MITSUBISHI ELECTRIC

700 series

INVERTER
FR-A700
INSTALLATION GUIDELINE
FR-A770-355K, 560K-79

Thank you for choosing this Mitsubishi Inverter.
Please read through this Installation Guideline enclosed to operate this inverter correctly.
Do not use this product until you have a full knowledge of the equipment, safety information and instructions.
Please forward this Installation Guideline to the end user.
If you are going to utilize functions and performance, refer to the *FR-A700 Instruction Manual (Applied)* [IB-0600226ENG].

CONTENTS

A 700

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

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

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

The ⚠CAUTION level may even lead to a serious consequence according to conditions. Both instruction levels must be followed because these are important to personal safety.

1. Electric Shock Prevention

⚠ WARNING

- While the inverter power is ON, do not open the front cover or the wiring cover. Do not run the inverter with the front cover or the wiring 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 accidentally touch the charged inverter circuits and get an electric shock.
- Before wiring, inspection or switching EMC filter ON/OFF connector, power must be switched OFF. To confirm that, LED indication of the operation panel must be checked. (It must be OFF.) Any person who is involved in wiring, inspection or switching EMC filter ON/OFF connector shall 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 code (NEC section 250, IEC 536 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 wiring or inspection of this equipment shall be fully competent to do the work.
- The inverter must be installed before wiring. Otherwise you may get an electric shock or be injured.
- Setting dial and key operations must be performed with dry hands to prevent an electric shock. Otherwise you may get an electric shock.
- 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. Otherwise you may get an electric shock.
- When measuring the main circuit capacitor capacity (*Pr.259 Main circuit capacitor life measuring* = "1"), 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.

2. Fire Prevention

⚠CAUTION

- Inverter must be installed on a nonflammable wall without holes (so that nobody touches the inverter heatsink on the rear side, etc.). Mounting it to or near flammable material can cause a fire.
- If the inverter has become faulty, the inverter power must be switched OFF. A continuous flow of large current could cause a fire.
- When using a brake resistor, a sequence that will turn OFF power when a fault signal is output must be configured.
  Otherwise the brake resistor may overheat due to damage of the brake transistor and possibly cause a fire.
- Do not connect a resistor directly to the DC terminals P/+ and N/-. Doing so could cause a fire.
- Daily and periodic inspections must be performed as instructed in the Instruction Manual. If the product is used without receiving any inspection, it may cause a burst, break, or fire.

3. Injury Prevention

⚠CAUTION

- The voltage applied to each terminal must be the ones specified in the Instruction Manual. Otherwise burst, damage, etc. may occur.
- The cables must be connected to the correct terminals. Otherwise burst, damage, etc. may occur.
- Polarity must be correct. Otherwise burst, damage, etc. may occur.
- While power is ON or for some time after power-OFF, do not touch the inverter since the inverter will be extremely hot. Doing so can cause burns.

4. Additional Instructions

Also the following points must be noted to prevent an accidental failure, injury, electric shock, etc.

(1) Transportation and installation

⚠CAUTION

- The product must be transported in correct method that corresponds to the weight. Failure to do so may lead to injuries.
- Do not stack the boxes containing inverters higher than the number recommended.
- The product must be installed to the position where withstands the weight of the product according to the information in the Instruction Manual.
- Do not install or operate the inverter if it is damaged or has parts missing. This can result in breakdowns.
- When carrying the inverter, do not hold it by the front cover or setting dial; it may fall off or fail.
- Do not stand or rest heavy objects on the product.
- The inverter mounting orientation must be correct.
- Foreign conductive objects must be prevented from entering the inverter. That includes screws and metal fragments or other flammable substance such as oil.
- As the inverter is a precision instrument, do not drop or subject it to impact.
- The inverter must be used under the following environment: Otherwise the inverter may be damaged.

Environment	Surrounding air temperature	*Pr.570* = "2" (Initial value)	-10°C to +50°C (non-freezing)
		Pr.570 = "102"	-10°C to +40°C (non-freezing)
	Ambient humidity		90% 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, vibration		Maximum 1000m above sea level for standard operation. After that derate by 3% for every extra 500m up to 2500m (91%). 2.9m/s^2 or less at 10 to 55Hz (directions of X, Y, Z axes)

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

- If halogen-based materials (fluorine, chlorine, bromine, iodine, etc.) infiltrate into a Mitsubishi product, the product will be damaged. Halogen-based materials are often included in fumigant, which is used to sterilize or disinfest wooden packages. When packaging, prevent residual fumigant components from being infiltrated into Mitsubishi products, or use an alternative sterilization or disinfection method (heat disinfection, etc.) for packaging. Sterilization of disinfection of wooden package should also be performed before packaging the product.

(2) Wiring ⚠CAUTION

- Do not install a power factor correction capacitor, surge suppressor or capacitor type filter on the inverter output side. These devices on the inverter output side may be overheated or burn out.
- The connection orientation of the output cables U, V, W to the motor affects the rotation direction of the motor.

(3) Test operation and adjustment
⚠CAUTION

- Before starting operation, each parameter must be confirmed and adjusted. A failure to do so may cause some machines to make unexpected motions.

(4) Operation ⚠WARNING

- Any person must stay away from the equipment when the retry function is set as it will restart suddenly after trip.
- Since pressing STOP RESET key may not stop output depending on the function setting status, separate circuit and switch that make an emergency stop (power OFF, mechanical brake operation for emergency stop, etc.) must be provided.
- OFF status of the start signal must be confirmed before resetting the inverter fault. Resetting inverter alarm with the start signal ON restarts the motor suddenly.
- The inverter must be used for three-phase induction motors. Connection of any other electrical equipment to the inverter output may damage the equipment.
- Performing pre-excitation (LX signal and X13 signal) under torque control (Real sensorless vector control) may start the motor running at a low speed even when the start command (STF or STR) is not input. The motor may also run at a low speed when the speed limit value = 0 with a start command input. It must be confirmed that the motor running will not cause any safety problem before performing pre-excitation.
- 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.
- The effect of electromagnetic interference must be reduced by using a noise filter or by other means. 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 parameter clear or all parameter clear is performed, the required parameters must be set again before starting operations because all parameters return to the initial value.
- The inverter can be easily set for high-speed operation. Before changing its setting, the performances of the motor and machine must be fully examined.
- Stop status cannot be hold by the inverter's brake function. In addition to the inverter's brake function, a holding device must be installed to ensure safety.
- Before running an inverter which had been stored for a long period, inspection and test operation must be performed.
- Static electricity in your body must be discharged before you touch the product. Otherwise the product may be damaged.

(5) Emergency stop ⚠CAUTION

- A safety backup such as an emergency brake must be provided to prevent hazardous condition to the machine and equipment in case of inverter failure.
- When the breaker on the inverter input side trips, the wiring must be checked for fault (short circuit), and internal parts of the inverter for a damage, etc. The cause of the trip must be identified and removed before turning ON the power of the breaker.
- When any protective function is activated, appropriate corrective action must be taken, and the inverter must be reset before resuming operation.

(6) 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.

(7) Disposing of the inverter
⚠CAUTION

- The inverter must be treated as industrial waste.

General instructions

Many of the diagrams and drawings in this Installation Guideline show the inverter without a cover or partially open for explanation. Never operate the inverter in this manner. The cover must be always reinstalled and the instruction in this Installation Guideline must be followed when operating the inverter.

1 INSTALLATION OF THE INVERTER AND INSTRUCTIONS

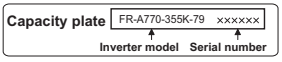
• Inverter Model

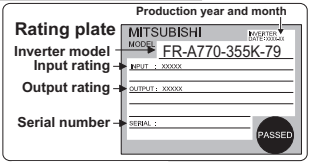
FR - A770 - 355K - 79

Symbol	Voltage class
A770	Three-phase 690V class

Symbol	Model number
355K, 560K	Displays the inverter capacity [kW]

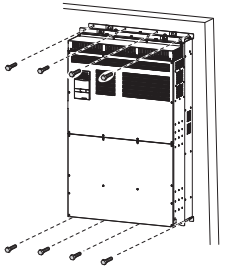
Capacity plate





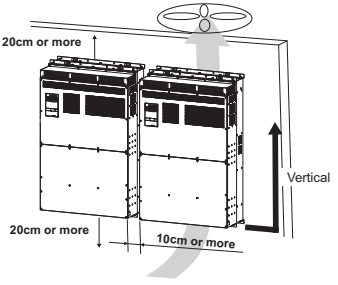
• **Installation of the inverter**

Installation on the enclosure



CAUTION

- When encasing multiple inverters, install them in parallel as a cooling measure.
- Install the inverter vertically.



• **Compatible plug-in options**

The options compatible with the FR-A770-79 are as shown below.

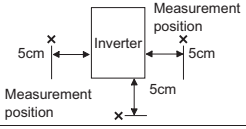
Model	Function
FR-A7AX	16-bit digital input function
FR-A7AY	Analog output function, Digital output function
FR-A7AR	Relay output function
FR-A7AP	Encoder feedback control, Vector control
FR-A7AL	Orientation control, Encoder feedback control, Vector control, Position control, Encoder pulse division output
FR-A7AZ	Bipolar analog output function, High-resolution analog input function, Motor thermistor interface
FR-A7NC	CC-Link communication function
FR-A7NCE	CC-Link IE Field Network communication function
FR-A7ND	DeviceNet communication function
FR-A7NP	Profibus-DP communication function

• **General precaution**

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.

• **Environment**

Before installation, check that the environment meets following specifications.

Surrounding air temperature	*Pr.570* = "2" (Initial value): -10°C to +50°C (non-freezing) *Pr.570* = "102": -10°C to +40°C (non-freezing) 
Ambient humidity	90%RH or less (non-condensing)
Storage temperature	-20°C to +65°C
Ambience	Indoors (No corrosive and flammable gases, oil mist, dust and dirt.)
Altitude, vibration	Maximum 1000m above sea level for standard operation. After that derate by 3% for every extra 500m up to 2500m (91%). 2.9m/s^2 or less at 10 to 55Hz (directions of X, Y, Z axes)

CAUTION

- Install the inverter on a strong surface securely and vertically with bolts.
- Leave enough clearance and take cooling measures.
- Avoid places where the inverter is subjected to direct sunlight, high temperature and high humidity.
- Install the inverter on a non-flammable wall surface.

• **Peripheral devices**

Check the inverter model of the inverter you purchased. Appropriate peripheral devices must be selected according to the capacity. Refer to the following list and prepare appropriate peripheral devices:

Motor Output (kW) *1	Applicable Inverter Model	Moulded Case Circuit Breaker (MCCB) *2 or Earth Leakage Circuit Breaker (ELB) (NF or NV type)	Input Side Magnetic Contactor *3
355	FR-A770-355K-79	500A	401A
560	FR-A770-560K-79	800A	611A

*1 Motor Output (kW) in the above table indicates values when using the 4-pole standard motor with power supply voltage of 690VAC 60Hz.

*2 Select the MCCB according to the power supply capacity. Install one MCCB per inverter.

*3 Magnetic contactor is selected based on the AC-3 class. The electrical durability of magnetic contactor is 500,000 times. When the magnetic contactor is used for emergency stop during motor driving, the electrical durability is 25 times.

CAUTION

- When the inverter capacity is larger than the motor capacity, select an MCCB and a magnetic contactor according to the inverter model and cable and reactor according to the motor output.
- 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.

2 SPECIFICATIONS

2.1 Inverter rating

Model FR-A770-□K-79			355	560
Applicable motor	capacity (kW) *4	*Pr.570* = "2" (Initial value)	355	560
		Pr.570 = "102" *6	315	500
Output	Rated current (A)	*Pr.570* = "2" (Initial value)	401	611
		Pr.570 = "102" *6	344	545
	Overload current rating *1		150% 60s (inverse-time characteristics)	
	Rated voltage *2		Three-phase 600 to 690V	
	Output frequency range		0.2 to 400Hz	
	PWM carrier frequency		2kHz	
Power supply	Rated input AC voltage/frequency		Three-phase 600 to 690V 50/60Hz	
	Permissible AC voltage fluctuation		±10%	
	Permissible frequency fluctuation		±5%	
	Power supply capacity (kVA) *3		463	730
Power supply voltage for control circuit *5			AC 380 to 480V 50/60Hz	
Protective structure (JEM 1030)			Open type (IP00)	
Cooling system			Forced air cooling	
Approx.mass (kg)			380	
Surrounding air temperature		*Pr.570* = "2" (Initial value)	-10°C to +50°C (non-freezing)	
		Pr.570 = "102" *6	-10°C to +40°C (non-freezing)	

*1 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.

*2 The maximum output voltage dose not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about $\sqrt{2}$ that of the power supply.

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

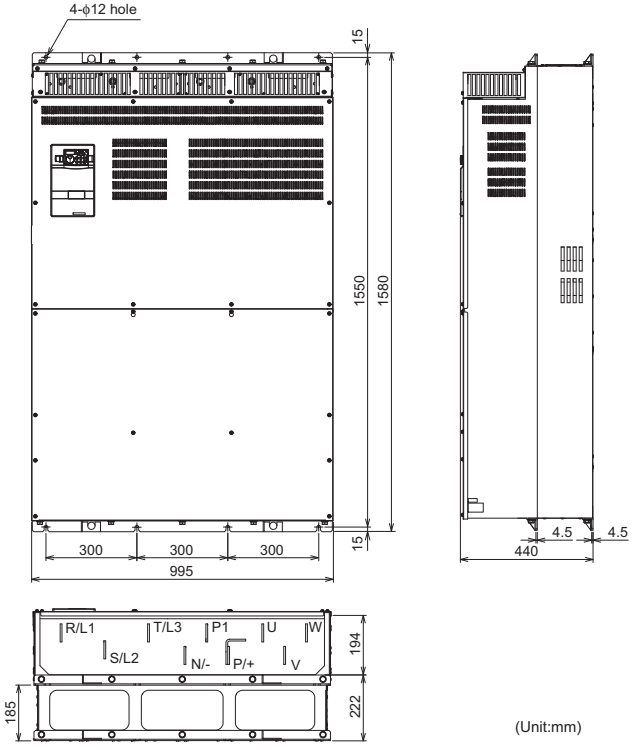
*4 The applicable motor capacity indicated assumes that the output voltage is 660 to 690V.

*5 When connecting the control circuit separately from the main circuit power supply.

*6 Set *Pr.570* = "102" for Vector control or Real sensorless vector control.

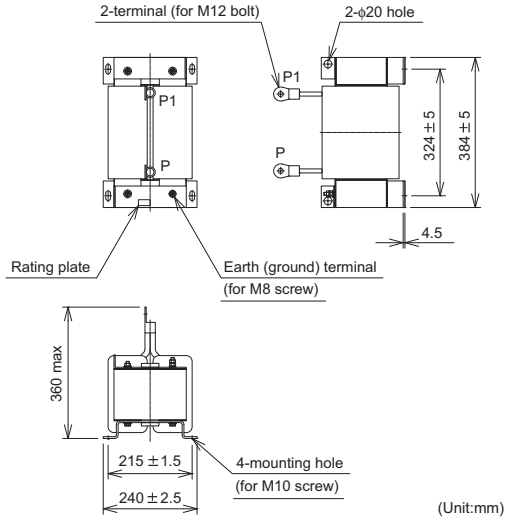
2.2 Outline dimension drawing

- **FR-A770-355K, 560K-79**



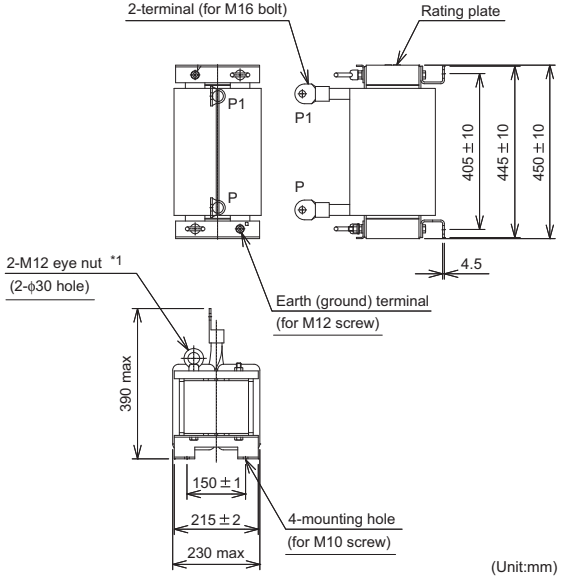
(Unit:mm)

- **FR-HEL-N355K**



(Unit:mm)

- **FR-HEL-N560K**

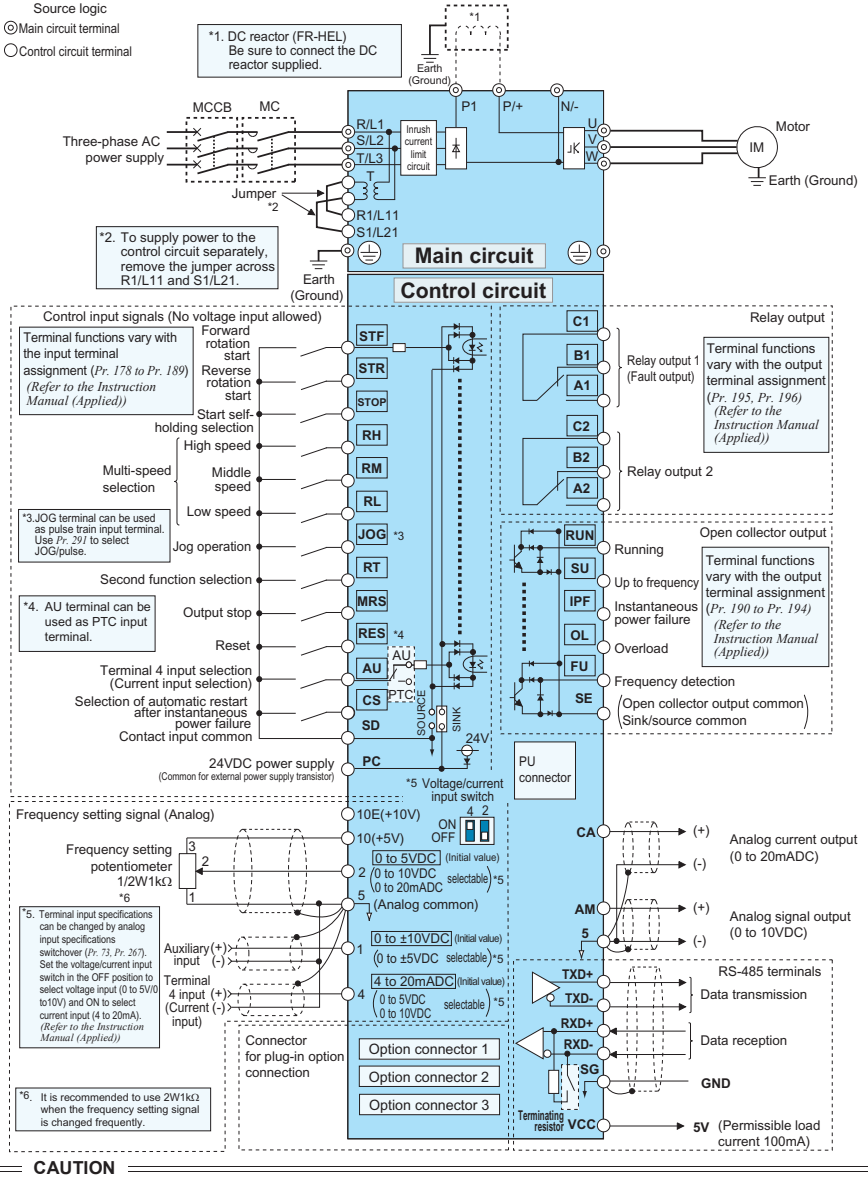


(Unit:mm)

*1 Remove the eye nut after installation of the product.

3 WIRING

3.1 Terminal connection diagram



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 wire of the input side and 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 an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.
- Set the voltage/current input switch correctly. Different setting may cause a fault, failure or malfunction.

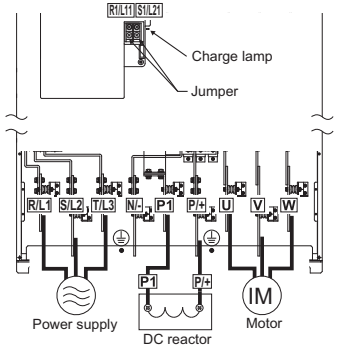
3.2 Main circuit terminal

(1) Main circuit terminal specifications

Terminal Symbol	Terminal Name	Description
R/L1, S/L2, T/L3	AC power input	Connect to the commercial power supply.
U, V, W	Inverter output	Connect a three-phase squirrel-cage motor.
R1/L11, S1/L21	Power supply for control circuit	Connected to the AC power supply terminals R/L1 and S/L2. To retain the fault display and fault output, remove the jumpers across terminals R/L1 and R1/L11 and across S/L2 and S1/L21, and apply external power supply of 380 to 480VAC to these terminals.
P/+, P1	DC reactor connection	Connect the DC reactor.
P/+, N/-	———	Non-connection
⏚	Earth (Ground)	For earthing (grounding) the inverter chassis. Must be earthed (grounded).

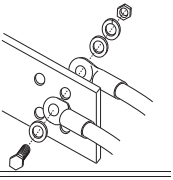
(2) Terminal layout and wiring

FR-A770-355K, 560K-79



CAUTION

- The power supply cables must be connected to R/L1, S/L2, T/L3. (Phase sequence needs not to be matched.) Never connect the power cable to the U, V, W of the inverter. Doing so will damage the inverter.
- Connect the motor to U, V, W. At this time, turning ON the forward rotation switch (signal) rotates the motor in the counterclockwise direction when viewed from the motor shaft.
- When wiring the inverter main circuit conductor, tighten a nut from the right side of the conductor. When wiring two wires, place wires on both sides of the conductor. (Refer to the drawing on the right.) For wiring, use bolts (nuts) provided with the inverter.



(3) Applicable cable size

Select the recommended cable size to ensure that a voltage drop will be 2% max.
If the wiring distance is long between the inverter and motor, a main circuit cable voltage drop will cause the motor torque to decrease especially at the output of a low frequency.
The following table indicates a selection example for the wiring length of 20m.

690V class

Applicable Inverter Model	Terminal Screw Size *2	Tightening Torque N·m	Crimping Terminal				Cable Size (mm^2) *1			
			R/L1, S/L2, T/L3	U, V, W	P/+, P1	Earth (Ground) Cable	R/L1, S/L2, T/L3	U, V, W	P/+, P1	Earth (Ground) Cable
FR-A770-355K-79	M12(M10)	46	200-12	200-12	325-12	150-10	200	200	250	150
FR-A770-560K-79	M12(M10)	46	150-12	150-12	200-12	200-10	2×150	2×150	2×200	200

*1 The recommended cable size is that of the cable (LMFC (heat resistant flexible cross-linked polyethylene insulated cable) etc.) with continuous maximum permissible temperature of 90°C. Assumes that the surrounding air temperature is 50°Cor less and wiring is performed in an enclosure.
*2 The terminal screw size indicates the terminal size for R/L1, S/L2, T/L3, U, V, W, PR, PX, P/+, N/-, P1, and a screw for earthing (grounding).

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

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

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 tighten too loosely can cause a short circuit or malfunction.
  A screw that has been tighten 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.

(4) Total wiring length

Connect one or more motors within the total wiring length of 500m.
(The wiring length should be 100m maximum for vector control.)

When driving a 690V class motor by the inverter, surge voltages attributable to the wiring constants may occur at the motor terminals, deteriorating the insulation of the motor.
Take the following measure in this case.

Use a "690V class inverter-driven insulation-enhanced motor"

(5) Cable size of the control circuit power supply (terminal R1/L11, S1/L21)

- Terminal screw size: M4
- Cable size: 0.75mm^2 to 2mm^2
- Tightening torque: 1.5N·m

3.3 Control circuit terminals

3.3.1 Control circuit specifications

indicates that terminal functions can be selected using *Pr. 178 to Pr. 196 (I/O terminal function selection)*.

(1) Input signals

Type	Terminal Symbol	Terminal Name	Description		Rated Specifications
Contact input	STF	Forward rotation start	Turn ON the STF signal to start forward rotation and turn it OFF to stop.	When the STF and STR signals are turned ON simultaneously, the stop command is given.	Input resistance 4.7kΩ Voltage at opening: 21 to 27VDC Contacts at short-circuited: 4 to 6mADC
	STR	Reverse rotation start	Turn ON the STR signal to start reverse rotation and turn it OFF to stop.		
	STOP	Start self-holding selection	Turn ON the STOP signal to self-hold the start signal.		
	RH, RM, RL	Multi-speed selection	Multi-speed can be selected according to the combination of RH, RM and RL signals.		
	JOG	Jog mode selection	Turn ON the JOG signal to select Jog operation (initial setting) and turn ON the start signal (STF or STR) to start Jog operation.		
		Pulse train input	JOG terminal can be used as pulse train input terminal. To use as pulse train input terminal, the *Pr. 291* setting needs to be changed. (maximum input pulse: 100kpulses/s)		Input resistance 2kΩ Contacts at short-circuited: 8 to 13mADC
	RT	Second function selection	Turn ON the RT signal to select second function. When the second function such as "second torque boost" and "second V/F (base frequency)" are set, turning ON the RT signal selects these functions.		Input resistance 4.7kΩ Voltage at opening: 21 to 27VDC Contacts at short-circuited: 4 to 6mADC
	MRS	Output stop	Turn ON the MRS signal (20ms or more) to stop the inverter output. Use to shut off the inverter output when stopping the motor by electromagnetic brake.		
	RES	Reset	Use to reset fault output provided when fault occurs. Turn ON the RES signal for more than 0.1s, then turn it OFF. In the initial status, reset is set always-enabled. By setting *Pr. 75*, reset can be set enabled only at fault occurrence. Recover about 1s after reset is cancelled.		
	AU	Terminal 4 input selection	Terminal 4 is valid only when the AU signal is turned ON. (The frequency setting signal can be set between 4 and 20mADC.) Turning the AU signal ON makes terminal 2 (voltage input) invalid.		
		PTC input	AU terminal is used as PTC input terminal (thermal protection of the motor). When using it as PTC input terminal, set the AU/PTC switch to PTC.		
	CS	Selection of automatic restart after instantaneous power failure	When the CS signal is left ON, the inverter restarts automatically at power restoration. Note that restart setting is necessary for this operation. In the initial setting, a restart is disabled.		
	SD	Contact input common (sink) (initial setting)	Common terminal for contact input terminal (sink logic).		——
		External transistor common (source)	Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction by undesirable currents.		
		24VDC power supply common	Common output terminal for 24VDC 0.1A power supply (PC terminal). Isolated from terminals 5 and SE.		
	PC	External transistor common (sink) (initial setting)	Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the sink logic to avoid malfunction by undesirable currents.		Power supply voltage range 19.2 to 28.8VDC Permissible load current 100mA
		Contact input common (source)	Common terminal for contact input terminal (source logic).		
		24VDC power supply	Can be used as 24VDC 0.1A power supply.		

Type	Terminal Symbol	Terminal Name	Description	Rated Specifications
Frequency setting	10E	Frequency setting power supply	When connecting the frequency setting potentiometer at an initial status, connect it to terminal 10. Change the input specifications of terminal 2 when connecting it to terminal 10E.	10VDC±0.4V Permissible load current 10mA
	10			5.2VDC±0.2V Permissible load current 10mA
	2	Frequency setting (voltage)	Inputting 0 to 5VDC (or 0 to 10V, 0 to 20mA) provides the maximum output frequency at 5V (10V, 20mA) and makes input and output proportional. Use *Pr. 73* to switch from among input 0 to 5VDC (initial setting), 0 to 10VDC, and 0 to 20mA. Set the voltage/current input switch in the ON position to select current input (0 to 20mA). *	Voltage input: Input resistance 10kΩ ± 1kΩ Maximum permissible voltage 20VDC Current input: Input resistance 245Ω ± 5Ω Maximum permissible current 30mA
	4	Frequency setting (current)	Inputting 4 to 20mADC (or 0 to 5V, 0 to 10V) provides the maximum output frequency at 20mA makes input and output proportional. This input signal is valid only when the AU signal is ON (terminal 2 input is invalid). Use *Pr. 267* to switch from among input 4 to 20mA (initial setting), 0 to 5VDC, and 0 to 10VDC. Set the voltage/current input switch in the OFF position to select voltage input (0 to 5V/0 to 10V).* Use *Pr. 858* to switch terminal functions.	
	1	Frequency setting auxiliary	Inputting 0 to ±5 VDC or 0 to ±10VDC adds this signal to terminal 2 or 4 frequency setting signal. Use *Pr. 73* to switch between the input 0 to ±5VDC and 0 to ±10VDC (initial setting).	Input resistance 10kΩ ± 1kΩ Maximum permissible voltage ± 20VDC
	5	Frequency setting common	Common terminal for frequency setting signal (terminal 2, 1 or 4) and analog output terminal AM and CA. Do not earth (ground).	———

* Set *Pr. 73*, *Pr. 267*, and a voltage/current input switch correctly, then input an analog signal in accordance with the setting.
Applying a voltage signal with voltage/current input switch ON (current input is selected) or a current signal with switch OFF (voltage input is selected) could cause component damage of the inverter or analog circuit of signal output devices.

(2) Output signals

Type	Terminal Symbol	Terminal Name	Description		Rated Specifications
Relay	A1, B1, C1	Relay output 1 (Fault output)	1 changeover contact output indicates that the inverter protective function has activated and the output stopped. Fault: No conduction across B-C (Across A-C Continuity), Normal: Across B-C Continuity (No conduction across A-C)		Contact capacity: 230VAC 0.3A (Power factor = 0.4) 30VDC 0.3A
	A2, B2, C2	Relay output 2	1 changeover contact output		
Open collector	RUN	Inverter running	Switched low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5Hz). Switched high during stop or DC injection brake operation.*		Permissible load 24VDC (27VDC maximum) 0.1A (A voltage drop is 2.8V maximum when the signal is ON.) Low is when the open collector output transistor is ON (conducts). High is when the transistor is OFF (does not conduct)
	SU	Up to frequency	Switched low when the output frequency reaches within the range of ±10% (initial value) of the set frequency. Switched high during acceleration/ deceleration and at a stop.	Fault code (4 bits) output	
	OL	Overload warning	Switched low when stall prevention is activated by the stall prevention function. Switched high when stall prevention is cancelled.		
	IPF	Instantaneous power failure	Switched low when an instantaneous power failure and under voltage protections are activated.		
	FU	Frequency detection	Switched low when the inverter output frequency is equal to or higher than the preset detected frequency and high when less than the preset detected frequency.		
	SE	Open collector output common	Common terminal for terminals RUN, SU, OL, IPF, FU		———

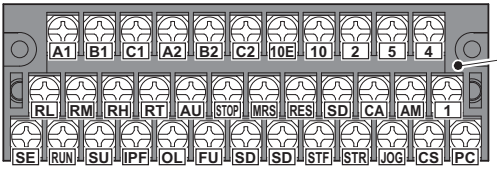
Type	Terminal Symbol	Terminal Name	Description		Rated Specifications
Analog	CA	Analog current output	Select one e.g. output frequency from monitor items. Not output during inverter reset. The output signal is proportional to the magnitude of the corresponding monitoring item. Use *Pr. 55*, *Pr. 56*, and *Pr. 866* to set full scales for the monitored output frequency, output current, and torque.	Output item: Output frequency (initial setting)	Load impedance 200Ω to 450Ω Output signal 0 to 20mADC
	AM	Analog voltage output			Output signal 0 to 10VDC Permissible load current 1mA (load impedance 10kΩ or more) Resolution 8 bits

(3) Communication

Type	Terminal Symbol		Terminal Name	Description
RS-485	———		PU connector	With the PU connector, communication can be made through RS-485. (for connection on a 1:1 basis only) . Conforming standard : EIA-485 (RS-485) . Transmission format : Multidrop . Communication speed : 4800 to 38400bps . Overall length : 500m
	RS-485 terminals	TXD+	Inverter transmission terminal	With the RS-485 terminals, communication can be made through RS-485. Conforming standard : EIA-485 (RS-485) Transmission format : Multidrop link Communication speed : 300 to 38400bps Overall length : 500m
		TXD-		
		RXD+	Inverter reception terminal	
		RXD-		
		SG	Earth (Ground)	
USB	———		USB connector	Non-connection

3.3.2 Wiring of control circuit

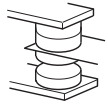
(1) Terminal layout



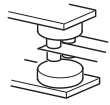
Control circuit terminal *
Terminal screw size: M3.5
Tightening torque: 1.2N·m
* Refer to instruction manuals of options for the available control terminals other than the standard control circuit terminal.

(2) Instructions for wiring of the control circuit terminal

- Terminals 5, SD and SE are common to the I/O signals and isolated from each other. Do not earth (ground). Avoid connecting the terminal SD and 5 and the terminal SE and 5.
- It is recommended to use the cables of 0.75mm^2 gauge for connection to the control circuit terminals. If the cable gauge used is 1.25mm^2 or more, the front cover may be lifted when there are many cables running or the cables are run improperly, resulting in an operation panel contact fault.
- The wiring length should be 30m maximum.
- When using contact inputs, use two or more parallel micro-signal contacts or twin contacts to prevent a contact faults since the control circuit input signals are micro-currents.



Micro signal contacts



Twin contacts

- To suppress EMI, use shielded or twisted cables for the control circuit terminals and run them away from the main and power circuits (including the 200V relay sequence circuit). For the cables connected to the control circuit terminals, connect their shields to the common terminal of the connected control circuit terminal. When connecting external power supply to the terminal PC, however, connect the shield of the power supply cable to the negative side of the external power supply. Do not directly earth (ground) the shield to the enclosure, etc.
- Do not apply a voltage to the contact input terminals (e.g. STF) of the control circuit.
- Always apply a voltage to the fault output terminals (A, B, C) via a relay coil, lamp, etc.

4 PRECAUTIONS FOR USE OF THE INVERTER

The FR-A700 series is a highly reliable product, but using incorrect peripheral circuits or incorrect operation/handling methods may shorten the product life or damage the product.
Before starting operation, always recheck the following items.

(1) Use crimping terminals with insulation sleeve to wire the power supply and motor.

(2) Application of power to the output terminals (U, V, W) of the inverter will damage the inverter. Never perform such wiring.

(3) 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 an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.

(4) 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 main circuit cable voltage drop will cause the motor torque to decrease especially at the output of a low frequency.
Refer to *page 8* for the recommended cable sizes.

(5) The total wiring length should be within the prescribed length.
Especially for long distance wiring, the equipment connected to the secondary side may malfunction. This is caused by a charging current due to the stray capacity of the wiring. Therefore, note the overall wiring length. *(Refer to page 8.)*

(6) 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.

(7) 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. If any of the above devices are installed, immediately remove it.

(8) For some short time after the power is switched OFF, a high voltage remains in the smoothing capacitor.
When accessing the inverter for inspection, wait for at least 10 minutes after the power supply has been switched OFF, and then make sure that the voltage across the main circuit terminals P/+ and N/- of the inverter is no more than 30VDC using a tester.±

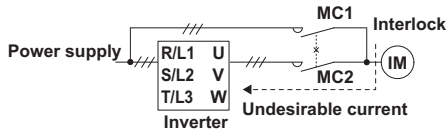
(9) A short circuit or earth (ground) fault on the inverter output side may damage the inverter modules.
- Fully check the insulation resistance of the circuit prior to inverter operation since repeated short circuits may damage the inverter modules. These short circuits may be caused by peripheral circuit inadequacy, an earth (ground) fault caused by wiring inadequacy, or reduced motor insulation resistance.
- Fully check the to-earth (ground) insulation and phase to phase insulation of the inverter output side before power-on. Especially for an old motor or use in a hostile atmosphere, securely check the motor insulation resistance etc.

(10) Do not use the inverter input side magnetic contactor 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.

(11) Do not apply a voltage higher than the permissible voltage to the inverter I/O signal circuits.
Application of a voltage higher than the permissible voltage 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 across terminals 10E and 5.

(12) Provide electrical and mechanical interlocks for MC1 and MC2 which are used for electronic bypass operation.

When the wiring is incorrect or if there is an electronic bypass circuit as shown on the right, the inverter will be damaged by leakage current from the power supply when it is connected to the inverter U, V, and W terminals due to arcs generated at the time of switch-over or chattering caused by a sequence error.



(13) If the machine must not be restarted when power is restored after a power failure, provide a magnetic contactor 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.

(14) A motor with encoder is necessary for vector control. In addition, connect the encoder directly to the backlash-free motor shaft. (An encoder is not necessary for Real sensorless vector control.)

(15) Inverter input side magnetic contactor (MC)

On the inverter input side, connect a MC for the following purposes. *(Refer to Chapter 1 of the Instruction Manual (Applied).)*

1)To release the inverter from the power supply when a fault occurs or when the drive is not functioning (e.g. emergency stop operation). For example, MC avoids overheat or burnout of the brake resistor when heat capacity of the resistor is insufficient or brake regenerative transistor is damaged with short while connecting an optional brake resistor.

2)To prevent any accident due to an automatic restart at restoration of power after an inverter stop made by a power failure

3)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.

(16) 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.

(17) Countermeasures against inverter-generated EMI

If electromagnetic noise generated from the inverter causes frequency setting signal to fluctuate and motor rotation speed to be unstable when changing motor speed with analog signal, the following countermeasures are effective.

- 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 shield cables as signal cables.
- Install a ferrite core on the signal cable (Example: ZCAT3035-1330 TDK).

(18) Instructions for overload operation

When performing an operation of frequent start/stop with the inverter, rise/fall in the temperature of the transistor element of the inverter will repeat due to a continuous 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. Decreasing current may increase the life. However, decreasing current will result in insufficient torque and the inverter may not start. Therefore, choose the inverter which has enough allowance for current (up to 2 rank larger in capacity).

(19) Make sure that the specifications and rating match the system requirements.

5 FAILSAFE OF THE SYSTEM WHICH USES THE INVERTER

When a fault occurs, the inverter trips to output a fault signal. 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 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 and 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.

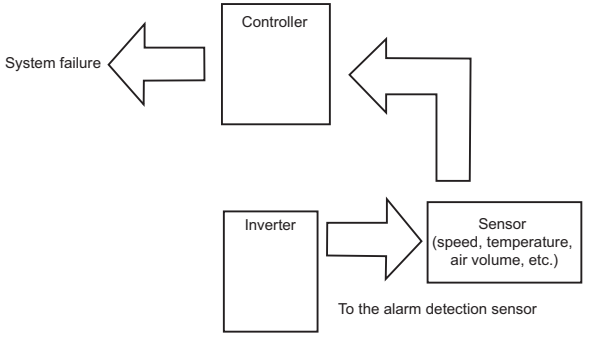
(1) Interlock method which uses the inverter status output signals
By combining the inverter status output signals to provide an interlock as shown below, an inverter alarm can be detected.

No.	Interlock Method	Check Method	Used Signals	Refer to Page
1)	Inverter protective function operation	Operation check of an alarm contact Circuit error detection by negative logic	Fault output signal (ALM signal)	*Refer to Chapter 4 of the Instruction Manual (Applied).*
2)	Inverter running status	Operation ready signal check	Operation ready signal (RY signal)	*Refer to Chapter 4 of the Instruction Manual (Applied).*
3)	Inverter running status	Logic check of the start signal and running signal	Start signal (STF signal, STR signal) Running signal (RUN signal)	*Refer to Chapter 4 of the Instruction Manual (Applied).*
4)	Inverter running status	Logic check of the start signal and output current	Start signal (STF signal, STR signal) Output current detection signal (Y12 signal)	*Refer to Chapter 4 of the Instruction Manual (Applied).*

(2) 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, when the inverter CPU fails, even if the interlock is provided using the inverter fault signal, start signal and RUN signal, there is a case where a fault signal is not output and RUN signal is kept output even if an inverter fault occurs.
Provide a speed detector to detect the motor speed and current detector to detect the motor current and consider the backup system such as checking up as below according to the level of importance of the system.

1) 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 motor current runs as the motor is running for the period until the motor stops since the inverter starts decelerating even if the start signal turns off. For the logic check, configure a sequence considering the inverter deceleration time. In addition, it is recommended to check the three-phase current when using the current detector.

2) Command speed and actual operation check
Check if there is no gap between the actual speed and commanded speed by comparing the inverter speed command and detected speed of the speed detector.



6 PARAMETER LIST

6.1 Parameter list

For simple variable-speed operation of the inverter, the initial setting 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 are available from the operation panel (FR-DU07).

REMARKS

- ◎ indicates simple mode parameters. (initially set to extended mode)
- The shaded parameters in the table allow its setting to be changed during operation even if "0" (initial value) is set in *Pr. 77 Parameter write selection*.

Parameter	Name	Setting Range	Initial Value
◎ 0	Torque boost	0 to 30%	1%
◎ 1	Maximum frequency	0 to 120Hz	60Hz
◎ 2	Minimum frequency	0 to 120Hz	0Hz
◎ 3	Base frequency	0 to 400Hz	60Hz
◎ 4	Multi-speed setting (high speed)	0 to 400Hz	60Hz
◎ 5	Multi-speed setting (middle speed)	0 to 400Hz	30Hz
◎ 6	Multi-speed setting (low speed)	0 to 400Hz	10Hz
◎ 7	Acceleration time	0 to 3600/360s	15s
◎ 8	Deceleration time	0 to 3600/360s	15s
◎ 9	Electronic thermal O/L relay	0 to 3600A	Rated inverter current
10	DC injection brake operation frequency	0 to 120Hz, 9999	3Hz
11	DC injection brake operation time	0 to 10s, 8888	0.5s
12	DC injection brake operation voltage	0 to 30%	1%
13	Starting frequency	0 to 60Hz	0.5Hz
14	Load pattern selection	0 to 5	0
15	Jog frequency	0 to 400Hz	5Hz
16	Jog acceleration/ deceleration time	0 to 3600/360s	0.5s
17	MRS input selection	0, 2, 4	0
18	High speed maximum frequency	120 to 400Hz	60Hz
19	Base frequency voltage	0 to 1000V, 8888, 9999	9999
20	Acceleration/deceleration reference frequency	1 to 400Hz	60Hz
21	Acceleration/deceleration time increments	0, 1	0
22	Stall prevention operation level (torque limit level)	0 to 400%	150%
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 400Hz, 9999	9999
28	Multi-speed input compensation selection	0, 1	0
29	Acceleration/deceleration pattern selection	0 to 5	0
31	Frequency jump 1A	0 to 400Hz, 9999	9999
32	Frequency jump 1B	0 to 400Hz, 9999	9999
33	Frequency jump 2A	0 to 400Hz, 9999	9999
34	Frequency jump 2B	0 to 400Hz, 9999	9999
35	Frequency jump 3A	0 to 400Hz, 9999	9999
36	Frequency jump 3B	0 to 400Hz, 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 400Hz	6Hz
43	Output frequency detection for reverse rotation	0 to 400Hz, 9999	9999
44	Second acceleration/ deceleration time	0 to 3600/360s	5s
45	Second deceleration time	0 to 3600/ 360s, 9999	9999
46	Second torque boost	0 to 30%, 9999	9999
47	Second V/F (base frequency)	0 to 400Hz, 9999	9999
48	Second stall prevention operation current	0 to 220%	150%
49	Second stall prevention operation frequency	0 to 400Hz, 9999	0Hz
50	Second output frequency detection	0 to 400Hz	30Hz
51	Second electronic thermal O/L relay	0 to 3600A, 9999	9999
52	DU/PU main display data selection	0, 5 to 8, 10 to 14, 17 to 20, 22 to 25, 32 to 35, 39, 46, 50 to 57, 100	0
54	CA terminal function selection	1 to 3, 5 to 8, 10 to 14, 17, 18, 21, 24, 32 to 34, 46, 50, 52, 53, 70	1
55	Frequency monitoring reference	0 to 400Hz	60Hz
56	Current monitoring reference	0 to 3600A	Rated inverter current
57	Restart coasting time	0, 0.1 to 30s, 9999	9999
58	Restart cushion time	0 to 60s	1s
59	Remote function selection	0, 1, 2, 3	0
60	Energy saving control selection	0, 4	0
61	Reference current	0 to 3600A, 9999	9999
62	Reference value at acceleration	0 to 220%, 9999	9999

Parameter	Name	Setting Range	Initial Value
63	Reference value at deceleration	0 to 220%, 9999	9999
64	Starting frequency for elevator mode	0 to 10Hz, 9999	9999
65	Retry selection	0 to 5	0
66	Stall prevention operation reduction starting frequency	0 to 400Hz	60Hz
67	Number of retries at fault occurrence	0 to 10, 101 to 110	0
68	Retry waiting time	0 to 600s	1s
69	Retry count display erase	0	0
71	Applied motor	0 to 8, 13 to 18	0
73	Analog input selection	0 to 7, 10 to 17	1
74	Input filter time constant	0 to 8	1
75	Reset selection/ disconnected PU detection/ PU stop selection	0 to 3, 14 to 17, 100 to 103, 114 to 117	14
76	Fault code output selection	0, 1, 2	0
77	Parameter write selection	0, 1, 2	0
78	Reverse rotation prevention selection	0, 1, 2	0
◎ 79	Operation mode selection	0, 1, 2, 3, 4, 6, 7	0
80	Motor capacity	0 to 3600kW, 9999	9999
81	Number of motor poles	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 9999	9999
82	Motor excitation current	0 to 3600A, 9999	9999
83	Rated motor voltage	0 to 1000V	690V
84	Rated motor frequency	10 to 120Hz	60Hz
89	Speed control gain (Advanced magnetic flux vector)	0 to 200%, 9999	9999
90	Motor constant (R1)	0 to 400mΩ, 9999	9999
91	Motor constant (R2)	0 to 400mΩ, 9999	9999
92	Motor constant (L1)	0 to 3600mΩ (0 to 400mH), 9999	9999
93	Motor constant (L2)	0 to 3600mΩ (0 to 400mH), 9999	9999
94	Motor constant (X)	0 to 100Ω (0 to 100%), 9999	9999
95	Online auto tuning selection	0 to 2	0
96	Auto tuning setting/status	0, 1, 101	0
100	V/F1(first frequency)	0 to 400Hz, 9999	9999
101	V/F1(first frequency voltage)	0 to 1,000V	0V
102	V/F2(second frequency)	0 to 400Hz, 9999	9999
103	V/F2(second frequency voltage)	0 to 1,000V	0V
104	V/F3(third frequency)	0 to 400Hz, 9999	9999
105	V/F3(third frequency voltage)	0 to 1,000V	0V
106	V/F4(fourth frequency)	0 to 400Hz, 9999	9999
107	V/F4(fourth frequency voltage)	0 to 1,000V	0V
108	V/F5(fifth frequency)	0 to 400Hz, 9999	9999
109	V/F5(fifth frequency voltage)	0 to 1,000V	0V
110	Third acceleration/ deceleration time	0 to 3600/ 360s, 9999	9999

Parameter	Name	Setting Range	Initial Value
111	Third deceleration time	0 to 3600/ 360s, 9999	9999
112	Third torque boost	0 to 30%, 9999	9999
113	Third V/F (base frequency)	0 to 400Hz, 9999	9999
114	Third stall prevention operation current	0 to 220%	150%
115	Third stall prevention operation frequency	0 to 400Hz	0
116	Third output frequency detection	0 to 400Hz	60Hz
117	PU communication station number	0 to 31	0
118	PU communication speed	48, 96, 192, 384	192
119	PU communication stop bit length	0, 1, 10, 11	1
120	PU communication parity check	0, 1, 2	2
121	Number of PU communication retries	0 to 10, 9999	1
122	PU communication check time interval	0, 0.1 to 999.8s, 9999	9999
123	PU communication waiting time setting	0 to 150ms, 9999	9999
124	PU communication CR/LF selection	0, 1, 2	1
◎ 125	Terminal 2 frequency setting gain frequency	0 to 400Hz	60Hz
◎ 126	Terminal 4 frequency setting gain frequency	0 to 400Hz	60Hz
127	PID control automatic switchover frequency	0 to 400Hz, 9999	9999
128	PID action selection	10, 11, 20, 21, 50, 51, 60, 61, 70, 71, 80, 81, 90, 91, 100, 101	10
129	PID proportional band	0.1 to 1000%, 9999	100%
130	PID integral time	0.1 to 3600s, 9999	1s
131	PID upper limit	0 to 100%, 9999	9999
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 10s, 9999	9999
135	Electronic bypass sequence selection	0, 1	0
136	MC switchover interlock time	0 to 100s	1s
137	Start waiting time	0 to 100s	0.5s
138	Bypass selection at a fault	0, 1	0
139	Automatic switchover frequency from inverter to bypass operation	0 to 60Hz, 9999	9999
140	Backlash acceleration stopping frequency	0 to 400Hz	1Hz
141	Backlash acceleration stopping time	0 to 360s	0.5s
142	Backlash deceleration stopping frequency	0 to 400Hz	1Hz
143	Backlash deceleration stopping time	0 to 360s	0.5s
144	Speed setting switchover	0, 2, 4, 6, 8, 10, 102, 104, 106, 108, 110	4
145	PU display language selection	0 to 7	1

Parameter	Name	Setting Range	Initial Value
147	Acceleration/deceleration time switching frequency	0 to 400Hz, 9999	9999
148	Stall prevention level at 0V input	0 to 220%	150%
149	Stall prevention level at 10V input	0 to 220%	200%
150	Output current detection level	0 to 220%	150%
151	Output current detection signal delay time	0 to 10s	0s
152	Zero current detection level	0 to 220%	5%
153	Zero current detection time	0 to 1s	0.5s
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 25s, 9999	0s
158	AM terminal function selection	1 to 3, 5 to 8, 10 to 14, 17, 18, 21, 24, 32 to 34, 46, 50, 52, 53, 70	1
159	Automatic switchover frequency range from bypass to inverter operation	0 to 10Hz, 9999	9999
◎ 160	User group read selection	0, 1, 9999	0
161	Frequency setting/key lock operation selection	0, 1, 10, 11	0
162	Automatic restart after instantaneous power failure selection	0, 1, 2, 10, 11, 12	0
163	First cushion time for restart	0 to 20s	0s
164	First cushion voltage for restart	0 to 100%	0%
165	Stall prevention operation level for restart	0 to 220%	150%
166	Output current detection signal retention time	0 to 10s, 9999	0.1s
167	Output current detection operation selection	0, 1	0
168	Parameter for manufacturer setting. Do not set.		
169			
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 999, 9999	9999
174	User group clear	0 to 999, 9999	9999
178	STF terminal function selection	0 to 9, 12 to 20, 22 to 28, 42 to 44, 50, 60, 62, 64 to 69, 74, 83, 9999	60
179	STR terminal function selection	0 to 9, 12 to 20, 22 to 28, 42 to 44, 50, 61, 62, 64 to 69, 74, 83, 9999	61

Parameter	Name	Setting Range	Initial Value
180	RL terminal function selection	0 to 9, 12 to 20, 22 to 28, 42 to 44, 50, 62, 64 to 69, 74, 83, 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	0 to 9, 12 to 20, 22 to 28, 42 to 44, 50, 62 to 69, 74, 83, 9999	4
185	JOG terminal function selection	0 to 9, 12 to 20, 22 to 28, 42 to 44, 50, 62, 64 to 69, 74, 76, 83, 9999	5
186	CS terminal function selection	0 to 9, 12 to 20, 22 to 28, 42 to 44, 50, 62, 64 to 69, 74, 83, 9999	6
187	MRS terminal function selection		24
188	STOP terminal function selection		25
189	RES terminal function selection		62
190	RUN terminal function selection	0 to 6, 8, 10 to 20, 25 to 28, 30 to 36, 39, 41 to 45, 47, 55, 64, 70, 83, 84, 90 to 99, 100 to 106, 108, 110 to 116, 120, 125 to 128, 130 to 136, 139, 141 to 145, 147, 155, 164, 170, 183, 184, 190 to 199, 9999	0
191	SU terminal function selection		1
192	IPF terminal function selection		2
193	OL terminal function selection		3
194	FU terminal function selection		4
195	ABC1 terminal function selection	0 to 6, 8, 10 to 20, 25 to 28, 30 to 36, 39, 41 to 45, 47, 55, 64, 70, 83, 84, 90, 91, 94 to 99, 100 to 106, 108, 110 to 116, 120, 125 to 128, 130 to 136, 139, 141 to 145, 147, 155, 164, 170, 183, 184, 190, 191, 194 to 199, 9999	99
196	ABC2 terminal function selection		9999
232 to 239	Multi-speed setting (8 speed to 15 speed)	0 to 400Hz, 9999	9999
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	1

Parameter	Name	Setting Range	Initial Value
245	Rated slip	0 to 50%, 9999	9999
246	Slip compensation time constant	0.01 to 10s	0.5s
247	Constant-power range slip compensation selection	0, 9999	9999
250	Stop selection	0 to 100s, 1000 to 1100s 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%
255	Life alarm status display	(0 to 15)	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
267	Terminal 4 input selection	0, 1, 2	0
268	Monitor decimal digits selection	0,1, 9999	9999
269	Parameter for manufacturer setting. Do not set.		
270	Stop-on contact/load torque high-speed frequency control selection	0, 1, 2, 3, 11, 13	0
271	High-speed setting maximum current	0 to 220%	50%
272	Middle-speed setting minimum current	0 to 220%	100%
273	Current averaging range	0 to 400Hz, 9999	9999
274	Current averaging filter time constant	1 to 4000	16
275	Stop-on contact excitation current low-speed multiplying factor	0 to 1000%, 9999	9999
278	Brake opening frequency	0 to 30Hz	3Hz
279	Brake opening current	0 to 220%	130%
280	Brake opening current detection time	0 to 2s	0.3s
281	Brake operation time at start	0 to 5s	0.3s
282	Brake operation frequency	0 to 30Hz	6Hz
283	Brake operation time at stop	0 to 5s	0.3s
284	Deceleration detection function selection	0, 1	0
285	Overspeed detection frequency (Excessive speed deviation detection frequency)	0 to 30Hz, 9999	9999
286	Droop gain	0 to 100%	0%
287	Droop filter time constant	0 to 1s	0.3s
288	Droop function activation selection	0, 1, 2, 10, 11	0
291	Pulse train I/O selection	0, 1	0
292	Automatic acceleration/ deceleration	0, 1, 3, 5 to 8	0
293	Acceleration/deceleration separate selection	0 to 2	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
299	Rotation direction detection selection at restarting	0, 1, 9999	0
331	RS-485 communication station number	0 to 31 (0 to 247)	0
332	RS-485 communication speed	3, 6, 12, 24, 48, 96, 192, 384	96
333	RS-485 communication stop bit length	0, 1, 10, 11	1
334	RS-485 communication parity check selection	0, 1, 2	2
335	RS-485 communication retry count	0 to 10, 9999	1
336	RS-485 communication check time interval	0 to 999.8s, 9999	0s
337	RS-485 communication waiting time setting	0 to 150ms, 9999	9999
338	Communication operation command source	0, 1	0
339	Communication speed command source	0, 1, 2	0
340	Communication startup mode selection	0, 1, 2, 10, 12	0
341	RS-485 communication CR/ LF selection	0, 1, 2	1
342	Communication EEPROM write selection	0, 1	0
343	Communication error count	—	0
350 *1	Stop position command selection	0, 1, 9999	9999
351 *1	Orientation speed	0 to 30Hz	2Hz
352 *1	Creep speed	0 to 10Hz	0.5Hz
353 *1	Creep switchover position	0 to 16383	511
354 *1	Position loop switchover position	0 to 8191	96
355 *1	DC injection brake start position	0 to 255	5
356 *1	Internal stop position command	0 to 16383	0
357 *1	Orientation in-position zone	0 to 255	5
358 *1	Servo torque selection	0 to 13	1
359 *1	Encoder rotation direction	0, 1	1
360 *1	16-bit data selection	0 to 127	0
361 *1	Position shift	0 to 16383	0
362 *1	Orientation position loop gain	0.1 to 100	1
363 *1	Completion signal output delay time	0 to 5s	0.5s
364 *1	Encoder stop check time	0 to 5s	0.5s
365 *1	Orientation limit	0 to 60s, 9999	9999
366 *1	Recheck time	0 to 5s, 9999	9999
367 *1	Speed feedback range	0 to 400Hz, 9999	9999
368 *1	Feedback gain	0 to 100	1
369 *1	Number of encoder pulses	0 to 4096	1024
374	Overspeed detection level	0 to 400Hz	140Hz
376 *1	Encoder signal loss detection enable/disable selection	0, 1	0
380	Acceleration S-pattern 1	0 to 50%	0
381	Deceleration S-pattern 1	0 to 50%	0
382	Acceleration S-pattern 2	0 to 50%	0
383	Deceleration S-pattern 2	0 to 50%	0

Parameter	Name	Setting Range	Initial Value
384	Input pulse division scaling factor	0 to 250	0
385	Frequency for zero input pulse	0 to 400Hz	0
386	Frequency for maximum input pulse	0 to 400Hz	60Hz
393 *1	Orientation selection	0, 1, 2	0
396 *1	Orientation speed gain (P term)	0 to 1000	60
397 *1	Orientation speed integral time	0 to 20s	0.333s
398 *1	Orientation speed gain (D term)	0 to 100	1
399 *1	Orientation deceleration ratio	0 to 1000	20
414	PLC function operation selection	0, 1	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
419 *1	Position command source selection	0, 1, 2	0
420 *1	Command pulse scaling factor numerator	0 to 32767	1
421 *1	Command pulse scaling factor denominator	0 to 32767	1
422 *1	Position loop gain	0 to 150sec^{-1}	25sec^{-1}
423 *1	Position feed forward gain	0 to 100%	0
424 *1	Position command acceleration/deceleration time constant	0 to 50s	0s
425 *1	Position feed forward command filter	0 to 5s	0s
426 *1	In-position width	0 to 32767pulse	100
427 *1	Excessive level error	0 to 400K, 9999	40K
428 *1	Command pulse selection	0 to 5	0
429 *1	Clear signal selection	0, 1	1
430 *1	Pulse monitor selection	0 to 5, 9999	9999
450	Second applied motor	0 to 8, 13 to 18, 9999	9999
451	Second motor control method selection	10, 11, 12, 20, 9999	9999
453	Second motor capacity	0 to 3600kW, 9999	9999
454	Number of second motor poles	2, 4, 6, 8, 10, 9999	9999
455	Second motor excitation current	0 to 3600A, 9999	9999
456	Rated second motor voltage	0 to 1000V	690V
457	Rated second motor frequency	10 to 120Hz	60Hz
458	Second motor constant (R1)	0 to 400mΩ, 9999	9999
459	Second motor constant (R2)	0 to 400mΩ, 9999	9999
460	Second motor constant (L1)	0 to 3600mΩ (0 to 400mH), 9999	9999
461	Second motor constant (L2)	0 to 3600mΩ (0 to 400mH), 9999	9999
462	Second motor constant (X)	0 to 100Ω (0 to 100%), 9999	9999
463	Second motor auto tuning setting/status	0, 1, 101	0
464 *1	Digital position control sudden stop deceleration time	0 to 360s	0s

Parameter	Name	Setting Range	Initial Value
465 *1	First position feed amount lower 4 digits	0 to 9999	0
466 *1	First position feed amount upper 4 digits	0 to 9999	0
467 *1	Second position feed amount lower 4 digits	0 to 9999	0
468 *1	Second position feed amount upper 4 digits	0 to 9999	0
469 *1	Third position feed amount lower 4 digits	0 to 9999	0
470 *1	Third position feed amount upper 4 digits	0 to 9999	0
471 *1	Fourth position feed amount lower 4 digits	0 to 9999	0
472 *1	Fourth position feed amount upper 4 digits	0 to 9999	0
473 *1	Fifth position feed amount lower 4 digits	0 to 9999	0
474 *1	Fifth position feed amount upper 4 digits	0 to 9999	0
475 *1	Sixth position feed amount lower 4 digits	0 to 9999	0
476 *1	Sixth position feed amount upper 4 digits	0 to 9999	0
477 *1	Seventh position feed amount lower 4 digits	0 to 9999	0
478 *1	Seventh position feed amount upper 4 digits	0 to 9999	0
479 *1	Eighth position feed amount lower 4 digits	0 to 9999	0
480 *1	Eighth position feed amount upper 4 digits	0 to 9999	0
481 *1	Ninth position feed amount lower 4 digits	0 to 9999	0
482 *1	Ninth position feed amount upper 4 digits	0 to 9999	0
483 *1	Tenth position feed amount lower 4 digits	0 to 9999	0
484 *1	Tenth position feed amount upper 4 digits	0 to 9999	0
485 *1	Eleventh position feed amount lower 4 digits	0 to 9999	0
486 *1	Eleventh position feed amount upper 4 digits	0 to 9999	0
487 *1	Twelfth position feed amount lower 4 digits	0 to 9999	0
488 *1	Twelfth position feed amount upper 4 digits	0 to 9999	0
489 *1	Thirteenth position feed amount lower 4 digits	0 to 9999	0
490 *1	Thirteenth position feed amount upper 4 digits	0 to 9999	0
491 *1	Fourteenth position feed amount lower 4 digits	0 to 9999	0
492 *1	Fourteenth position feed amount upper 4 digits	0 to 9999	0
493 *1	Fifteenth position feed amount lower 4 digits	0 to 9999	0
494 *1	Fifteenth position feed amount upper 4 digits	0 to 9999	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 to 9999	0
503	Maintenance timer	0 (1 to 9998)	0
504	Maintenance timer alarm output set time	0 to 9998, 9999	9999
505	Speed setting reference	1 to 120Hz	60Hz
506	Parameter 1 for user	0 to 65535	0

Parameter	Name	Setting Range	Initial Value
507	Parameter 2 for user	0 to 65535	0
508	Parameter 3 for user	0 to 65535	0
509	Parameter 4 for user	0 to 65535	0
510	Parameter 5 for user	0 to 65535	0
511	Parameter 6 for user	0 to 65535	0
512	Parameter 7 for user	0 to 65535	0
513	Parameter 8 for user	0 to 65535	0
514	Parameter 9 for user	0 to 65535	0
515	Parameter 10 for user	0 to 65535	0
516	S-pattern time at a start of acceleration	0.1 to 2.5s	0.1s
517	S-pattern time at a completion of acceleration	0.1 to 2.5s	0.1s
518	S-pattern time at a start of deceleration	0.1 to 2.5s	0.1s
519	S-pattern time at a completion of deceleration	0.1 to 2.5s	0.1s
539	Modbus-RTU communication check time interval	0 to 999.8s, 9999	9999
547	Parameter for manufacturer setting. Do not set.		
548			
549	Protocol selection	0, 1	0
550	NET mode operation command source selection	0, 1, 9999	9999
551	PU mode operation command source selection	1, 2, 3, 9999	9999
555	Current average time	0.1 to 1.0s	1s
556	Data output mask time	0.0 to 20.0s	0s
557	Current average value monitor signal output reference current	0 to 3600A	Rated inverter current
563	Energization time carrying-over times	(0 to 65535)	0
564	Operating time carrying-over times	(0 to 65535)	0
569	Second motor speed control gain	0 to 200%, 9999	9999
570	Multiple rating setting	2, 102	2
571	Holding time at a start	0.0 to 10.0s, 9999	9999
574	Second motor online auto tuning	0, 1	0
575	Output interruption detection time	0 to 3600s, 9999	1s
576	Output interruption detection level	0 to 400Hz	0Hz
577	Output interruption cancel level	900 to 1100%	1000%
611	Acceleration time at a restart	0 to 3600s, 9999	15s
665	Regeneration avoidance frequency gain	0 to 200%	100%
684	Tuning data unit switchover	0, 1	0
800	Control method selection	0 to 5, 9 to 12, 20	20
802 *1	Pre-excitation selection	0, 1	0
803	Constant power range torque characteristic selection	0, 1	0
804	Torque command source selection	0, 1, 2, 3, 4, 5, 6	0
805	Torque command value (RAM)	600 to 1400%	1000%

Parameter	Name	Setting Range	Initial Value
806	Torque command value (RAM,EEPROM)	600 to 1400%	1000%
807	Speed limit selection	0, 1, 2	0
808	Forward rotation speed limit	0 to 120Hz	60Hz
809	Reverse rotation speed limit	0 to 120Hz, 9999	9999
810	Torque limit input method selection	0, 1	0
811	Set resolution switchover	0, 1, 10, 11	0
812	Torque limit level (regeneration)	0 to 400%, 9999	9999
813	Torque limit level (3rd quadrant)	0 to 400%, 9999	9999
814	Torque limit level (4th quadrant)	0 to 400%, 9999	9999
815	Torque limit level 2	0 to 400%, 9999	9999
816	Torque limit level during acceleration	0 to 400%, 9999	9999
817	Torque limit level during deceleration	0 to 400%, 9999	9999
818	Easy gain tuning response level setting	1 to 15	2
819	Easy gain tuning selection	0 to 2	0
820	Speed control P gain 1	0 to 1000%	60%
821	Speed control integral time 1	0 to 20s	0.333s
822	Speed setting filter 1	0 to 5s, 9999	9999
823 *1	Speed detection filter 1	0 to 0.1s	0.001s
824	Torque control P gain 1	0 to 200%	100%
825	Torque control integral time 1	0 to 500ms	5ms
826	Torque setting filter 1	0 to 5s, 9999	9999
827	Torque detection filter 1	0 to 0.1s	0s
828	Model speed control gain	0 to 1000%	60%
830	Speed control P gain 2	0 to 1000%, 9999	9999
831	Speed control integral time 2	0 to 20s, 9999	9999
832	Speed setting filter 2	0 to 5s, 9999	9999
833 *1	Speed detection filter 2	0 to 0.1s, 9999	9999
834	Torque control P gain 2	0 to 200%, 9999	9999
835	Torque control integral time 2	0 to 500ms, 9999	9999
836	Torque setting filter 2	0 to 5s, 9999	9999
837	Torque detection filter 2	0 to 0.1s, 9999	9999
840 *1	Torque bias selection	0 to 3, 9999	9999
841 *1	Torque bias 1	600 to 1400%, 9999	9999
842 *1	Torque bias 2	600 to 1400%, 9999	9999
843 *1	Torque bias 3	600 to 1400%, 9999	9999
844 *1	Torque bias filter	0 to 5s, 9999	9999
845 *1	Torque bias operation time	0 to 5s, 9999	9999
846 *1	Torque bias balance compensation	0 to 10V, 9999	9999
847 *1	Fall-time torque bias terminal 1 bias	0 to 400%, 9999	9999
848 *1	Fall-time torque bias terminal 1 gain	0 to 400%, 9999	9999
849	Analog input offset adjustment	0 to 200%	100%
850	Brake operation selection	0, 1, 2	0

Parameter	Name	Setting Range	Initial Value
853	Speed deviation time	0 to 100s	1s
854	Excitation ratio	0 to 100%	100%
858	Terminal 4 function assignment	0, 1, 4, 9999	0
859	Torque current	0 to 3600A, 9999	9999
860	Second motor torque current	0 to 3600A, 9999	9999
862	Notch filter time constant	0 to 60	0
863	Notch filter depth	0, 1, 2, 3	0
864	Torque detection	0 to 400%	150%
865	Low speed detection	0 to 400Hz	1.5Hz
866	Torque monitoring reference	0 to 400%	150%
867	AM output filter	0 to 5s	0.01s
868	Terminal 1 function assignment	0 to 6, 9999	0
869	Current output filter	0 to 5s	0.02s
870	Speed detection hysteresis	0 to 5Hz	0Hz
872	Input phase loss protection selection	0, 1	0
873	Speed limit	0 to 120Hz	20Hz
874	OLT level setting	0 to 200%	150%
875	Fault definition	0, 1	0
877	Speed feed forward control/ model adaptive speed control selection	0, 1, 2	0
878	Speed feed forward filter	0 to 1s	0s
879	Speed feed forward torque limit	0 to 400%	150%
880	Load inertia ratio	0 to 200 times	7
881	Speed feed forward gain	0 to 1000%	0%
882	Regeneration avoidance operation selection	0, 1, 2	0
883	Regeneration avoidance operation level	300 to 1200V	1080V DC
884	Regeneration avoidance at deceleration detection sensitivity	0 to 5	0
885	Regeneration avoidance compensation frequency limit value	0 to 30Hz, 9999	6Hz
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 to 3600kW	Rated inverter capacity
894	Control selection during commercial power-supply operation	0, 1, 2, 3	0
895	Power saving rate reference value	0, 1, 9999	9999
896	Power unit cost	0 to 500, 9999	9999
897	Power saving monitor average time	0,1 to 1000h, 9999	9999
898	Power saving cumulative monitor clear	0, 1, 10, 9999	9999
899	Operation time rate (estimated value)	0 to 100%, 9999	9999

Parameter	Name	Setting Range	Initial Value
C0 (900)	CA terminal calibration	—	—
C1 (901)	AM terminal calibration	—	—
C2 (902)	Terminal 2 frequency setting bias frequency	0 to 400Hz	0Hz
C3 (902)	Terminal 2 frequency setting bias	0 to 300%	0%
125 (903)	Terminal 2 frequency setting gain frequency	0 to 400Hz	60Hz
C4 (903)	Terminal 2 frequency setting gain	0 to 300%	100%
C5 (904)	Terminal 4 frequency setting bias frequency	0 to 400Hz	0Hz
C6 (904)	Terminal 4 frequency setting bias	0 to 300%	20%
126 (905)	Terminal 4 frequency setting gain frequency	0 to 400Hz	60Hz
C7 (905)	Terminal 4 frequency setting gain	0 to 300%	100%
C8 (930)	Current output bias signal	0 to 100%	0%
C9 (930)	Current output bias current	0 to 100%	0%
C10 (931)	Current output gain signal	0 to 100%	100%
C11 (931)	Current output gain current	0 to 100%	100%
C12 (917)	Terminal 1 bias frequency (speed)	0 to 400Hz	0Hz
C13 (917)	Terminal 1 bias (speed)	0 to 300%	0%
C14 (918)	Terminal 1 gain frequency (speed)	0 to 400Hz	60Hz
C15 (918)	Terminal 1 gain (speed)	0 to 300%	100%
C16 (919)	Terminal 1 bias command (torque/magnetic flux)	0 to 400%	0%
C17 (919)	Terminal 1 bias (torque/ magnetic flux)	0 to 300%	0%
C18 (920)	Terminal 1 gain command (torque/magnetic flux)	0 to 400%	150%
C19 (920)	Terminal 1 gain (torque/ magnetic flux)	0 to 300%	100%
C38 (932)	Terminal 4 bias command (torque/magnetic flux)	0 to 400%	0%
C39 (932)	Terminal 4 bias (torque/ magnetic flux)	0 to 300%	20%
C40 (933)	Terminal 4 gain command (torque/magnetic flux)	0 to 400%	150%
C41 (933)	Terminal 4 gain (torque/ magnetic flux)	0 to 300%	100%
989	Parameter for manufacturer setting. Do not set.		
990	PU buzzer control	0, 1	1
991	PU contrast adjustment	0 to 63	58
994	Droop break point gain	0.1 to 100%, 9999	9999
995	Droop break point torque	0.1 to 100%	100%
999	Automatic parameter setting	10, 11, 20, 21, 30, 31, 9999	9999
Pr. CL	Parameter clear	0, 1	0
ALLC	All parameter clear	0, 1	0
Er.CL	Faults history clear	0, 1	0
PCPY *2	Parameter copy	0, 1, 2, 3	0

*1 Setting can be made only when the FR-A7AP/FR-A7AL is mounted.

*2 Parameters cannot be copied from FR-A720 or FR-A740.

7 FR-A770 DEDICATED SPECIFICATIONS

The following section describes the details of parameters which are described differently or not described in the FR-A700 Instruction Manual (Applied) (IB-0600226ENG).

7.1 DU/PU monitor display data selection for the terminals CA and AM

The full-scale value reference for the monitor output is 1200V.

Monitored item	Unit	*Pr.52* setting		*Pr.54* (CA) *Pr.158* (AM) setting value	Full-scale Value of the Terminal CA and AM	Description
		DU LED	PU main monitor			
Output voltage	0.1V	0/100		3	1200V	Displays the inverter output voltage.
Converter output voltage	0.1V	8	*1	8	1200V	Displays the DC bus voltage value.
Converter output voltage peak value	0.1V	12	*1	12	1200V	Retains and displays the peak value of DC bus voltage (cleared with each start).

*1 Frequency setting to output terminal status on the PU main monitor are selected by "other monitor selection" of the parameter unit (FR-PU04, FR-PU07).

7.2 Elevator mode (automatic acceleration and deceleration)

(1) Elevator mode

- By setting *Pr.292 Automatic acceleration/deceleration* ="5" or "6", the elevator mode is selected and the base frequency voltage is changed to "690V".

Name	Normal operation	Elevator mode	
		Pr.292 =5	*Pr.292* =6
Torque boost	*Pr.0* (1%)	Changes according to the output current	
Starting frequency	*Pr.13* (0.5Hz)	*Pr.64* (2Hz) Accelerate after maintaining 100ms	
Base frequency voltage	*Pr.19* (9999)	690V	
Stall prevention operation level	*Pr.22* (150%) etc.	150%	180%

7.3 Multiple rating

(1) By setting "102" in *Pr.570 Multiple rating setting*, vector control can be performed.

Parameter number	Name	Initial value	Setting range	Description
570	Multiple rating setting	2	2	Vector control cannot be performed. Writing is disabled during operation.
			102	Vector control can be performed. Writing is disabled during operation. Rated specifications are changed. *(Refer to page 3)*

(2) By enabling *Pr.570 Multiple rating setting*, initial values of the following parameters will be changed to the initial values on page *3*.

Parameter number	Name	Initial value
9	Electronic thermal O/L relay	Rated current
56	Current monitoring reference	Rated current
557	Current average value monitor signal output reference current	Rated current
893	Energy saving monitor reference (motor capacity)	Rated capacity

(3) The control method availability determined by *Pr.570* is as follows.

Control method setting (*Pr.80, Pr.81, Pr.800*)	*Pr.570* setting	
	2	102
V/F control	○	○
Advanced magnetic flux vector control	○	○
Real sensorless vector control	×	○
Vector control	×	○
Vector control test operation	×	○

○: Enabled, ×: Disabled

CAUTION

· When the setting of *Pr.570 Multiple rating setting* is changed, perform all parameter clear and inverter reset.

7.4 Operation by PLC function (Pr. 414 to Pr. 417, Pr. 498, Pr. 506 to Pr. 515)

I/O data read, write, etc. can be performed by accessing the inverter in the predetermined method using special relays, special registers, etc.
Operation, parameter read/write, etc. can be performed in accordance with the created sequence programs (built in the inverter) using input data from the control input terminals.
With the output signals, output data can be output to outside the inverter from the control output terminals as not only the inverter's status signals but also pilot lamp on/off, interlock and other control signals set freely by the user.

Parameter Number	Name	Initial Value	Setting Range	Description
414	PLC function operation selection	0	0	PLC function is invalid
			1	PLC function is valid (Inverter reset is necessary to make this setting valid.)
415	Inverter operation lock mode setting	0	0	The inverter start signal is valid regardless of the sequence program execution key.
			1	The inverter start signal is valid only when the sequence program execution key is set to RUN. When the sequence program execution key is in the STOP position, the inverter does not start if the inverter start signal STF or STR is turned ON. (If the key is switched from RUN to STOP during inverter operation, the inverter is decelerated to a stop.)
416	Pre-scale setting value	0	0 to 5	Pre-scale function selection (increments scaling factor) 0: No function 1: × 1 2: × 0.1 3: × 0.01 4: × 0.001 5: × 0.0001
417	Pre-scale setting value	1	0 to 32767	Set the pre-scale value to calcute the number of sampling pulse when inputting the pulse train.
498	PLC function flash memory clear	0	0 to 9999	9696: Flash memory clear
				Other than 9696: Flash memory is not cleared
506	Parameter 1 for user	0	0 to 65535	Inverter parameters *Pr. 506 to Pr. 515* can be used as user parameters. Since this parameter area and the devices used with the PLC function, D110 to D119, are accessible to each other, the values set in *Pr. 506 to Pr. 515* can be used in a sequence program. The result of operation performed in the sequence program can also be monitored using *Pr. 506 to Pr. 515*.
507	Parameter 2 for user			
508	Parameter 3 for user			
509	Parameter 4 for user			
510	Parameter 5 for user			
511	Parameter 6 for user			
512	Parameter 7 for user			
513	Parameter 8 for user			
514	Parameter 9 for user			
515	Parameter 10 for user			

Refer to the FR-A700 PLC function programming manual for details of the PLC function.

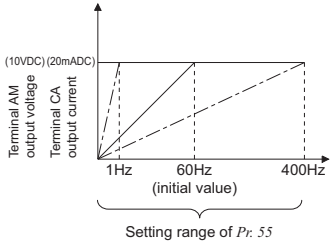
7.5 Reference of the terminal CA (analog current output) and AM (analog voltage output) (Pr. 55, Pr. 56, Pr. 866, Pr. 867, Pr. 869)

Two types of monitor output, analog current output from the terminal CA and analog voltage output from the terminal AM, are available.
Set the reference of the signal output from terminal CA and AM.

Parameter Number	Name	Initial Value	Setting Range	Description
55 *	Frequency monitoring reference	60Hz	0 to 400Hz	Set the full-scale value to output the output frequency monitor value to terminal CA and AM.
56 *	Current monitoring reference	Rated inverter current	0 to 3600A	Set the full-scale value to output the output current monitor value to terminal CA and AM.
866 *	Torque monitoring reference	150%	0 to 400%	Set the full-scale value to output the torque monitor value to terminal CA and AM.
867	AM output filter	0.01s	0 to 5s	Set the output filter of terminal AM.
869	Current output filter	0.02s	0 to 5s	Adjust response level of current output.

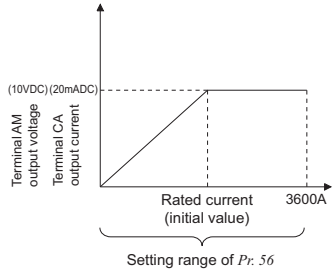
* The above parameters allow its setting to be changed during operation in any operation mode even if "0" (initial value) is set in *Pr. 77 Parameter write selection*.

(1) Frequency monitoring reference (*Pr. 55*)



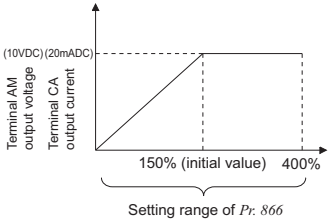
- Set the full scale value when outputting the frequency monitor from terminal CA or AM.
- For the calibration of terminal CA, set the full-scale value of the connected meter when output current of terminal CA is 20mADC.
  Set the frequency to be indicated as the full scale value on the meter (20mADC ammeter) connected between terminal CA and 5. (For example, 60Hz or 120Hz)
  Output current is proportional to the frequency. (Maximum output current is 20mADC.)
- For the calibration of terminal AM, set the full-scale value of the connected meter when output voltage of terminal AM is 10VDC.
  Set the frequency to be indicated as the full scale value on the meter (10VDC voltmeter) connected between terminal AM and 5.
  (For example, 60Hz or 120Hz)
  Output voltage is proportional to the frequency. (Maximum output voltage is 10VDC.)

(2) Current monitoring reference (*Pr. 56*)



- Set the full scale value when outputting the current monitor from terminal CA or AM.
- For the calibration of terminal CA, set the full-scale value of the connected current meter when the output current of terminal CA is 20mADC.
  Set the current to be indicated as the full scale value on the meter (20mADC ammeter) connected between terminal CA and 5.
  Output current is proportional to the monitored value of output current. (Maximum output current is 20mADC.)
- For the calibration of terminal AM, set the full-scale value of the connected current meter when the output voltage of terminal AM is 10VDC.
  Set the current to be indicated as the full scale value on the meter (10VDC voltmeter) connected between terminal AM and 5.
  Output voltage is proportional to the monitored value of output current. (Maximum output voltage is 10VDC.)

(3) Torque monitoring reference (*Pr. 866*)



- Set the full scale value when outputting the torque monitor from terminal CA or AM.
- For calibration of terminal CA, set the full-scale value of the connected torque meter when the output current of terminal CA is 20mA.
  Set the torque to be indicated as the full scale value on the meter (20mADC ammeter) connected between terminal CA and 5.
  Output current is proportional to the monitored value of torque. (Maximum output current is 20mADC.)
- For the calibration of terminal AM, set the full-scale value of the connected current meter when the output voltage of terminal AM is 10VDC.
  Set the torque to be indicated as the full scale value on the meter (10VDC voltmeter) connected between terminal AM and 5.
  Output voltage is proportional to the monitored value of torque. (Maximum output voltage is 10VDC.)

(4) Terminal AM response adjustment *(Pr. 867)*

- Using *Pr. 867*, the output voltage response of the terminal AM can be adjusted within the range 0 to 5s.
- Increasing the setting stabilizes the terminal AM output more but reduces the response level. (Setting "0" sets the response level to 7ms)

(5) Adjustment of response level of terminal CA *(Pr. 869)*

- The response level of the output current of the terminal CA can be adjusted between 0 and 5s with *Pr. 869*.
- Increasing the setting stabilizes the terminal CA output more but reduces the response level. (Setting "0" sets the response level to about 7ms.)

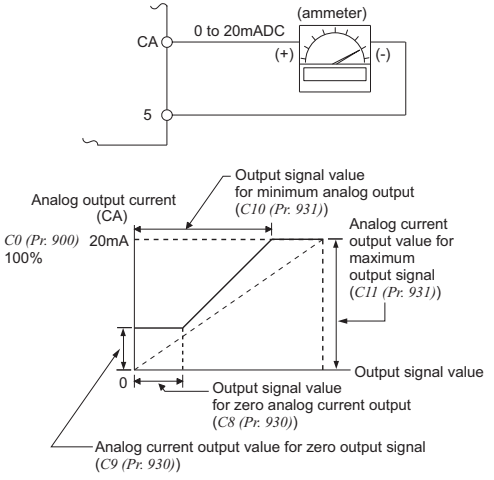
7.6 Terminal CA, AM calibration (Calibration parameter C0 (Pr. 900), C1 (Pr. 901), C8 (Pr. 930) to C11 (Pr. 931))

By using the operation panel or parameter unit, you can calibrate terminal CA and terminal AM to full scale deflection.

Parameter Number	Name	Initial Value	Setting Range	Description
C0(900)	CA terminal calibration	—	—	Calibrate the scale of the meter connected to terminal CA.
C1(901)	AM terminal calibration	—	—	Calibrate the scale of the analog meter connected to terminal AM.
C8(930)	Current output bias signal	0%	0 to 100%	Output signal value for minimum analog current output
C9(930)	Current output bias current	0%	0 to 100%	Output current value for minimum analog current output
C10(931)	Current output gain signal	100%	0 to 100%	Output signal value for maximum analog current output
C11(931)	Current output gain current	100%	0 to 100%	Output current value for maximum analog current output

*1 The parameter number in parentheses is the one for use with the parameter unit (FR-PU04/FR-PU07).
*2 The above parameters allow its setting to be changed during operation in any operation mode even if "0" (initial value) is set in *Pr. 77 Parameter write selection*.

(1) CA terminal calibration (*C0(Pr. 900), C8(Pr. 930) to C11(Pr. 931)*)



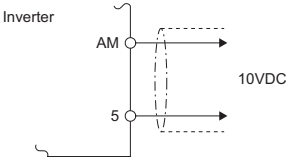
- Terminal CA is factory-set to provide a 20mADC output in the full-scale status of the corresponding monitor item. Calibration parameter *C0 (Pr. 900)* allows the output current ratios (gains) to be adjusted according to the meter scale. Note that the maximum output current is 20mADC.
- Use calibration parameters *C8 (Pr. 930)* and *C9 (Pr. 930)* to set a value for zero analog current output (meter points zero) . In addition, use calibration parameters *C10 (Pr. 931)* and *C11 (Pr. 931)* to set a value for maximum analog current output.
- Use calibration parameters *C8 (Pr. 930)* and *C10 (Pr. 931)* to set output signal values (monitor output set in *Pr. 54*) when the current output at terminal CA is zero or maximum. At this time, the full-scale of each monitor is 100%. *(Refer to the A700 Instruction Manual (Applied))*
- Use calibration parameters *C9 (Pr. 930)* and *C11 (Pr. 931)* to set the current output values at terminal CA when the output signal value (monitor output set in *Pr. 54*) is zero or maximum. At this time, the current output calibrated using calibration parameter *C0 (Pr. 900)* is 100%.

- Calibrate CA terminal in the following procedure.
  1) Connect a 0-20mADC meter (DC ammeter) to across inverter terminals CA-5. (Note the polarity. Terminal CA is plus.)
  2) Set calibration parameters *C8 (Pr. 930)* to *C11 (Pr. 931)* to initial values. (When the meter needle does not point to 0, calibrate using *C8 (Pr. 930)* and *C9 (Pr. 930)*)
  3) Refer to the output signal list *(page 26)* to set *Pr. 54*.
     When running frequency, inverter output current or the like has been selected as the output signal, preset in *Pr. 55* or *Pr. 56* the running frequency or current value at which the output signal is 20mA.
  4) Run the inverter. (The inverter may be run in either the PU or External operation mode.)
  5) Use calibration parameter *C0 (Pr. 900)* to set the meter needle to point to full-scale.

Remarks

- When outputting the item that cannot achieve a 100% value easily by operation, e.g. output current, set "21" (reference voltage output) in *Pr. 54* and perform calibration. (20mADC is output at terminal CA.)
- Even when calibration parameters are set as *C8 (Pr. 930) ≥ C10 (Pr. 931) and C9 (Pr. 930) ≥ C11 (Pr. 931)*, current can be output at terminal CA.

(2) AM terminal calibration *(C1 (Pr. 901))*



· Terminal AM is factory-set to provide a 10VDC output in the full-scale status of the corresponding monitor item. *Calibration parameter C1 (Pr. 901)* allows the output voltage ratios (gains) to be adjusted according to the meter scale. Note that the maximum output voltage is 10VDC.

· Calibrate the AM terminal in the following procedure.

1) Connect a 0-10VDC meter (frequency meter) to across inverter terminals AM-5. (Note the polarity. The terminal AM is positive.)
2) Refer to the monitor description list *(Refer to the A700 Instruction Manual (Applied))* and set *Pr. 158*.
   When you selected the running frequency, inverter output current, etc. as monitor, preset in *Pr. 55* or *Pr. 56* the running frequency or current value at which the output signal will be 10V.
3) When outputting the item that cannot achieve a 100% value easily by operation, e.g. output current, set "21" (reference voltage output) in *Pr. 158* and perform the following operation. After that, set "2" (output current, for example) in *Pr. 158*.

REMARKS

· When outputting such an item as the output current, which cannot reach a 100% value easily by operation, set *Pr. 158* = "21" (reference voltage output) and make calibration. 10VDC is output from the terminal AM.

7.7 List of parameters different from FR-A700

Parameter	Function name	Item	A770-79	A700
52	DU/PU main display data selection	Setting range	Without "9"	With "9"
54	FM terminal function selection	Setting range	Without "9"	With "9"
68	Retry waiting time	Setting range	0 to 600s	0 to 10s
71	Applied motor	Setting range	0 to 8, 13 to 18	0 to 8, 13 to 18, 20, 23, 24, 30, 33, 34, 40, 43, 44, 50, 53, 54, 330, 333, 334, 8093, 8094
83	Rated motor voltage	Initial value	690V	200V class: 200V 400V class: 400V
84	Rated motor frequency	Setting range	10 to 120Hz	10 to 300Hz
96	Auto tuning setting/status	Setting range	Without "11"	With "11"
158	AM terminal function selection	Setting range	Without "9"	With "9"
178	STF terminal function selection	Setting range	Without "10, 11, 70, 71"	With "10, 11, 70, 71"
179	STR terminal function selection			
180	RL terminal function selection			
181	RM terminal function selection			
182	RH terminal function selection			
183	RT terminal function selection			
184	AU terminal function selection			
185	JOG terminal function selection			
186	CS terminal function selection			
187	MRS terminal function selection			
188	STOP terminal function selection			
189	RES terminal function selection			
190	RUN terminal function selection	Setting range	Without "7, 46, 57, 85, 107, 146, 157, 185"	With "7, 46, 57, 85, 107, 146, 157, 185"
191	SU terminal function selection			
192	IPF terminal function selection			
193	OL terminal function selection			
194	FU terminal function selection			
195	ABC1 terminal function selection			
196	ABC2 terminal function selection			
291	Pulse train I/O selection	Setting range	Without "10, 11, 20, 21, 100"	With "10, 11, 20, 21, 100"
292	Automatic acceleration/ deceleration	Setting range	Without "11"	With "11"
306	Analog output signal selection	Setting range	Without "9"	With "9"
310	Analog meter voltage output selection	Setting range	Without "9"	With "9"
313	DO0 output selection	Setting range	Without "7, 46, 57, 85, 107, 146, 157, 185"	With "7, 46, 57, 85, 107, 146, 157, 185"
314	DO1 output selection			
315	DO2 output selection			
316	DO3 output selection			
317	DO4 output selection			
318	DO5 output selection			
319	DO6 output selection			
320	RA1 output selection	Setting range	Without "7, 46, 57, 85"	With "7, 46, 57, 85"
321	RA2 output selection			
322	RA3 output selection			
450	Second applied motor	Setting range	0 to 8, 13 to 18, 9999	0 to 8, 13 to 18, 20, 23, 24, 30, 33, 34, 40, 43, 44, 50, 53, 54, 9999
456	Rated second motor voltage	Initial value	690V	200V class: 200V 400V class: 400V
800	Control method selection	Setting range	Without "13, 14"	With "13, 14"
838	DA1 terminal function selection	Setting range	Without "9"	With "9"
883	Regeneration avoidance operation level	Setting range	300 to 1200V	300 to 800V
		Initial value	1080V	200V class: 380V 400V class: 760V

7.8 Control mode-based parameter (function) correspondence table and instruction code list

Pr.	Name	Instruction Code *1			Control Mode-based Correspondence Table *2							Parameter Copy *3	Parameter Clear *3	All Parameter Clear *3
		Read	Write	Extended	V/F control	Advanced magnetic flux vector control	Vector control			Real sensorless vector control				
							Speed control	Torque control	Position control	Speed control	Torque control			
414	PLC function operation selection	0E	8E	4	○	○	○	○	○	○	○	○	×	×
415	Inverter operation lock mode setting	0F	8F	4	○	○	○	○	○	○	○	○	○	○
416	Pre-scale function selection	10	90	4	○	○	○	○	○	○	○	○	○	○
417	Pre-scale setting value	11	91	4	○	○	○	○	○	○	○	○	○	○
498	PLC function flash memory clear	62	E2	4	○	○	○	○	○	○	○	×	×	×
506	Parameter 1 for user	06	86	5	○	○	○	○	○	○	○	○	○	○
507	Parameter 2 for user	07	87	5	○	○	○	○	○	○	○	○	○	○
508	Parameter 3 for user	08	88	5	○	○	○	○	○	○	○	○	○	○
509	Parameter 4 for user	09	89	5	○	○	○	○	○	○	○	○	○	○
510	Parameter 5 for user	0A	8A	5	○	○	○	○	○	○	○	○	○	○
511	Parameter 6 for user	0B	8B	5	○	○	○	○	○	○	○	○	○	○
512	Parameter 7 for user	0C	8C	5	○	○	○	○	○	○	○	○	○	○
513	Parameter 8 for user	0D	8D	5	○	○	○	○	○	○	○	○	○	○
514	Parameter 9 for user	0E	8E	5	○	○	○	○	○	○	○	○	○	○
515	Parameter 10 for user	0F	8F	5	○	○	○	○	○	○	○	○	○	○
570	Multiple rating setting	46	C6	5	○	○	○	○	○	○	○	○	○	○
869	Current output filter	45	C5	8	○	○	○	○	○	○	○	○	○	○
C8 (930)	Current output bias signal	1E	9E	9	○	○	○	○	○	○	○	○	○	○
C9 (930)	Current output bias current	1E	9E	9	○	○	○	○	○	○	○	○	○	○
C10 (931)	Current output gain signal	1F	9F	9	○	○	○	○	○	○	○	○	○	○
C11 (931)	Current output gain current	1F	9F	9	○	○	○	○	○	○	○	○	○	○

*1 These instruction codes are used for parameter read and write by using Mitsubishi inverter protocol with the RS-485 communication.

*2 Validity and invalidity according to operation mode are as follows:
○:Usable parameter
×:Unusable parameter
Δ:Parameters available only during position control set by parameter

*3 "○" indicates valid and "×" indicates invalid of "parameter copy", "parameter clear", and "all parameter clear".

8 TROUBLESHOOTING

When a fault occurs in the inverter, the inverter trips and the PU display automatically changes to one of the following fault or alarm indications.
If the fault does not correspond to any of the following faults or if you have any other problem, please contact your sales representative.

- Retention of fault output signal..... When the magnetic contactor (MC) provided on the input side of the inverter is opened when a fault occurs, the inverter's control power will be lost and the alarm output will not be held.
- Fault or alarm indication ..... When the protective function is activated, the operation panel display automatically switches to the above indication.
- Resetting method ..... When the protective function is activated, the inverter output is kept stopped. Unless reset, therefore, the inverter cannot restart. *(Refer to page 32)*
- When any fault occurs, take the appropriate corrective action, then reset the inverter, and resume operation. Not doing so may lead to the inverter fault and damage.

Inverter fault or alarm displays are roughly categorized as below.

(1) Error Message
A message regarding operational fault and setting fault by the operation panel (FR-DU07) and parameter unit (FR-PU04 /FR-PU07) is displayed. The inverter does not trip.
(2) Warning
The inverter does not trip even when a warning is displayed. However, failure to take appropriate measures will lead to a fault.
(3) Alarm
The inverter does not trip. You can also output an alarm signal by making parameter setting.
(4) Fault
When a fault occurs, the inverter trips and a fault signal is output.

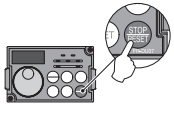
REMARKS

- For the details of fault displays and other troubles, also *refer to the Instruction Manual (Applied)*.
- Past eight faults can be displayed using the setting dial. (*Refer to the Instruction Manual (Applied)*.)

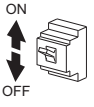
8.1 Reset method of protective function

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

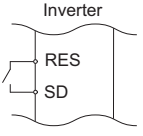
Operation 1: ..... Using the operation panel, press STOP RESET to reset the inverter.
(This may only be performed when a fault occurs. *(Refer to the Instruction Manual (Applied))* for fault.)



Operation 2:..... Switch power OFF once. After the indicator of the operation panel turns OFF, switch it ON again.



Operation 3: ..... Turn on the reset signal (RES) for more than 0.1s. (If the RES signal is kept ON, "Err." appears (flickers) 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.

8.2 List of fault or alarm display

	Operation Panel Indication		Name
Error message	E - - -	E - - -	Faults history
	HOLd	HOLD	Operation panel lock
	LOCd	LOCD	Password locked
	Er1 to Er4	Er1 to 4	Parameter write error
	rE1 to rE4	rE1 to 4	Copy operation error
	Err.	Err.	Error
Warning	OL	OL	Stall prevention (overcurrent)
	oL	oL	Stall prevention (overvoltage)
	TH	TH	Electronic thermal relay function pre-alarm
	PS	PS	PU stop
	MT	MT	Maintenance signal output
	SL	SL	Speed limit indication (Output during speed limit)
Alarm	Fn	FN	Fan alarm
Fault	E.OC1	E.OC1	Overcurrent trip during acceleration
	E.OC2	E.OC2	Overcurrent trip during constant speed
	E.OC3	E.OC3	Overcurrent trip during deceleration or stop
	E.Ov1	E.OV1	Regenerative overvoltage trip during acceleration
	E.Ov2	E.OV2	Regenerative overvoltage trip during constant speed
	E.Ov3	E.OV3	Regenerative overvoltage trip during deceleration or stop
	E.THT	E.THT	Inverter overload trip (electronic thermal relay function)
	E.THM	E.THM	Motor overload trip (electronic thermal relay function)
	E.FIN	E.FIN	Heatsink overheat
	E.IPF	E.IPF	Instantaneous power failure
	E.UVT	E.UVT	Undervoltage
	E.ILF	E.ILF*	Input phase loss
	E.OLT	E.OLT	Stall prevention stop

	Operation Panel Indication		Name
Fault	E. GF	E.GF	Output side earth (ground) fault overcurrent
	E. LF	E.LF	Output phase loss
	E.OHT	E.OHT	External thermal relay operation
	E.PTC	E.PTC*	PTC thermistor operation
	E.OPT	E.OPT	Option fault
	E.OP3	E.OP3	Communication option fault
	E. 1 to E. 3	E. 1 to E. 3	Option fault
	E. PE	E.PE	Parameter storage device fault
	E.PUE	E.PUE	PU disconnection
	E.rET	E.RET	Retry count excess
	E.PE2	E.PE2*	Parameter storage device fault
	E. 5 to E. 7, E.CPU	E. 5 to E. 7, E.CPU	CPU fault
	E.CTE	E.CTE	RS-485 terminal power supply short circuit
	E.P24	E.P24	24VDC power output short circuit
	E.CDO	E.CDO*	Output current detection value exceeded
	E.IOH	E.IOH*	Inrush current limit circuit fault
	E.SER	E.SER*	Communication fault (inverter)
	E.AIE	E.AIE*	Analog input fault
	E. OS	E.OS	Overspeed occurrence
	E.OSD	E.OSD	Speed deviation excess detection
	E.ECT	E.ECT	Signal loss detection
	E. Od	E.OD	Excessive position fault
	E.MB1 to E.MB7	E.MB1 to E.MB7	Brake sequence fault
	E.EP	E.EP	Encoder phase fault
	E. 11	E.11	Opposite rotation deceleration fault
	E. bE E. 13	E.BE E.13	Internal circuit fault

* If an error occurs when using the FR-PU04, "Fault 14" is displayed on the FR-PU04.

Appendix 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: Gothaer Strasse 8, 40880 Ratingen, Germany
- Note

  We declare that this inverter conforms with the EMC Directive in industrial environments and affix the CE marking on the inverter. When using the inverter in a residential area, take appropriate measures and ensure the conformity of the inverter used in the residential area.

(1) EMC Directive

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

- EMC Directive: 2004/108/EC
- Standard(s): EN61800-3:2004 (Second environment / PDS Category "C3")

Note: First environment
Environment including residential buildings. Includes buildings directly connected without a transformer to the low voltage power supply network which supplies power to residential buildings.
Second environment
Environment including all buildings except buildings directly connected without a transformer to the low voltage power supply network which supplies power to residential buildings.

- Note

Install the inverter and perform wiring according to the following instructions.

* The inverter is equipped with a built-in EMC filter. Set the EMC filter valid (initial setting).
* Connect the inverter to an earthed power supply.
* Install a motor and a control cable written in the EMC Installation Manual (BCN-A21041-204) according to the instruction.
* The cable length between the inverter and the motor is 5 m maximum.
* Confirm that the inverter conforms with the EMC Directive as the industrial drives application for final installation.

(2) Low Voltage Directive

We have self-confirmed our inverters as products compliant to the Low Voltage Directive (Conforming standard EN 61805-1) and affix the CE marking 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 8* 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 8*.
* Use the moulded case circuit breaker and magnetic contactor which conform to the EN or IEC Standard.
* This product can cause a d.c. current in the protective earthing conductor. Where a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.
* Use the inverter under the conditions of overvoltage category III (usable with the earthed-neutral system power supply) and pollution degree 1 specified in IEC664.
* 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 30VDC, 0.3A. (Relay output has basic isolation from the inverter internal circuit.)
* Control circuit terminals on *page 6* are safely isolated from the main circuit.
* Environment

	During Operation	In Storage	During Transportation
Surrounding air temperature	*Pr.570* = "2" (Initial value): -10°C to +50°C (non-freezing) *Pr.570* = "102": -10°C to +40°C (non-freezing)	-20°C to +65°C	-20°C to +65°C
Ambient humidity	90% RH or less	90% RH or less	90% RH or less
Maximum altitude	1000m	1000m	10000m

Details are given in the technical information "Low Voltage Directive Conformance Guide" (BCN-A21041-203). Please contact your sales representative.

MEMO

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REVISIONS

*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
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⚠ For Maximum Safety

- Mitsubishi inverters are not designed or manufactured to be used in equipment or systems in situations that can affect or endanger human life.
- When considering this product for operation in special applications such as machinery or systems used in passenger transportation, medical, aerospace, atomic power, electric power, or submarine repeating applications, please contact your nearest Mitsubishi sales representative.
- Although this product was manufactured under conditions of strict quality control, you are strongly advised to install safety devices to prevent serious accidents when it is used in facilities where breakdowns of the product are likely to cause a serious accident.
- Please do not use this product for loads other than three-phase induction motors.

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