K) or higher

*4 For FR-F846-00170(7.5K) or lower

*5 For FR-F846-00250(11K) or higher

*6 Differs according to capacities.

- 4%: FR-F846-00170(7.5K) or lower
- 2%: FR-F846-00250(11K) to 01160(55K)
- 1%: FR-F846-01800(75K) or higher

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|---|------------------------|
| 43 | Output frequency detection for reverse rotation | 0 to 590 Hz, 9999 | 9999 |
| 44 | Second acceleration/ deceleration time | 0 to 3600 s | 5s |
| 45 | Second deceleration time | 0 to 3600 s, 9999 | 9999 |
| 46 | Second torque boost | 0 to 30%, 9999 | 9999 |
| 47 | Second V/F (base frequency) | 0 to 590 Hz, 9999 | 9999 |
| 48 | Second stall prevention operation level | 0 to 400% | 110% |
| 49 | Second stall prevention operation frequency | 0 to 590 Hz, 9999 | 0 Hz |
| 50 | Second output frequency detection | 0 to 590 Hz | 30 Hz |
| 51 | Second electronic thermal O/L relay | 0 to 500 A, 9999 ^{*2} | 9999 |
| | | 0 to 3600 A, 9999 ^{*3} | |
| 52 | Operation panel main monitor selection | 0, 5 to 14, 17, 18, 20, 23 to 25, 34, 38, 40 to 45, 50 to 57, 61, 62, 64, 67 to 69, 81 to 96, 98, 100 | 0 |
| 54 | FM/CA terminal function selection | 1 to 3, 5 to 14, 17, 18, 21, 24, 34, 50, 52, 53, 61, 62, 67, 69, 70, 85, 87 to 90, 92, 93, 95, 98 | 1 |
| 55 | Frequency monitoring reference | 0 to 590 Hz | 50 Hz |
| 56 | Current monitoring reference | 0 to 500 A ^{*2} | Inverter rated current |
| | | 0 to 3600 A ^{*3} | |
| 57 | Restart coasting time | 0, 0.1 to 30 s, 9999 | 9999 |
| 58 | Restart cushion time | 0 to 60 s | 1s |
| 59 | Remote function selection | 0 to 3, 11 to 13 | 0 |
| 60 | Energy saving control selection | 0, 4, 9 | 0 |
| 65 | Retry selection | 0 to 5 | 0 |
| 66 | Stall prevention operation reduction starting frequency | 0 to 590 Hz | 50 Hz |
| 67 | Number of retries at fault occurrence | 0 to 10, 101 to 110 | 0 |
| 68 | Retry waiting time | 0.1 to 600 s | 1 s |
| 69 | Retry count display erase | 0 | 0 |
| 70 | Parameter for manufacturer setting. Do not set. | | |
| 71 | Applied motor | 0 to 6, 13 to 16, 20, 23, 24, 40, 43, 44, 50, 53, 54, 70, 73, 74, 8090, 8093, 8094, 9090, 9093, 9094 | 0 |
| 72 | PWM frequency selection | 0 to 15 ^{*2} | 2 |
| | | 0 to 6, 25 ^{*3} | |
| 73 | Analog input selection | 0 to 7, 10 to 17 | 1 |

| Parameter | Name | Setting Range | Initial Value | |
|-----------|--|--|---------------|--------|
| 74 | Input filter time constant | 0 to 8 | 1 | |
| 75 | Reset selection/ disconnected PU detection/PU stop selection | 0 to 3, 14 to 17, 1000 to 1003, 1014 to 1017 ^{*2} | 14 | |
| | | 0 to 3, 14 to 17, 100 to 103, 114 to 117, 1000 to 1003, 1014 to 1017, 1100 to 1103, 1114 to 1117 ^{*3} | | |
| | | Reset selection | | 0 to 3 |
| | | Disconnected PU detection | | 0, 1 |
| | | PU stop selection | | 1 |
| | Reset limit | 0 ^{*2} | 0 | |
| | | 0, 1 ^{*3} | | |
| 76 | Fault code output selection | 0 to 2 | 0 | |
| 77 | Parameter write selection | 0 to 2 | 0 | |
| 78 | Reverse rotation prevention selection | 0 to 2 | 0 | |
| 79 | Operation mode selection Simple | 0 to 4, 6, 7 | 0 | |
| 80 | Motor capacity | 0.4 to 55 kW, 9999 ^{*2} | 9999 | |
| | | 0 to 3600 kW, 9999 ^{*3} | | |
| 81 | Number of motor poles | 2, 4, 6, 8, 10, 12, 9999 | 9999 | |
| 82 | Motor excitation current | 0 to 500 A, 9999 ^{*2} | 9999 | |
| | | 0 to 3600 A, 9999 ^{*3} | | |
| 83 | Rated motor voltage | 0 to 1000 V | 400 V | |
| 84 | Rated motor frequency | 10 to 400 Hz, 9999 | 9999 | |
| 85 | Excitation current break point | 0 to 400 Hz, 9999 | 9999 | |
| 86 | Excitation current low speed scaling factor | 0 to 300% | 9999 | |
| 89 | Speed control gain (Advanced magnetic flux vector) | 0 to 200%, 9999 | 9999 | |
| 90 | Motor constant (R1) | 0 to 50 Ω, 9999 ^{*2} | 9999 | |
| | | 0 to 400 mΩ, 9999 ^{*3} | | |
| 91 | Motor constant (R2) | 0 to 50 Ω, 9999 ^{*2} | 9999 | |
| | | 0 to 400 mΩ, 9999 ^{*3} | | |
| 92 | Motor constant (L1)/ d-axis inductance (Ld) | 0 to 6000 mH, 9999 ^{*2} | 9999 | |
| | | 0 to 400 mH, 9999 ^{*3} | | |
| 93 | Motor constant (L2)/ q-axis inductance (Lq) | 0 to 6000 mH, 9999 ^{*2} | 9999 | |
| | | 0 to 400 mH, 9999 ^{*3} | | |
| 94 | Motor constant (X) | 0 to 100%, 9999 | 9999 | |

^{*2} For FR-F846-01160(55K) or lower

^{*3} For FR-F846-01800(75K) or higher



| Parameter | Name | Setting Range | Initial Value |
|-----------|--|---|---------------|
| 95 | Online auto tuning selection | 0, 1 | 0 |
| 96 | Auto tuning setting/status | 0, 1, 11, 101 | 0 |
| 100 | V/F1 (first frequency) | 0 to 590 Hz, 9999 | 9999 |
| 101 | V/F1 (first frequency voltage) | 0 to 1000 V | 0 V |
| 102 | V/F2 (second frequency) | 0 to 590 Hz, 9999 | 9999 |
| 103 | V/F2 (second frequency voltage) | 0 to 1000 V | 0 V |
| 104 | V/F3 (third frequency) | 0 to 590 Hz, 9999 | 9999 |
| 105 | V/F3 (third frequency voltage) | 0 to 1000 V | 0 V |
| 106 | V/F4 (fourth frequency) | 0 to 590 Hz, 9999 | 9999 |
| 107 | V/F4 (fourth frequency voltage) | 0 to 1000 V | 0 V |
| 108 | V/F5 (fifth frequency) | 0 to 590 Hz, 9999 | 9999 |
| 109 | V/F5 (fifth frequency voltage) | 0 to 1000 V | 0 V |
| 111 | Check valve deceleration time | 0 to 3600 s, 9999 | 9999 |
| 117 | PU communication station number | 0 to 31 | 0 |
| 118 | PU communication speed | 48, 96, 192, 384, 576, 768, 1152 | 192 |
| 119 | PU communication stop bit length / data length | 0, 1, 10, 11 | 1 |
| | PU communication data length | 0, 1 | 0 |
| | PU communication stop bit length | 0, 1 | 1 |
| 120 | PU communication parity check | 0 to 2 | 2 |
| 121 | PU communication retry count | 0 to 10, 9999 | 1 |
| 122 | PU communication check time interval | 0, 0.1 to 999.8 s, 9999 | 9999 |
| 123 | PU communication waiting time setting | 0 to 150 ms, 9999 | 9999 |
| 124 | PU communication CR/LF selection | 0 to 2 | 1 |
| 125 | Terminal 2 frequency setting gain frequency <i>Simple</i> | 0 to 590 Hz | 50 Hz |
| 126 | Terminal 4 frequency setting gain frequency <i>Simple</i> | 0 to 590 Hz | 50 Hz |
| 127 | PID control automatic switchover frequency | 0 to 590 Hz, 9999 | 9999 |
| 128 | PID action selection | 0, 10, 11, 20, 21, 50, 51, 60, 61, 70, 71, 80, 81, 90, 91, 100, 101, 1000, 1001, 1010, 1011, 2000, 2001, 2010, 2011 | 0 |
| 129 | PID proportional band | 0.1 to 1000%, 9999 | 100% |
| 130 | PID integral time | 0.1 to 3600 s, 9999 | 1 s |
| 131 | PID upper limit | 0 to 100%, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|---|---------------|
| 132 | PID lower limit | 0 to 100%, 9999 | 9999 |
| 133 | PID action set point | 0 to 100%, 9999 | 9999 |
| 134 | PID differential time | 0.01 to 10 s, 9999 | 9999 |
| 135 | Electronic bypass sequence selection | 0, 1 | 0 |
| 136 | MC switchover interlock time | 0 to 100 s | 1 s |
| 137 | Start waiting time | 0 to 100 s | 0.5 s |
| 138 | Bypass selection at a fault | 0, 1 | 0 |
| 139 | Automatic switchover frequency from inverter to bypass operation | 0 to 60 Hz, 8888, 9999 | 9999 |
| 140 | Backlash acceleration stopping frequency | 0 to 590 Hz | 1 Hz |
| 141 | Backlash acceleration stopping time | 0 to 360 s | 0.5 s |
| 142 | Backlash deceleration stopping frequency | 0 to 590 Hz | 1 Hz |
| 143 | Backlash deceleration stopping time | 0 to 360 s | 0.5 s |
| 144 | Speed setting switchover | 0, 2, 4, 6, 8, 10, 12, 102, 104, 106, 108, 110, 112 | 4 |
| 145 | PU display language selection | 0 to 7 | — |
| 147 | Acceleration/ deceleration time switching frequency | 0 to 590 Hz, 9999 | 9999 |
| 148 | Stall prevention level at 0V input | 0 to 400% | 110% |
| 149 | Stall prevention level at 10V input | 0 to 400% | 120% |
| 150 | Output current detection level | 0 to 400% | 110% |
| 151 | Output current detection signal delay time | 0 to 10s | 0s |
| 152 | Zero current detection level | 0 to 400% | 5% |
| 153 | Zero current detection time | 0 to 10 s | 0.5 s |
| 154 | Voltage reduction selection during stall prevention operation | 0, 1, 10, 11 | 1 |
| 155 | RT signal function validity condition selection | 0, 10 | 0 |
| 156 | Stall prevention operation selection | 0 to 31, 100, 101 | 0 |
| 157 | OL signal output timer | 0 to 25 s, 9999 | 0 s |
| 158 | AM terminal function selection | 1 to 3, 5 to 14, 17, 18, 21, 24, 34, 50, 52 to 54, 61, 62, 67, 69, 70, 86 to 96, 98 | 1 |
| 159 | Automatic switch-over frequency range from bypass to inverter operation | 0 to 10 Hz, 9999 | 9999 |
| 160 | User group read selection <i>Simple</i> | 0, 1, 9999 | 0 |

| Parameter | Name | Setting Range | Initial Value | Parameter | Name | Setting Range | Initial Value |
|------------|---|--|---------------|-----------|---|---|---------------|
| 161 | Frequency setting/key lock operation selection | 0, 1, 10, 11 | 0 | 190 | RUN terminal function selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 67 ^{*7} , 68, 70 to 80, 82, 85, 90 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 167 ^{*7} , 168, 170 to 180, 182, 185, 190 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 0 |
| 162 | Automatic restart after instantaneous power failure selection | 0 to 3, 10 to 13, 1000 to 1003, 1010 to 1013 | 0 | 191 | SU terminal function selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 67 ^{*7} , 68, 70 to 80, 82, 85, 90, 91, 94 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 167 ^{*7} , 168, 170 to 180, 182, 185, 190 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 1 |
| 163 | First cushion time for restart | 0 to 20 s | 0 s | 192 | IPF terminal function selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 67 ^{*7} , 68, 70 to 80, 82, 85, 90, 91, 94 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 167 ^{*7} , 168, 170 to 180, 182, 185, 190 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 2 |
| 164 | First cushion voltage for restart | 0 to 100% | 0% | 193 | OL terminal function selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 67 ^{*7} , 68, 70 to 80, 82, 85, 90, 91, 94 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 167 ^{*7} , 168, 170 to 180, 182, 185, 190 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 3 |
| 165 | Stall prevention operation level for restart | 0 to 400% | 110% | 194 | FU terminal function selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 67 ^{*7} , 68, 70 to 80, 82, 85, 90, 91, 94 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 167 ^{*7} , 168, 170 to 180, 182, 185, 190 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 4 |
| 166 | Output current detection signal retention time | 0 to 10 s, 9999 | 0.1 s | 195 | ABC1 terminal function selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 67 ^{*7} , 68, 70 to 80, 82, 85, 90, 91, 94 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 167 ^{*7} , 168, 170 to 180, 182, 185, 190, 191, 194 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242, 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 99 |
| 167 | Output current detection operation selection | 0, 1, 10, 11 | 0 | | | | |
| 168 | Parameter for manufacturer setting. | | | | | | |
| 169 | Do not set. | | | | | | |
| 170 | Watt-hour meter clear | 0, 10, 9999 | 9999 | | | | |
| 171 | Operation hour meter clear | 0, 9999 | 9999 | | | | |
| 172 | User group registered display/batch clear | 9999, (0 to 16) | 0 | | | | |
| 173 | User group registration | 0 to 1999, 9999 | 9999 | | | | |
| 174 | User group clear | 0 to 1999, 9999 | 9999 | | | | |
| 178 | STF terminal function selection | 0 to 8, 10 to 14, 16, 18, 24, 25, 28, 37 to 40, 46 to 48, 50, 51, 57, 58, 60, 62, 64 to 67, 70 to 73, 77 to 81, 84, 94 to 98, 9999 | 60 | | | | |
| 179 | STR terminal function selection | 0 to 8, 10 to 14, 16, 18, 24, 25, 28, 37 to 40, 46 to 48, 50, 51, 57, 58, 61, 62, 64 to 67, 70 to 73, 77 to 81, 84, 94 to 98, 9999 | 61 | | | | |
| 180 | RL terminal function selection | 0 to 8, 10 to 14, 16, 18, 24, 25, 28, 37 to 40, 46 to 48, 50, 51, 57, 58, 62, 64 to 67, 70 to 73, 77 to 81, 84, 94 to 98, 9999 | 0 | | | | |
| 181 | RM terminal function selection | | 1 | | | | |
| 182 | RH terminal function selection | | 2 | | | | |
| 183 | RT terminal function selection | | 3 | | | | |
| 184 | AU terminal function selection | | 4 | | | | |
| 185 | JOG terminal function selection | | 5 | | | | |
| 186 | CS terminal function selection | | 9999 | | | | |
| 187 | MRS terminal function selection | | 24 | | | | |
| 188 | STOP terminal function selection | | 25 | | | | |
| 189 | RES terminal function selection | | 62 | | | | |
| 232 to 239 | Multi-speed setting (speeds 8 to 15) | 0 to 590 Hz, 9999 | 9999 | 240 | Soft-PWM operation selection | 0, 1 | 1 |
| 241 | Analog input display unit switchover | 0, 1 | 0 | 242 | Terminal 1 added compensation amount (terminal 2) | 0 to 100% | 100% |
| 243 | Terminal 1 added compensation amount (terminal 4) | 0 to 100% | 75% | 244 | Cooling fan operation selection | 0, 1, 101 to 105 | 1 |
| 245 | Rated slip | 0 to 50%, 9999 | 9999 | 246 | Slip compensation time constant | 0.01 to 10 s | 0.5 s |
| 247 | Constant-power range slip compensation selection | 0, 9999 | 9999 | 248 | Self power management selection | 0 to 2 | 0 |

^{*7} This signal cannot be assigned to any of the output terminals for plug-in options (FR-A8AY and FR-A8AR).



| Parameter | Name | Setting Range | Initial Value |
|-----------|--|--|---------------|
| 249 | Earth (ground) fault detection at start | 0, 1 | 0 |
| 250 | Stop selection | 0 to 100 s, 1000 to 1100 s, 8888, 9999 | 9999 |
| 251 | Output phase loss protection selection | 0, 1 | 1 |
| 252 | Override bias | 0 to 200% | 50% |
| 253 | Override gain | 0 to 200% | 150% |
| 254 | Main circuit power OFF waiting time | 1 to 3600 s, 9999 | 600 s |
| 255 | Life alarm status display | (0 to 63) | 0 |
| 256 | Inrush current limit circuit life display | (0 to 100%) | 100% |
| 257 | Control circuit capacitor life display | (0 to 100%) | 100% |
| 258 | Main circuit capacitor life display | (0 to 100%) | 100% |
| 259 | Main circuit capacitor life measuring | 0, 1 | 0 |
| 260 | PWM frequency automatic switchover | 0, 1 | 1 |
| 261 | Power failure stop selection | 0 to 2, 11, 12, 21, 22 | 0 |
| 262 | Subtracted frequency at deceleration start | 0 to 20 Hz | 3 Hz |
| 263 | Subtraction starting frequency | 0 to 590 Hz, 9999 | 50 Hz |
| 264 | Power-failure deceleration time 1 | 0 to 3600 s | 5 s |
| 265 | Power-failure deceleration time 2 | 0 to 3600s, 9999 | 9999 |
| 266 | Power failure deceleration time switchover frequency | 0 to 590 Hz | 50 Hz |
| 267 | Terminal 4 input selection | 0 to 2 | 0 |
| 268 | Monitor decimal digits selection | 0, 1, 9999 | 9999 |
| 269 | Parameter for manufacturer setting. Do not set. | | |
| 289 | Inverter output terminal filter | 5 to 50 ms, 9999 | 9999 |
| 290 | Monitor negative output selection | 0 to 7 | 0 |
| 291 | Pulse train I/O selection | 0, 1 | 0 |
| 294 | UV avoidance voltage gain | 0 to 200% | 100% |
| 295 | Frequency change increment amount setting | 0, 0.01, 0.1, 1, 10 | 0 |
| 296 | Password lock level | 0 to 6, 99, 100 to 106, 199, 9999 | 9999 |
| 297 | Password lock/unlock | (0 to 5), 1000 to 9998, 9999 | 9999 |
| 298 | Frequency search gain | 0 to 32767, 9999 | 9999 |
| 299 | Rotation direction detection selection at restarting | 0, 1, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-------------------|--|--|---------------|
| 313 ^{*8} | DO0 output selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 68, 70 to 80, 85 to 96, 98 to 105, 107, 108, 110 to 116, 125, 126, 135, 139 to 142, 145 to 154, 157, 164 to 166, 168, 170 to 180, 185 to 196, 198 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 242, 300 to 308, 311 to 313, 315, 317 to 320, 326, 328 to 330, 342, 9999 | 9999 |
| 314 ^{*8} | DO1 output selection | | |
| 315 ^{*8} | DO2 output selection | | |
| 316 ^{*8} | DO3 output selection | | |
| 317 ^{*8} | DO4 output selection | | |
| 318 ^{*8} | DO5 output selection | | |
| 319 ^{*8} | DO6 output selection | | |
| 320 ^{*8} | RA1 output selection | 0 to 5, 7, 8, 10 to 19, 25, 26, 35, 39 to 42, 45 to 54, 57, 64 to 66, 68, 70 to 80, 85 to 91, 94 to 96, 98, 99, 200 to 208, 211 to 213, 215, 217 to 220, 226, 228 to 230, 9999 | 9999 |
| 321 ^{*8} | RA2 output selection | | |
| 322 ^{*8} | RA3 output selection | | |
| 338 | Communication operation command source | 0, 1 | 0 |
| 339 | Communication speed command source | 0 to 2 | 0 |
| 340 | Communication startup mode selection | 0 to 2, 10, 12 | 0 |
| 342 | Communication EEPROM write selection | 0, 1 | 0 |
| 349 | Communication reset selection | 0, 1, 100, 101 (1000, 1001, 1000, 1101) ^{*9} | 0 |
| 374 | Overspeed detection level | 0 to 590 Hz, 9999 | 9999 |
| 384 | Input pulse division scaling factor | 0 to 250 | 0 |
| 385 | Frequency for zero input pulse | 0 to 590 Hz | 0 |
| 386 | Frequency for maximum input pulse | 0 to 590 Hz | 50 Hz |
| 390 | % setting reference frequency | 1 to 590 Hz | 50 Hz |
| 414 | PLC function operation selection | 0 to 2, 11, 12 | 0 |
| 415 | Inverter operation lock mode setting | 0, 1 | 0 |
| 416 | Pre-scale function selection | 0 to 5 | 0 |
| 417 | Pre-scale setting value | 0 to 32767 | 1 |
| 450 | Second applied motor | 0, 1, 3 to 6, 13 to 16, 20, 23, 24, 40, 43, 44, 50, 53, 54, 70, 73, 74, 210, 213, 214, 240, 243, 244, 8090, 8093, 8094, 9090, 9093, 9094, 9999 | 9999 |

^{*8} The setting is available when the PLC function is enabled.

^{*9} Values in brackets available when the HMS network option is installed.

| Parameter | Name | Setting Range | Initial Value |
|-----------|--|---|---------------|
| 453 | Second motor capacity | 0.4 to 55 kW, 9999 * ² | 9999 |
| | | 0 to 3600 kW, 9999 * ³ | |
| 454 | Number of second motor poles | 2, 4, 6, 8, 10, 12, 9999 | 9999 |
| 455 | Second motor excitation current | 0 to 500 A, 9999 * ² | 9999 |
| | | 0 to 3600 A, 9999 * ³ | |
| 456 | Rated second motor voltage | 0 to 1000 V | 400 V |
| 457 | Rated second motor frequency | 10 to 400 Hz, 9999 | 9999 |
| 458 | Second motor constant (R1) | 0 to 50 Ω, 9999 * ² | 9999 |
| | | 0 to 400 mΩ, 9999 * ³ | |
| 459 | Second motor constant (R2) | 0 to 50 Ω, 9999 * ² | 9999 |
| | | 0 to 400 mΩ, 9999 * ³ | |
| 460 | Second motor constant(L1)/ d-axis inductance (Ld) | 0 to 6000 mH, 9999 * ² | 9999 |
| | | 0 to 400 mH, 9999 * ³ | |
| 461 | Second motor constant (L2)/ q-axis inductance (Lq) | 0 to 6000 mH, 9999 * ² | 9999 |
| | | 0 to 400 mH, 9999 * ³ | |
| 462 | Second motor constant (X) | 0 to 100%, 9999 | 9999 |
| 463 | Second motor auto tuning setting/status | 0, 1, 11, 101 | 0 |
| 495 | Remote output selection | 0, 1, 10, 11 | 0 |
| 496 | Remote output data 1 | 0 to 4095 | 0 |
| 497 | Remote output data 2 | 0 to 4095 | 0 |
| 498 | PLC function flash memory clear | 0, 9696 (0 to 9999) | 0 |
| 502 | Stop mode selection at communication error | 0 to 4 | 0 |
| 503 | Maintenance timer 1 | 0 (1 to 9998) | 0 |
| 504 | Maintenance timer 1 warning output set time | 0 to 9998, 9999 | 9999 |
| 505 | Speed setting reference | 1 to 590 Hz | 50 Hz |
| 506 | Display estimated main circuit capacitor residual life | 0 to 100% | 100% |
| 514 | Emergency drive dedicated retry waiting time | 0.1 to 600 s, 9999 | 9999 |
| 515 | Emergency drive dedicated retry count | 1 to 200, 9999 | 1 |
| 522 | Output stop frequency | 0 to 590 Hz, 9999 | 9999 |
| 523 | Emergency drive mode selection | 100, 111, 112, 121 to 124, 200, 211, 212, 221 to 224, 300, 311, 312, 321 to 324, 400, 411, 412, 421 to 424, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|---|------------------------|
| 524 | Emergency drive running speed | 0 to 590 Hz, 9999 | 9999 |
| 541 | Frequency command sign selection | 0, 1 | 0 |
| 544 | CC-Link extended setting | 0, 1, 12, 14, 18, 24, 28, 100, 112, 114, 118, 128 | 0 |
| 547 | USB communication station number | 0 to 31 | 0 |
| 548 | USB communication check time interval | 0 to 999.8 s, 9999 | 9999 |
| 550 | NET mode operation command source selection | 0, 1, 5, 9999 | 9999 |
| 551 | PU mode operation command source selection | 1 to 3, 5, 9999 | 9999 |
| 552 | Frequency jump range | 0 to 30 Hz, 9999 | 9999 |
| 553 | PID deviation limit | 0 to 100%, 9999 | 9999 |
| 554 | PID signal operation selection | 0 to 7, 10 to 17 | 0 |
| 555 | Current average time | 0.1 to 1 s | 1 s |
| 556 | Data output mask time | 0 to 20 s | 0 s |
| 557 | Current average value monitor signal output reference current | 0 to 500 A * ² | Inverter rated current |
| | | 0 to 3600 A * ³ | |
| 560 | Second frequency search gain | 0 to 32767, 9999 | 9999 |
| 561 | PTC thermistor protection level | 0.5 to 30 kΩ, 9999 | 9999 |
| 563 | Energization time carrying-over times | (0 to 65535) | 0 |
| 564 | Operating time carrying-over times | (0 to 65535) | 0 |
| 565 | Second motor excitation current break point | 0 to 400 Hz, 9999 | 9999 |
| 566 | Second motor excitation current low-speed scaling factor | 0 to 300% | 9999 |
| 569 | Second motor speed control gain | 0 to 200%, 9999 | 9999 |
| 571 | Holding time at a start | 0 to 10 s, 9999 | 9999 |
| 573 | 4 mA input check selection | 1 to 4, 9999 | 9999 |
| 574 | Second motor online auto tuning | 0, 1 | 0 |
| 575 | Output interruption detection time | 0 to 3600 s, 9999 | 1 s |
| 576 | Output interruption detection level | 0 to 590 Hz | 0 Hz |
| 577 | Output interruption cancel level | 900 to 1100% | 1000% |
| 578 | Auxiliary motor operation selection | 0 to 3 | 0 |
| 579 | Motor connection function selection | 0 to 3 | 0 |
| 580 | MC switching interlock time (multi-pump) | 0 to 100 s | 1 s |
| 581 | Start waiting time (multi-pump) | 0 to 100 s | 1 s |

*² For FR-F846-01160(55K) or lower

*³ For FR-F846-01800(75K) or higher



| Parameter | Name | Setting Range | Initial Value |
|-----------|--|-----------------------|---------------|
| 582 | Auxiliary motor connection-time deceleration time | 0 to 3600 s, 9999 | 1 s |
| 583 | Auxiliary motor disconnection-time acceleration time | 0 to 3600 s, 9999 | 1 s |
| 584 | Auxiliary motor 1 starting frequency | 0 to 590 Hz | 50 Hz |
| 585 | Auxiliary motor 2 starting frequency | 0 to 590 Hz | 50 Hz |
| 586 | Auxiliary motor 3 starting frequency | 0 to 590 Hz | 50 Hz |
| 587 | Auxiliary motor 1 stopping frequency | 0 to 590 Hz | 0 Hz |
| 588 | Auxiliary motor 2 stopping frequency | 0 to 590 Hz | 0 Hz |
| 589 | Auxiliary motor 3 stopping frequency | 0 to 590 Hz | 0 Hz |
| 590 | Auxiliary motor start detection time | 0 to 3600 s | 5 s |
| 591 | Auxiliary motor stop detection time | 0 to 3600 s | 5 s |
| 592 | Traverse function selection | 0 to 2 | 0 |
| 593 | Maximum amplitude amount | 0 to 25% | 10% |
| 594 | Amplitude compensation amount during deceleration | 0 to 50% | 10% |
| 595 | Amplitude compensation amount during acceleration | 0 to 50% | 10% |
| 596 | Amplitude acceleration time | 0.1 to 3600 s | 5 s |
| 597 | Amplitude deceleration time | 0.1 to 3600 s | 5 s |
| 598 | Undervoltage level | 350 to 430 V DC, 9999 | 9999 |
| 599 | X10 terminal input selection | 0, 1 | 0 |
| 600 | First free thermal reduction frequency 1 | 0 to 590 Hz, 9999 | 9999 |
| 601 | First free thermal reduction ratio 1 | 1 to 100% | 100% |
| 602 | First free thermal reduction frequency 2 | 0 to 590 Hz, 9999 | 9999 |
| 603 | First free thermal reduction ratio 2 | 1 to 100% | 100% |
| 604 | First free thermal reduction frequency 3 | 0 to 590 Hz, 9999 | 9999 |
| 606 | Power failure stop external signal input selection | 0, 1 | 1 |
| 607 | Motor permissible load level | 110 to 250% | 150% |
| 608 | Second motor permissible load level | 110 to 250%, 9999 | 9999 |
| 609 | PID set point/ deviation input selection | 1 to 5 | 2 |
| 610 | PID measured value input selection | 1 to 5, 101 to 105 | 3 |
| 611 | Acceleration time at a restart | 0 to 3600s, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|--|-------------------|---------------|
| 617 | Reverse rotation excitation current low-speed scaling factor | 0 to 300%, 9999 | 9999 |
| 653 | Speed smoothing control | 0 to 200% | 0% |
| 654 | Speed smoothing cutoff frequency | 0 to 120 Hz | 20 Hz |
| 655 | Analog remote output selection | 0, 1, 10, 11 | 0 |
| 656 | Analog remote output 1 | 800 to 1200% | 1000% |
| 657 | Analog remote output 2 | 800 to 1200% | 1000% |
| 658 | Analog remote output 3 | 800 to 1200% | 1000% |
| 659 | Analog remote output 4 | 800 to 1200% | 1000% |
| 660 | Increased magnetic excitation deceleration operation selection | 0, 1 | 0 |
| 661 | Magnetic excitation increase rate | 0 to 40%, 9999 | 9999 |
| 662 | Increased magnetic excitation current level | 0 to 300% | 100% |
| 663 | Control circuit temperature signal output level | 0 to 100 °C | 0 °C |
| 665 | Regeneration avoidance frequency gain | 0 to 200% | 100% |
| 668 | Power failure stop frequency gain | 0 to 200% | 100% |
| 673 | SF-PR slip amount adjustment operation selection | 2 to 4, 6, 9999 | 9999 |
| 674 | SF-PR slip amount adjustment gain | 0 to 500% | 100% |
| 675 | User parameter auto storage function selection | 1, 9999 | 9999 |
| 684 | Tuning data unit switchover | 0, 1 | 0 |
| 686 | Maintenance timer 2 | 0 (1 to 9998) | 0 |
| 687 | Maintenance timer 2 warning output set time | 0 to 9998, 9999 | 9999 |
| 688 | Maintenance timer 3 | 0 (1 to 9998) | 0 |
| 689 | Maintenance timer 3 warning output set time | 0 to 9998, 9999 | 9999 |
| 692 | Second free thermal reduction frequency 1 | 0 to 590 Hz, 9999 | 9999 |
| 693 | Second free thermal reduction ratio 1 | 1 to 100% | 100% |
| 694 | Second free thermal reduction frequency 2 | 0 to 590 Hz, 9999 | 9999 |
| 695 | Second free thermal reduction ratio 2 | 1 to 100% | 100% |
| 696 | Second free thermal reduction frequency 3 | 0 to 590 Hz, 9999 | 9999 |
| 699 | Input terminal filter | 5 to 50 ms, 9999 | 9999 |
| 702 | Maximum motor frequency | 0 to 400 Hz, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|---|---------------|
| 706 | Induced voltage constant (phi f) | 0 to 5000 mV/(rad/s), 9999 | 9999 |
| 707 | Motor inertia (integer) | 10 to 999, 9999 | 9999 |
| 711 | Motor Ld decay ratio | 0 to 100%, 9999 | 9999 |
| 712 | Motor Lq decay ratio | 0 to 100%, 9999 | 9999 |
| 717 | Starting resistance tuning compensation | 0 to 200%, 9999 | 9999 |
| 721 | Starting magnetic pole position detection pulse width | 0 to 6000 μ s, 10000 to 16000 μ s, 9999 | 9999 |
| 724 | Motor inertia (exponent) | 0 to 7, 9999 | 9999 |
| 725 | Motor protection current level | 100 to 500%, 9999 | 9999 |
| 726 | Auto Baudrate/Max Master | 0 to 255 | 255 |
| 727 | Max Info Frames | 1 to 255 | 1 |
| 728 | Device instance number (Upper 3 digits) | 0 to 419 (0 to 418) | 0 |
| 729 | Device instance number (Lower 4 digits) | 0 to 9999 (0 to 4302) | 0 |
| 738 | Second motor induced voltage constant (phi f) | 0 to 5000 mV/(rad/s), 9999 | 9999 |
| 739 | Second motor Ld decay ratio | 0 to 100%, 9999 | 9999 |
| 740 | Second motor Lq decay ratio | 0 to 100%, 9999 | 9999 |
| 741 | Second starting resistance tuning compensation | 0 to 200%, 9999 | 9999 |
| 742 | Second motor magnetic pole position detection pulse width | 0 to 6000 μ s, 10000 to 16000 μ s, 9999 | 9999 |
| 743 | Second motor maximum frequency | 0 to 400 Hz, 9999 | 9999 |
| 744 | Second motor inertia (integer) | 10 to 999, 9999 | 9999 |
| 745 | Second motor inertia (exponent) | 0 to 7, 9999 | 9999 |
| 746 | Second motor protection current level | 100 to 500%, 9999 | 9999 |
| 753 | Second PID action selection | 0, 10, 11, 20, 21, 50, 51, 60, 61, 70, 71, 80, 81, 90, 91, 100, 101, 1000, 1001, 1010, 1011, 2000, 2001, 2010, 2011 | 0 |
| 754 | Second PID control automatic switch-over frequency | 0 to 590 Hz, 9999 | 9999 |
| 755 | Second PID action set point | 0 to 100%, 9999 | 9999 |
| 756 | Second PID proportional band | 0.1 to 1000%, 9999 | 100 % |
| 757 | Second PID integral time | 0.1 to 3600 s, 9999 | 1 s |
| 758 | Second PID differential time | 0.01 to 10 s, 9999 | 9999 |
| 759 | PID unit selection | 0 to 43, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|--|---------------|
| 760 | Pre-charge fault selection | 0, 1 | 0 |
| 761 | Pre-charge ending level | 0 to 100%, 9999 | 9999 |
| 762 | Pre-charge ending time | 0 to 3600 s, 9999 | 9999 |
| 763 | Pre-charge upper detection level | 0 to 100%, 9999 | 9999 |
| 764 | Pre-charge time limit | 0 to 3600 s, 9999 | 9999 |
| 765 | Second pre-charge fault selection | 0, 1 | 0 |
| 766 | Second pre-charge ending level | 0 to 100%, 9999 | 9999 |
| 767 | Second pre-charge ending time | 0 to 3600 s, 9999 | 9999 |
| 768 | Second pre-charge upper detection level | 0 to 100%, 9999 | 9999 |
| 769 | Second pre-charge time limit | 0 to 3600 s, 9999 | 9999 |
| 774 | Operation panel monitor selection 1 | 1 to 3, 5 to 14, 17, 18, 20, 23 to 25, 34, 38, 40 to 45, 50 to 57, 61, 62, 64, 67 to 69, 81 to 96, 98, 100, 9999 | 9999 |
| 775 | Operation panel monitor selection 2 | | 9999 |
| 776 | Operation panel monitor selection 3 | | 9999 |
| 777 | 4 mA input fault operation frequency | 0 to 590 Hz, 9999 | 9999 |
| 778 | 4 mA input check filter | 0 to 10 s | 0 s |
| 779 | Operation frequency during communication error | 0 to 590 Hz, 9999 | 9999 |
| 791 | Acceleration time in low-speed range | 0 to 3600 s, 9999 | 9999 |
| 792 | Deceleration time in low-speed range | 0 to 3600s, 9999 | 9999 |
| 799 | Pulse increment setting for output power | 0.1, 1, 10, 100, 1000 kWh | 1 kWh |
| 800 | Control method selection | 9, 20, 109, 110 | 20 |
| 820 | Speed control P gain 1 | 0 to 1000% | 25% |
| 821 | Speed control integral time 1 | 0 to 20 s | 0.333 s |
| 822 | Speed setting filter 1 | 0 to 5 s, 9999 | 9999 |
| 824 | Torque control P gain 1 (current loop proportional gain) | 0 to 500% | 50% |
| 825 | Torque control integral time 1 (current loop integral time) | 0 to 500 ms | 40 ms |
| 827 | Torque detection filter 1 | 0 to 0.1 s | 0 s |
| 828 | Parameter for manufacturer setting. Do not set. | | |
| 830 | Speed control P gain 2 | 0 to 1000%, 9999 | 9999 |
| 831 | Speed control integral time 2 | 0 to 20 s, 9999 | 9999 |
| 832 | Speed setting filter 2 | 0 to 5 s, 9999 | 9999 |
| 834 | Torque control P gain 2 (current loop proportional gain) | 0 to 500%, 9999 | 9999 |



| Parameter | Name | Setting Range | Initial Value |
|-----------|--|---|------------------------|
| 835 | Torque control integral time 2 (current loop integral time) | 0 to 500 ms, 9999 | 9999 |
| 837 | Torque detection filter 2 | 0 to 0.1 s, 9999 | 9999 |
| 849 | Analog input offset adjustment | 0 to 200% | 100% |
| 858 | Terminal 4 function assignment | 0, 4, 9999 | 0 |
| 859 | Torque current/Rated PM motor current | 0 to 500 A, 9999 ^{*2} 0 to 3600 A, 9999 ^{*3} | 9999 |
| 860 | Second motor torque current/Rated PM motor current | 0 to 500 A, 9999 ^{*2} 0 to 3600 A, 9999 ^{*3} | 9999 |
| 864 | Torque detection | 0 to 400% | 150% |
| 866 | Torque monitoring reference | 0 to 400% | 150% |
| 867 | AM output filter | 0 to 5 s | 0.01 s |
| 868 | Terminal 1 function assignment | 0, 4, 9999 | 0 |
| 869 | Current output filter | 0 to 5 s | 0.02 s |
| 870 | Speed detection hysteresis | 0 to 5 Hz | 0 Hz |
| 872 | Input phase loss protection selection | 0, 1 | 0 |
| 874 | OLT level setting | 0 to 400% | 110% |
| 882 | Regeneration avoidance operation selection | 0 to 2 | 0 |
| 883 | Regeneration avoidance operation level | 300 to 1200 V | 760 V DC |
| 884 | Regeneration avoidance at deceleration detection sensitivity | 0 to 5 | 0 |
| 885 | Regeneration avoidance compensation frequency limit value | 0 to 590 Hz, 9999 | 6 Hz |
| 886 | Regeneration avoidance voltage gain | 0 to 200% | 100% |
| 888 | Free parameter 1 | 0 to 9999 | 9999 |
| 889 | Free parameter 2 | 0 to 9999 | 9999 |
| 891 | Cumulative power monitor digit shifted times | 0 to 4, 9999 | 9999 |
| 892 | Load factor | 30 to 150% | 100% |
| 893 | Energy saving monitor reference (motor capacity) | 0.1 to 55 kW ^{*2} 0 to 3600 kW ^{*3} | Inverter rated current |
| 894 | Control selection during commercial power-supply operation | 0 to 3 | 0 |
| 895 | Power saving rate reference value | 0, 1, 9999 | 9999 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|-------------------|---------------|
| 896 | Power unit cost | 0 to 500, 9999 | 9999 |
| 897 | Power saving monitor average time | 0 to 1000 h, 9999 | 9999 |
| 898 | Power saving cumulative monitor clear | 0, 1, 10, 9999 | 9999 |
| 899 | Operation time rate (estimated value) | 0 to 100%, 9999 | 9999 |
| 900 | FM/CA terminal calibration | — | — |
| 901 | AM terminal calibration | — | — |
| 902 | Terminal 2 frequency setting bias frequency | 0 to 590 Hz | 0 Hz |
| 902 | Terminal 2 frequency setting bias | 0 to 300% | 0% |
| 903 | Terminal 2 frequency setting gain frequency | 0 to 590 Hz | 50 Hz |
| 903 | Terminal 2 frequency setting gain | 0 to 300% | 100% |
| 904 | Terminal 4 frequency setting bias frequency | 0 to 590 Hz | 0 Hz |
| 904 | Terminal 4 frequency setting bias | 0 to 300% | 20% |
| 905 | Terminal 4 frequency setting gain frequency | 0 to 590 Hz | 50 Hz |
| 905 | Terminal 4 frequency setting gain | 0 to 300% | 100% |
| 917 | Terminal 1 bias frequency (speed) | 0 to 590 Hz | 0 Hz |
| 917 | Terminal 1 bias (speed) | 0 to 300% | 0% |
| 918 | Terminal 1 gain frequency (speed) | 0 to 590 Hz | 50 Hz |
| 918 | Terminal 1 gain (speed) | 0 to 300% | 100% |
| 919 | Terminal 1 bias command (torque) | 0 to 400% | 0% |
| 919 | Terminal 1 bias (torque) | 0 to 300% | 0% |
| 920 | Terminal 1 gain command (torque) | 0 to 400% | 150% |
| 920 | Terminal 1 gain (torque) | 0 to 300% | 100% |
| 930 | Current output bias signal | 0 to 100% | 0% |
| 930 | Current output bias current | 0 to 100% | 0% |
| 931 | Current output gain signal | 0 to 100% | 100% |
| 931 | Current output gain current | 0 to 100% | 100% |
| 932 | Terminal 4 bias command (torque) | 0 to 400% | 0% |
| 932 | Terminal 4 bias (torque) | 0 to 300% | 20% |
| 933 | Terminal 4 gain command (torque) | 0 to 400% | 150% |
| 933 | Terminal 4 gain (torque) | 0 to 300% | 100% |
| 934 | PID display bias coefficient | 0 to 500, 9999 | 9999 |
| 934 | PID display bias analog value | 0 to 300% | 20% |

^{*2} For FR-F846-01160(55K) or lower

^{*3} For FR-F846-01800(75K) or higher

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|---|-------------------|
| 935 | PID display gain coefficient | 0 to 500, 9999 | 9999 |
| 935 | PID display gain analog value | 0 to 300% | 100% |
| 977 | Input voltage mode selection | 0 to 2 | 0 |
| 989 | Parameter copy alarm release | 10 ^{*2} | 10 ^{*2} |
| | | 100 ^{*3} | 100 ^{*3} |
| 990 | PU buzzer control | 0, 1 | 1 |
| 991 | PU contrast adjustment | 0 to 63 | 58 |
| 992 | Operation panel setting dial push monitor selection | 0 to 3, 5 to 14, 17, 18, 20, 23 to 25, 34, 38, 40 to 45, 50 to 57, 61, 62, 64, 67 to 69, 81 to 96, 98, 100 | 0 |
| 997 | Fault initiation | 0 to 255, 9999 | 9999 |
| 998 | PM parameter initialization <i>Simple</i> | 0, 8009, 8109, 9009, 9109 | 0 |
| 999 | Automatic parameter setting <i>Simple</i> | 1, 2, 10 to 13, 20, 21, 9999 | 9999 |
| 1000 | Direct setting selection | 0 to 2 | 0 |
| 1002 | Lq tuning target current adjustment coefficient | 50 to 150%, 9999 | 9999 |
| 1006 | Clock (year) | 2000 to 2099 | 2000 |
| 1007 | Clock (month, day) | 101 to 131, 201 to 229, 301 to 331, 401 to 430, 501 to 531, 601 to 630, 701 to 731, 801 to 831, 901 to 930, 1001 to 1031, 1101 to 1130, 1201 to 1231 | 101 |
| 1008 | Clock (hour, minute) | 0 to 59, 100 to 159, 200 to 259, 300 to 359, 400 to 459, 500 to 559, 600 to 659, 700 to 759, 800 to 859, 900 to 959, 1000 to 1059, 1100 to 1159, 1200 to 1259, 1300 to 1359, 1400 to 1459, 1500 to 1559, 1600 to 1659, 1700 to 1759, 1800 to 1859, 1900 to 1959, 2000 to 2059, 2100 to 2159, 2200 to 2259, 2300 to 2359 | 0 |
| 1013 | Emergency drive running speed after retry reset | 0 to 590 Hz | 50 Hz |
| 1015 | Integral stop selection at limited frequency | 0 to 2, 10 to 12 | 0 |
| 1016 | PTC thermistor protection detection time | 0 to 60 s | 0 s |

^{*2} For FR-F846-01160(55K) or lower

^{*3} For FR-F846-01800(75K) or higher

| Parameter | Name | Setting Range | Initial Value |
|-----------|-------------------------------------|---|---------------|
| 1018 | Monitor with sign selection | 0, 1, 9999 | 9999 |
| 1020 | Trace operation selection | 0 to 4 | 0 |
| 1021 | Trace mode selection | 0 to 2 | 0 |
| 1022 | Sampling cycle | 0 to 9 | 2 |
| 1023 | Number of analog channels | 1 to 8 | 4 |
| 1024 | Sampling auto start | 0, 1 | 0 |
| 1025 | Trigger mode selection | 0 to 4 | 0 |
| 1026 | Number of sampling before trigger | 0 to 100% | 90% |
| 1027 | Analog source selection (1ch) | 1 to 3, 5 to 14, 17, 18, 20, 23, 24, 34, 40 to 42, 52 to 54, 61, 62, 64, 67 to 69, 81 to 96, 98, 201 to 213, 230 to 232, 237, 238 | 201 |
| 1028 | Analog source selection (2ch) | | 202 |
| 1029 | Analog source selection (3ch) | | 203 |
| 1030 | Analog source selection (4ch) | | 204 |
| 1031 | Analog source selection (5ch) | | 205 |
| 1032 | Analog source selection (6ch) | | 206 |
| 1033 | Analog source selection (7ch) | | 207 |
| 1034 | Analog source selection (8ch) | | 208 |
| 1035 | Analog trigger channel | 1 to 8 | 1 |
| 1036 | Analog trigger operation selection | 0, 1 | 0 |
| 1037 | Analog trigger level | 600 to 1400 | 1000 |
| 1038 | Digital source selection (1ch) | 1 to 255 | 1 |
| 1039 | Digital source selection (2ch) | | 2 |
| 1040 | Digital source selection (3ch) | | 3 |
| 1041 | Digital source selection (4ch) | | 4 |
| 1042 | Digital source selection (5ch) | | 5 |
| 1043 | Digital source selection (6ch) | | 6 |
| 1044 | Digital source selection (7ch) | | 7 |
| 1045 | Digital source selection (8ch) | | 8 |
| 1046 | Digital trigger channel | 1 to 8 | 1 |
| 1047 | Digital trigger operation selection | 0, 1 | 0 |
| 1048 | Display-off waiting time | 0 to 60 min | 0 min |
| 1049 | USB host reset | 0, 1 | 0 |
| 1106 | Torque monitor filter | 0 to 5 s, 9999 | 9999 |
| 1107 | Running speed monitor filter | 0 to 5 s, 9999 | 9999 |
| 1108 | Excitation current monitor filter | 0 to 5 s, 9999 | 9999 |



| Parameter | Name | Setting Range | Initial Value |
|--------------|---|---|---------------|
| 1124 | Station number in inverter-to-inverter link | 0 to 5, 9999 | 9999 |
| 1125 | Number of inverters in inverter-to-inverter link system | 2 to 6 | 2 |
| 1132 | Pre-charge change increment amount | 0 to 100%, 9999 | 9999 |
| 1133 | Second pre-charge change increment amount | 0 to 100%, 9999 | 9999 |
| 1136 | Second PID display bias coefficient | 0 to 500, 9999 | 9999 |
| 1137 | Second PID display bias analog value | 0 to 300% | 20% |
| 1138 | Second PID display gain coefficient | 0 to 500, 9999 | 9999 |
| 1139 | Second PID display gain analog value | 0 to 300% | 100% |
| 1140 | Second PID set point/deviation input selection | 1 to 5 | 2 |
| 1141 | Second PID measured value input selection | 1 to 5, 101 to 105 | 3 |
| 1142 | Second PID unit selection | 0 to 43, 9999 | 9999 |
| 1143 | Second PID upper limit | 0 to 100%, 9999 | 9999 |
| 1144 | Second PID lower limit | 0 to 100%, 9999 | 9999 |
| 1145 | Second PID deviation limit | 0 to 100%, 9999 | 9999 |
| 1146 | Second PID signal operation selection | 0 to 7, 10 to 17 | 0 |
| 1147 | Second output interruption detection time | 0 to 3600 s, 9999 | 1 s |
| 1148 | Second output interruption detection level | 0 to 590 Hz | 0 Hz |
| 1149 | Second output interruption cancel level | 900 to 1100% | 1000% |
| 1150 to 1199 | PLC function user parameters 1 to 50 | 0 to 65535 | 0 |
| 1211 | PID gain tuning timeout time | 1 to 9999 s | 100 s |
| 1212 | Step manipulated amount | 900 to 1100% | 1000% |
| 1213 | Step responding sampling cycle | 0.01 to 600 s | 1 s |
| 1214 | Timeout time after the maximum slope | 1 to 9999 s | 10 s |
| 1215 | Limit cycle output upper limit | 900 to 1100% | 1100% |
| 1216 | Limit cycle output lower limit | 900 to 1100% | 1000% |
| 1217 | Limit cycle hysteresis | 0.1 to 10% | 1% |
| 1218 | PID gain tuning setting | 0, 100 to 102, 111, 112, 121, 122, 200 to 202, 211, 212, 221, 222 | 0 |
| 1219 | PID gain tuning start/status | (0), 1, 8, (9, 90 to 96) | 0 |

| Parameter | Name | Setting Range | Initial Value | |
|--------------|--|------------------------------------|----------------|------|
| 1300 to 1343 | Communication option parameters | | | |
| 1350 to 1359 | | | | |
| 1361 | | Detection time for PID output hold | 0 to 900 s | 5 s |
| 1362 | | PID output hold range | 0 to 50%, 9999 | 9999 |
| 1363 | PID priming time | 0 to 360 s, 9999 | 9999 | |
| 1364 | Stirring time during sleep | 0 to 3600 s | 15 s | |
| 1365 | Stirring interval time | 0 to 1000 h | 0 h | |
| 1366 | Sleep boost level | 0 to 100%, 9999 | 9999 | |
| 1367 | Sleep boost waiting time | 0 to 360 s | 0 s | |
| 1368 | Output interruption cancel time | 0 to 360 s | 0 s | |
| 1369 | Check valve closing completion frequency | 0 to 120 Hz, 9999 | 9999 | |
| 1370 | Detection time for PID limiting operation | 0 to 900 s | 0 s | |
| 1371 | PID upper/lower limit prewarning level range | 0 to 50%, 9999 | 9999 | |
| 1372 | PID measured value control set point change amount | 0 to 50% | 5% | |
| 1373 | PID measured value control set point change rate | 0 to 100% | 0% | |
| 1374 | Auxiliary pressure pump operation starting level | 900 to 1100% | 1000% | |
| 1375 | Auxiliary pressure pump operation stopping level | 900 to 1100% | 1000% | |
| 1376 | Auxiliary motor stopping level | 0 to 100%, 9999 | 9999 | |
| 1377 | PID input pressure selection | 1 to 3, 9999 | 9999 | |
| 1378 | PID input pressure warning level | 0 to 100% | 20% | |
| 1379 | PID input pressure fault level | 0 to 100%, 9999 | 9999 | |
| 1380 | PID input pressure warning set point change amount | 0 to 100% | 5% | |
| 1381 | PID input pressure fault operation selection | 0, 1 | 0 | |
| 1410 | Starting times lower 4 digits | 0 to 9999 | 0 | |
| 1411 | Starting times upper 4 digits | 0 to 9999 | 0 | |
| 1412 | Motor induced voltage constant (phi f) exponent | 0 to 2, 9999 | 9999 | |
| 1413 | Second motor induced voltage constant (phi f) exponent | 0 to 2, 9999 | 9999 | |
| 1424 | Ethernet communication network number | 1 to 239 | 1 | |

| Parameter | Name | Setting Range | Initial Value |
|-----------|---|---|---------------|
| 1425 | Ethernet communication station number | 1 to 120 | 1 |
| 1426 | Link speed and duplex mode selection | 0 to 4 | 0 |
| 1427 | Ethernet function selection 1 | 502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 45237, 61450 | 5001 |
| 1428 | Ethernet function selection 2 | 502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 45237, 61450 | 45237 |
| 1429 | Ethernet function selection 3 | 502, 5000 to 5002, 5006 to 5008, 5010 to 5013, 9999, 45237, 61450 | 9999 |
| 1431 | Ethernet signal loss detection function selection | 0 to 3 | 0 |
| 1432 | Ethernet communication check time interval | 0 to 999.8 s, 9999 | 9999 |
| 1434 | Ethernet IP address 1 | 0 to 255 | 192 |
| 1435 | Ethernet IP address 2 | 0 to 255 | 168 |
| 1436 | Ethernet IP address 3 | 0 to 255 | 50 |
| 1437 | Ethernet IP address 4 | 0 to 255 | 1 |
| 1438 | Subnet mask 1 | 0 to 255 | 255 |
| 1439 | Subnet mask 2 | 0 to 255 | 255 |
| 1440 | Subnet mask 3 | 0 to 255 | 255 |
| 1441 | Subnet mask 4 | 0 to 255 | 0 |
| 1442 | Ethernet IP filter address 1 | 0 to 255 | 0 |
| 1443 | Ethernet IP filter address 2 | 0 to 255 | 0 |
| 1444 | Ethernet IP filter address 3 | 0 to 255 | 0 |
| 1445 | Ethernet IP filter address 4 | 0 to 255 | 0 |
| 1446 | Ethernet IP filter address 2 range specification | 0 to 255, 9999 | 9999 |
| 1447 | Ethernet IP filter address 3 range specification | 0 to 255, 9999 | 9999 |
| 1448 | Ethernet IP filter address 4 range specification | 0 to 255, 9999 | 9999 |
| 1449 | Ethernet command source selection IP address 1 | 0 to 255 | 0 |
| 1450 | Ethernet command source selection IP address 2 | 0 to 255 | 0 |
| 1451 | Ethernet command source selection IP address 3 | 0 to 255 | 0 |
| 1452 | Ethernet command source selection IP address 4 | 0 to 255 | 0 |

| Parameter | Name | Setting Range | Initial Value |
|-----------|--|--------------------------|---------------|
| 1453 | Ethernet command source selection IP address 3 range specification | 0 to 255, 9999 | 9999 |
| 1454 | Ethernet command source selection IP address 4 range specification | 0 to 255, 9999 | 9999 |
| 1455 | Keepalive time | 1 to 7200 s | 3600 s |
| 1460 | PID multistage set point 1 | 0 to 100%, 9999 | 9999 |
| 1461 | PID multistage set point 2 | | 9999 |
| 1462 | PID multistage set point 3 | | 9999 |
| 1463 | PID multistage set point 4 | | 9999 |
| 1464 | PID multistage set point 5 | | 9999 |
| 1465 | PID multistage set point 6 | | 9999 |
| 1466 | PID multistage set point 7 | | 9999 |
| 1469 | Number of cleaning times monitor | 0 to 255 | 0 |
| 1470 | Number of cleaning times setting | 0 to 255 | 0 |
| 1471 | Cleaning trigger selection | 0 to 15 | 0 |
| 1472 | Cleaning reverse rotation frequency | 0 to 590 Hz | 30 Hz |
| 1473 | Cleaning reverse rotation operation time | 0 to 3600 s | 5 s |
| 1474 | Cleaning forward rotation frequency | 0 to 590 Hz, 9999 | 9999 |
| 1475 | Cleaning forward rotation operation time | 0 to 3600 s, 9999 | 9999 |
| 1476 | Cleaning stop time | 0 to 3600 s | 5 s |
| 1477 | Cleaning acceleration time | 0 to 3600 s, 9999 | 9999 |
| 1478 | Cleaning deceleration time | 0 to 3600 s, 9999 | 9999 |
| 1479 | Cleaning time trigger | 0 to 6000 h | 0 h |
| 1480 | Load characteristics measurement mode | 0, 1, (2 to 5, 81 to 85) | 0 |
| 1481 | Load characteristics load reference 1 | 0 to 400%, 8888, 9999 | 9999 |
| 1482 | Load characteristics load reference 2 | 0 to 400%, 8888, 9999 | 9999 |
| 1483 | Load characteristics load reference 3 | 0 to 400%, 8888, 9999 | 9999 |
| 1484 | Load characteristics load reference 4 | 0 to 400%, 8888, 9999 | 9999 |
| 1485 | Load characteristics load reference 5 | 0 to 400%, 8888, 9999 | 9999 |
| 1486 | Load characteristics maximum frequency | 0 to 590 Hz | 50 Hz |
| 1487 | Load characteristics minimum frequency | 0 to 590 Hz | 6 Hz |
| 1488 | Upper limit warning detection width | 0 to 400%, 9999 | 20% |



| Parameter | Name | Setting Range | Initial Value |
|-----------|---|-----------------|---------------|
| 1489 | Lower limit warning detection width | 0 to 400%, 9999 | 20% |
| 1490 | Upper limit fault detection width | 0 to 400%, 9999 | 9999 |
| 1491 | Lower limit fault detection width | 0 to 400%, 9999 | 9999 |
| 1492 | Load status detection signal delay time / load reference measurement waiting time | 0 to 60 s | 1 s |

| Parameter | Name | Setting Range | Initial Value |
|-----------|-----------------------------|---------------|---------------|
| Pr.CLR | Parameter clear | (0,) 1 | 0 |
| ALL.CL | All parameter clear | (0,) 1 | 0 |
| Err.CL | Fault history clear | (0,) 1 | 0 |
| Pr.CPY | Parameter copy | (0,) 1 to 3 | 0 |
| Pr.CHG | Initial value change list | — | — |
| IPM | IPM initialization | 0, 12, 14 | 0 |
| AUTO | Automatic parameter setting | — | — |
| Pr.MD | Group parameter setting | (0,) 1, 2 | 0 |

6 TROUBLESHOOTING

6.1 Inverter fault and alarm indications

- When the inverter detects a fault, depending on the nature of the fault, the operation panel displays an error message or warning, or a protective function activates to trip the inverter.
- When any fault occurs, take an appropriate corrective action, then reset the inverter, and resume the operation. Restarting the operation without a reset may break or damage the inverter.
- When a protective function activates, note the following points.

| Item | Description |
|---------------------------|---|
| Fault output signal | Opening the magnetic contactor (MC) provided on the input side of the inverter at a fault occurrence shuts off the control power to the inverter, therefore, the fault output will not be retained. |
| Fault or alarm indication | When a protective function activates, the operation panel displays a fault indication. |
| Operation restart method | While a protective function is activated, the inverter output is kept shutoff. Reset the inverter to restart the operation. |

- Inverter fault or alarm indications are categorized as below.

| Item | Description |
|---------------|---|
| Error message | A message regarding an operational fault and setting fault by the operation panel and the parameter unit. The inverter does not trip. |
| Warning | The inverter does not trip even when a warning. However, failure to take appropriate measures will lead to a fault. |
| Alarm | The inverter does not trip. An Alarm (LF) signal can be output with a parameter setting. |
| Fault | A protective function activates to trip the inverter and output a Fault (ALM) signal. |

NOTES

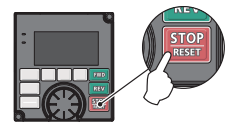
- For the details of fault displays and other malfunctions, also refer to the FR-F800 Instruction Manual (Detailed).
- Past eight faults can be displayed using the setting dial. (Refer to *page 19*.)

6.2 Reset method of protective function

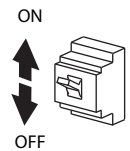
The inverter can be reset by performing any of the following operations. Note that the internal thermal integrated value of the electronic thermal relay function and the number of retries are cleared (erased) by resetting the inverter. Inverter recovers about 1s after reset is released.

Three different methods can be used to reset an inverter.

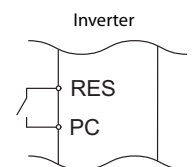
- Using the operation panel, press the STOP/RESET key to reset the inverter. (This may only be performed when a fault occurs.)



- Switch OFF the power once, then switch it ON again.



- Turn ON the reset signal (RES) for more than 0.1s. (If the RES signal is kept ON, "Err" appears (blinks) to indicate that the inverter is in a reset status.)



CAUTION

OFF status of the start signal must be confirmed before resetting the inverter fault. Resetting inverter fault with the start signal ON restarts the motor suddenly. This may cause injury.



6.3 List of fault displays

| | Operation panel indication | Name | Data code |
|---------------|----------------------------|--|--------------------------------------|
| Error message | LOCD | Password locked | — |
| | Er1 to Er4 Er8 | Parameter write error | — |
| | rE1 to rE4 rE6 to rE8 | Copy operation error | — |
| | Err. | Error | — |
| Warning | OL | Stall prevention (overcurrent) | — |
| | oL | Stall prevention (overvoltage) | — |
| | TH | Electronic thermal relay function pre-alarm | — |
| | PS | PU Stop | — |
| | MT1 to MT3 | Maintenance signal output | — |
| | CF | Continuous operation during communication fault | — |
| | SA | Safety stop | — |
| | UF | USB host error | — |
| | ED | Emergency drive in operation | — |
| | LDF | Load fault warning | — |
| Alarm | EHR | Ethernet communication fault | — |
| | FN | Fan alarm | — |
| Alarm | FN2 | Internal-circulation fan alarm | — |
| | Fault | E.OC1 | Overcurrent trip during acceleration |
| E.OC2 | | Overcurrent trip during constant speed | 17 (H11) |
| E.OC3 | | Overcurrent trip during deceleration or stop | 18 (H12) |
| E.OV1 | | Regenerative overvoltage trip during acceleration | 32 (H20) |
| E.OV2 | | Regenerative overvoltage trip during constant speed | 33 (H21) |
| E.OV3 | | Regenerative overvoltage trip during deceleration or stop | 34 (H22) |
| E.THT | | Inverter overload trip (electronic thermal relay function) | 48 (H30) |
| E.THM | | Motor overload trip (electronic thermal relay function) | 49 (H31) |
| E.FIN | | Heatsink overheat | 64 (H40) |
| E.IPF | | Instantaneous power failure | 80 (H50) |
| E.UVT | | Undervoltage | 81 (H51) |
| E.ILF | | Input phase loss | 82 (H52) |
| E.OLT | | Stall prevention stop | 96 (H60) |
| E. SOT | | Loss of synchronism detection | 97 (H61) |
| E.LUP | | Upper limit fault detection | 98 (H62) |
| E.LDN | | Lower limit fault detection | 99 (H63) |
| E.BE | | Brake transistor alarm detection | 112 (H70) |
| E.GF | | Output side earth fault overcurrent | 128 (H80) |

| | Operation panel indication | Name | Data code |
|--------------|-------------------------------|--|-------------------|
| Fault | E.LF | Output phase loss | 129 (H81) |
| | E.OHT | External thermal relay operation | 144 (H90) |
| | E.PTC | PTC thermistor operation | 145 (H91) |
| | E.OPT | Option fault | 160 (HA0) |
| | E.OP1 | Communication option fault | 161 (HA1) |
| | E.16 to E.20 | User definition error by the PLC function | 164–168 (HA4–HA8) |
| | E.PE | Parameter storage device fault | 176 (HB0) |
| | E.PUE | PU disconnection | 177 (HB1) |
| | E.RET | Retry count excess | 178 (HB2) |
| | E.PE2 | Parameter storage device fault | 179 (HB3) |
| | E.CPU | CPU fault | 192 (HC0) |
| | E.CTE | Operation panel power supply short circuit | 193 (HC1) |
| | E.P24 | 24 V DC power fault | 194 (HC2) |
| | E.CDO | Abnormal output current detection | 196 (HC4) |
| | E.IOH | Inrush current limit circuit fault | 197 (HC5) |
| | E.AIE | Analog input fault | 199 (HC7) |
| | E.USB | USB communication fault | 200 (HC8) |
| | E.SAF | Safety circuit fault | 201 (HC9) |
| | E.PBT | Internal circuit fault | 202 (HCA) |
| | E.OS | Overspeed occurrence | 208 (HDO) |
| E.IAH | Abnormal internal temperature | 225 (HE1) | |
| E.LCI | 4 mA input fault | 228 (HE4) | |
| E.PCH | Pre-charge fault | 229 (HE5) | |
| E.PID | PID signal fault | 230 (HE6) | |
| E.EHR | Ethernet communication fault | 231 (HE7) | |
| E. 1 to E. 3 | Option fault | 241–243 (HF1–HF3) | |
| E. 5 to E. 7 | CPU fault | 245–247 (HF5–HF7) | |
| E.13 | Internal circuit fault | 253 (HFD) | |

If faults other than the above appear, contact your sales representative.

7 SPECIFICATIONS

7.1 Inverter rating

| Model FR-F846-□ | 00023 (0.75K) | 00038 (1.5K) | 00052 (2.2K) | 00083 (3.7K) | 00126 (5.5K) | 00170 (7.5K) | 00250 (11K) | 00310 (15K) | 00380 (18.5K) | 00470 (22K) | 00620 (30K) | 00770 (37K) | 00930 (45K) | 01160 (55K) | 01800 (75K) | 02160 (90K) | 02600 (110K) | 03250 (132K) | 03610 (160K) | |
|-----------------------------------|---------------------------------------|--|-----------------|-----------------|-----------------|-----------------|----------------|----------------|------------------|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----|
| Applicable motor capacity [kW] *1 | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | 110 | 132 | 160 | |
| Output | Rated capacity [kVA] *2 | 1.6 | 2.7 | 3.7 | 5.8 | 8.8 | 12 | 18 | 22 | 27 | 33 | 43 | 53 | 65 | 81 | 110 | 137 | 165 | 198 | 248 |
| | Rated current [A] | 2.1 | 3.5 | 4.8 | 7.6 | 11.5 | 16 | 23 | 29 | 35 | 43 | 57 | 70 | 85 | 106 | 144 | 180 | 216 | 260 | 325 |
| | Overload current rating *3 | 120% of rated motor capacity for 60 s, 150% of rated motor capacity for 3 s (max. surrounding air temperature 40 °C) | | | | | | | | | | | | | | | | | | |
| | Rated voltage *4 | Three-phase 380 to 500 V | | | | | | | | | | | | | | | | | | |
| Power supply | Rated input AC voltage/ frequency | Three-phase 380 to 500 V 50 Hz/60 Hz *7 | | | | | | | | | | | | | | | | | | |
| | Permissible AC voltage fluctuation | 323 to 550 V 50 Hz/60 Hz | | | | | | | | | | | | | | | | | | |
| | Permissible frequency fluctuation | ±5% | | | | | | | | | | | | | | | | | | |
| | Rated input current [A] *5 | 2.1 | 3.5 | 4.8 | 7.6 | 11.5 | 16 | 23 | 29 | 35 | 43 | 57 | 70 | 85 | 106 | 144 | 180 | 216 | 260 | 325 |
| | Power supply capacity [kVA] *6 | 1.6 | 2.7 | 3.7 | 5.8 | 9 | 12 | 18 | 22 | 27 | 33 | 43 | 53 | 65 | 81 | 110 | 137 | 165 | 198 | 248 |
| Protective structure | Dust- and water-proof type (IP55) *9 | | | | | | | | | | | | | | | | | | | |
| | UL Type12 *8 | | | | | | | | | | | | | | | | | | | |
| Cooling system | Self-cooling + internal fan | | | | | | | | | Forced-air-cooling + internal fan | | | | | | | | | | |
| DC reactor | Built-in | | | | | | | | | | | | | | | | | | | |
| Approx. mass [kg] | 15 | 15 | 15 | 15 | 16 | 17 | 26 | 26 | 27 | 27 | 59 | 60 | 63 | 64 | 147 | 150 | 153 | 189 | 193 | |

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor.

*2 The rated output capacity indicated assumes that the output voltage is 440 V.

*3 The % value of the overload current rating indicated 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. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about $\sqrt{2}$.

*5 The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

*6 The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).

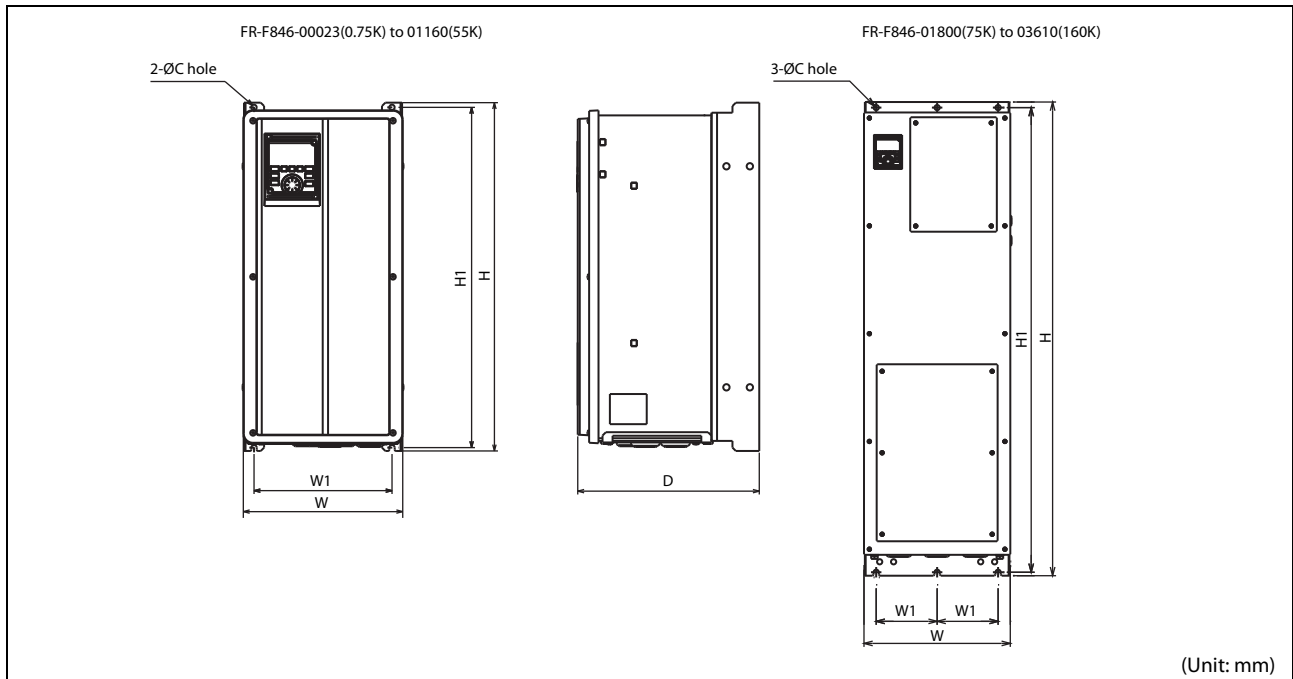
*7 For the power voltage exceeding 480 V, set Pr. 977 "Input voltage mode selection". (For details, refer to the FR-F800 Instruction Manual (Detailed).)

*8 UL Type 12 Enclosure-Suitable for Installation in a Compartment Handling Conditioned Air (Plenum)

*9 For compliance with IP55, remove the protective bushes and install the recommended cable glands.



7.2 Outline dimensions



| Inverter Type | W | W1 | H | H1 | D | C |
|----------------------|-----|-----|------|-------|-------|----|
| FR-F846-00023(0.75K) | 238 | 201 | 520 | 508 | 271 | 8 |
| FR-F846-00038(1.5K) | | | | | | |
| FR-F846-00052(2.2K) | | | | | | |
| FR-F846-00083(3.7K) | | | | | | |
| FR-F846-00126(5.5K) | | | | | | |
| FR-F846-00170(7.5K) | | | | | | |
| FR-F846-00250(11K) | 238 | 201 | 650 | 635.5 | 285 | 10 |
| FR-F846-00310(15K) | | | | | | |
| FR-F846-00380(18.5K) | | | | | | |
| FR-F846-00470(22K) | | | | | | |
| FR-F846-00620(30K) | 345 | 300 | 790 | 770 | 357 | 12 |
| FR-F846-00770(37K) | | | | | | |
| FR-F846-00930(45K) | | | | | | |
| FR-F846-01160(55K) | | | | | | |
| FR-F846-01800(75K) | 420 | 175 | 1360 | 1334 | 456.6 | 15 |
| FR-F846-02160(90K) | | | | | | |
| FR-F846-02600(110K) | | | | | | |
| FR-F846-03250(132K) | | | | | | |
| FR-F846-03610(160K) | 420 | 175 | 1510 | 1482 | 456.6 | 15 |

A APPENDIX

A.1 Instructions for Compliance with the EU Directives

The EU Directives are issued to standardize different national regulations of the EU Member States and to facilitate free movement of the equipment, whose safety is ensured, in the EU territory.

Since 1996, compliance with the EMC Directive that is one of the EU Directives has been legally required. Since 1997, compliance with the Low Voltage Directive, another EU Directive, has been also legally required. When a manufacturer confirms its equipment to be compliant with the EMC Directive and the Low Voltage Directive, the manufacturer must declare the conformity and affix the CE marking.

- 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

A.1.1 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(s): EN61800-3:2004+A1:2012 (First environment / PDS Category C2, Second environment / PDS Category C3 ^{*1})
^{*1} The applicable standard depends on the type of the built-in EMC filter.
- Please ensure you chose the right inverter for the intended environment.
- The installer shall provide a guide for installation and use, including recommended mitigation devices.

| |
|--------------|
| NOTES |
|--------------|

- First environment
Environment including buildings/facilities which are directly connected to a low voltage main supply which also supplies residential buildings.
Directly connected means that there is no intermediate transformer between these buildings.
- Second environment
Environment including all buildings/facilities which are not directly connected to the low voltage main supply which also supplies residential buildings.



NOTES

Set the EMC filter valid and install the inverter and perform wiring according to the following instructions:

- The inverter is equipped with a built-in EMC filter. Enable the EMC filter. (For details, refer to the FR-F800-E Instruction Manual (Hardware, L2 type).)
- Connect the inverter to an earthed power supply.
- Install a motor and a control cable according to the EMC Installation Guidelines (BCN-A21041-204) and Technical News (MF-S-143) according to the instruction.
- Confirm that the inverter conforms with the EMC Directive as the industrial drives application for final installation.
- The FR-F846 models are equipped with a harmonic suppression DC-choke. If the inverter has an input current of 16 A or less, limits for harmonic current emissions of EN/IEC61000-3-2 shall apply. However, for professional equipment with a total rated power of 1 kW or higher, the limits for harmonic current emissions of EN/IEC61000-3-2 shall not apply. If the equipment input current is more than 16 A and does not exceed 75 A, the equipment complies with EN/IEC61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to the value provided in the table below at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to the value mentioned in the table below. If the equipment input current is more than 75 A and the power supply capacity is 100 kVA or more, limits for the harmonic current emissions of IEC61000-3-4 shall apply. However, the equipment complies with IEC61000-3-4 provided that the short-circuit ratio R_{sce} is greater than or equal to the value provided in the table below.

| Inverter model | Standard | Ssc | Rsce |
|----------------------|------------------|-----------|------|
| FR-F846-00250(11K) | EN/IEC61000-3-12 | 3059 kVA | ≥120 |
| FR-F846-00310(15K) | | 3858 kVA | |
| FR-F846-00380(18.5K) | | 4656 kVA | |
| FR-F846-00470(22K) | | 5720 kVA | |
| FR-F846-00620(30K) | | 7582 kVA | |
| FR-F846-00770(37K) | | 9312 kVA | |
| FR-F846-00930(45K) | | 11307 kVA | |
| FR-F846-01160(55K) | | 14100 kVA | |
| FR-F846-01800(75K) | | 19155 kVA | |
| FR-F846-02160(90K) | IEC61000-3-4 | — | ≥350 |
| FR-F846-02600(110K) | | | |
| FR-F846-03250(132K) | | | |
| FR-F846-03610(160K) | | | |

- Limitations of voltage variations, voltage fluctuations, and blinking for the low-voltage power supply systems are specified as shown below.

| Inverter model | Standard | Remarks |
|----------------------|------------------|--|
| FR-F846-00023(0.75K) | EN/IEC61000-3-3 | |
| FR-F846-00038(1.5K) | | |
| FR-F846-00052(2.2K) | | |
| FR-F846-00083(3.7K) | | |
| FR-F846-00126(5.5K) | | |
| FR-F846-00170(7.5K) | | |
| FR-F846-00250(11K) | | |
| FR-F846-00310(15K) | | |
| FR-F846-00380(18.5K) | | |
| FR-F846-00470(22K) | | |
| FR-F846-00620(30K) | EN/IEC61000-3-11 | The equipment is intended for use only in premises having a supply current capacity ≥ 100 A per phase. |
| FR-F846-00770(37K) | | |
| FR-F846-00930(45K) | — | |
| FR-F846-01160(55K) | | |
| FR-F846-01800(75K) | | |
| FR-F846-02160(90K) | | |
| FR-F846-02600(110K) | | |
| FR-F846-03250(132K) | | |
| FR-F846-03610(160K) | | |

A.1.2 Low Voltage Directive

We have self-confirmed our inverters as products compliant to the Low Voltage Directive (conforming standard EN 61800-5-1) and place the CE mark on the inverters.

Outline of instructions

- Do not use an earth leakage current breaker as an electric shock protector without connecting the equipment to the earth. Connect the equipment to the earth securely.
- Wire the earth terminal independently. (Do not connect two or more cables to one terminal.)
- Use the cable sizes on *page 7* under the following conditions.
 - Surrounding air temperature: 40 °C maximum
 - If conditions are different from above, select appropriate wire according to EN60204 Appendix C TABLE 5.
- 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 cable whose size is indicated on *page 7*.
- Use the moulded case circuit breaker and magnetic contactor which conform to the EN or IEC Standard.
- DC current may flow from the inverter to a protective earth (ground) conductor. When using a residual current device (RDC) or residual current monitor (RDM), connect a type B RCD or RCM to the power supply side.
- Use the inverter under the conditions of overvoltage category II (usable regardless of the earth (ground) condition of the power supply), overvoltage category III (usable with the earthed-neutral system power supply) and pollution degree 2 or lower specified in IEC 60664.
- On the input and output of the inverter, use cables of the type and size set forth in EN60204 Appendix C.
- The operating capacity of the relay outputs (terminal symbols A1, B1, C1, A2, B2, C2) should be 30 V DC, 0.3 A. (Relay outputs are basically isolated from the inverter internal circuit.)
- Control circuit terminals on *page 4* are safely isolated from the main circuit.
- Environment (for details, refer to *page 3*)

| | During Operation | In Storage | During Transportation |
|---------------------|----------------------|----------------|-----------------------|
| Ambient temperature | -10 to +40 °C | -20 to +65 °C | -20 to +65 °C |
| Ambient humidity | 95% RH or less | 95% RH or less | 95% RH or less |
| Maximum altitude | 2500 m ^{*1} | 2500 m | 10000 m |

^{*1} For the installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.

- Install the inverter at a place where ultraviolet radiation is not applied directly.



Branch circuit protection

For installation Class T, Class J, Class CC, or Class L fuse, or UL 489 Molded Case Circuit Breaker (MCCB) according to the local directives must be provided.

| FR-F846-□ | 00023 (0.75K) | 00038 (1.5K) | 00052 (2.2K) | 00083 (3.7K) | 00126 (5.5K) | 00170 (7.5K) | 00250 (11K) | 00310 (15K) | 00380 (18.5K) | 00470 (22K) |
|---|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|------------------|----------------|
| Rated fuse voltage [V] | 500 V or more | | | | | | | | | |
| Fuse allowable rating [A] | 6 | 10 | 10 | 15 | 25 | 35 | 60 | 70 | 90 | 100 |
| Molded case circuit breaker (MCCB) Maximum allowable rating [A] *1 | 15 | 15 | 15 | 20 | 30 | 40 | 60 | 70 | 90 | 100 |

| FR-F846-□ | 00620 (30K) | 00770 (37K) | 00930 (45K) | 01160 (55K) | 01800 (75K) | 02160 (90K) | 02600 (110K) | 03250 (132K) | 03610 (160K) |
|---|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|
| Rated fuse voltage [V] | 500 V or more | | | | | | | | |
| Fuse allowable rating [A] | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 | 500 |
| Molded case circuit breaker (MCCB) Maximum allowable rating [A] *1*2 | 150 | 175 | 225 | 250 | 450 | 450 | 500 | — | — |

*1 Maximum allowable rating by US National Electrical Code. Exact size must be chosen for each installation.

*2 Select an appropriate molded case circuit breaker with a rating that is suitable for the size of the cable.

A.1.3 Short circuit ratings

- 400 V class
Suitable for use in a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 500 V maximum.

A.1.4 Machinery directive

The frequency inverter itself is not a machine in the spirit of the EU machinery directive. The start up of the frequency inverter in a machine is prohibited so long until it has been confirmed that the entire machine complies with the provisions of Directive 98/37/EC (from 29.12.2009 Machinery Directive 2006/42/EC).

A.2 Instructions for UL and cUL

(Conforming standard UL 508C, CSA C22.2 No.274-13)

A.2.1 General precautions

| |
|------------------|
| ⚠ WARNING |
|------------------|

| |
|--|
| The bus capacitor discharge time is 10 minutes. Before starting wiring or inspection, switch power off, wait for more than 10 minutes, and check for residual voltage between terminal P/+ and N/- with a meter etc., to avoid a hazard of electrical shock. |
|--|

A.2.2 Installation

The types of inverter listed on *page 40* have been approved as products for a UL type 12 enclosure that is suitable for installation in a Compartment Handling Conditioned Air (Plenum).

Install the inverter so that the ambient temperature, humidity and ambience of the inverter will satisfy the specifications. (Refer to *page 3*.)

The drive must be installed in clean air according to enclosure classification.

Cooling air must be clean, free from corrosive materials and electrically conductive dust regarding the UL Type 12 enclosure. This enclosure provides protection from airborne dust and light sprays or splashing water from all directions.

Branch circuit protection

For installation in the United States, Class T, Class J, or Class CC fuse, or UL 489 Molded Case Circuit Breaker (MCCB) must be provided in accordance with the National Electrical Code and any applicable provincial codes (refer to the tables on *page 40*).

For installation in Canada, Class T, Class J, or Class CC fuse, or UL 489 Molded Case Circuit Breaker (MCCB) must be provided in accordance with the Canada Electrical Code and any applicable provincial codes (refer to the tables on *page 40*).

A.2.3 Wiring of the power supply and 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 wires (rated at 75 °C) and round crimping terminals. Crimp the crimping terminals with the crimping tool recommended by the terminal maker.

A.2.4 Short circuit ratings

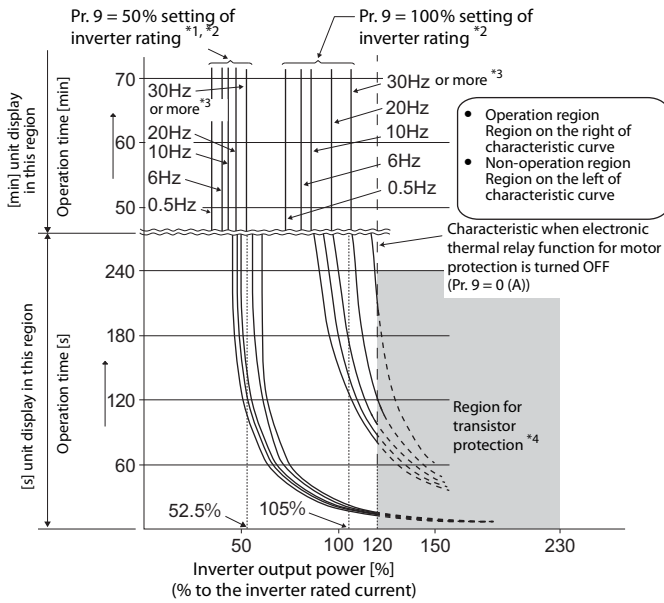
- 400 V class
Suitable for use in a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 500 V maximum.



A.2.5 Motor overload protection

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

Electronic thermal relay function operation characteristic (LD rating)



This function detects the overload (overheat) of the motor, stops the operation of the inverter's output transistor, and stops the output. (The operation characteristic is shown on the left.)

When using the Mitsubishi Electric constant-torque motor

- ① Set one of "1", "13" to "16", "50", "53", "54" in Pr. 71. This provides a 100% continuous torque characteristic in the low-speed range.
- ② Set the rated current of the motor in Pr. 9.

*1 When 50% of the inverter rated output current (current value) is set in Pr. 9.

*2 The % value denotes the percentage to the inverter rated output current. It is not the percentage to the motor rated current.

*3 When you set the electronic thermal relay function dedicated to the Mitsubishi Electric constant-torque motor, this characteristic curve applies to operation at 6 Hz or higher.

*4 Transistor protection is activated depending on the temperature of the heatsink. The protection may be activated even with less than 150% depending on the operating conditions.

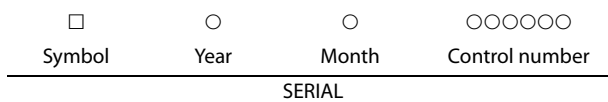
CAUTION

- The internal accumulated heat value of the electronic thermal relay function is reset by inverter power reset and reset signal input. Avoid unnecessary reset and power-OFF.
- When using multiple motors with one inverter, or using a multi-pole motor or a specialized motor, provide an external thermal relay (OCR) between the inverter and motor. And for the setting of the thermal relay, add the line-to line leakage current to the current value on the motor rating plate (details in the FR-F800 Instruction Manual (Detailed)).
- For low-speed operation where the cooling capability of the motor reduces, it is recommended to use a thermal protector or thermistor-incorporated motor.
- When the difference between the inverter and motor capacities is large and the setting is small, the protective characteristics of the electronic thermal relay function will be deteriorated. In this case, use an external thermal relay.
- A special motor cannot be protected by the electronic thermal relay function. Use an external thermal relay.
- Electronic thermal memory retention function is not provided by the drive.

A.3 SERIAL number check

The SERIAL number can be checked on the inverter rating plate or package. (Refer to page 1.)

Rating plate example



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

A.4 Instructions for EAC

The product certified in compliance with the Eurasian Conformity has the EAC marking.



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