

Panasonic

M2X Series Inverter for 3-phase Induction Motor Speed Control

INSTRUCTION MANUAL



Be sure to hand over this instruction manual to customers.

- Thank you for purchasing Panasonic Inverter.
- To ensure proper use of this product, read this instruction manual thoroughly.
Keep this manual in place, and read it whenever required.

Contents

Before startup

Safety Precautions	4
Introduction	8
• Unpacking and inspection	8
• Checking the inverter model	8

Preparation and adjustment

System Configuration and Wiring ..	12
• Wiring general view	12
• Inverter and applicable peripheral equipment	13
• Wiring	14
• Changing the input signal logic	16
• Terminal function	17

If necessary

Protective Function	33
• Protective functions	33
• Canceling trip	36

Application

Parameter Description	39
Detailed Parameter Description	45
• Function of parameter	45
(Parameter initialization	59)

Specifications

Specifications	67
Dimensions	68
Conformity to EC Directive / UL Standard	69

Parts Description 9 <ul style="list-style-type: none"> Outline and Part Names 9 CAUTION 10 <ul style="list-style-type: none"> Instructions for safe and correct operation 10 	Installation 11	Before startup
<ul style="list-style-type: none"> Precautions when wiring 20 Parameter Setting 21 <ul style="list-style-type: none"> Setting 21 Test Operation 23 <ul style="list-style-type: none"> Pre-operation inspections 23 Test run 23 	Operation Function 24 <ul style="list-style-type: none"> Selection of the run command 24 Frequency command selection changing procedure 24 Acceleration/deceleration time changing procedure 25 Operation function 26 Run mode 28 	Preparation and adjustment
Maintenance/Inspection 37 Troubleshooting 38 <ul style="list-style-type: none"> Inspection to determine cause of problem 38 	Servicing (Repair) Back cover	If necessary
<ul style="list-style-type: none"> Copying parameter 62 Extracting and locking parameters 65 		Application
<ul style="list-style-type: none"> Structure of peripheral equipment 70 List of Inverters and Applicable Peripheral Equipment 71 	Optional Accessories 72 Recommended Equipment 74 Warranty 75	Spec.

Safety Precautions

Safety precautions should always be followed.

Precautions that must be heeded in order to protect the user and others from harm and prevent property loss or damage are as follows:

■ The extent of injury or damage that could be suffered by improper use contrary to directions is ranked as follows:




DANGER

Situation involving danger which could result in death or serious injury if equipment is handled incorrectly.



CAUTION

Situation involving danger which could result in medium to light injury, or property damage if equipment is handled incorrectly.

Items labeled as  **CAUTION** could be connected with core serious consequences, depending upon the circumstances. These instructions are extremely important and should be observed in all cases.

■ Installation



CAUTION

- Install on non-combustible material such as metal.
Failure to do so could result in fire.
- Do not use this product in a place where it may be splashed with water, in corrosive gas or inflammable gas atmosphere, or near a combustible object. Neglecting this instruction may result in fire.
- Do not carry by the front case when moving the inverter.
Doing so is dangerous and could result in injury if dropped.
- Do not allow foreign material such as metal chips to get inside the inverter.
Doing so could result in fire.
- Be sure to install on a base capable of supporting the inverter's weight in accordance with the directions given in the instruction manual.
Failure to do so could result in the inverter dropping or falling.

■ Wiring

DANGER

- Make sure the power is cut off before handling wiring.
Failure to do so could result in electrical shock or fire.
- Be sure to install a no-fuse breaker (NFB) or an earth leakage breaker.
Failure to do so could result in fire.
- Be sure to ground the GND terminal.
Failure to do so could result in electrical shock or fire.
- Have wiring work done a licensed electrician.
Failure to do so could result in electrical shock or fire.
- Be sure to install the inverter before wiring.
Failure to do so could result in electrical shock or fire.

CAUTION

- Do not ground the AC power source with the output terminals (U/T1, V/T2, W/T3).
Doing so could result in injury or fire.
- Make sure the voltage of the AC power source agrees with the rated voltage of the inverter.
If not, it could result in injury or fire.

Safety Precautions

Safety precautions should always be followed.

■ Operation

DANGER

- Be sure to mount the case and cover before turning the power on. Never remove the case or cover while the inverter is receiving power.
Failure to mount or removing the case/cover could result in electric shock.
- Never operate the switches with wet hands.
Doing so could result in electric shock.
- Provide an emergency stop device externally, so that you can immediately stop operation and turn OFF the power supply in case of emergency.
Neglecting this instruction may result in injury, electric shock, fire or damage to equipment.
- Do not turn ON/OFF the electromagnetic contactor of the power supply frequently. Do not start or stop the motor with this magnetic contactor.
Neglecting this instruction may result in breakdown or fire.
- If the retry function is selected, the inverter could unexpectedly start operating again if tripped. Do not approach the inverter in the condition.
Doing so could result in injury.
- If trip reset is carried out with the operate signal ON, the inverter could unexpectedly start operating again. Do not approach the inverter in the condition.
Doing so could result in injury.
- To copy parameters by using the operation panel, be sure to use the inverters of the same model.
Neglecting this instruction may result in injury.

CAUTION

- The radiator and regenerative resistor become very hot.
Touching these parts could result in skin burning injury.
- The inverter can be easily set to operate at speeds ranging from low to high. Set the operating speed so that the motor and machine tolerance is not exceeded.
Failure to do so could result in injury.

■ Maintenance/Inspection



- Wait for at least 15 minutes after turning off the power to perform inspections. Failure to do so could result in electric shock.
- Except for qualified personnel, anyone must not perform maintenance or inspection. Neglecting this instruction may result in electric shock or injury.

■ Other



- Never attempt to modify, disassemble or repair this product by yourself. Neglecting this instruction may result in electric shock, injury or fire.
- Install this product securely to prevent a fire or accident resulting in injury or death in case of earthquake. Neglecting this instruction may result in fire, electric shock or injury.
- After occurrence of an earthquake, be sure to perform safety inspections. Neglecting this instruction may result in fire, electric shock or injury.

GENERAL PRECAUTIONS

The diagrams given in this instruction manual may show the cases, covers or safety breakers removed in order to show details.

When operating, be sure to return the cases, covers or safety breakers and operate as specified in the manual.

When disposing of the inverter, handle it as an industrial waste.

Introduction

Unpacking and inspection

- Is the model correct?
- Was the equipment damaged in transport?

If there is anything wrong with the equipment,
contact your Panasonic dealer.

Checking the inverter model

Legend on the nameplate

Panasonic

Model No. M2X374BSA

Power Input 3.7kW
3PH AC 380~460V 50/60Hz
10.5A

Output 3PH AC 380~460V 0~400Hz
9.0A

Ser.No. 01110001

Matsushita Electric Industrial Co., Ltd Made in Japan

Rated input

Rated output

Model number

Production number (serial number)

Model number

M2X	37	4	B	S	A
-----	----	---	---	---	---

Series

Code	Applicable motor capacity
04	0.4 kW
08	0.75 kW
15	1.5 kW
22	2.2 kW
37	3.7 kW
55	5.5 kW
75	7.5 kW

Code	Communication (RS485) specification
A	Without communication interface
C	With communication interface

Code	Operation panel specification
S	Without control dial (standard)
V	With control dial
N	Blank cover

Code	Regenerative braking
B	With regenerative braking circuit and resistor
C	With regenerative braking circuit

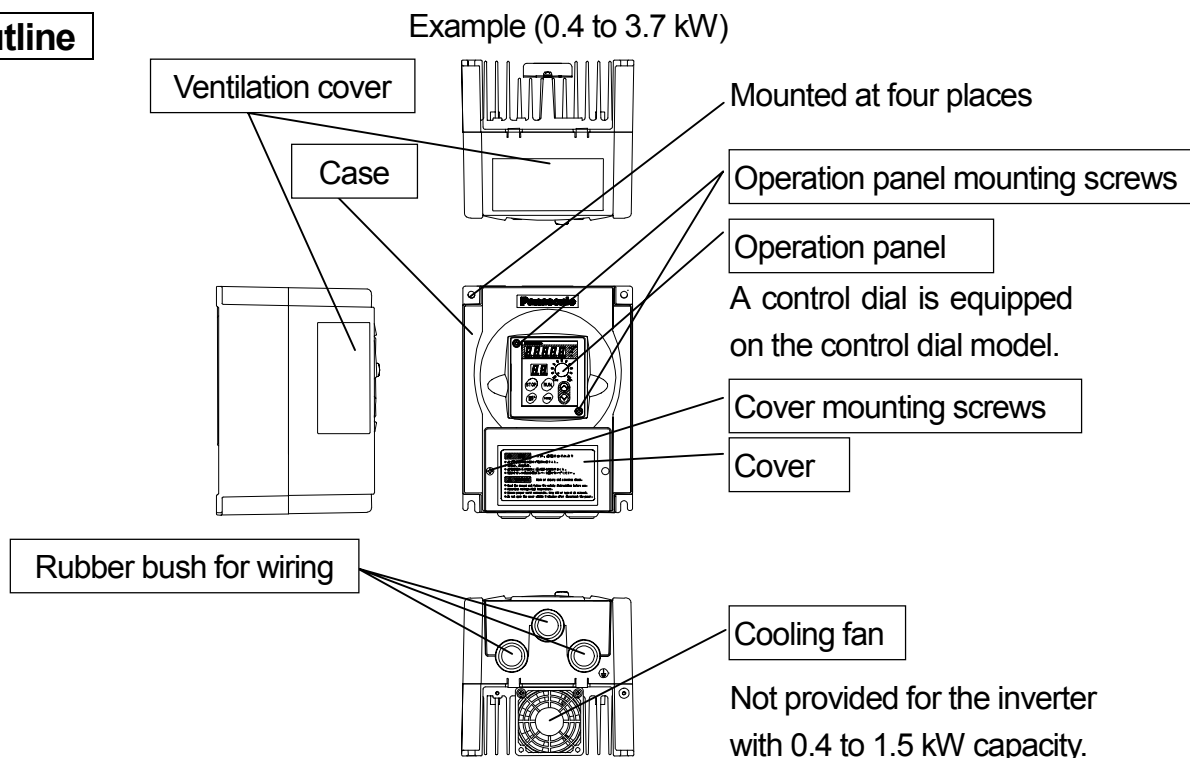
Code	Supply voltage
4	3-phase 400V

Parts Description

Outline and Part Names

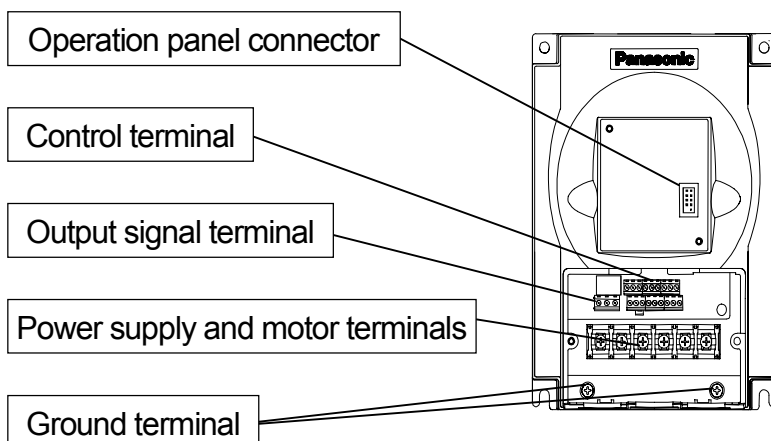
- 0.4 - 7.5 kW

Outline



Operation panel cover removed

For terminal assignment, refer to P17, 18.



- * The inverter is shipped with the ventilation cover mounted. If the inverter is used at +40°C or higher temperatures, be sure to remove the ventilation cover and the rubber bushes for wiring.

CAUTION

Instructions for safe and correct operation

1. The capacity of the power source must be in the range 1.5 times the inverter capacity to 500 kVA. If the power source has 500 kVA or higher capacity and the length of the cable between it and the inverter is 100 m or less, or if the power source has a phase advancing capacitor selector, excessive peak current will flow into the power source input circuit and may damage the converter. If this is the case, install power factor improvement AC reactor at the input of each inverter.
2. Do not connect the phase advancing capacitor to the inverter output. Otherwise, the capacitor may be damaged.
3. Do not install an electromagnetic contactor between the inverter and motor. Run/stop the motor from inverter operation panel using the RUN switch or control input terminal. Do not operate the electromagnetic contactor installed on the power source more often than actually required.
In particular, never attempt to start or stop the motor with this electromagnetic contactor.
4. Operating the motor through the inverter increases leakage current that may trip the leakage breaker. If this is the case, use leakage breaker of high frequency proof type (designed for use with inverter) on both the system causing the problem and system affected.
5. The total cable length of the inverter and motor must be shorter than 30 m. To use a cable longer than 30 m, provide a reactor between the inverter and the motor, or reduce the inverter's carrier frequency.

Inverter ↔ motor cable length	Up to 30 m	Up to 50 m	Up to 100 m
[30 Carrier frequency]	0 to 7 (14.9 kHz or less)	0 to 5 (10.1 kHz or less)	0 to 2 (3.9 kHz or less)

6. To use the electronic thermal trip function incorporated in the inverter, observe the following instructions.
 - Check the rated current of your 3-phase induction motor to define the electric thermal value.
 - Use one motor for each inverter.
7. To control several motors with an inverter (parallel operation), select the inverter's capacity so that the total of the motors' rated currents does not exceed the inverter's rated current. Note that, if you select the inverter's capacity based on the total of the motors' capacity, the inverter's rated current may be exceeded depending on the motor type.

Installation

Install the inverter properly to prevent equipment failure or accidents.

Installation location

- ① Install the inverter indoors in a place not exposed to rain or direct sunlight. The inverter is not waterproof.
- ② Install in a place not exposed to corrosive/flammable gases, grinding fluid, oil mist, metal powder or chips.
- ③ Place with adequate ventilation, which is not exposed to excessive humidity, dirt or dust.
- ④ Place not subject to vibration.

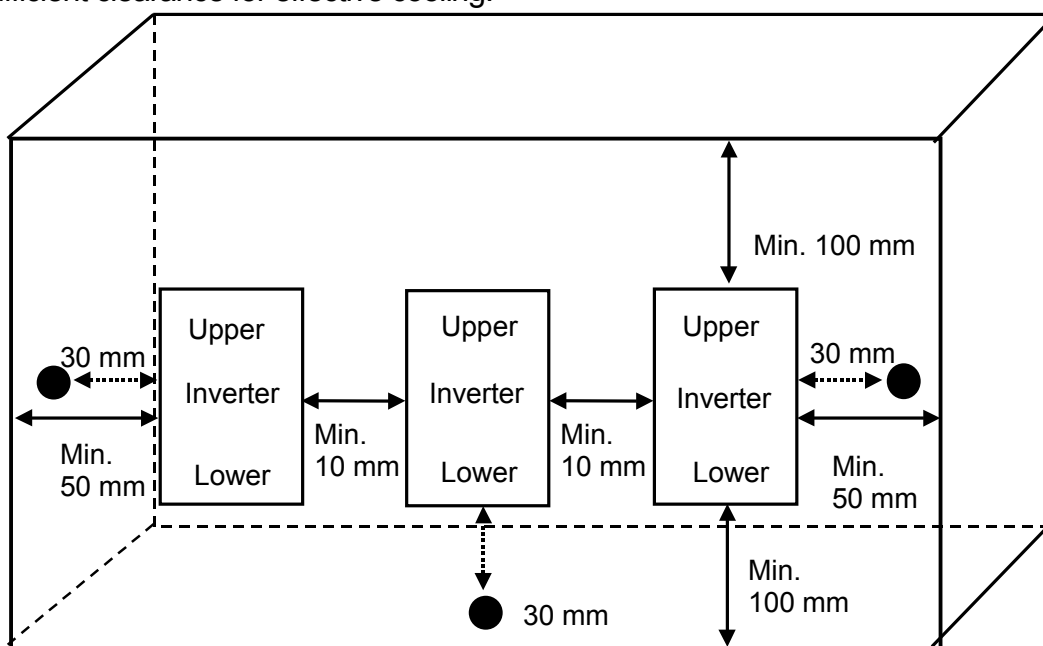
Environmental conditions

Item	Conditions
Ambient temperature	-10 to 50°C (no freezing) If the ambient temperature exceeds 40°C, remove the ventilation cover and rubber bushes.
Ambient humidity	Max. 90%RH (no dewing)
Storage temperature	-20°C to 65°C (no freezing) ^{*1}
Storage humidity	Max. 90 %RH (no dewing)
Protective construction	IP40 (Fully enclosed) (With ventilation cover)
Vibration	Max. 5.9 m/s ² (10 to 60 Hz)
Elevation	Max. 1000 m

*1 For a shorter period in transit.

Mounting direction and clearance

- Provide sufficient clearance for effective cooling.

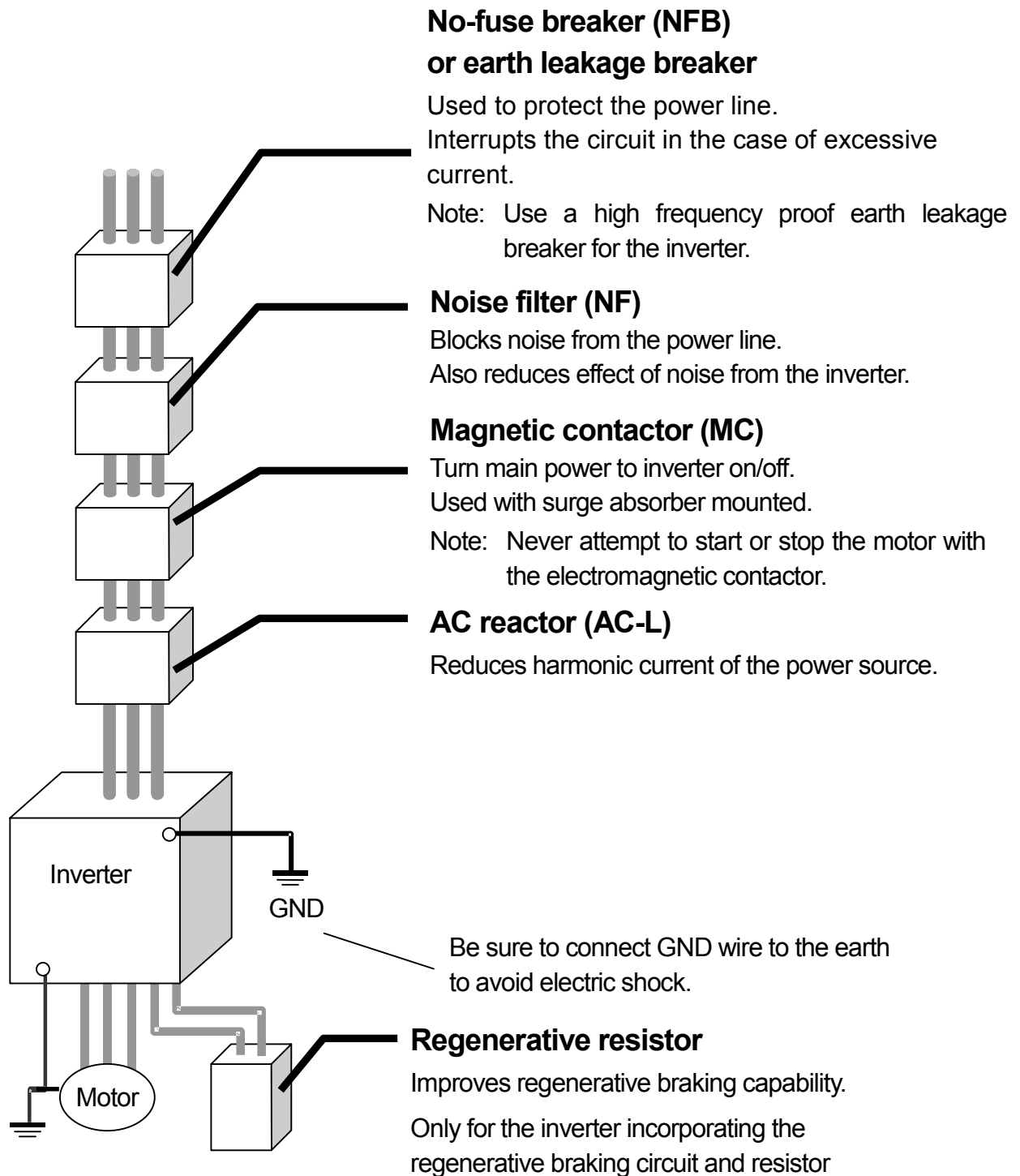


Make sure ambient temperature doesn't exceed allowable temperature at position indicated by ● in the figure above.

System Configuration and Wiring

Wiring general view

- Wiring must be performed by a qualified electrician.
- To avoid electric shock, do not connect the power supply to the unit.



Inverter and applicable peripheral equipment

Wiring apparatus selection

(1) Selection of no-fuse breaker, magnetic contactor, thermal relay, and wiring

Inverter No.	Applicable motor (kW)	No-fuse breaker (Rated current) Matsushita Electric Works	Magnetic contactor (Contact configuration) Matsushita Electric Works	Thermal relay ^{*1} (Current adjustment range) Matsushita Electric Works	Wiring (mm ²) ^{*2}		
					Input (for power supply)	Output (for motor)	Control circuit
M2X044***	0.4	BBC35N (5A)	BMFT61044N (3P+1a)	BMF903E (1.4 - 2.2A)	2.0 (AWG14)	2.0 (AWG14)	0.75 (AWG18)
M2X084***	0.75	BBC35N (5A)	BMFT61044N (3P+1a)	BMF904E (1.7 - 2.6A)	2.0 (AWG14)	2.0 (AWG14)	0.75 (AWG18)
M2X154***	1.5	BBC310N (10A)	BMFT61044N (3P+1a)	BMF907E (2.8 - 4.2A)	2.0 (AWG14)	2.0 (AWG14)	0.75 (AWG18)
M2X224***	2.2	BBC315N (15A)	BMFT61044N (3P+1a)	BMF911E (4.0 - 6.0A)	2.0 (AWG14)	2.0 (AWG14)	0.75 (AWG18)
M2X374***	3.7	BBC320N (20A)	BMFT61044N (3P+1a)	BMF915E (5.0 - 8.0A)	2.0 (AWG14)	2.0 (AWG14)	0.75 (AWG18)
M2X554***	5.5	BBC320N (20A)	BMFT61044N (3P+1a)	BMF927E (9.0 - 13.0A)	3.5 (AWG12)	2.0 (AWG14)	0.75 (AWG18)
M2X754***	7.5	BBC330N (30A)	BMFT61044N (3P+1a)	BMF937E (12 - 18A)	3.5 (AWG12)	3.5 (AWG12)	0.75 (AWG18)

The cables connected to the ground terminal \oplus must be the same size as the power supply cable and the motor cable, respectively.

(2) Relay selection

For relays used in control circuits such as the control input terminal, you should use a small signal relay (min. guaranteed current of 1mA or less) in order to prevent poor contact.

<Examples> Matsushita Electric Works: DS type, NK type, HC type
Omron: G2A type

(3) Control circuit switch selection

If using a switch instead of a relay, use a switch for extremely small current in order to prevent poor contact.

<Example> Nihon Kaiheiki: M-2012J-G

*1 To use the inverter for parallel operation, select the thermal relay according to the motor used.

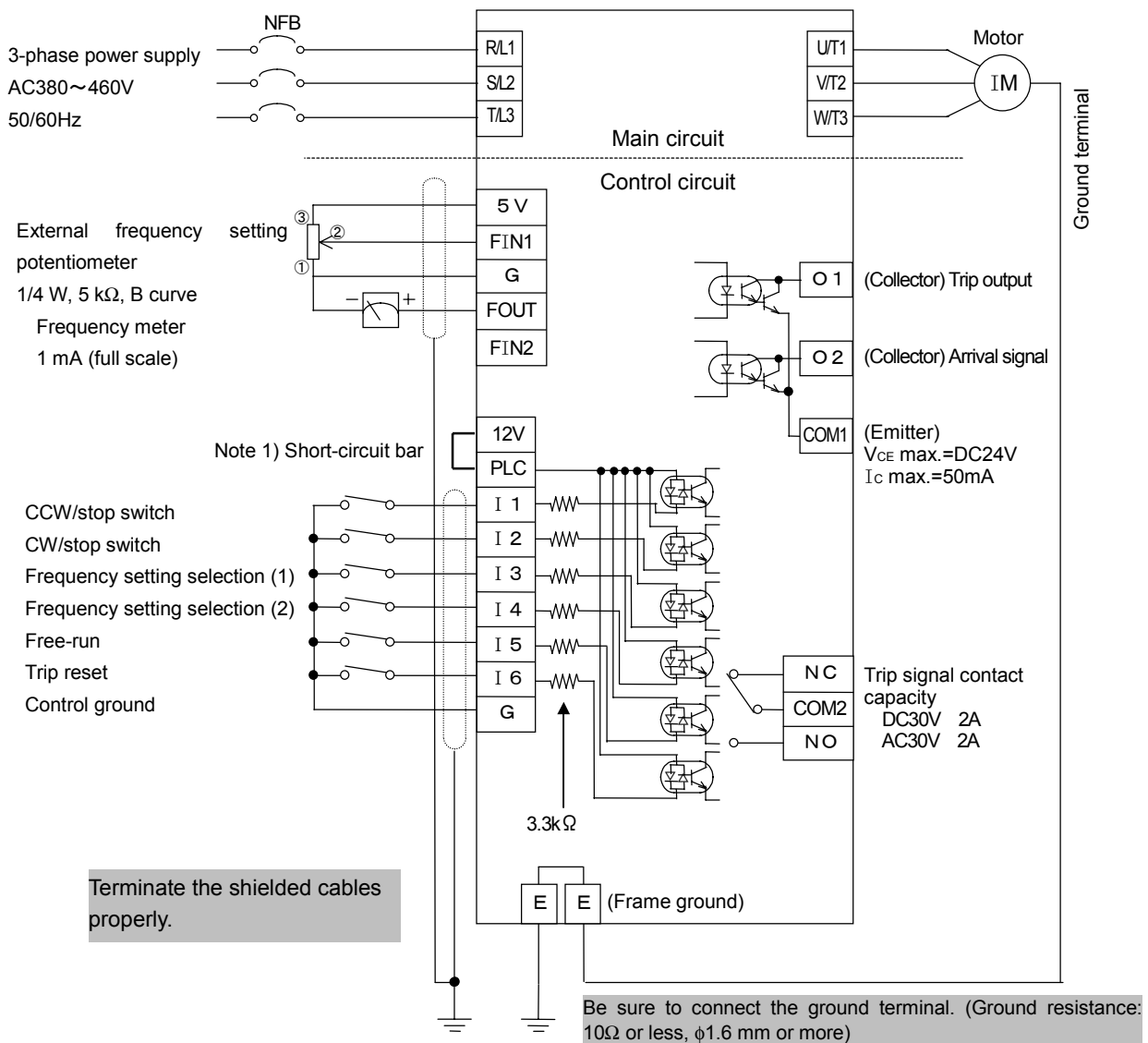
*2 The above motor cable sizes apply to the case where the distance between the motor and the inverter is 20 m or less. If the distance between the motor and the inverter exceeds 20 m, select a cable size of the next higher rank.

System Configuration and Wiring

Wiring

Standard wiring diagram

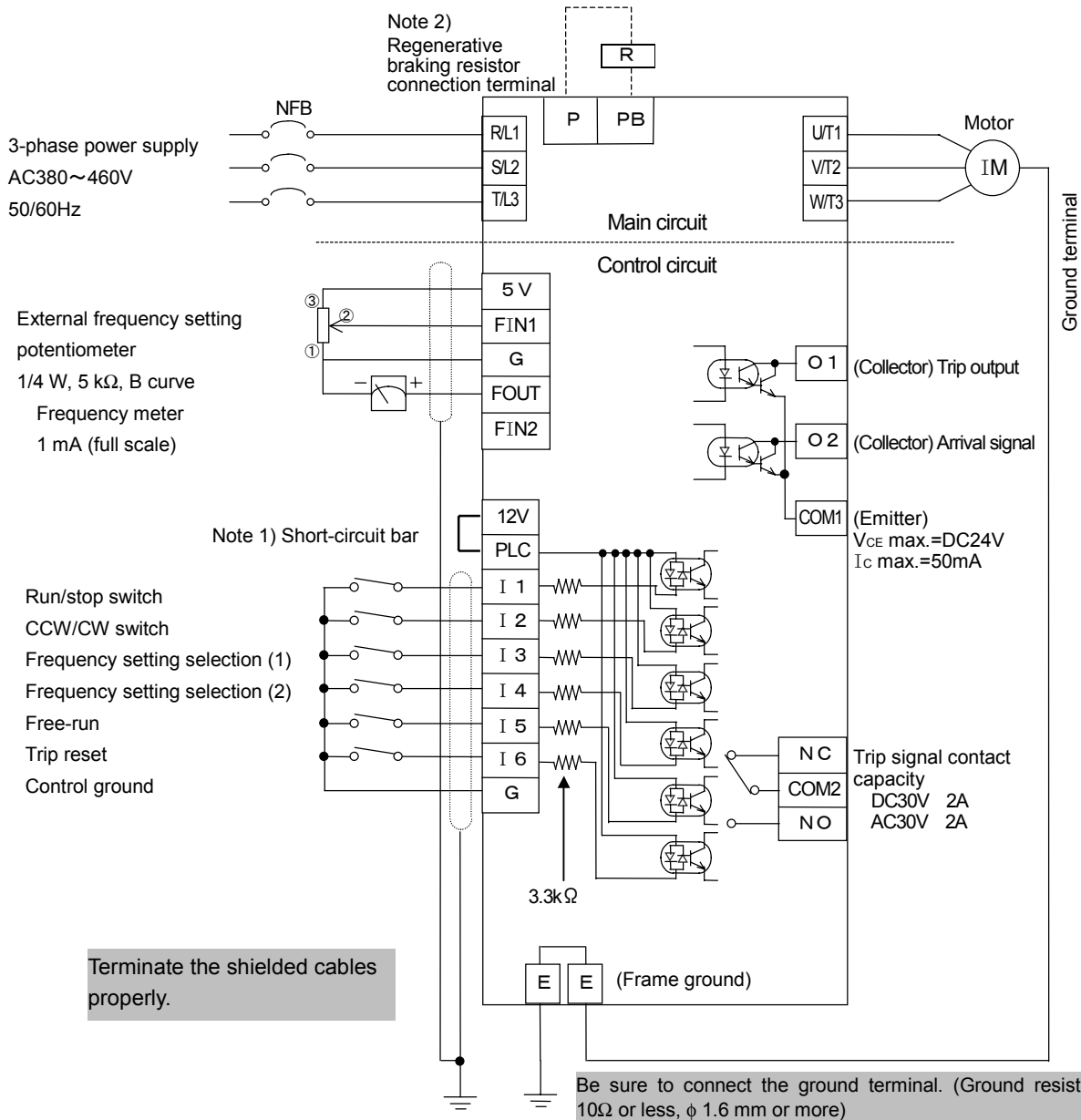
• 0.4 kW, 0.75 kW, 1.5 kW, 2.2 kW, 3.7 kW



Note 1) When the “PLC” and “12 V” terminals are short-circuited, sink input is available.
When the “PLC” and “G” terminals are short-circuited, source input is available.
For details on sink input and source input, see P16.

Wiring

• 5.5 kW, 7.5 kW



Note 1) When the “PLC” and “12 V” terminals are short-circuited, sink input is available. When the “PLC” and “G” terminals are short-circuited, source input is available. For details on sink input and source input, see P16.

Note 2) If you intend to connect an external regenerative braking resistor, specification check is required. Contact Motor Co., Matsushita Electric Industrial Co., Ltd.

System Configuration and Wiring

Changing the input signal logic

The inverter provides two types of input signal logics: sink input and source input.

When the “PLC” and “12 V” terminals are short-circuited, sink input is available. When the “PLC” and “G” terminals are short-circuited, source input is available.

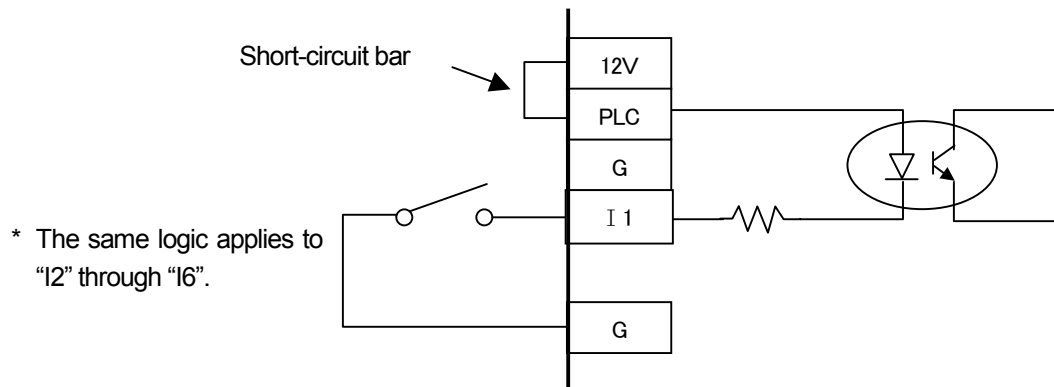
The inverter has been set for sink input before shipment.

The following description is provided on the assumption that the inverter has been set for sink input.

1) Sink input

This logic indicates that a signal turns ON when a current flows out of an input terminal.

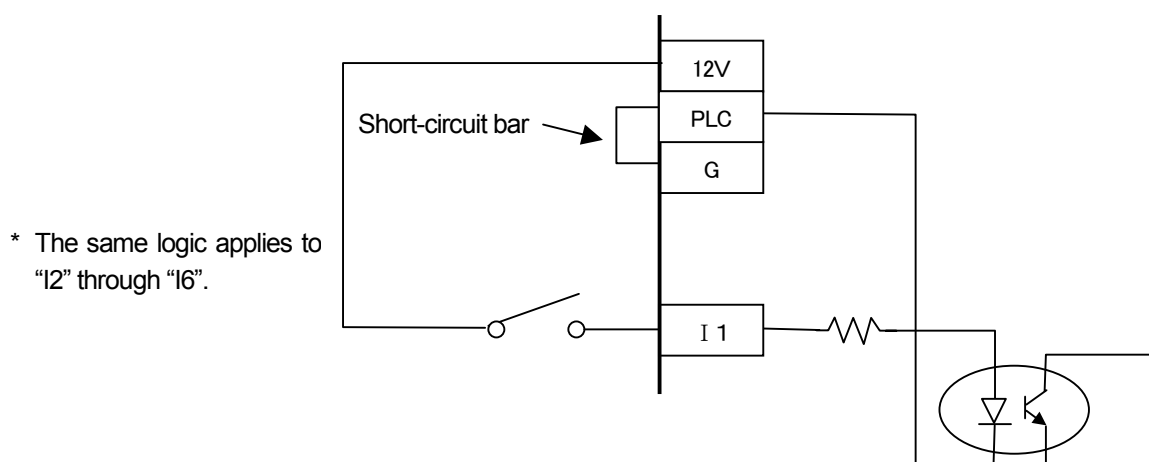
“G” is the common terminal for input signals.



2) Source input

This logic indicates that a signal turns ON when a current flows into an input terminal.

“12 V” is the common terminal for input signals.



Terminal function

(1) Main circuit terminal



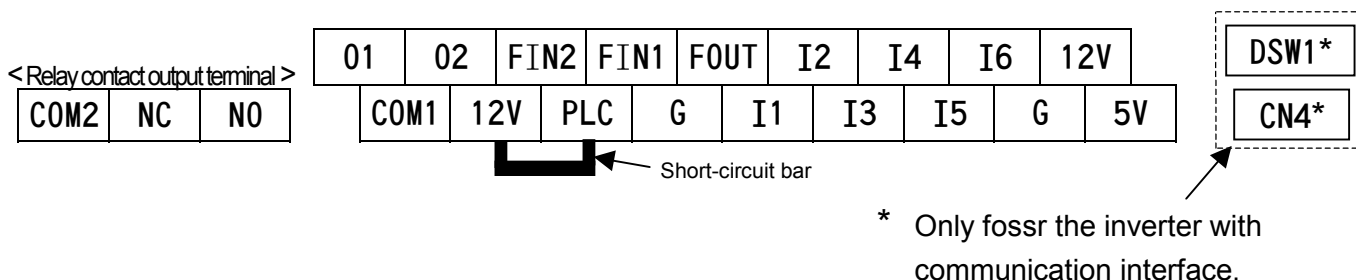
Capacity	Terminal screw	Tightening torque N·m	Location
0.4kW - 7.5kW	M 4	1.0 - 1.2	All terminals (including "E" terminal)

Terminal code	Terminal name	Function
R, S, T/ L1, L2, L3	Power supply terminal	Connected to a commercial power supply (3-phase 380 to 460 V, 50/60 Hz).
U, V, W/ T1, T2, T3	Motor terminal	Connected to a 3-phase induction motor.
E	Ground terminal	Inverter's frame ground (FG) terminal. Ground resistance: 10 Ω or less
P	P terminal	Converter's + terminal
P B	PB terminal	Regenerative resistor connection terminal ^{*1} Connect a regenerative resistor between the P and PB terminals.

*1: Only for 5.5 kW and 7.5 kW.

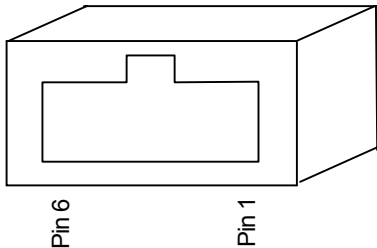
System Configuration and Wiring

(2) Control terminal



Terminal screw size: M2.5, Tightening torque: 0.3 to 0.5 N•m

Terminal code	Terminal name	Function
5 V	Power supply terminal for frequency setting	+5 VDC is applied. $I_{max} = 20 \text{ mA}$
12 V	External power supply terminal	+12 VDC is applied. $I_{max} = 20 \text{ mA}$ Serves as a common terminal for contact inputs when the source input logic is selected. When the source input logic is selected (the PLC and G terminals are short-circuited), short-circuiting each input terminal and this terminal turns ON the input signal. Opening these terminals turns it OFF.
FIN1 FIN2	Input terminal for frequency setting	Frequency setting is enabled by applying 0 to +5 VDC (or 0 to +10 VDC) between the FIN1 and G terminals, or by applying 4 to 20 mA between the FIN2 and G terminals. If both the FIN1 and FIN2 inputs are activated, a larger frequency setting is enabled. To use these terminals, change [17 Frequency command selection] to "0-5" or "0-10". Input impedance FIN1: 100 kΩ FIN2: 250 Ω
G	Control ground	Common ground terminal for contact inputs. Serves as a common terminal for contact inputs when the sink input logic is selected. When the sink input logic is selected (the PLC and 12V terminals are short-circuited), short-circuiting each input terminal and this terminal turns ON the input signal. Opening these terminals turns it OFF.
FOUT	Frequency meter terminal	Outputs a voltage proportional to the output frequency between the FOUT and G terminals. Connect a DC ammeter with 1 mA full-scale. By changing [64 FOUT switching], a pulse output synchronized with the output frequency is enabled.

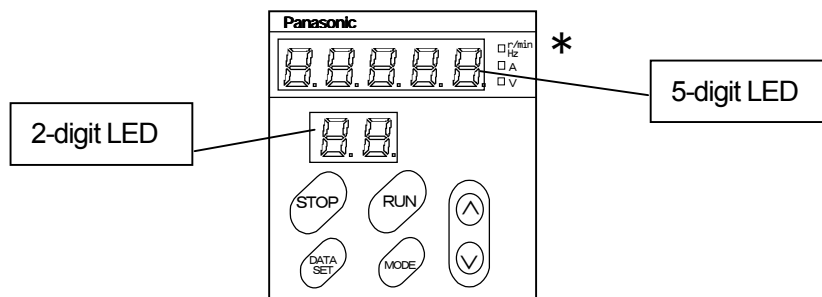
Terminal code		Terminal name	Function																			
Input terminals	I 1	CCW/stop command terminal	Short-circuiting the “I1” and “G” terminals activates the CCW command. Opening these terminals activates the stop command. Short-circuiting the “I2” and “G” terminals activates the CW command. Opening these terminals activates the stop command. When [46]I1·I2 function selection] is changed, “I1” serves as run/stop command, and “I2” serves as CCW/CW command.																			
	I 2	CW/stop command terminal																				
	I 3 I 4 I 5 I 6	Frequency setting selection terminal	By using [18] Operation mode selection], [47]I5 function selection] and [48]I6 function selection], you can select the following functions: <table><tr><td>Operation mode</td><td>I 3</td><td>I 4</td><td>I 5</td><td>I 6</td></tr><tr><td>2-speed operation mode</td><td>CCW jogging</td><td>CW jogging</td><td colspan="2" rowspan="3">Selectable from Free-run stop, External forced trip, No. 2 acceleration/ deceleration time and Trip reset commands.</td></tr><tr><td>4-speed operation mode</td><td colspan="2" rowspan="2">Frequency setting selection</td></tr><tr><td>8-speed operation mode</td></tr><tr><td>16-speed operation mode</td><td colspan="2"></td><td colspan="2"></td></tr></table>	Operation mode	I 3	I 4	I 5	I 6	2-speed operation mode	CCW jogging	CW jogging	Selectable from Free-run stop, External forced trip, No. 2 acceleration/ deceleration time and Trip reset commands.		4-speed operation mode	Frequency setting selection		8-speed operation mode	16-speed operation mode				
	Operation mode	I 3	I 4	I 5	I 6																	
	2-speed operation mode	CCW jogging	CW jogging	Selectable from Free-run stop, External forced trip, No. 2 acceleration/ deceleration time and Trip reset commands.																		
4-speed operation mode	Frequency setting selection																					
8-speed operation mode																						
16-speed operation mode																						
G	Control ground	Common ground terminal for contact inputs.																				
Output terminals	O 1 O 2 COM1	Output signal terminal	Open-collector output terminals. (Signal is not retained when power is OFF.) By using [51] Output signal ① selection] and [52] Output signal ② selection], you can select the signal type. The default settings of “O 1” and “O 2” are trip signal (transistor turns ON at trip), and arrival signal (transistor turns ON at arrival), respectively. “O 1” “O 2” (collector) Ic max. = 50 mA “COM 1” (emitter) Vce max. = 24 VDC																			
	NC NO COM2	Output signal terminal	Relay contact output terminals. (Signal is not retained when power is OFF.) By using [53] Relay output signal selection], you can select the signal type. When inactivated: NO - COM2 open, NC - COM2 closed When activated: NO - COM2 closed, NC - COM2 open Contact capacity: 30 VAC 2 A, 30 VDC 2A Contact rating: Contact resistance 50 mΩ or less (via 5 VDC 1A voltage drop method)																			
* CN 4		RS485 communication connector	RS485 communication connector (6-pin modular jack RJ11) <table><tr><td>Pin No.</td><td>Function</td></tr><tr><td>1</td><td>Unused</td></tr><tr><td>2</td><td>+ 5 V</td></tr><tr><td>3</td><td>RS 4 8 5 +</td></tr><tr><td>4</td><td>RS 4 8 5 –</td></tr><tr><td>5</td><td>G (Control ground)</td></tr><tr><td>6</td><td>Unused</td></tr></table> 	Pin No.	Function	1	Unused	2	+ 5 V	3	RS 4 8 5 +	4	RS 4 8 5 –	5	G (Control ground)	6	Unused					
Pin No.	Function																					
1	Unused																					
2	+ 5 V																					
3	RS 4 8 5 +																					
4	RS 4 8 5 –																					
5	G (Control ground)																					
6	Unused																					
* DSW 1		Terminating resistance	Terminating resistance selection switch The 390Ω resistance ON/OFF can be selected. OFF : <input type="checkbox"/> ON : <input type="checkbox"/>																			

* Only for the inverter with communication interface

Parameter Setting

Setting

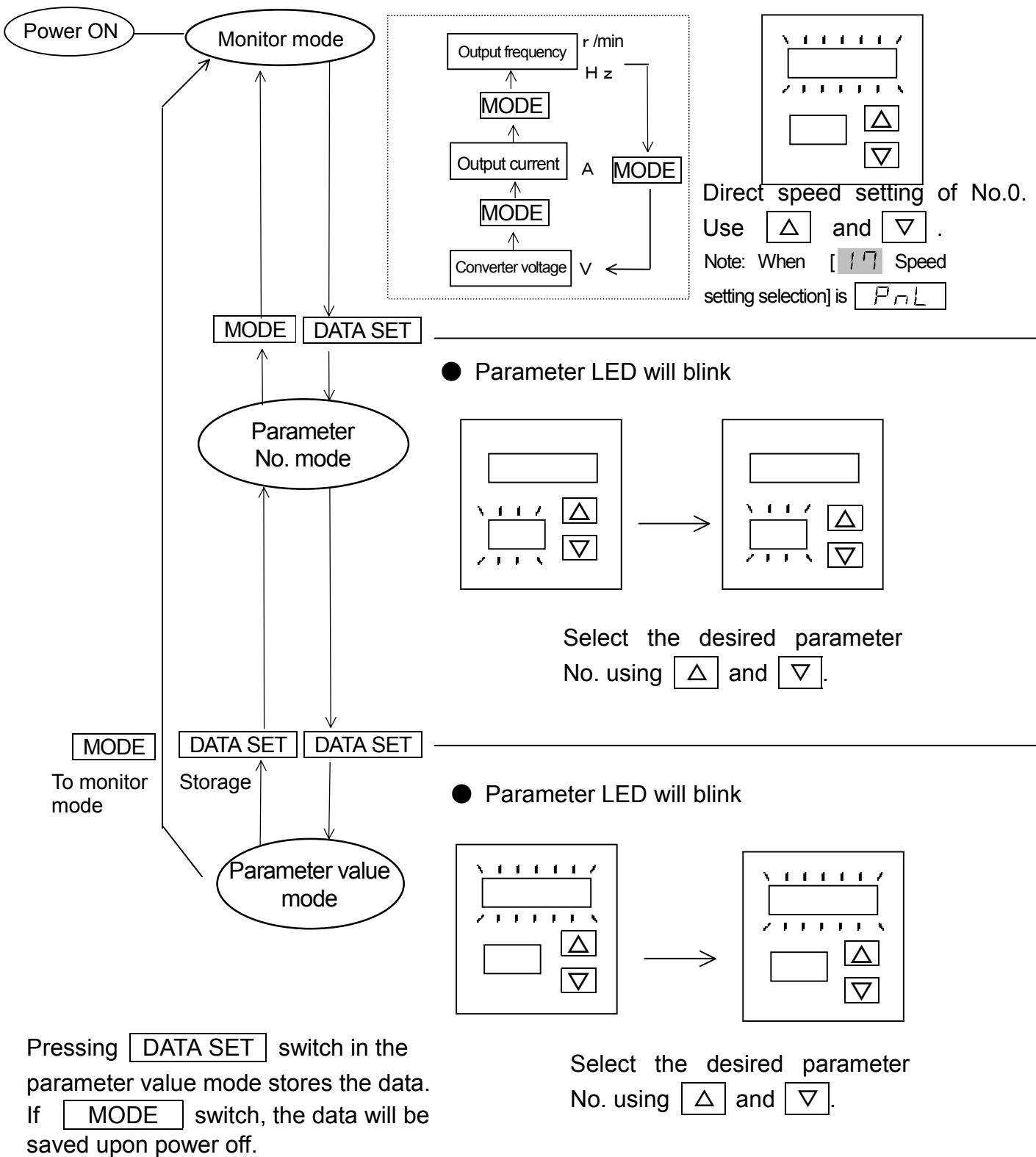
Operation Panel



- * Normally in the monitor mode, the operation panel displays frequency (Hz).
- * The indicated value is just for reference. Do not use this device as a measuring instrument. Also, the operation panel can display the magnification factor specified by [F1 Display scale factor].

5-digit LED	Displays an output frequency, set frequency, value magnified by the scale factor, cause of error and parameter value.								
2-digit LED	Display a parameter number. In the monitor mode, the direction of motor rotation is displayed.								
MODE switch	Used to change the monitor mode. Pressing this switch changes the monitor as follows: <div style="text-align: center;"> Output frequency → Converter voltage → Motor current ↑ </div>								
DATA SET switch	Used to switch between the parameter No. mode and the parameter value mode, and to register a parameter value. <table border="1" style="margin-top: 10px;"> <thead> <tr> <th colspan="2">● Description on each mode</th> </tr> </thead> <tbody> <tr> <td>Monitor mode</td><td>Displays an output frequency, converter voltage and motor current. At power-ON, the operation panel is set to this mode. If the [MODE] switch is pressed in the parameter No. mode or parameter value mode, the display will be changed to this mode. </td></tr> <tr> <td>Parameter No. mode</td><td>A parameter number (00 - 99) blinks. If the [DATA SET] switch is pressed in the monitor mode, the display will be changed to this mode.</td></tr> <tr> <td>Parameter value mode</td><td>A parameter set value blinks. The set value can be changed with the [Δ] or [▽] button. Pressing the [DATA SET] switch after changing a set value registers the updated value. Even if the [MODE] switch is pressed, the data will not be registered. </td></tr> </tbody> </table>	● Description on each mode		Monitor mode	Displays an output frequency, converter voltage and motor current. At power-ON, the operation panel is set to this mode. If the [MODE] switch is pressed in the parameter No. mode or parameter value mode, the display will be changed to this mode.	Parameter No. mode	A parameter number (00 - 99) blinks. If the [DATA SET] switch is pressed in the monitor mode, the display will be changed to this mode.	Parameter value mode	A parameter set value blinks. The set value can be changed with the [Δ] or [▽] button. Pressing the [DATA SET] switch after changing a set value registers the updated value. Even if the [MODE] switch is pressed, the data will not be registered.
● Description on each mode									
Monitor mode	Displays an output frequency, converter voltage and motor current. At power-ON, the operation panel is set to this mode. If the [MODE] switch is pressed in the parameter No. mode or parameter value mode, the display will be changed to this mode.								
Parameter No. mode	A parameter number (00 - 99) blinks. If the [DATA SET] switch is pressed in the monitor mode, the display will be changed to this mode.								
Parameter value mode	A parameter set value blinks. The set value can be changed with the [Δ] or [▽] button. Pressing the [DATA SET] switch after changing a set value registers the updated value. Even if the [MODE] switch is pressed, the data will not be registered.								
[Δ] [▽] switch	Use to select, set and modify a parameter. Can be held down for continuous changing.								
RUN switch	Issues the run command.								
STOP switch	Issues the stop command.								

Parameter Setting



Test Operation

Pre-operation inspections

After installing and wiring, inspect the following before running the inverter.

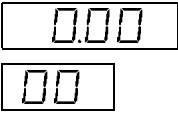


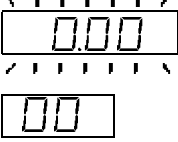
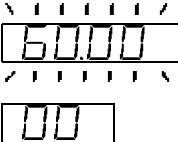

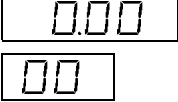

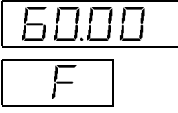

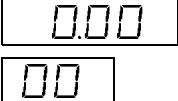
- (1) Check if wiring is correct. (In particular, check improper connections of the power supply terminals (R/L1, S/L2 and T/L3) and motor terminals (U/T1, V/T2 and W/T3), short-circuited load and ground fault.)
- (2) Does input power comply with the rating?
- (3) Are there any places that could be shorted by wire cuttings, etc?
- (4) Are any screws or terminals loose?

Test run

- (1) Preparation for safety operation



- ① Set the motor so that it can be independently operated.
- ② Turn off all the inputs on the control terminal block.

- (2) Follow the test procedure:

Step	Operation panel		Remarks
	Switch	Display on LED	
① Power ON			<ul style="list-style-type: none"> • Monitor mode upon power-up (Output frequency display)
② Frequency setting (See Note)	Press  Press  to specify frequency.	 	<ul style="list-style-type: none"> • The 0th speed frequency is displayed. (The set value is "0.00" Hz.) • Set the 0th speed frequency to "60" Hz.
③ Return back to the monitor mode	Press  to register data.		
④ Run (forward) command	Press  .		<ul style="list-style-type: none"> • Frequency gradually changes. • The direction of motor rotation is displayed.
⑤ Stop command	Press  .		<ul style="list-style-type: none"> • Frequency gradually changes to "0" Hz.

<Operation check>

- ① Smooth motor rotation. No unusual sound. No excessive vibration.
- ② Smooth acceleration and deceleration.
- ③ Motor direction and speed.

Note) To specify frequency with the inverter's control dial, set  Frequency command selection] to  (Inverter's control dial).

Operation Function

Selection of the run command

The M2X series inverter provides the following six types of operations depending on whether frequency commands and run commands are entered through the operation panel or the terminal block.

	Speed command		Run command		Parameter	
	From operation panel, or control dial	Terminal block FIN1 or FIN2 on terminal block *2	Operation panel	Terminal block	17 Frequency command selection	16 Run command selection
1	○		○ *1	○ *1	PnL or UOL	b0FH (both)
2		○	○ *1	○ *1	0-5 or 0-10	b0FH (both)
3	○		○		PnL or UOL	PnL (panel)
4		○	○		0-5 or 0-10	PnL (panel)
5	○			○	PnL or UOL	FEr (terminal block)
6		○		○	0-5 or 0-10	FEr (terminal block)

Default settings of [**17** Frequency command selection] and [**16** Run command selection] are **PnL** and **b0FH**, respectively.

Frequency command selection changing procedure

Example) Change [**17** Frequency command selection] from **PnL** to **UOL**.

Step	Operation panel	
	Switch	LED display
① Power ON		<div>0.00</div> <div>00</div>
② Parameter number mode	Press DATA SET Using Δ , select the parameter No.	<div>0.00</div> <div>00</div> <div>→</div> <div>PnL</div> <div>17</div>
③ Parameter set value mode	Press DATA SET Using Δ , select the parameter value Press DATA SET to save the value	<div>PnL</div> <div>→</div> <div>UOL</div> <div>17</div> <div>17</div>




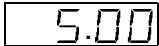

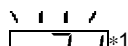
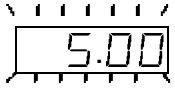

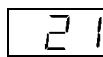
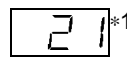
*1 The run command from the terminal block overrides the command from the operation panel, if both are enabled.

The RUN switch on the operation panel is active only when both the CCW/stop switch (I1) and the CW/stop switch (I2) on the terminal block are OFF. If both or one of [I1] and [I2] are turned on while the RUN switch is active, the operation mode set from RUN switch is cancelled.

*2 The "FIN1" and "FIN2" terminals are intended for voltage command (0 to 5 VDC or 0 to 10 VDC) and current command (4 to 20 mADC), respectively. For details, refer to "Terminal function: "(2) Control Terminal" on P18.

Acceleration/deceleration time changing procedure

Example) Change [21 Acceleration time] from [5.00] to [10].

Step	Operation panel	
	Switch	LED display
① Power ON		 
② Parameter number mode	Press [DATA SET]. Using [Δ], select the parameter No.	 →   → 
③ Parameter set value mode	Press [DATA SET]. Using [Δ], select the parameter value. Press [DATA SET] to save the value.	 →   → 

*1 To change deceleration time, use [31 Deceleration time].

Operation Function

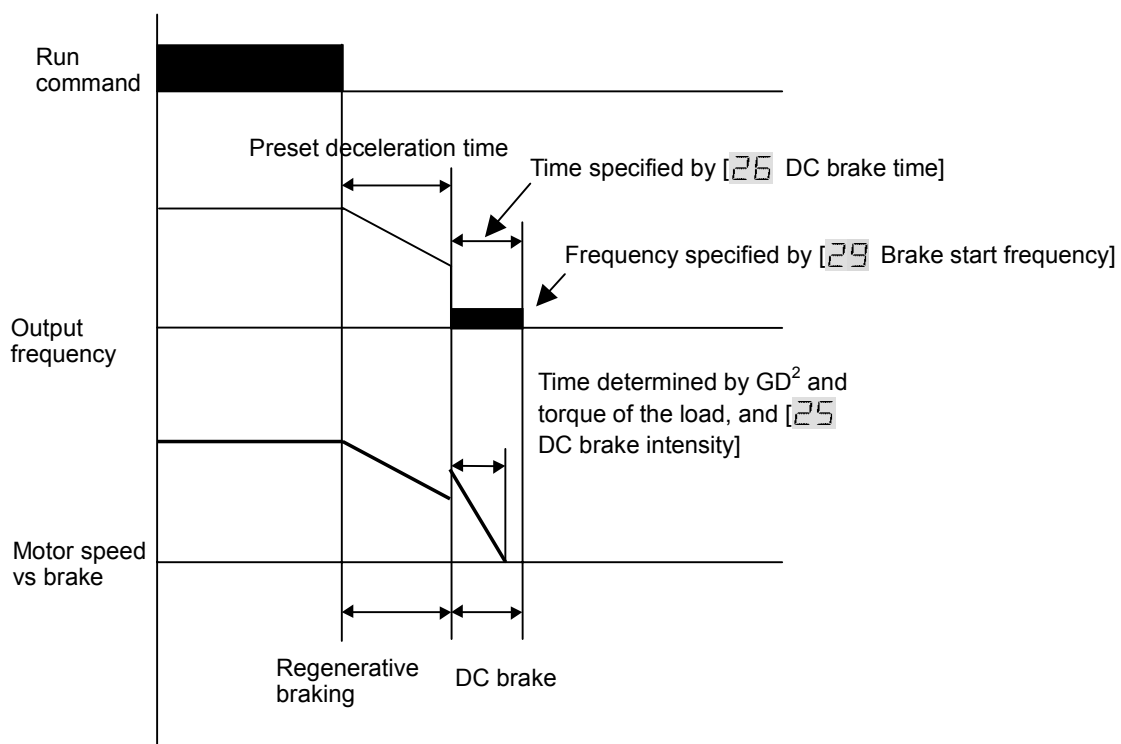
Operation function

The inverter has the following control functions that are made active from the operation panel and terminal block.

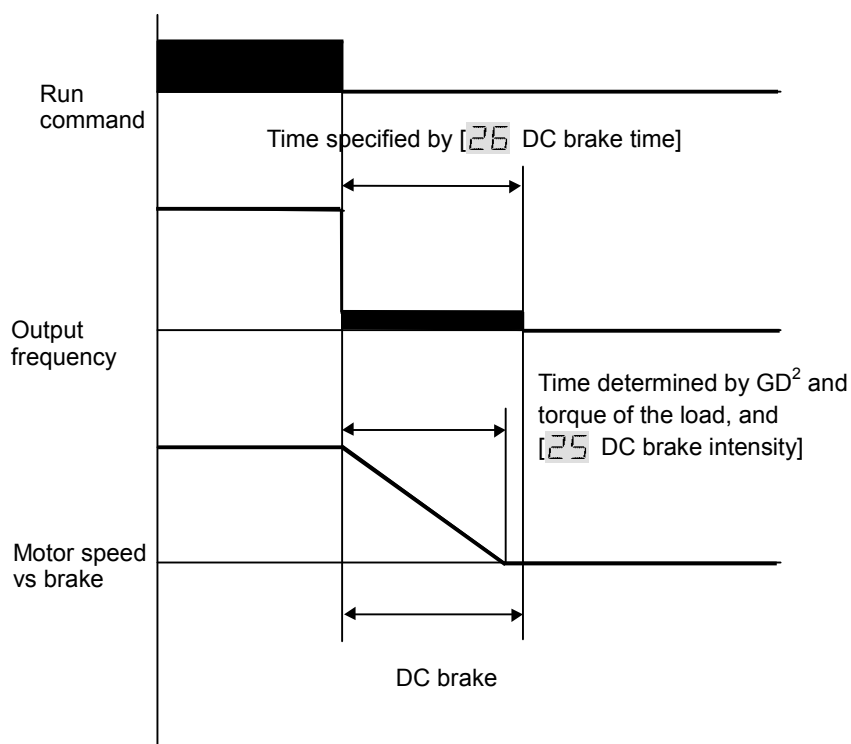
Operation control	Description
Jogging	<ul style="list-style-type: none"> ■ Acceleration/deceleration time is set to "0". This function is optimum for positioning. By setting [18 Operation mode selection] to "2-speed mode", jogging operation is enabled. When the "I3" and "G" control input terminals are short-circuited, CCW jogging is enabled. When "I4" and "G" are short-circuited, CW jogging is enabled, and the jogging frequency is output. You can switch over between the normal operation mode and the jogging mode. The jogging frequency can be specified in the range of 0 to 30 Hz. If the jogging frequency is too high, the inverter may trip due to overcurrent.
Free-run stop	<ul style="list-style-type: none"> ■ Turns off the output voltage applied to the motor, allowing the motor to coast. This function is useful to brake the motor mechanically. Remember that touching the motor output terminals (U/T1, V/T2 and W/T3) may cause electric shock even if the free-run stop function is activated.
DC brake	<ul style="list-style-type: none"> ■ Activates the brake by applying a direct current to the motor at the time when the inverter shifts from the running status to the stop status. If the CCW, CW or jogging command is issued while the DC brake function is activated, the DC brake is disabled, and the motor starts running as specified by the command.
Positioning DC brake	<ul style="list-style-type: none"> ■ When a stop command is issued during normal operation, the motor soft-stops, and the DC brake is activated when the output frequency is reduced to 3 Hz. (The frequency at which the brake is activated can be changed with the parameter). ■ When the frequency is set to "0", the DC brake is activated when the output frequency falls below 1 Hz. ■ The DC brake intensity (torque) and time can be specified with the parameters.
DC brake for full-range stop	<ul style="list-style-type: none"> ■ When a stop command is issued during normal operation, the DC brake is immediately activated without soft-stop. ■ The DC brake intensity (torque) and time can be specified with the parameters. ■ The DC brake time is twice as long as the time specified for "Positioning DC brake".

<Examples of DC Brake Operation Patterns>

Positioning DC brake



DC brake for full-range stop



Operation Function

Run mode

The inverter operates in the following two run modes.

Select the desired mode in the parameter [**18** Run mode selection].

Mode	Function of terminal block						Setting in [18 Run mode selection].
	I 1	I 2	I 3	I 4	I 5*1	I 6*1	
2-speed	CCW	CW	CCW jogging	CW jogging	Free-run stop External forced trip command No.2 acceleration/ deceleration time selection Trip reset command	Free-run stop External forced trip command No.2 acceleration/ deceleration time selection Trip reset command	<div>2</div>
4-speed	CCW	CW	Frequency setting selection		Free-run stop External forced trip command No.2 acceleration/ deceleration time selection Trip reset command	Free-run stop External forced trip command No.2 acceleration/ deceleration time selection Trip reset command	<div>4</div> [Default setting]
8-speed	CCW	CW	Frequency setting selection			Free-run stop External forced trip command No.2 acceleration/ deceleration time selection Trip reset command	<div>8</div>
16-speed	CCW	CW	Frequency setting selection				<div>16</div>

In the 4-, 8- or 16-speed mode, the following multi-speed operation is enabled by short-circuiting or opening the frequency setting selection terminals. When all the terminals are opened, the 0th speed frequency is selected, allowing you to specify frequency with the [**00** Set frequency (0th speed)] parameter, external frequency setting control dial, or the inverter's control dial.

With [**17** Frequency command selection], select whether to use the 0th speed frequency, external frequency setting control dial or the inverter's control dial.

■ Input terminal description

(1) Input terminals are given the following priority.

DC brake < Normal operation < Jogging < Free-run stop < External forced trip

Example)

- ① If the run command is issued while the DC brake is activated, the motor will immediately start running.
- ② If the free-run stop command is issued during jogging operation, the motor will coast to stop.
- ③ Even if the run command is issued while the free-run command is activated, the motor will not start running.

(2) If both the CCW and CW commands are issued during trip, the trip can be canceled. Before canceling the trip, remove the cause of the trip.

*1 [**47** I5 function selection], [**48** I6 function selection]

■ Frequency setting selection method for multi-speed operation

- (1) When [**49** Multi-speed input selection] is set to 1b 1f (1 BIT): 1-bit input

One type of multi-speed frequency can be assigned to one of the [Frequency setting selection] terminals. When the 4-speed, 8-speed and 16-speed operation modes are selected, up to 3-stepped, 4-stepped and 5-stepped speed operations are enabled, respectively.

Example: 16-speed mode

Control terminal number				Frequency setting
I3	I4	I5	I6	
OFF	OFF	OFF	OFF	0th speed frequency
ON	x	x	x	1st speed frequency
OFF	ON	x	x	2nd speed frequency
OFF	OFF	ON	x	3rd speed frequency
OFF	OFF	OFF	ON	4th speed frequency

- “ON” and “OFF” indicate the connection between each frequency setting selection terminal and the “G” terminal.
- “x” indicates that either “ON” or “OFF” is acceptable.

- (2) When [**49** Multi-speed input selection] is set to b 1n (Binary): Binary input [Default setting]

You can select frequency by setting a binary number for the frequency setting selection terminals.

< 4-speed mode >

I3	I4	Frequency setting
OFF	OFF	0th speed frequency
ON	OFF	1st speed frequency
OFF	ON	2nd speed frequency
ON	ON	3rd speed frequency

< 8-speed mode >

I3	I4	I5	Frequency setting
OFF	OFF	OFF	0th speed frequency
ON	OFF	OFF	1st speed frequency
OFF	ON	OFF	2nd speed frequency
ON	ON	OFF	3rd speed frequency
OFF	OFF	ON	4th speed frequency
ON	OFF	ON	5th speed frequency
OFF	ON	ON	6th speed frequency
ON	ON	ON	7th speed frequency

Operation Function

< 16-speed mode >

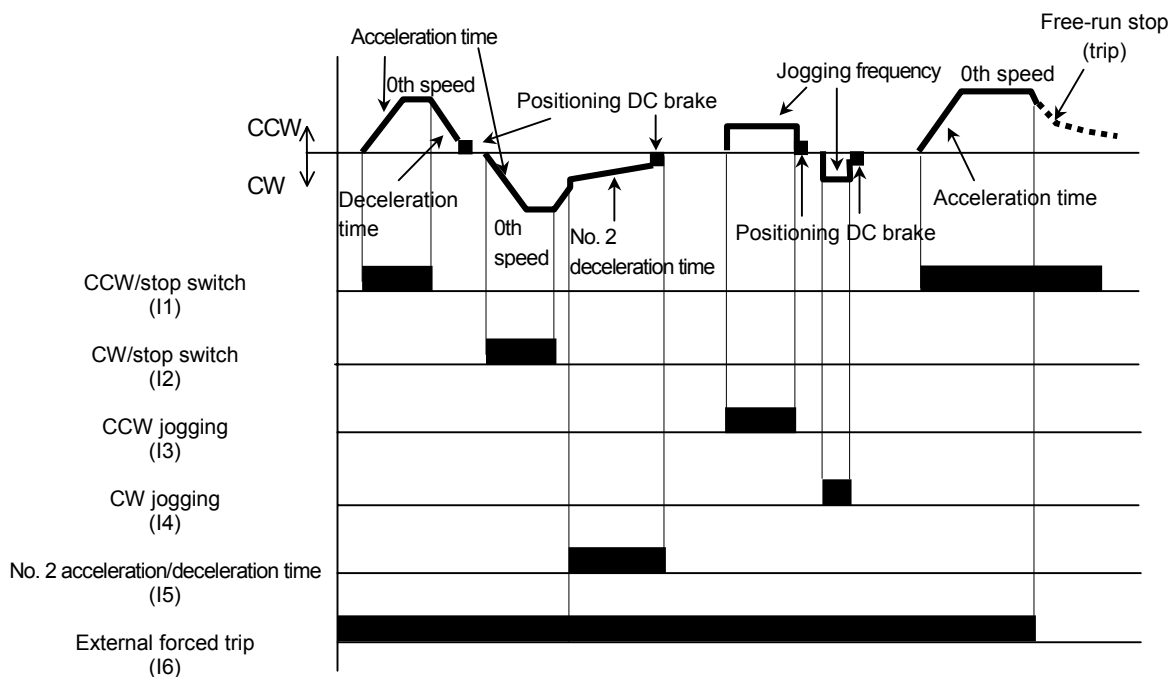
Control terminal number				Frequency setting
I3	I4	I5	I6	
OFF	OFF	OFF	OFF	0th speed frequency
ON	OFF	OFF	OFF	1st speed frequency
OFF	ON	OFF	OFF	2nd speed frequency
ON	ON	OFF	OFF	3rd speed frequency
OFF	OFF	ON	OFF	4th speed frequency
ON	OFF	ON	OFF	5th speed frequency
OFF	ON	ON	OFF	6th speed frequency
ON	ON	ON	OFF	7th speed frequency
OFF	OFF	OFF	ON	8th speed frequency
ON	OFF	OFF	ON	9th speed frequency
OFF	ON	OFF	ON	10th speed frequency
ON	ON	OFF	ON	11th speed frequency
OFF	OFF	ON	ON	12th speed frequency
ON	OFF	ON	ON	13th speed frequency
OFF	ON	ON	ON	14th speed frequency
ON	ON	ON	ON	15th speed frequency

- “ON” and “OFF” indicate the connection between each frequency setting selection terminal and the “G” terminal.

■ Operation pattern in 2-speed mode - Example:

When [47 I5 function selection] is set to U-d (No. 2 acceleration/deceleration time)

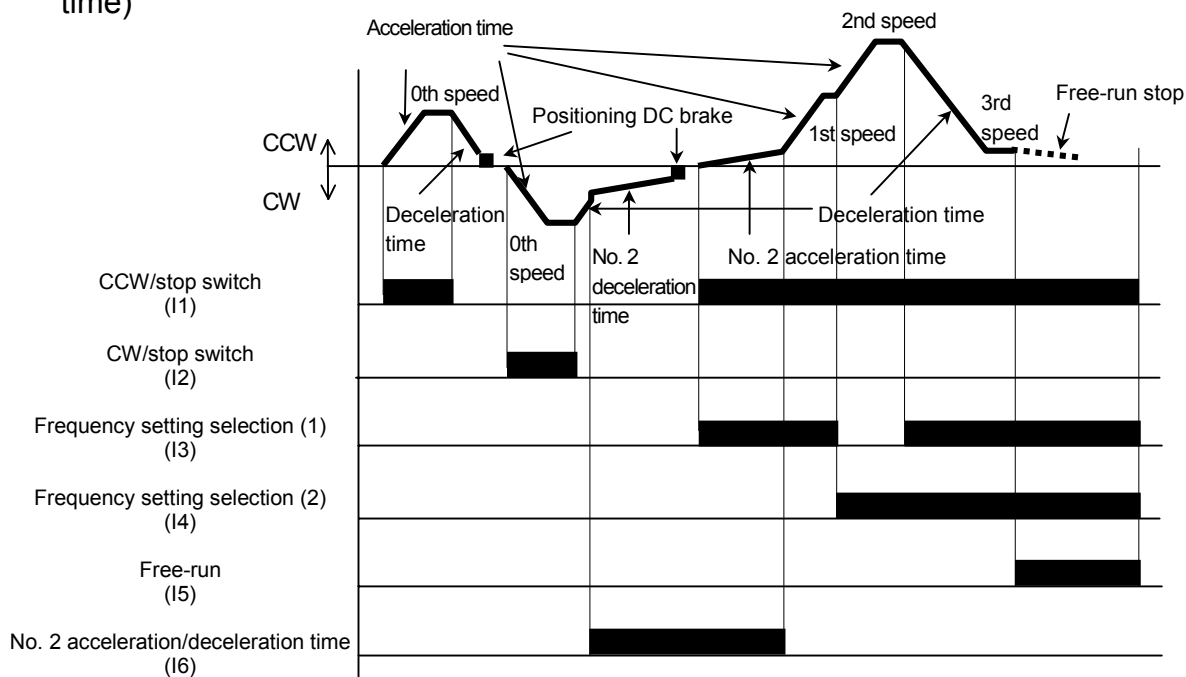
When [48 I6 function selection] is set to ΓHr (External forced trip)



■ Operation pattern in 4-speed mode - Example:

When [47 I5 function selection] is set to FrEE (Free-run command)

When [48 I6 function selection] is set to U-d (No. 2 acceleration/deceleration time)

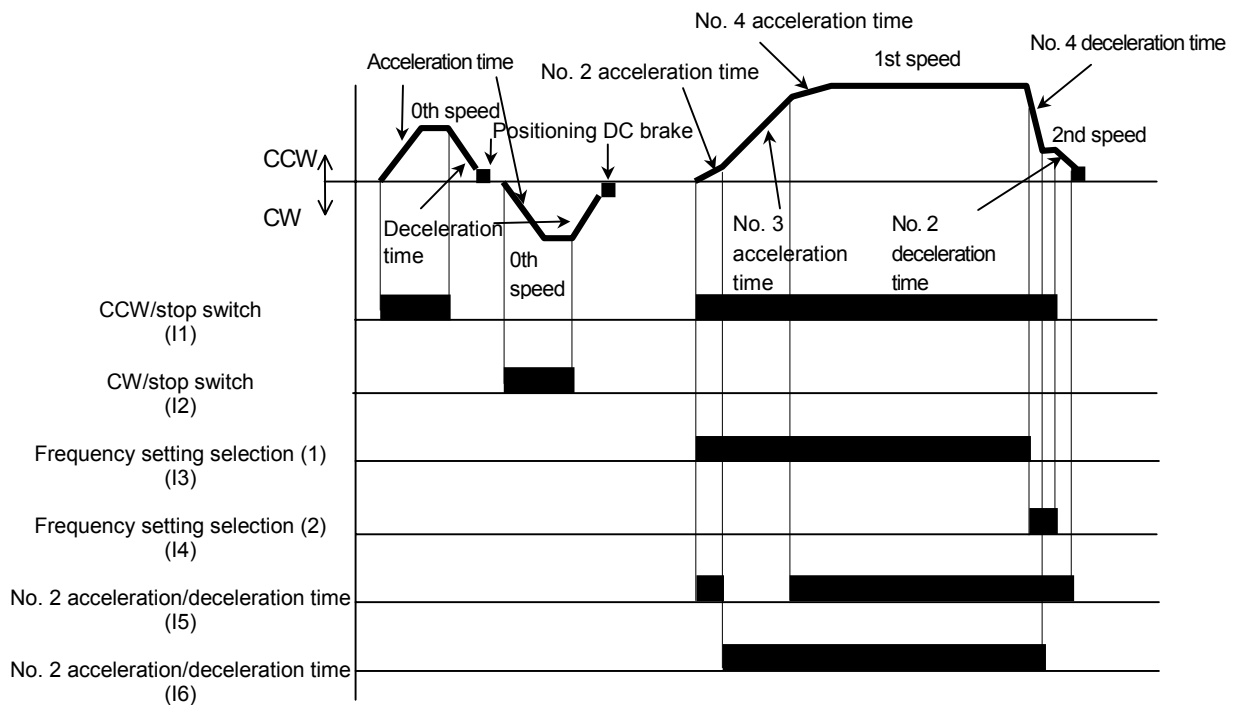


Operation Function

■ Operation pattern in 4-speed mode - Example:

When both [47 I5 function selection] and [48 I6 function selection] are set to

U-d (No. 2 acceleration/deceleration time)



Protective Function

Protective functions

Your inverter is equipped with the following protective function that:

- ① displays warning message, or
- ② avoids trip without displaying warning message.
- ③ displays warning message and turns off inverter output, or
- ④ trips the inverter (the trip signal will be removed upon power off)

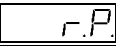
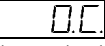
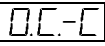
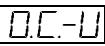
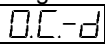

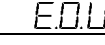
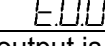
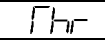
Type	Display on 5-digit LED	Protective function	Corrective action
①	Electronic thermal trip Monitor (Flashes)	Monitor display flashes when the output current reaches the electronic thermal trip level and the timer operates.	Check for overloading and reduce the load as necessary.
②	Overcurrent stall prevention (Not displayed)	If the output current exceeds [56 Current limit operating point] during acceleration or constant-speed operation, the output frequency is reduced for trip prevention. (The operation level can be adjusted with [56 Current limit operating point].)	Increase the acceleration time, or reduce the inertial load.
	Overvoltage stall prevention (Not displayed)	If the converter's DC voltage exceeds approx. 775 V during deceleration, the deceleration time is prolonged for trip prevention. (The deceleration time can be adjusted with [57 Deceleration factor at stall].)	Prolong the deceleration time, or reduce the inertial load.
③	Undervoltage Instantaneous power failure protection L	When the converter's DC voltage falls below approx. 360 V, it is judged as "instantaneous power failure", and the inverter's output is turned off.*1 When the converter's DC voltage falls below approx. 300 V, the control circuit is reset. If the voltage is restored by the time the control circuit is reset, the operation can be continued.*2	Check the power source, cabling, wiring, etc.
	CW rotation prevention*3 rEUP	When the CW rotation prevention function is selected, CW rotation is prevented when the CW signal is issued.	Check if the CW command is not issued.

*1 The inverter can continue normal operation with approx. 15 ms power interruption.


*2 Enabled when [**70** Restart prevention upon power recovery] is set to **4E5**.

*3 This function is enabled only when [**78** CW rotation prevention] is set to **4E5**.

Protective Function

Type	Display on 5-digit LED	Protective function	Corrective action
③	Restart prevention when power is restored*2 	Prevents the inverter from restarting automatically if already given the run command before power is recovered or turned up or it is reset.	Issue the stop command once, and then issue the run command.
④	Overcurrent trip  (at constant speed)  Protection by CT detection  (During acceleration)  (During deceleration)	When the inverter's output current exceeds approx. 200% of its rated current, the inverter trips. (The displayed message varies depending on the inverter's operating condition.)	Power supply voltage drop, excessive GD ² of load, insufficient acceleration/deceleration time, short-circuited load or ground fault may be considered as the cause of the trip. Examine the cause of trip thoroughly.
	Regenerative overvoltage trip 	When the converter's DC voltage exceeds approx. 800 V, the inverter trips.	If trip occurs while the inverter is running, the deceleration time may be too short and should be extended. In some cases, an external regenerative resistor may be required. If the trip occurs upon power-up, the inductance of the power factor improving AC reactor at the input of inverter may be too large, use an AC reactor compatible with the capacity of the inverter.
	Overvoltage trip retry at power-ON 	When overvoltage trip occurs because of too large inductance of the power factor improving AC reactor in the inverter's input circuit,  is displayed, and the output is turned off. When the converter's DC voltage falls below approx. 800 V, the trip is automatically canceled, enabling normal operation. *1	The power factor improving AC reactor' capacity may be too large. Select a proper reactor according to the inverter's capacity.
	Overload trip (electronic thermal) 	If the motor current continues to exceed the level set in [Electronic thermal], the inverter will be tripped because it may be overloaded.	Reduce the load, change operating pattern or use larger size inverter.

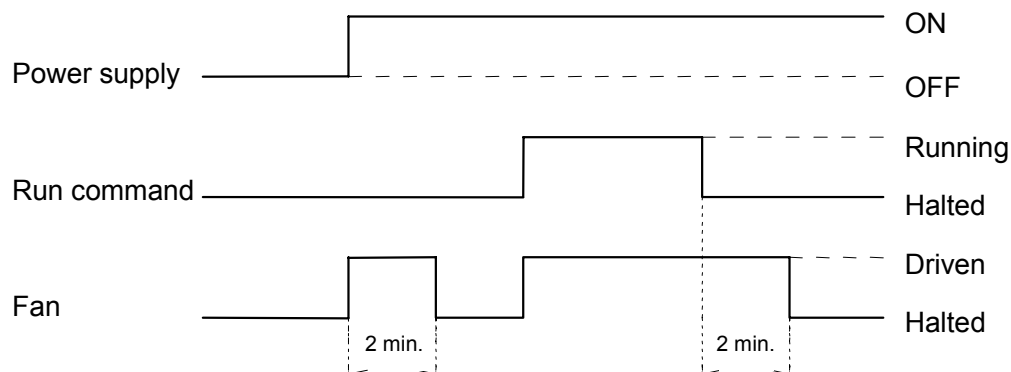
*1 This function is enabled only when [ Overvoltage trip retry at power-ON] is set to *YES*.

*2 When [ Restart prevention when power is restored] is set to *YES*, this function prevents the inverter from restarting automatically.

Type	Display on 5-digit LED	Protective function	Corrective action
④	Radiator fin overheat protection [OH]	When the temperature of the radiator fin exceeds approx. 100°C, the temperature sensor is activated to trip the inverter.	Examine the cooling fan and the ambient temperature.
	CPU error [Err]	Trips the inverter if the micro-computer causes an error.	The microcomputer operation may be interfered by external noise. Locate and remove the noise source or reduce the noise level.
	Self-diagnosis trip [CAU]	Trips upon changing in certain parameter, e.g. [18 Operation mode selection].	This is not an error. After trip is canceled, the updated result will become effective.
	Communication error [UErr]	If communication is interrupted for a period of, or longer than [r5 Protocol timeout] as many times as, or more frequently than [r4 Communication retry frequency], it is judged as communication error.	Check the communication host for abnormal condition.
	External forced trip [OL]	Trips the inverter when [47 I5 function selection] or [48 I6 function selection] is set to external forced trip and I5/I6 is not connected to [G]. After short-circuiting "I5/I6" and "G", reset the trip.	After short-circuiting the "I5" or "I6" terminal and the "G" terminal, cancel the trip. When a thermal protector is connected, examine the cause of overload.

Note) If the LED display shows a cause of trip and "88888" alternately after the trip is reset, the cause of trip has not been removed yet. Remove the cause of trip first, and then reset the trip again.

Note) The cooling fan driving sequence is shown below.





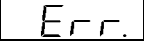
- While the inverter trips, the fan is driven only for two minutes.

Protective Function

Canceling trip

First remove the cause and then reset the system by following one of the following steps.

- [1] Turn off the inverter. Wait until the trip message disappears and then power on again.
- [2] Leaving the trip message displayed, connect both [I1] and [I2] to [G] for at least 0.1 seconds. ^{*1}
- [3] Leaving the trip message displayed, press both  and  switches on the operation panel for at least 1 second.
- [4] Leaving the trip message displayed, issue the trip reset command. ^{*2}

* If the CPU error  occurs, cancel the trip according to the above procedure. The trip cannot be canceled with the above [2], [3] and [4] methods.

^{*1} When [46] [I1/I2 function selection] is set to "I1: Run/stop" and "I2: CCW/CW", the trip cannot be canceled.

^{*2} This method is effective only when [47] [I5 function selection] or [48] [I6 function selection] are set to r5f.

Maintenance/Inspection

You should perform maintenance/inspection on a regular basis in order to ensure safety and keep the inverter in good running order.

Precautions when performing maintenance/inspections

- (1) The power should be turned on/off only by the person performing the task.
- (2) The internal circuits of the inverter remain charged with high voltage for a short while after power is turned off. To perform inspection, first turn off the power and then wait for the LED display on the operation panel to go off (min. 15 minutes).
- (3) Do not use a megger for the purpose of measuring insulation resistance. Otherwise, the inverter is damaged.

Inspection items and environment

- Ordinary/normal usage conditions

Ambient conditions: Annual mean temperature 30°C, max. 20 hrs/day at max. load rate 80%

- Perform daily and periodic inspections in accordance with the following items:

Classification	Inspection cycle	Inspection items
Daily inspection	Daily	<ul style="list-style-type: none">• Ambient temperature, humidity, dirt, dust, foreign objects, etc.• Is there abnormal vibration/noise?• Is main circuit voltage normal?• Is there strange odor?• Is there lint in the air holes?• Cleanliness of control unit• Is wiring damaged?• Are equipment connections loose or off center?• Are foreign objects lodged in at the load side?
Periodic inspections	1 year	<ul style="list-style-type: none">• Are fastened sections loose?• Is there evidence of overheating?• Are terminal blocks damaged?

<Caution>

Inspection cycle for periodic inspections may vary if usage conditions differ from those given above.

Approximate period for part replacement

Period for part replacement varies depending on how the inverter is used. Parts must be replaced or repaired when something is wrong with them.

Product name	Part name	Standard replacement period (hrs)	Remarks
Inverter	Smoothing capacitor	Approx. 5 years	Standard replacement period gives a number of years for reference only. If a part becomes faulty it must be replaced even if the standard replacement period has not yet been reached.
	Cooling fan	2 - 3 years (10 - 30 thousand hours)	
	Aluminum electrolytic capacitor on PCB	Approx. 5 years	

Troubleshooting

Inspection to determine cause of problem

When a problem occurs, perform the inspections and take the measures prescribed in the following table. If you cannot determine the cause of the problem, if you suspect that the inverter is not working properly, if a part is damaged, or there are any other problems you cannot solve, contact your Panasonic dealer.

Problem	Possible cause	Corrective action
Motor won't run	Improper wiring	Correct wiring.
	Power is not fed to power input terminals.	Turn on power. Turn off and then on power.
	LED on the operation panel is unlit.	Check power supply.
	Not a rated voltage on the supply input terminals.	Check the voltage.
	Error is displayed.	See Section [Protective function].
	Free-run command is issued.	Cancel the command.
	Both CCW and CW switches are on.	Turn off unnecessary one.
	Check if the frequency setting is correct.	Check the frequency setting.
	Motor is locked or overloaded.	Release the lock or reduce the load.
	One phase is missing.	Check wiring between the inverter and motor.
Motor runs in wrong direction	Check the output terminals (U/T1, V/T2 and W/T3) for incorrect phase order.	Match the phase order of the output terminals (U/T1, V/T2 and W/T3) with those of the motor terminals.
Motor runs but cannot change speed	Motor is overloaded.	Reduce the load.
Motor runs at incorrect speed	No. of phases and voltage of the motor do not match those of power source.	Check the specifications and the identification plate.
	Voltage on power input terminal (R/L1, S/L2 or T/L3) is out of spec.	Check the voltage.
	Check if the frequency setting range is correct.	Check [74 Lower limit frequency] and [75 Upper limit frequency].
	Check if the motor's terminal voltage is extremely low.	Check [35 Base frequency], [36 Maximum output voltage adjustment] and [37 V/F reduction characteristic].
	Motor is overloaded.	Reduce the load.
Unstable motor speed	Load varies excessively.	Keep fluctuations in the load at minimum. Replace with larger inverter and motor set.

Parameter Description

No.	Parameter name	Parameter setting			
		Adjustment range	Min. unit	Factory setting	Check ^{*1}
00	Set frequency (0th speed)	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
01	1st speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	50Hz	
02	2nd speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	30Hz	
03	3rd speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	15Hz	
04	4th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
05	5th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
06	6th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
07	7th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
08	8th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
09	9th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
10	10th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
11	11th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
12	12th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
13	13th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
14	14th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
15	15th speed frequency	0, 0.5 ^{*2} - Upper limit frequency	0.01Hz ^{*3}	0Hz	
16	Run command selection	<div>PnL</div> Operation panel <div>TEr</div> Terminal block <div>60FH</div> Both <div>51G</div> RS485 communication		60FH	
17	Frequency command selection	<div>PnL</div> Operation panel <div>UOL</div> Control dial <div>0-5</div> 0 - 5V(4-20mA) <div>0-10</div> 0 - 10V(4-20mA)		PnL	
18	Operation mode selection	2, 4, 8, 16 speed operation mode		4 speed operation mode	
19	Torque control	0 - 100	2	400W - 1.5kW	40
		<div>AUF.1</div> <div>AUF.0</div> Automatic boost <div>SLIP</div> Slip frequency vector control		2.2kW - 7.5kW	20
20	Jogging frequency	0, 0.5 ^{*2} ~ 30Hz	0.01Hz	7Hz	

*1 Parameters marked by in the Check column are tripped for safety if modified or memorized.

Cancel the trip before use.

*2 The lower limit of the adjustment range varies depending on the [88 Starting frequency] setting.

*3 When the set value exceeds 160 Hz, the minimum unit of setting is 0.05 Hz.

Parameter Description

No.	Parameter name	Parameter setting			
		Adjustment range	Min. unit	Factory setting	Check ^{*1}
21	Acceleration time	0 - 3600 sec <div> <div>- 3 sec</div> <div>3 sec - 10 sec</div> <div>10 sec -</div> </div> <div> <div>: in steps of 0.01 sec</div> <div>: in steps of 0.1 sec</div> <div>: in steps of 1 sec</div> </div>		5 sec	
22	No.2 acceleration time			5 sec	
23	No.3 acceleration time			5 sec	
24	No.4 acceleration time			5 sec	
25	DC brake intensity	0 - 100	2	70	
26	DC brake time	Case of <input type="text" value="POS"/> : 0 - 3 sec Case of <input type="text" value="-POS"/> : 0 - 6 sec	0.05 sec 0.1 sec	0.5 sec 1.0 sec	
27	DC brake selection	<input type="text" value="POS"/> Positioning <input type="text" value="-POS"/> Full-range stop		<input type="text" value="POS"/>	
28	Start-up brake time	0 - 3 sec	0.05 sec	0 (Disabled)	
29	Brake starting	0.5 - 400Hz	0.01Hz ^{*3}	3 Hz	
30	Carrier frequency	0, 1, 2, 3, 4, 5, 6, 7		5	
31	Deceleration time	0 - 3600 sec <div> <div>- 3 sec</div> <div>3 sec - 10 sec</div> <div>10 sec -</div> </div> <div> <div>: in steps of 0.01 sec</div> <div>: in steps of 0.1 sec</div> <div>: in steps of 1 sec</div> </div>		5 sec	
32	No.2 deceleration time			5 sec	
33	No.3 deceleration time			5 sec	
34	No.4 deceleration time			5 sec	
35	Base frequency	30 - 400Hz	1Hz	50Hz	
36	Maximum output	0 - 100%	1%	100%	
37	V/F reduction characteristic	1.0 - 2.0 squared	0.1	1.0	
38	2nd V/F selection	<input type="text" value="n0"/> No selection (Ordinary V/F pattern) <input type="text" value="UP"/> Upper pattern <input type="text" value="LO"/> Lower pattern		<input type="text" value="n0"/>	
39	2nd V/F base frequency	30 - 400Hz	1Hz	50Hz	
40	2nd V/F boost	0 - 100	2	0	
41	Jump frequency width	0 - 400Hz	0.01Hz ^{*3}	0Hz	
42	Jump frequency ①	0, 0.5 ^{*2} - 400Hz	0.01Hz ^{*3}	0Hz	
43	Jump frequency ②	0, 0.5 ^{*2} - 400Hz	0.01Hz ^{*3}	0Hz	
44	Jump frequency ③	0, 0.5 ^{*2} - 400Hz	0.01Hz ^{*3}	0Hz	
45	Jump frequency ④	0, 0.5 ^{*2} - 400Hz	0.01Hz ^{*3}	0Hz	

*1 Parameters marked by in the Check column are tripped for safety if modified or memorized.

Cancel the trip before use.

*2 The lower limit of the adjustment range varies depending on the [Starting frequency] setting.

*3 When the set value exceeds 160 Hz, the minimum unit of setting is 0.05 Hz.

No.	Parameter name	Parameter setting			
		Adjustment range	Min. unit	Factory setting	Check ^{*1}
46	I1/I2 function selection	<div>F5r5</div> <div>r5Fr</div>	I1: Forward (ccw) /stop I2: Reverse (cw) /stop I1: Run/stop I2: Forward (ccw) /Reverse (cw)	F5r5	
47	I5 function selection	<div>FrEE</div> <div>rHr</div>	Free-run External forced trip	FrEE	
48	I6 function selection	<div>U-d</div> <div>r5r</div>	2nd acceleration/deceleration Trip reset	r5r	
49	Multi-speed input selection	<div>1b1r</div> <div>b1n</div>	1 bit Binary	b1n	
50	Unused				
51	Output signal ① selection	<div>FrIP</div> <div>rUn</div> <div>FrEE</div> <div>F</div>	Trip, <div>SrBL</div> Arrival Running Free-run CCW, <div>r</div> CW	FrIP	
52	Output signal ② selection	<div>CL-F</div> <div>CL-C</div> <div>CAUS</div> <div>dC-b</div>	Output frequency detection Motor current detection Cause of trip DC braking	SrBL	
53	Relay output signal selection Enabled only when the relay output terminals (NC, COM2 and NO) are used.	<div>FrIP</div> <div>rUn</div> <div>FrEE</div> <div>F</div> <div>CL-F</div> <div>CL-C</div>	Trip, <div>SrBL</div> Arrival Running Free-run CCW, <div>r</div> CW Output frequency detection Motor current detection	FrIP	
54	Motor current detection level	50 - 150%	5%	100%	
55	Output signal polarity ① selection	<div>nOr</div> Normal, <div>rEU</div> Reverse		nOr	
56	Current limit operating point	50 - 150%	10%	150%	
57	Deceleration factor at stall	x1, x2, x4, x8, x16		x8	
58	Acceleration mode selection	<div>L1n.</div> Linear <div>5-1</div> S curve ①		L1n.	
59	Deceleration mode selection	<div>5-2</div> S curve ②		L1n.	

*1 Parameters marked by in the Check column are tripped for safety if modified or memorized.
Cancel the trip before use.

Parameter Description

No.	Parameter name	Parameter setting			
		Adjustment range	Min. unit	Factory setting	Check ^{*1}
60	Monitor mode selection	<div>5-F Set frequency</div> <div>0-F Output frequency</div> <div>dC-U DC voltage</div> <div>CUr Output current</div> <div>Fb-F Feedback frequency</div>		0-F	
61	Display scale factor	0.1 - 60.0	0.1	1.0	
62	Frequency meter adjustment	—	—	—	
63	Frequency meter full-scale	0 - 400Hz	1Hz	60Hz	
64	FOUT switching	<div>CArA Current analog output</div> <div>dIG Digital</div> <div>ArA Analog</div>		ArA	
65	Comparative frequency A	0, 0.5 ^{*2} - 400Hz	0.01Hz ^{*3}	0Hz	
66	Comparative frequency B	0, 0.5 ^{*2} - 400Hz	0.01Hz ^{*3}	0Hz	
67	Agreement detection width	0 - 400Hz	0.01Hz ^{*3}	3Hz	
68	Drop frequency at instantaneous power failure	0 - 400Hz	0.01Hz ^{*3}	3Hz	
69	Free-run time at instantaneous power failure	1, 2, 3, 4, 5		1	
70	Restart prevention upon power recovery	<div>n0 Restart</div> <div>YES No restart</div>		n0	
71	Retry selection	<div>n0 No retry</div> <div>1 - 4 Retry up to No. of times set</div>		n0	
72	Retry start time	0 - 120 sec	2 sec	4 sec	
73	Frequency setting bias	0 - - 60Hz	0.01Hz ^{*3}	0Hz	
74	Lower limit frequency	0, 0.5 ^{*2} to (Upper limit frequency - 0.01) Hz	0.01Hz ^{*3}	0Hz	
75	Upper limit frequency	(Lower limit frequency + 0.01) to 400 Hz	0.01Hz ^{*3}	60Hz	
76	Input filter time constant	1, 2, 3, 4, 5		3	
77	Overvoltage trip retry at power-ON Trip retry	<div>n0 No retry</div> <div>YES Retry</div>		n0	
78	CW rotation prevention	<div>n0 Enables CW rotation</div> <div>YES Prevents CW rotation</div>		n0	
79	Electronic thermal	30 - 150%	5%	115%	

*1 Parameters marked by in the Check column are tripped for safety if modified or memorized.

Cancel the trip before use.

*2 The lower limit of the adjustment range varies depending on the [**88** Starting frequency] setting.

*3 When the set value exceeds 160 Hz, the minimum unit of setting is 0.05 Hz.

No.	Parameter name	Parameter setting			
		Adjustment range	Min. unit	Factory setting	Check ^{*1}
80	Trip cause clear	<input type="text" value="n0"/> <input type="text" value="YES"/>		<input type="text" value="n0"/>	
81	Trip cause①	<input type="text" value="—"/>	<input type="text" value="—"/>	<input type="text" value="—"/>	
82	Trip cause②	<input type="text" value="—"/>	<input type="text" value="—"/>	<input type="text" value="—"/>	
83	Trip cause③	<input type="text" value="—"/>	<input type="text" value="—"/>	<input type="text" value="—"/>	
84	Trip cause④	<input type="text" value="—"/>	<input type="text" value="—"/>	<input type="text" value="—"/>	
85	Trip cause⑤	<input type="text" value="—"/>	<input type="text" value="—"/>	<input type="text" value="—"/>	
86	Parameter initialization	<input type="text" value="n0"/> <input type="text" value="YES"/>		<input type="text" value="n0"/>	
87	Motor selection	<input type="text" value="4P. 08"/> <div> <div>Motor capacity ^{*2}</div> <div>Number of motor poles</div> </div>		4-pole inverter capacity ^{*3}	
88	Starting frequency	0.5 - 10Hz	0.01Hz	1Hz	
89	Automatic voltage adjustment reference voltage	380, 400, 440, 460V		400V	
90	Automatic voltage adjustment selection	<input type="text" value="n0"/> Enables automatic voltage adjustment <input type="text" value="YES-1"/> Disables automatic voltage adjustment <input type="text" value="YES-2"/> Disables automatic voltage adjustment during deceleration only		<input type="text" value="n0"/>	
AA	Parameter lock	<input type="text" value="n0"/> Parameters are not locked <input type="text" value="ALL"/> All parameters are locked <input type="text" value="PART"/> Locks unnecessary parameter		<input type="text" value="n0"/>	
bb	Copy parameter	<input type="text" value="n0"/> Parameters not copied <input type="text" value="PLoAd"/> Parameters are read out to panel <input type="text" value="PPrG1"/> Parameters are written into inverter <input type="text" value="P.InIt"/> Panel data is initialized		<input type="text" value="n0"/>	
C0	Motor rated current	0 - 100A	0.01	※ ^{*4}	
C1	Motor no-load current	0 - 100A	0.01	※ ^{*4}	
C2	Motor primary resistance	0 - 100Ω	0.01	※ ^{*4}	
C3	Slip correction gain	0, 1, 2, 3, 4, 5, 6, 7		4	
C4	Slip correction response time	0, 1, 2, 3, 4, 5, 6, 7		0	

*1 Parameters marked by in the Check column are tripped for safety if modified or memorized. Cancel the trip before use.

*2 The motor capacity is defined as follows: 0.4: 0.4 kW, 0.8: 0.75 kW, 1.5: 1.5 kW, 2.2: 2.2 kW, 3.7: 3.7 kW, 5.5: 5.5 kW, 7.5: 7.5 kW.

*3 The 4-pole motor with the same capacity as the inverter's rating has been specified as the default setting.

*4 The parameter settings marked with asterisk (※) vary depending on the capacity. They will be restored to the default settings through initialization.

Parameter Description

No.	Parameter name	Parameter setting			
		Adjustment range	Min. unit	Factory setting	Check ^{*1}
L0	PID function selection	<div>n0 Disables PID control</div> <div>YES-1 Enables PID control (Reverse)</div> <div>YES-2 Enables PID control (Normal)</div>		n0	
L1	Proportional (P) gain setting	0.2 - 5	0.1	1.0	
L2	Integral (I) time constant setting	0.0 - 150.0 sec	0.1 sec	1.0 sec	
L3	Differential (D) time constant setting	0.0 - 100.0 sec	0.1 sec	0.0 sec	
L4	PID scale ratio setting	0.01 - 99.99	0.01	1.0	
L5	Feedback input method setting	<div>F 10.5 0 - 5 V input to FIN1</div> <div>F 10.10 0 - 10 V input to FIN1</div> <div>F2.420 4 - 20 mA input to FIN2</div>		F2.420	
n0	Equipment number	80 - 9F	1	81	
n1	Communication speed	2400, 4800, 9600, 19200bps		9600	
n2	Communication standard	<div>8n0.1 Bit length: 8, Parity: None, Stop bit: 1</div> <div>8n0.2 Bit length: 8, Parity: None, Stop bit: 2</div> <div>8Od.1 Bit length: 8, Parity: Odd, Stop bit: 1</div> <div>8Od.2 Bit length: 8, Parity: Odd, Stop bit: 2</div> <div>8EU.1 Bit length: 8, Parity: Even, Stop bit: 1</div> <div>8EU.2 Bit length: 8, Parity: Even, Stop bit: 2</div> <div>7n0.1 Bit length: 7, Parity: None, Stop bit: 1</div> <div>7n0.2 Bit length: 7, Parity: None, Stop bit: 2</div> <div>7Od.1 Bit length: 7, Parity: Odd, Stop bit: 1</div> <div>7Od.2 Bit length: 7, Parity: Odd, Stop bit: 2</div> <div>7EU.1 Bit length: 7, Parity: Even, Stop bit: 1</div> <div>7EU.2 Bit length: 7, Parity: Even, Stop bit: 2</div>		8EU.1	
n3	Communication response time	5 - 1000ms	1ms	10ms	
n4	Number of communication retries	0 - 8 n0	1	n0	
n5	Protocol timeout	1 - 255 sec	1 sec	2 sec	
99	Parameter extraction	Parameter No.	—	—	

*1 Parameters marked by in the Check column are tripped for safety if modified or memorized.
Cancel the trip before use.

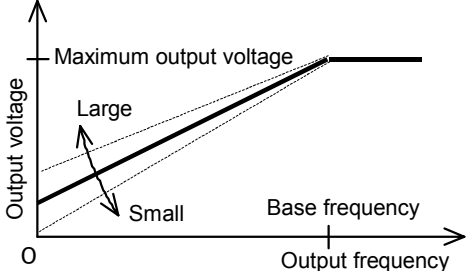
Detailed Parameter Description

Function of parameter

No.	Parameter name	Description															
00	Set frequency (0th speed)	Used to specify desired operating frequency. Enabled when [17Frequency command selection] is set to PnL.															
01	1st speed frequency	Used to specify frequency for multi-speed operation. Enabled when [18Operation mode selection] is set to 4-, 8- and 16-speed operation modes. <table><tr><td>Operation mode</td><td>I3</td><td>I4</td><td>I5</td><td>I6</td></tr><tr><td>2-speed mode</td><td>CCW jogging</td><td>CW jogging</td><td colspan="2" rowspan="4">Select among: free-run, external forced trip, No.2 acceleration/deceleration and trip reset.</td></tr><tr><td>4-speed mode</td><td colspan="2" rowspan="3">Frequency setting selection</td></tr><tr><td>8-speed mode</td></tr><tr><td>16-speed mode</td></tr></table>	Operation mode	I3	I4	I5	I6	2-speed mode	CCW jogging	CW jogging	Select among: free-run, external forced trip, No.2 acceleration/deceleration and trip reset.		4-speed mode	Frequency setting selection		8-speed mode	16-speed mode
Operation mode	I3		I4	I5	I6												
2-speed mode	CCW jogging		CW jogging	Select among: free-run, external forced trip, No.2 acceleration/deceleration and trip reset.													
4-speed mode	Frequency setting selection																
8-speed mode																	
16-speed mode																	
02	2nd speed frequency																
03	3rd speed frequency																
04	4th speed frequency																
05	5th speed frequency																
06	6th speed frequency																
07	7th speed frequency																
08	8th speed frequency																
09	9th speed frequency																
10	10th speed frequency																
11	11th speed frequency																
12	12th speed frequency																
13	13th speed frequency																
14	14th speed frequency																
15	15th speed frequency																
16	Run command selection	Run command can be selected through the following control facility. <ul style="list-style-type: none">● PnL (PaNeL) : RUN switch on the operation panel● TEr (TERminal) : Input terminal [I1]/[I2]■ bOTH (BOTH) : Both operation panel and input terminals can be used.● SIG (SIG) : RS485 communication * When PnL is selected, the input terminal cannot be used for run command.															
17	Frequency command selection	Used to select whether [00 Set frequency (0th speed)], frequency setting input terminals (FIN1 and FIN2) or the inverter's control dial is used for the 0th speed frequency setting. <ul style="list-style-type: none">■ PnL [00 Set frequency (0th speed)]● 0-5 Analog command FIN1 (Voltage command) 0 to 5 VDC FIN2 (Current command) 4 to 20 mA● 0-10 Analog command FIN1 (Voltage command) 0 to 10 VDC FIN2 (Current command) 4 to 20 mA● UoL Inverter's control dial * If UoL is selected for the inverter that is not equipped with the control dial, the 0th speed frequency setting is disabled.															

■: Factory setting

Detailed Parameter Description

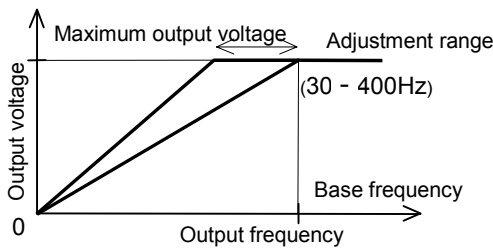
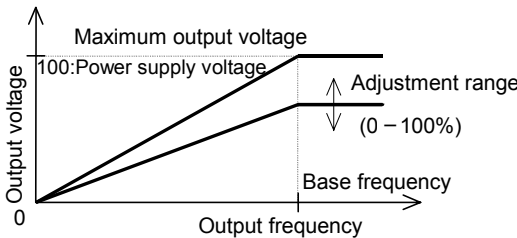
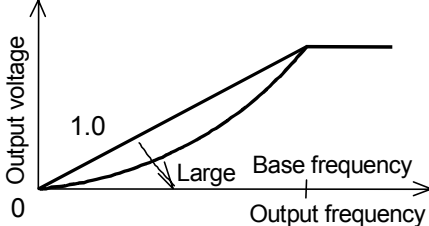
No.	Parameter name	Description
18	Run mode selection	<p>Selects the run mode.</p> <ul style="list-style-type: none"> ● <input type="text" value="2"/> 2-speed mode ■ <input type="text" value="4"/> 4-speed mode ● <input type="text" value="8"/> 8-speed mode ● <input type="text" value="16"/> 16-speed mode
19	Torque control	<p>■ <input type="text" value="0"/> - <input type="text" value="100"/> : Manual torque boost</p> <p>The inverter's output voltage in low-frequency range can be adjusted</p> <p>* If this parameter setting is too high, the inverter may trip due to overcurrent.</p>  <ul style="list-style-type: none"> ● <input type="text" value="AUF0"/> : Automatic boost. Performs optimum automatic torque control for the motor with the same capacity as the inverter. ● <input type="text" value="AUF1"/> : Automatic boost. Performs relatively weak automatic torque control for the motor with the same capacity as the inverter. ● <input type="text" value="SLIP"/> : Slip frequency vector control. Performs slip frequency vector control for the motor selected by <input type="text" value="B7"/> Motor selection]. <p><Precaution for selecting automatic boost or slip frequency vector control></p> <ul style="list-style-type: none"> • Select the parameter when the motor is not in operation. • Do not use this parameter for parallel operation. • Control may become unstable depending on the actual load conditions. In such a case, set this parameter to "manual torque boost". • When the power supply voltage is high, reduce the inverter's output voltage by adjusting <input type="text" value="35"/> Base frequency] or <input type="text" value="36"/> Maximum output voltage adjustment].
20	Jogging frequency	Used to specify frequency for jogging operation.
21	Acceleration time	<p>Used to determine the output frequency change ratio during acceleration.</p> <ul style="list-style-type: none"> • Specify the time required for change by 50 Hz. • When this parameter is set to "0" seconds, the actual acceleration time is 0.01 seconds. • For a set value less than 3 sec., the increment/decrement step is 0.01 sec. For a set value over 3 sec. to less than 10 sec., the step is 0.1 sec. For a set value over 10 sec., the step is 1 sec.

■: Factory setting

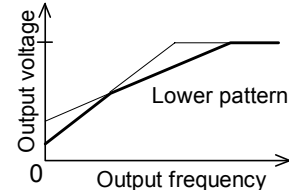
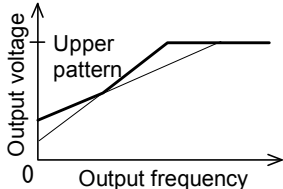
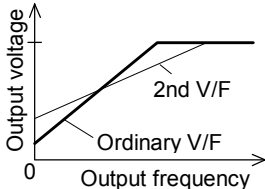
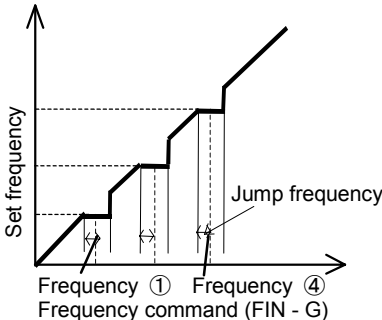
No.	Parameter name	Description																								
22	No.2 acceleration time	The acceleration time can be set when [47 I5 function selection] or [48 I6 function selection] is set to <input type="text" value="U-d"/> (No. 2 acceleration/deceleration).																								
23 24	No.3 acceleration time No.4 acceleration time	These acceleration times can be set when [47 I5 Function selection] and [48 I6 Function selection] are both set to <input type="text" value="U-d"/> No.2 acceleration/deceleration. <table><tr><th>Setting</th><th>I5 - G</th><th>I6 - G</th></tr><tr><td>No. 3 acceleration</td><td>Open</td><td>Short-circuited</td></tr><tr><td>No. 4 acceleration</td><td>Short-circuited</td><td>Short-circuited</td></tr></table>	Setting	I5 - G	I6 - G	No. 3 acceleration	Open	Short-circuited	No. 4 acceleration	Short-circuited	Short-circuited															
Setting	I5 - G	I6 - G																								
No. 3 acceleration	Open	Short-circuited																								
No. 4 acceleration	Short-circuited	Short-circuited																								
25 26	DC brake intensity DC brake time	Used to adjust the DC brake time and the DC brake intensity at the time when the inverter shifts from the running status to the stop status. <ul style="list-style-type: none">When the DC brake time and/or DC brake intensity is set to “0”, the motor will coast. * When the brake for urgent stop (full-range stop) is selected, the DC brake time is twice as long as that of the positioning brake time.																								
27	DC brake selection	Used to select the DC brake type. ■ <input type="text" value="POS"/> Positioning ● <input type="text" value="-POS"/> Full-range stop																								
28	Start-up brake time	At start-up, the DC brake is activated for a specified time before the motor actually starts running. When this parameter is set to “0”, the DC brake will not work. <ul style="list-style-type: none">The DC brake intensity (torque) is specified by [25 DC brake intensity]. However, when this parameter is set to “0”, the DC brake will not work.																								
29	Brake starting frequency	Used to adjust the frequency at which the positioning DC brake starts working. <ul style="list-style-type: none">The DC brake will be activated when the output frequency falls below [Brake starting frequency] while the motor in normal operation is soft-stopped by the stop command.If the motor in normal operation stops as the frequency setting is reduced, the DC brake will be activated when the output frequency falls below 1 Hz, regardless of the [Brake starting frequency] setting.																								
30	Carrier frequency	Select eight of the following frequencies while the motor is in stop status. Selection made while the motor is running cannot be accepted. <table><tr><th>Set value</th><th>Carrier frequency</th><th>Metallic sound from motor</th><th>Noise and leak current</th></tr><tr><td>0</td><td>1.2kHz</td><td rowspan="4">Large</td><td rowspan="4">Small</td></tr><tr><td>1</td><td>2.6kHz</td></tr><tr><td>2</td><td>3.9kHz</td></tr><tr><td>3</td><td>6.0kHz</td></tr><tr><td>4</td><td>8.0kHz</td><td rowspan="4">Small</td><td rowspan="4">Large</td></tr><tr><td>5</td><td>10.1kHz</td></tr><tr><td>6</td><td>12.0kHz</td></tr><tr><td>7</td><td>14.9kHz</td></tr></table>	Set value	Carrier frequency	Metallic sound from motor	Noise and leak current	0	1.2kHz	Large	Small	1	2.6kHz	2	3.9kHz	3	6.0kHz	4	8.0kHz	Small	Large	5	10.1kHz	6	12.0kHz	7	14.9kHz
Set value	Carrier frequency	Metallic sound from motor	Noise and leak current																							
0	1.2kHz	Large	Small																							
1	2.6kHz																									
2	3.9kHz																									
3	6.0kHz																									
4	8.0kHz	Small	Large																							
5	10.1kHz																									
6	12.0kHz																									
7	14.9kHz																									

■: Factory setting

Detailed Parameter Description

No.	Parameter name	Description									
31	Deceleration time	<p>Used to determine the output frequency change ratio during deceleration.</p> <ul style="list-style-type: none"> Specify the time required for change by 50 Hz. When this parameter is set to "0" seconds, the actual deceleration time is 0.01 seconds. For a set value less than 3 sec., the increment/decrement step is 0.01 sec. For a set value over 3 sec. to less than 10 sec., the step is 0.1 sec. For a set value over 10 sec., the step is 1 sec. 									
32	No.2 deceleration time	<p>The deceleration time can be set when [47 I5 function selection] or [48 I6 function selection] is set to <input type="text" value="U-d"/> (No. 2 acceleration/deceleration).</p>									
33 34	No.3 deceleration time No.4 deceleration time	<p>These deceleration times can be set when [47 I5 Function selection] and [48 I6 Function selection] are both set to <input type="text" value="U-d"/> No.2 acceleration/ deceleration.</p> <table border="1"> <thead> <tr> <th>Setting</th><th>I5 - G</th><th>I6 - G</th></tr> </thead> <tbody> <tr> <td>No. 3 acceleration</td><td>Open</td><td>Short-circuited</td></tr> <tr> <td>No. 4 acceleration</td><td>Short-circuited</td><td>Short-circuited</td></tr> </tbody> </table>	Setting	I5 - G	I6 - G	No. 3 acceleration	Open	Short-circuited	No. 4 acceleration	Short-circuited	Short-circuited
Setting	I5 - G	I6 - G									
No. 3 acceleration	Open	Short-circuited									
No. 4 acceleration	Short-circuited	Short-circuited									
35	Base frequency	<p>Used to set the base frequency (maximum frequency in constant torque range) between 30 and 400 Hz, according to the motor's rating. Motor oscillation may occur depending on the setting of this parameter.</p> 									
36	Maximum output voltage adjustment	<p>Used to adjust the maximum output voltage (base frequency voltage).</p> <p>The adjustment range is 0 to 100% of input voltage.</p> 									
37	V/F reduction characteristic	<p>Used to specify proper V/F characteristic according to load characteristic.</p> <p> <input checked="" type="checkbox"/> <input type="text" value="1.0"/> Constant torque load <input type="checkbox"/> <input type="text" value="2.0"/> Reduced torque load </p> <p>Fine adjustment between 1.0 and 2.0 is enabled.</p> <p>Note) Enabled when [Torque control] is set to "manual boost" only. Motor oscillation may occur depending on the setting of this parameter.</p> 									

■: Factory setting

No.	Parameter name	Description																			
38 39 40	2nd V/F selection 2nd V/F base frequency 2nd V/F boost	<p>[2nd V/F selection] is used to specify a particular V/F pattern. The upper pattern <input type="text" value="UP"/> and the lower pattern <input type="text" value="LD"/> specified by [2nd V/F base frequency] and [2nd V/F boost], as well as the ordinary V/F pattern can be selected.</p> <p>■ <input type="text" value="n0"/> Ordinary pattern</p> <p>● <input type="text" value="UP"/> Upper pattern</p> <p>● <input type="text" value="LD"/> Lower pattern</p> <p>Note) Enabled when [<input type="text" value="19"/> Torque control] is set to “manual boost” only.</p> <div></div>																			
41 42 43 44 45	Jump frequency width Jump frequency ① Jump frequency ② Jump frequency ③ Jump frequency ④	<p>To avoid mechanical resonance, you can specify a range where frequency setting is disabled, or [<input type="text" value="41"/> Jump frequency width], from the frequency specified by [<input type="text" value="42"/> Jump frequency ①] to [<input type="text" value="45"/> Jump frequency ④].</p> <div></div> <ul style="list-style-type: none">• During acceleration/deceleration, frequency output is enabled even in the jump range.• If jump frequency ranges are overlapped with each other, the entire overlapped range is regarded as the jump range.																			
46	I1/I2 function selection	<p>Used to switch the command for the “I1” and “I2” input terminals as follows:</p> <table><tr><th rowspan="2">Input terminal</th><th colspan="2">I1 – G</th><th colspan="2">I2 – G</th></tr><tr><th>Short-circuited</th><th>Open</th><th>Short-circuited</th><th>Open</th></tr><tr><td>■ <input type="text" value="F5.r5"/></td><td>CCW</td><td>Stop</td><td>CW</td><td>Stop</td></tr><tr><td><input type="text" value="r5.Fr"/></td><td>Run</td><td>Stop</td><td>CW</td><td>CCW</td></tr></table> <p>(<input type="text" value="F5.r5"/> : Fwd-Stop/Rev-Stop <input type="text" value="r5.Fr"/> : Run-Stop/Fwd-Rev)</p>	Input terminal	I1 – G		I2 – G		Short-circuited	Open	Short-circuited	Open	■ <input type="text" value="F5.r5"/>	CCW	Stop	CW	Stop	<input type="text" value="r5.Fr"/>	Run	Stop	CW	CCW
Input terminal	I1 – G			I2 – G																	
	Short-circuited	Open	Short-circuited	Open																	
■ <input type="text" value="F5.r5"/>	CCW	Stop	CW	Stop																	
<input type="text" value="r5.Fr"/>	Run	Stop	CW	CCW																	

■: Factory setting

Detailed Parameter Description

No.	Parameter name	Description																																			
47	I5 Function selection	<p>The function of input terminals [I5] and [I6] can be one of the following:</p> <ul style="list-style-type: none">● FREE (FREE) : “Terminal”– “G” short-circuited → Free-run stop● THr (THeRmal) : “Terminal”– “G” open→ External forced trip command● U-d (Up-Down) : “Terminal”– “G” short-circuited→No. 2 acceleration/deceleration time selection● rSeT (ReSeT) : “Terminal”– “G” short-circuited→ Trip reset command <p>* Before selecting THr , short-circuit the input terminal and the ground terminal. Otherwise, the inverter will trip.”</p> <p>* By setting both [I5 function selection] and [I6 function selection] to U-d (No. 2 acceleration/ deceleration time), you can select four types of acceleration/deceleration time.</p> <table><tr><td>I5 – G</td><td>I6 – G</td><td>Acceleration/deceleration time setting</td></tr><tr><td>Open</td><td>Open</td><td>Acceleration time, Deceleration time</td></tr><tr><td>Short-circuited</td><td>Open</td><td>No. 2 acceleration/ deceleration time</td></tr><tr><td>Open</td><td>Short-circuited</td><td>No. 3 acceleration/ deceleration time</td></tr><tr><td>Short-circuited</td><td>Short-circuited</td><td>No. 4 acceleration/ deceleration time</td></tr></table>	I5 – G	I6 – G	Acceleration/deceleration time setting	Open	Open	Acceleration time, Deceleration time	Short-circuited	Open	No. 2 acceleration/ deceleration time	Open	Short-circuited	No. 3 acceleration/ deceleration time	Short-circuited	Short-circuited	No. 4 acceleration/ deceleration time																				
I5 – G	I6 – G		Acceleration/deceleration time setting																																		
Open	Open	Acceleration time, Deceleration time																																			
Short-circuited	Open	No. 2 acceleration/ deceleration time																																			
Open	Short-circuited	No. 3 acceleration/ deceleration time																																			
Short-circuited	Short-circuited	No. 4 acceleration/ deceleration time																																			
48	I6 Function selection																																				
49	Multispeed input selection	<p>Used to select the frequency setting method for multi-speed operation.</p> <ul style="list-style-type: none">● 1b 1f (1 bit): 1-bit input <p>One type of multi-speed frequency can be assigned to one of the [Frequency setting selection] terminals. When the 4-speed, 8-speed and 16-speed operation modes are selected, up to 3-stepped, 4-stepped and 5-stepped speed operations are enabled, respectively.</p> <p>Example: 16-speed mode</p> <table><tr><th colspan="4">Input terminals</th><th>Frequency setting</th></tr><tr><th>I 3</th><th>I 4</th><th>I 5</th><th>I 6</th><th></th></tr><tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>0th speed frequency</td></tr><tr><td>Short-circuited</td><td>×</td><td>×</td><td>×</td><td>1st speed frequency</td></tr><tr><td>Open</td><td>Short-circuited</td><td>×</td><td>×</td><td>2nd speed frequenc</td></tr><tr><td>Open</td><td>Open</td><td>Short-circuited</td><td>×</td><td>3rd speed frequency</td></tr><tr><td>Open</td><td>Open</td><td>Open</td><td>Short-circuited</td><td>4th speed frequency</td></tr></table> <ul style="list-style-type: none">● Open, short-circuited: connected to [G] terminal● ×: Don't care <ul style="list-style-type: none">■ b 1n (Binary): binary input <p>You can select frequency by setting a binary number for the [Frequency setting selection] terminals. (See P29, 30.)</p>	Input terminals				Frequency setting	I 3	I 4	I 5	I 6		Open	Open	Open	Open	0th speed frequency	Short-circuited	×	×	×	1st speed frequency	Open	Short-circuited	×	×	2nd speed frequenc	Open	Open	Short-circuited	×	3rd speed frequency	Open	Open	Open	Short-circuited	4th speed frequency
Input terminals				Frequency setting																																	
I 3	I 4	I 5	I 6																																		
Open	Open	Open	Open	0th speed frequency																																	
Short-circuited	×	×	×	1st speed frequency																																	
Open	Short-circuited	×	×	2nd speed frequenc																																	
Open	Open	Short-circuited	×	3rd speed frequency																																	
Open	Open	Open	Short-circuited	4th speed frequency																																	
50	Unused																																				

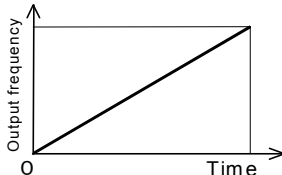
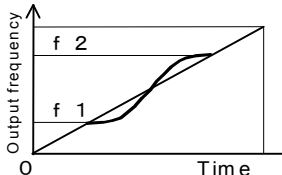
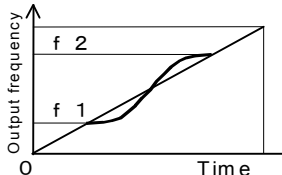
■: Factory setting

No.	Parameter name	Description																																																
51	Output signal ① selection	Output signal to terminals [O1], [O2]-[COM1] can be selected as shown below.																																																
52	Output signal ② selection	<div><div><div>●</div><div><div>TrIP</div><div>(TRIP)</div><div>:</div><div>trip output signal (trip: on)</div></div></div><div><div>●</div><div><div>STaBL</div><div>(STaBL)</div><div>:</div><div>arrival signal (arrive: on)</div></div></div><div><div>●</div><div><div>rUn</div><div>(RUN)</div><div>:</div><div>run/stop signal (run: on)</div></div></div><div><div>●</div><div><div>FrEE</div><div>(FREE)</div><div>:</div><div>free-run signal (free-run: on)</div></div></div><div><div>●</div><div><div>F</div><div>(Fwd)</div><div>:</div><div>running in CCW signal (CCW: on)</div></div></div><div><div>●</div><div><div>r</div><div>(Rev)</div><div>:</div><div>running in CW signal (CW: on)</div></div></div><div><div>●</div><div><div>Ct-F</div><div>(Check-F)</div><div>:</div><div>Output frequency detection signal</div><div>→See [65 Comparative frequency A] and [66 Comparative frequency B].</div></div></div><div><div>●</div><div><div>Ct-C</div><div>(Check-C)</div><div>:</div><div>Motor current detection signal</div><div>→See [54 Motor current detection level].</div></div></div><div><div>●</div><div><div>dC-b</div><div>(DC-Brake)</div><div>:</div><div>DC braking signal (DC braking: ON)</div></div></div><div><div>●</div><div><div>CAUS</div><div>(CAUS)</div><div>:</div><div>Trip cause output signal</div><div>At occurrence of trip, the following signal is output.</div></div></div></div> <table><tr><th colspan="2">Trip</th><th>ON duration</th><th>OFF duration</th></tr><tr><td><div>OC</div></td><td>Constant overcurrent</td><td>Continual</td><td></td></tr><tr><td><div>OC-C</div></td><td>Overcurrent detected by current sensor</td><td>1 sec</td><td>2 sec</td></tr><tr><td><div>OC-U</div></td><td>Overcurrent during acceleration</td><td>3 sec</td><td>1 sec</td></tr><tr><td><div>OC-d</div></td><td>Overcurrent during deceleration</td><td>1 sec</td><td>3 sec</td></tr><tr><td><div>OV</div></td><td>Overvoltage</td><td>1 sec</td><td>1 sec</td></tr><tr><td><div>OL</div></td><td>External forced trip</td><td>0.25 sec</td><td>0.25 sec</td></tr><tr><td><div>Thr</div></td><td>Electronic thermal</td><td>0.9 sec</td><td>0.1 sec</td></tr><tr><td><div>OH</div></td><td>Radiator fin overheat protection</td><td>2 sec</td><td>2 sec</td></tr><tr><td><div>Err</div></td><td>CPU error</td><td>0.1 sec</td><td>0.4 sec</td></tr><tr><td><div>UErr</div></td><td>Communication error</td><td>0.4 sec</td><td>0.4 sec</td></tr><tr><td><div>CAU</div></td><td>Self-diagnosis shut-off</td><td>0.5 sec</td><td>0.5 sec</td></tr></table> <div>* The polarity for [51 Output signal ① selection] can be inverted by [55 Output signal ① polarity selection].</div>	Trip		ON duration	OFF duration	<div>OC</div>	Constant overcurrent	Continual		<div>OC-C</div>	Overcurrent detected by current sensor	1 sec	2 sec	<div>OC-U</div>	Overcurrent during acceleration	3 sec	1 sec	<div>OC-d</div>	Overcurrent during deceleration	1 sec	3 sec	<div>OV</div>	Overvoltage	1 sec	1 sec	<div>OL</div>	External forced trip	0.25 sec	0.25 sec	<div>Thr</div>	Electronic thermal	0.9 sec	0.1 sec	<div>OH</div>	Radiator fin overheat protection	2 sec	2 sec	<div>Err</div>	CPU error	0.1 sec	0.4 sec	<div>UErr</div>	Communication error	0.4 sec	0.4 sec	<div>CAU</div>	Self-diagnosis shut-off	0.5 sec	0.5 sec
Trip		ON duration	OFF duration																																															
<div>OC</div>	Constant overcurrent	Continual																																																
<div>OC-C</div>	Overcurrent detected by current sensor	1 sec	2 sec																																															
<div>OC-U</div>	Overcurrent during acceleration	3 sec	1 sec																																															
<div>OC-d</div>	Overcurrent during deceleration	1 sec	3 sec																																															
<div>OV</div>	Overvoltage	1 sec	1 sec																																															
<div>OL</div>	External forced trip	0.25 sec	0.25 sec																																															
<div>Thr</div>	Electronic thermal	0.9 sec	0.1 sec																																															
<div>OH</div>	Radiator fin overheat protection	2 sec	2 sec																																															
<div>Err</div>	CPU error	0.1 sec	0.4 sec																																															
<div>UErr</div>	Communication error	0.4 sec	0.4 sec																																															
<div>CAU</div>	Self-diagnosis shut-off	0.5 sec	0.5 sec																																															

Detailed Parameter Description

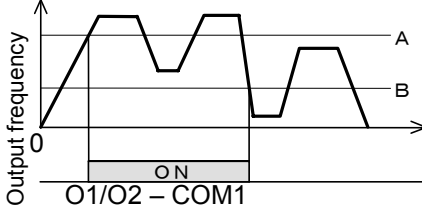
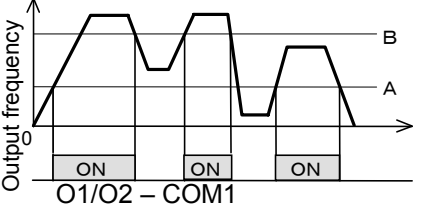
No.	Parameter name	Description
53	Relay output selection	<p>Used to select the signal type when the relay output terminals (NC, COM2 and NO) are used.</p> <ul style="list-style-type: none"> ■ TrIP (TRIP): Trip output signal (During trip: NC - COM2: Open, NO - COM2: Closed) ● STaBL (STaBL): Arrival signal (At arrival: NC - COM2: Open, NO - COM2: Closed) ● rUn (RUN): Run/stop signal (During operation: NC - COM2: Open, NO - COM2: Closed) ● FrEE (FREE): Free-run signal (During free-run: NC - COM2: Open, NO - COM2: Closed) ● F (Fwd): CCW operation signal (During CCW operation: NC - COM2: Open, NO - COM2: Closed) ● r (Rev): CW operation signal (During CW operation: NC - COM2: Open, NO - COM2: Closed) ● Ct-F (Check-F): Output frequency detection signal → See 65 Comparative frequency A] and 66 Comparative frequency B]. ● Ct-C (Check-C): Motor current detection signal → See 54 Motor current detection level].
54	Motor current detection level	<p>When 51 Output signal ① selection], 52 Output signal ② selection] and 53 Relay output selection] are set to Ct-C, this parameter is used to define the current level to be detected as a percentage relative to the inverter's rated current.</p> <p>When the motor current exceeds the specified detection level, the output terminal is activated. When the motor current falls below the detection level, the output turns OFF.</p>
55	Output signal ① polarity selection	<p>Reverses the polarity of output signal on output terminals [O1] and [COM1].</p> <ul style="list-style-type: none"> ■ nOr (NORmal) : transistor: "ON" ... normal polarity ● rEU (REVerse) : transistor: "OFF" ... reversed polarity
56	Current limit operating point	<p>Limits the motor current at the specified operating point.</p> <p>The set value is a percentage relative to the inverter's rated current.</p>

■: Factory setting

No.	Parameter name	Description
57	Deceleration factor at stall	Used to adjust the deceleration time when the stall preventing function is activated during deceleration. <ul style="list-style-type: none"> Define a magnification factor relative to the ordinary deceleration time.
58 59	Acceleration mode selection Deceleration selection	Linear acceleration/deceleration or S-curve acceleration/deceleration can be selected. <div> ■ L In Linear ● 5.-1 S-curve ① ● 5.-2 S-curve ② </div> <div>    </div> <div> <p>(Weak)</p> <p>An S-curve is shown between operating frequencies f1 and f2. It represents a relatively weak acceleration/deceleration characteristic.</p> <p>(Strong)</p> <p>An S-curve is shown between operating frequencies f1 and f2. It represents a relatively strong acceleration/deceleration characteristic.</p> </div> <p>General acceleration/deceleration mode that linearly increases output frequency to set frequency.</p>
60	Monitor mode selection	Used to select the data type to be displayed on the 5-digit LED display. When the frequency display mode is selected, a value magnified by [51 Display scale factor] is displayed. <div> ■ 0.-F Output frequency ● CU- Output current </div> <div> ● 5.-F Set frequency ● dC-U Converter DC voltage </div> <div> ● Fb.-F Feedback frequency (available when the PID function is selected) </div>
61	Display scale factor	Used to specify a scale factor for the value to be displayed on the 5-digit LED display. Motor's synchronous revolution speed, line speed, etc. can be displayed. * After the display scale factor is changed, the following frequency-related parameters will be displayed as the values magnified by the scale factor. <div> <div> [00-15] 0th – 15th speed frequency] [67] Match detection width] </div> <div> [20] Jogging frequency] [68] Drop frequency at instantaneous power failure] </div> <div> [29] Brake starting frequency] [73] Frequency setting bias] </div> <div> [41-45] Jump frequency] [74] Lower limit frequency] </div> <div> [63] Frequency meter full-scale] [75] Upper limit frequency] </div> <div> [65-66] Comparative frequency] [88] Start-up frequency] </div> </div>

■: Factory setting

Detailed Parameter Description

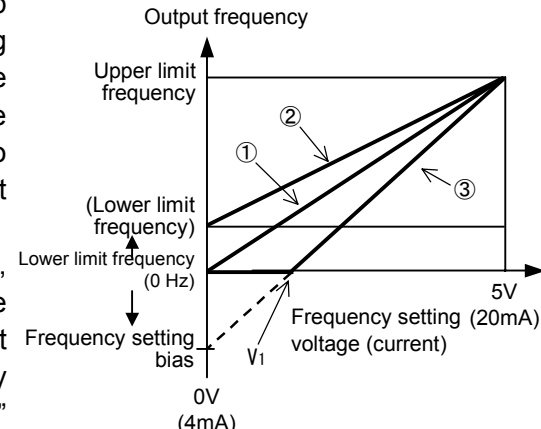
No.	Parameter name	Description
62	Frequency parameter adjustment	Used to calibrate the frequency meter. With the Δ or ∇ button, adjust the frequency meter's pointer so that it indicates the full-scale value.
63	Frequency meter full-scale	Used to define the frequency meter's full-scale frequency. The default setting is 60 Hz. To use a higher full-scale frequency, adjust this parameter.
64	FOUT switching	Used to select the frequency output signal type applied to the "FOUT" frequency output terminal. <ul style="list-style-type: none"> ● \boxed{CnA} Motor current output analog signal ■ \boxed{AnA} Frequency output analog signal ● \boxed{dIG} Frequency output digital signal
65 66	Comparative frequency A Comparative frequency B	<p>When [51 Output signal ① selection], [52 Output signal ② selection] or [53 Relay output selection] is set to $\boxed{CL-F}$ (Output frequency detection signal), this parameter is used to specify the frequency to be detected.</p> <ul style="list-style-type: none"> When the output frequency exceeds [Comparative frequency A], the output signal turns ON. When the output frequency falls below [Comparative frequency B], the output signal turns OFF. <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>▪ When $A \geq B$</p> </div> <div style="text-align: center;">  <p>▪ When $A < B$</p> </div> </div> <p>* Unless the difference between the output frequency and the comparative frequency exceeds 1 Hz, the output signal does not turn ON/OFF.</p>
67	Match detection width	<p>When [51 Output signal ① selection], [52 Output signal ② selection] or [53 Relay output selection] is set to \boxed{SfBL} (Arrival signal), this parameter is used to adjust the arrival signal output timing during acceleration/deceleration.</p> <ul style="list-style-type: none"> When the difference between the output frequency and the set frequency reaches "Match detection width", the arrival signal will be output. When this parameter is set to "0", the arrival signal will not be output. The arrival signal will not be output while the motor is stopped, DC brake is activated, or the direction of motor rotation is switched (CCW – CW). When [29 Brake starting frequency] is smaller than [Match detection width], the arrival signal will be output in the range from the match detection width to the DC brake starting frequency.

■: Factory setting

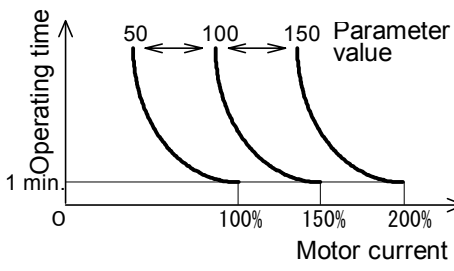
No.	Parameter name	Description												
68	Drop frequency at instantaneous power failure	Used to adjust the output frequency at power recovery from instantaneous power failure. <ul style="list-style-type: none">At power recovery, the starting frequency is determined by subtracting [Drop frequency at instantaneous power failure] from the output frequency at instantaneous power failure.If a power failure continues for a long period and the control circuit is reset, the starting frequency at power recovery is 0.5 Hz, as in the case of the ordinary power-up.												
69	Free-run time at instantaneous power failure	Free-running time upon recovery from instantaneous power interruption can be set. <table><tr><th>Set value</th><th>Free-run time</th></tr><tr><td>1</td><td>0.4s</td></tr><tr><td>2</td><td>0.8s</td></tr><tr><td>3</td><td>1.2s</td></tr><tr><td>4</td><td>1.6s</td></tr><tr><td>5</td><td>2.0s</td></tr></table>	Set value	Free-run time	1	0.4s	2	0.8s	3	1.2s	4	1.6s	5	2.0s
Set value	Free-run time													
1	0.4s													
2	0.8s													
3	1.2s													
4	1.6s													
5	2.0s													
70	Restart prevention upon power recovery	When set to YES , continuous operation is inhibited even if power is restored after instantaneous interruption.												
71 72	Retry selection Retry start time	These parameters will automatically try to cancel the trip and continue operation after the specified retry start time. The number of retries is initialized if the parameters have not been used for 120 minutes after the previous retry. <ul style="list-style-type: none">NO (NO): no retry1 - 4 : No. of retries <ul style="list-style-type: none">If [51 Output signal ① selection] or [52 Output signal ② selection] or [53 Relay output selection] is set to TRIP, no trip signal is output during retry, until the retry is repeated to the set No. of times. <p>* When [Restart prevention upon power recovery] is set to YES , the retry function is disabled.</p>												

■: Factory setting

Detailed Parameter Description

No.	Parameter name	Description										
<div>73</div> <div>74</div> <div>75</div>	Frequency setting bias Lower limit frequency Upper limit frequency	<p>Used to define the relationship between the frequency setting voltage (or current) and the output frequency for the frequency command input to the frequency setting input terminal (FIN1 or FIN2).</p> <ul style="list-style-type: none"> In the figure on the right, Line ① applies to the case where both [Lower limit frequency] and [Frequency setting bias] are set to "0" Hz. (Default settings) Lines ② and ③ apply to the cases where [Lower limit frequency] or [Frequency setting bias] is not "0", respectively. When [Frequency setting bias] is used, the break point voltage (V1) is determined by the following formula: $V_1 = \frac{[\text{Frequency setting bias}]}{[\text{Upper limit frequency}] - [\text{Lower limit frequency}] + [\text{Frequency setting bias}]} \times 5 [\text{V}]$ <p>* The output frequency must not be smaller than [Lower limit frequency].</p> <p>* [00] 0th speed frequency] through [15] 15th speed frequency] cannot be set higher than [Upper limit frequency].</p> 										
<div>76</div>	Input filter time constant	<p>Used to specify the input filter time constant for the external frequency setting signal (voltage or current signal).</p> <p>* If noise hinders stable operation, reduce the filter time constant.</p> <table border="1"> <thead> <tr> <th>Set value</th><th>Filter time constant</th><th>Response</th></tr> </thead> <tbody> <tr> <td>1</td><td rowspan="5"> <div>Large</div> <div>↕</div> <div>Small</div> </td><td rowspan="5"> <div>Poor</div> <div>↕</div> <div>Excellent</div> </td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> </tbody> </table> <p>■: Factory setting</p>	Set value	Filter time constant	Response	1	<div>Large</div> <div>↕</div> <div>Small</div>	<div>Poor</div> <div>↕</div> <div>Excellent</div>	2	3	4	5
Set value	Filter time constant	Response										
1	<div>Large</div> <div>↕</div> <div>Small</div>	<div>Poor</div> <div>↕</div> <div>Excellent</div>										
2												
3												
4												
5												
<div>77</div>	Overvoltage trip retry at power-ON	<p>When this parameter is set to <div>YES</div>, the inverter trips with <div>E.O.U.</div> indication, if overvoltage trip occurs at power-ON. When the converter's DC voltage falls below approx. 800 V, the trip will be automatically canceled.</p> <p>* If an overvoltage condition continues for more than the specified time at power-ON, it is judged as the ordinary overvoltage trip, and the displayed message changes from <div>E.O.U.</div> to <div>O.U.</div>.</p>										

■: Factory setting

No.	Parameter name	Description
78	CW rotation prevention	Setting this parameter to <input type="text" value="YES"/> prevents a trouble caused by CW rotation.
79	Electronic thermal	<p>Set the range of electronic thermal level.</p> <ul style="list-style-type: none"> Set the level by the percent of inverter rated current. When the motor current exceeds the set value, the operation panel display blinks.  <p>* To increase this parameter from the default value, you must check the inverter's temperature rise.</p>
80	Trip cause clear	<p>Can be used to clear trip causes.</p> <p><Procedure></p> <ol style="list-style-type: none"> Set this parameter to <input type="text" value="YES"/> by using the <input type="text" value="Δ"/> button, and turn OFF the power supply. After the display turns off, it will be cleared at the next power-ON, and the 5-digit LED display shows <input type="text" value="CLr"/>. In this status, the inverter will not work. Turn OFF the power supply again, and turn it ON to operate the inverter.
81	Trip cause ①	Trip causes store trip cause, respectively - total 5. For further information, see [Monitor].
82	Trip cause ②	
83	Trip cause ③	
84	Trip cause ④	
85	Trip cause ⑤	
86	Parameter initialization	<p>By using this parameter all other parameters can be initialized to the standard factory settings.</p> <p><Procedure></p> <ol style="list-style-type: none"> Using <input type="text" value="Δ"/> switch, select <input type="text" value="YES"/> and then turn off power. Wait until the display turns off, and then turn on power. The 5-digit LED displays <input type="text" value="-----"/> showing the completion of initialization. The inverter is not yet ready for operation. Simply turn off and on it again.
87	Motor selection	<p>When [<input type="text" value="19"/> Torque control] is set to <input type="text" value="SLIP"/> (Slip frequency vector control), this parameter is used to specify the capacity and number of poles of the motor.</p> <p>* Motor selection must be performed when the motor is not in operation.</p>

■: Factory setting

Detailed Parameter Description

No.	Parameter name	Description
88	Starting frequency	Used to specify the inverter's starting output frequency. * Increasing [Starting frequency] enhances the torque at start-up. However, this condition is almost direct start, and it is not suitable for shockless start. Furthermore, the inverter may trip depending on the load condition.
89	Automatic voltage adjustment reference voltage	Select the motor's rated voltage for automatic voltage adjustment.
90	Automatic voltage adjustment selection	Used to suppress fluctuations in output voltage by correcting an output voltage relative to fluctuations in input power supply voltage. However, a voltage higher than the power supply voltage cannot be output.
AA	Parameter lock	Allows the optional locking of parameters. <ul style="list-style-type: none"> ■ <input type="checkbox"/> n0 Parameters are not locked ● <input type="checkbox"/> ALL All parameters are locked ● <input type="checkbox"/> PARF Parameters that require no setting are locked. • Selecting <input type="checkbox"/> ALL deactivates <input type="checkbox"/> DATA SET , <input type="checkbox"/> MODE , <input type="checkbox"/> Δ and <input type="checkbox"/> ▽ switches, inhibiting parameter setting procedure. (<input type="checkbox"/> RUN and <input type="checkbox"/> STOP switches remain active.) • Selecting <input type="checkbox"/> PARF allows the parameters selected by means of parameter [99] to be set.
bb	Copy parameter	For copying procedure, refer to [Parameter copying method]. <ul style="list-style-type: none"> ■ <input type="checkbox"/> n0 Disables parameter copy. ● <input type="checkbox"/> PLORd Loads a parameter onto the operation panel. ● <input type="checkbox"/> PPrG1 Saves a parameter into the inverter. ● <input type="checkbox"/> P.InIf Panel data initialization For details, refer to <input type="checkbox"/> Copying parameter .
C0	Motor rated current	Used to specify the motor's rated current for slip frequency vector control. *1
C1	Motor no-load current	Used to specify the motor's no-load current for slip frequency vector control. *1
C2	Motor primary resistance	Used to specify the motor's primary resistance for slip frequency vector control. *1
C3	Slip correction gain	Used to adjust the slip correction gain for slip frequency vector control.
C4	Slip correction response time	Used to specify the slip correction response time for slip frequency vector control.

*1 Because a motor constant is required for slip frequency vector control, the standard constant for our motors has been specified as the default setting. To operate other manufacturer's motor, specify the constant of the motor used.

■: Factory setting

No.	Parameter name	Description																	
L0	PID function selection	<p>When the PID function is selected, this parameter is used to adjust the inverter's output frequency according to the deviation of the detected value from the target value. Using the PID function enables air flow rate, water flow rate or other parameters to be controlled.</p> <div><div><div>■</div><div><div>n0</div></div></div><div>Disables PID control</div><div><div>●</div><div><div>4E5-1</div></div></div><div>Enables PID control (Reverse)</div><div><div>●</div><div><div>4E5-2</div></div></div><div>Enables PID control (Normal)</div></div> <div><div><div><div>▪</div><div>When this parameter is set to <div>4E5-1</div> (Reverse), the output frequency (control quantity) will be increased if the deviation (target value – measured value) is a positive value. If it is a negative value, the output frequency (control quantity) will be reduced.</div></div></div><div><div><div>▪</div><div>When this parameter is set to <div>4E5-2</div> (Normal), the output frequency (control quantity) will be increased if the deviation (target value – measured value) is a negative value. If it is a positive value, the output frequency (control quantity) will be reduced.</div></div></div></div> <div><div>Relationship between deviation and output frequency</div><table><tr><th rowspan="2"></th><th colspan="2">Deviation</th></tr><tr><th>Positive</th><th>Negative</th></tr><tr><td>Reverse</td><td><div>↗</div></td><td><div>↘</div></td></tr><tr><td>Normal</td><td><div>↘</div></td><td><div>↗</div></td></tr></table></div> <div><div>Detected value and target value entering method</div><table><tr><th>Detected value</th><th>Target value (specified by <div>17</div> Frequency command selection])</th></tr><tr><td>4 - 20 mA signal input to FIN2</td><td><div>Select either</div><div><div><div>PnL</div></div>Operation panel</div><div><div><div>UoL</div></div>Inverter's control dial</div><div><div><div>0-5</div></div>0 – 5V(FIN1)</div><div><div><div>0-10</div></div>0 – 10V(FIN1)</div></td></tr><tr><td>0 - 5 V or 0 - 10 V signal input to FIN1</td><td><div>Select either</div><div><div><div>PnL</div></div>Operation panel</div><div><div><div>UoL</div></div>Inverter's control dial</div></td></tr></table></div> <div><div>Configuration (Example)</div><div><div><div><div>Target value 0 - 5V</div><div>→</div><div><div>Inverter</div><div><div>FIN1</div><div>FIN2</div></div></div><div><div>Detected value 4 - 20mA</div><div>→</div><div><div>Temperature sensor</div><div>⊗</div></div></div><div><div>Motor</div><div>→</div><div><div>Fan</div></div></div></div><div><div>* Set <div>17</div> Frequency command selection] to <div>0-5</div> .</div></div></div></div></div>		Deviation		Positive	Negative	Reverse	<div>↗</div>	<div>↘</div>	Normal	<div>↘</div>	<div>↗</div>	Detected value	Target value (specified by <div>17</div> Frequency command selection])	4 - 20 mA signal input to FIN2	<div>Select either</div> <div><div><div>PnL</div></div>Operation panel</div> <div><div><div>UoL</div></div>Inverter's control dial</div> <div><div><div>0-5</div></div>0 – 5V(FIN1)</div> <div><div><div>0-10</div></div>0 – 10V(FIN1)</div>	0 - 5 V or 0 - 10 V signal input to FIN1	<div>Select either</div> <div><div><div>PnL</div></div>Operation panel</div> <div><div><div>UoL</div></div>Inverter's control dial</div>
	Deviation																		
	Positive	Negative																	
Reverse	<div>↗</div>	<div>↘</div>																	
Normal	<div>↘</div>	<div>↗</div>																	
Detected value	Target value (specified by <div>17</div> Frequency command selection])																		
4 - 20 mA signal input to FIN2	<div>Select either</div> <div><div><div>PnL</div></div>Operation panel</div> <div><div><div>UoL</div></div>Inverter's control dial</div> <div><div><div>0-5</div></div>0 – 5V(FIN1)</div> <div><div><div>0-10</div></div>0 – 10V(FIN1)</div>																		
0 - 5 V or 0 - 10 V signal input to FIN1	<div>Select either</div> <div><div><div>PnL</div></div>Operation panel</div> <div><div><div>UoL</div></div>Inverter's control dial</div>																		

■: Factory setting

Detailed Parameter Description

No.	Parameter name	Description
L1	Proportional (P) gain setting	Used to specify proportional gain.
L2	Integral (I) time constant setting	<p>In combination with [L1 Proportional (P) gain setting], this parameter defines the output frequency (control quantity) according to the deviation quantity and change with time.</p> <p>Example of PI action for stepped feedback signal</p>
L3	Differential (D) time constant setting	<p>In combination with [L1 Proportional (P) gain setting], this parameter defines the output frequency (control quantity) according to the deviation rate.</p> <p>Example of PD action for proportionally changing feedback signal</p>
L4	PID scale factor setting	Used to specify the scale factor for the control quantity (output frequency) to be obtained by PID operation.
L5	Feedback input method setting	<p>Used to specify the feedback input method for PID control.</p> <ul style="list-style-type: none"> ● F10.5 Specifies "FIN1: 0 – 5 V" input as the feedback input source. ● F10.10 Specifies "FIN1: 0 – 10 V" input as the feedback input source. ■ F24.20 Specifies "FIN2: 4 – 20 mA" input as the feedback input source. <p>F10.5 and F10.10 can be selected only when [17 Frequency command selection] is set to PnL or UOL. F24.20 can be selected regardless of the [17 Frequency command selection] setting.</p>

■: Factory setting

No.	Parameter name	Description																	
n0	Equipment No.	Indicates a unique number of an inverter in a network. Assign a different equipment number to an individual inverter in a network. When this parameter is set to "80", access from the host is enabled for broadcast (broadcast for all stations) only.																	
n1	Communication speed	Used to specify the speed of communication between the inverter and the host. <ul style="list-style-type: none"> ● 2400 2400bps ● 4800 4800bps ■ 9600 9600bps ● 19200 19200bps 																	
n2	Number of communication retries	Used to specify the standard of communication between the inverter and the host. <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2">Bit length</td><td>8</td><td>8bit length</td></tr> <tr> <td>7</td><td>7bit length (With this setting, abbreviated transmission commands cannot be used.)</td></tr> <tr> <td rowspan="3">Parity</td><td>n0</td><td>None</td></tr> <tr> <td>Od</td><td>Odd</td></tr> <tr> <td>Ev</td><td>Even</td></tr> <tr> <td rowspan="2">Stop bit</td><td>1</td><td>Stop bit: 1 bit</td></tr> <tr> <td>2</td><td>Stop bit: 2 bits</td></tr> </table>	Bit length	8	8bit length	7	7bit length (With this setting, abbreviated transmission commands cannot be used.)	Parity	n0	None	Od	Odd	Ev	Even	Stop bit	1	Stop bit: 1 bit	2	Stop bit: 2 bits
Bit length	8	8bit length																	
	7	7bit length (With this setting, abbreviated transmission commands cannot be used.)																	
Parity	n0	None																	
	Od	Odd																	
	Ev	Even																	
Stop bit	1	Stop bit: 1 bit																	
	2	Stop bit: 2 bits																	
n3	Communication response time	Used to specify a communication response time.																	
n4	Number of communication retries	Used to specify allowable number of retries at occurrence of protocol timeout error. If communication is interrupted for a period of, or longer than [n5 Protocol timeout] as many times as, or more frequently than [Number of communication retries], it is judged as communication error trip.																	
n5	Protocol timeout	Used to specify the host's allowable receiving wait time after the inverter sends a command to the host.																	
99	Parameter extraction	Used to extract a parameter. For details, refer to Extracting parameters . When [AA Parameter lock] is set to PArΓ , parameter setting is enabled only for the extracted parameter.																	

- The **n0** through **n5** parameters can be used only for the inverter equipped with the communication interface.

■: Factory setting

Detailed Parameter Description


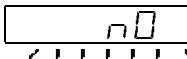
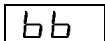

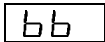


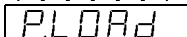
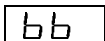
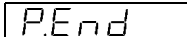

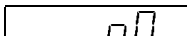
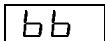
Copying parameter

Parameters can be copied through the operation panel.

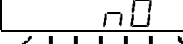
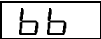
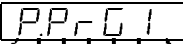
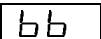
* To copy parameters, be sure to use the inverters of the same model with the same capacity.

[1] Producing master panel

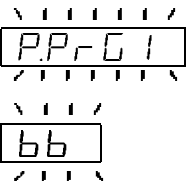
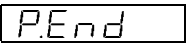



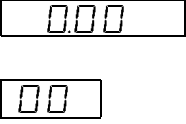
Step	Operation panel		Remarks
	Switch	Display on LED	
<1. Initializing operation panel> * Perform only once at the beginning.			
① Turn power on		<div><div>000</div><div>00</div></div>	<ul style="list-style-type: none">At power-ON, the operation panel is set to the monitor mode (output frequency display mode).
② Call [bb Copy parameter]	Press <div>DATA SET</div> . Press and hold <div>Δ</div> .	<div>Parameter value</div> <div><div>00</div><div>bb</div></div>	<ul style="list-style-type: none">Parameter No. mode
③ Select <div>P.In If</div> initialize panel data	Press <div>DATA SET</div> . Using <div>Δ</div> select <div>P.In If</div> .	<div><div>n0</div><div>bb</div></div> <div><div>P.In If</div><div>bb</div></div>	<ul style="list-style-type: none">Parameter value mode
④ Initialize panel	Holding down <div>STOP</div> , press <div>DATA SET</div> for 1 second.	<div><div>P.In If</div><div>bb</div></div>	
⑤ Wait for approx. 10 seconds		<div>P.End</div>	
⑥ Panel is initialized	Press <div>STOP</div> .	<div><div>n0</div><div>bb</div></div>	<ul style="list-style-type: none">Parameter number mode

Step	Operation panel		Remarks
	Switch	Display on LED	
<2. Reading parameter values from inverter internal circuit to operation panel>			
⑦ Select [Read P.LOAd parameter out to panel]	Press DATA SET . Using  , select P.LOAd .	   	• Parameter value mode
⑧ Read parameter out to panel	Holding  , press  for 1 second.	 	• 2-digit and 5-digit LEDs will flash.
⑨ Wait for approx. 20 seconds			
⑩ Parameter values have been read from the inverter circuits to the inverter panel	Press  .	 	• Parameter number mode

[2] Copying parameter values to inverter

Step	Operation panel		Remarks
	Switch	Display on LED	
<3. Copying parameter values from operation panel into inverter internal circuit>			
⑪ Select [Write P.P.rG1 parameter into inverter]	Press DATA SET . Using Δ , select P.P.rG1 .	   	• Parameter value mode

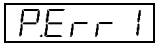
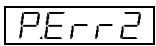
Detailed Parameter Description

⑫ Write parameter into inverter	Holding STOP , press DATA SET for 1 second.		<ul style="list-style-type: none"> 2-digit and 5-digit LEDs flash.
⑬ Wait for approx. 10 seconds			<ul style="list-style-type: none"> P.E.nd is displayed for approx. 3 seconds.
⑭ Parameter values have been written from the operation panel into the inverter circuits			<ul style="list-style-type: none"> Self-diagnosis trip occurs.
⑮ Return to monitor mode	Simultaneously press  and  to cancel trip.		<ul style="list-style-type: none"> Monitor mode

To copy parameter values to two or more inverters, use the master panel produced in [1] and repeat the steps of [2].

* If parameters are not copied correctly, **PErr1** or **PErr2** is displayed followed by no self-diagnosis trip.

To cancel the display, press **STOP**. For corrective action, refer to the description that follows.

Error message	Description	Corrective action
	Parameter values to be copied are invalid.	The parameter values may have been destroyed by external noises. Press STOP and repeat steps starting with <1. Initializing operation panel>.
	The copy is attempted between inverters of different series.	Be sure to copy between the same series.
	After panel initialization, attempt is made to write parameter value from the operation panel into the inverter without first reading parameter values in inverter out to the panel.	Press STOP and repeat steps starting with <1. Initializing operation panel>.

Extracting and locking parameters

Register numbers of parameters that can be edited. After that, these parameters can be edited by calling the number.

Example: Only [21 Acceleration time] can be set with PArΓ.

Step	Operation panel		Remarks
	Switch	Display on LED	
① Turn power on		<div style="border: 1px solid black; padding: 2px; display: inline-block;">000</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">00</div>	<ul style="list-style-type: none"> Default mode: Monitor (reading output frequency)
② Select [99]	Press DATA SET . Using Δ , select [99].	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Parameter value</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">00</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">00-0F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">99</div>	<ul style="list-style-type: none"> Parameter number mode
③ Select [21]	Press DATA SET . Using Δ , select [21].	<div style="border: 1px solid black; padding: 2px; display: inline-block;">00-0F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">99</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">21-0F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">99</div>	<ul style="list-style-type: none"> Parameter value mode
④ Register [21]	Press DATA SET . Press Δ . Press DATA SET .	<div style="border: 1px solid black; padding: 2px; display: inline-block;">21-0F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">99</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">21-0n</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">99</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">21-0n</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">99</div>	<ul style="list-style-type: none"> Parameter value mode Parameter is saved.

Detailed Parameter Description

Step	Operation panel		Remarks
	Switch	Display on LED	
⑤ Select [RR]	Press . Press .	 	
⑥ Select partial lock	Press . Press .	 	• Changes stored
⑦ Trip reset	Press and simultaneously.	 	• Monitor mode

When selecting more than one parameter, repeat steps ③ and ④ before proceeding to step ⑤.

● Canceling parameter lock

If a parameter is erroneously locked, cancel the parameter lock according to the following procedure.

- 1) Turn OFF the power supply, and make sure that the LED display turns off. Then, turn ON the power supply while pressing the key.
- 2) Call [Parameter lock], and change it to .
- 3) Turn OFF the power supply, and make sure that the LED display turns off. Then, turn ON the power supply.

Specifications

(1) 3-phase power supply specifications

Model		M2X044**	M2X084**	M2X154**	M2X224**	M2X374**	M2X554**	M2X754**
Output ratings	Applicable motor (kW) *1	0.4	0.75	1.5	2.2	3.7	5.5	7.5
	Output capacity (kVA) *2	1.3	2.0	3.0	4.4	7.2	10.4	12.8
	Rated output current (A)	1.5	2.5	3.7	5.5	9.0	13	16
	Rated output voltage *3	3-phase 380 - 460 V A C						
Power supply	Voltage	3-phase 380 - 460 V A C						
	Frequency	50 / 60 H z						
	Allowable voltage fluctuation	- 15%, + 10%						
	Allowable frequency fluctuation	± 5%						
Control system	Control method	Low noise sine wave PWM						
	Output frequency range	0.5 - 400 H z (Start/stop at 0.5Hz)						
	Frequency setting accuracy	± 0.5% (25°C±10°C)						
	Frequency setting resolution	▪ Digital: 0.01 Hz ▪ Analog: Set frequency range/1000 Hz (0.05 Hz min.)						
	Frequency setting signal	0 to +5 V D C, 0 to +10 V, 4 to 20 m A						
	Voltage/frequency characteristic	Base frequency: 30 to 400 Hz (1 Hz step) Reduced torque pattern is available.						
	Overload current rating	150% for one minute						
	Regenerative brake torque	150% or more (for short time)				50% or more (for short time)		
	DC brake	Brake starting frequency, brake time and brake intensity are adjustable.						
	Acceleration/deceleration time	0 to 3600 sec. (0 to 3 sec: 0.01 sec. step, 3 to 10 sec.: 0.1 sec. step, 10 sec. or more: 1 sec. step) * Time required for change by 50 Hz. Up to four types of acceleration/deceleration time can be specified.						
	Jogging frequency range	0 - 30Hz						
	Operation mode	2-speed mode, 4-speed mode, 8-speed mode, 16-speed mode						
	Others	Automatic boost / Slip frequency vector control can be selected. Automatic voltage adjustment function / Retry function can be selected. PID function, RS-485 communication function (only for the inverter with communication interface), Parameter lock function are available.						
	Protective functions		Undervoltage protection, Overcurrent protection, Overvoltage protection, Instantaneous power failure protection, Stall prevention, Overload limit (current limiter), Overload trip (electronic thermal trip), Restart prevention upon power recovery, Self-diagnosis trip (Causes of trip can be stored for up to five events in the past.)					
Protective structure		IP40 (Fully enclosed) (With ventilation cover)						
Cooling method		Natural cooling				Forced air cooling		
Weight (kg)		2.1				2.2		4.0

*1 The applicable motors indicate the 3-phase (4-pole) induction motors manufactured by Motor Company, Matsushita Electric Industrial Co., Ltd.

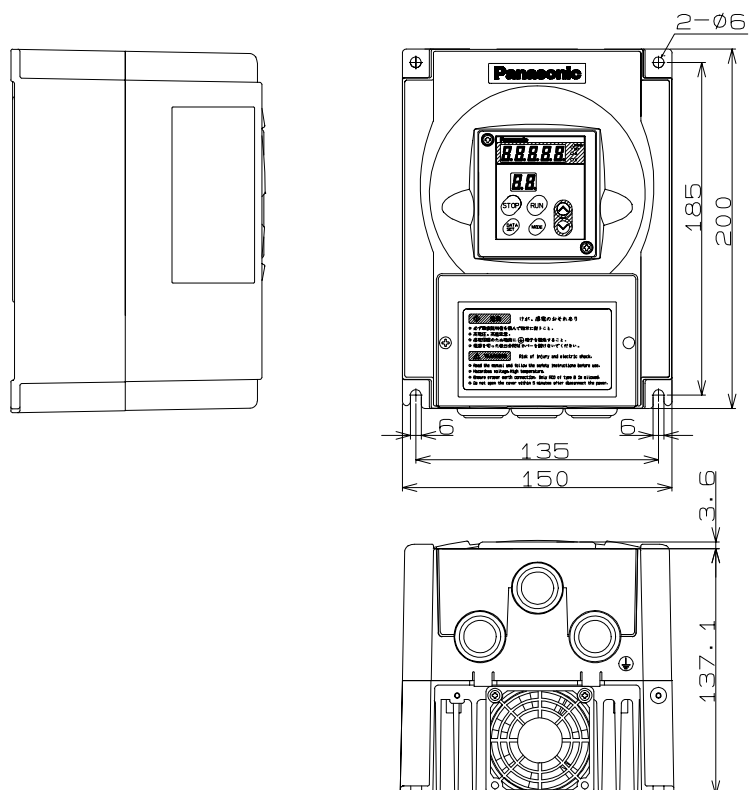
To use other manufacturer's motor, select a proper motor within the inverter's rating.

*2 The output capacity indicates the capacity under a rated output voltage of 460 V.

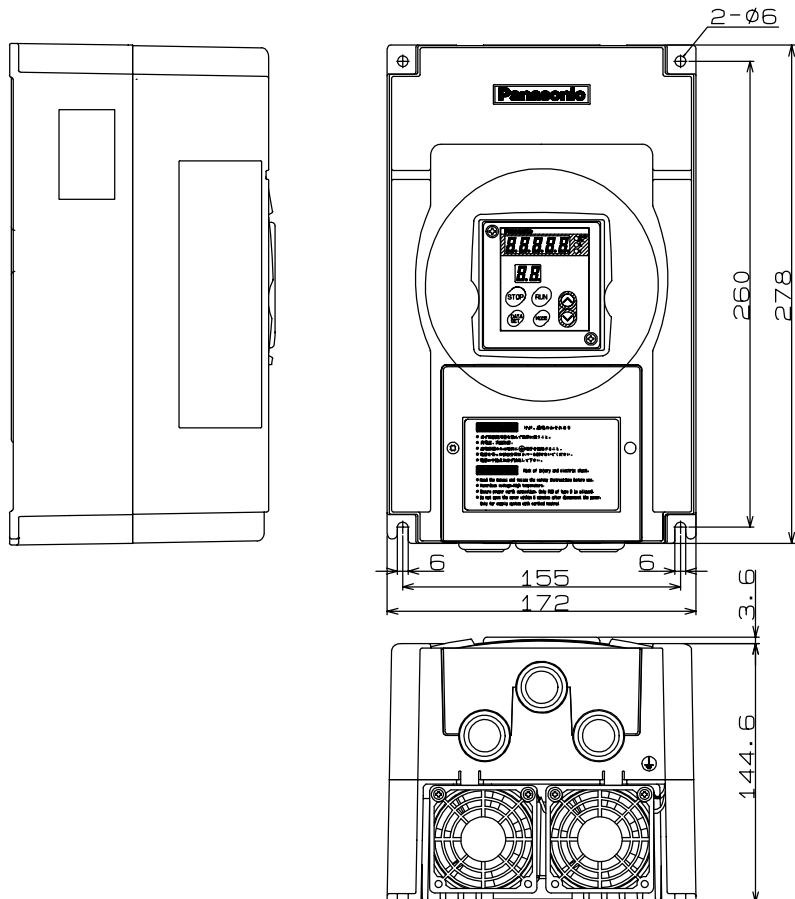
*3 The output voltage shall not exceed the power supply voltage.

Dimensions (Unit: mm) Tolerance ± 2 mm

● 0.4 – 3.7kW



● 5.5 – 7.5kW



* Use M4 mounting screws.

Conformity to EC Directive / UL Standard

EC Directive

The EC Directive is applied to all electronic products that provide proper functions and are exported to EU (European Union) for direct sales for general consumers. These products must conform to the EU uniformed safety standards, and the CE marking that indicates the conformity to the standards must be affixed to the products.

Inverters are handled as the components to be incorporated in machinery or equipment, not the above-mentioned product that provides proper functions and are exported for direct sales for general consumers. Therefore, applying the CE marking to inverters is not compulsorily required.

To facilitate the conformity of the machinery or equipment that incorporates inverters to the EC Directive, we attain conformity to the relevant standards of the Low Voltage Directive.

Conformity to the EMC Directive

Regarding our inverter systems, we define models (conditions) of their installation distance, wiring and so on for inverters and general-purpose motors, so that the models conform to the relevant standards of the EMC Directive. However, when an inverter system is actually incorporated in machinery or equipment, its wiring and grounding conditions may be different from the models. For this reason, the machinery or equipment in which the inverter and general-purpose motor are incorporated must undergo the final examination to verify the conformity to the EMC Directive (particularly, in terms of unnecessary radiation noise and noise terminal voltage).

Applicable standards

Object	Applicable standards	
Inverter	EN50178	Conformity to Low Voltage Directive relevant standards
	EN55011 Radio Interference Wave Characteristics for Industrial, Scientific and Medical High-frequency Equipment	Conformity to EMC Directive relevant standards
	IEC61000-4-2 Electrostatic Discharge Immunity Test	
	IEC61000-4-3 Radio Frequency Radiation Field Immunity Test	
	IEC61000-4-4 Electrical High-speed Transient Phenomena / Burst Immunity Test	
	IEC61000-4-5 Lightning Surge Immunity Test	
	IEC61000-4-6 High-frequency Conduction Immunity Test	
	IEC61000-4-11 Instantaneous Power Failure Immunity Test	

IEC: International Electrotechnical Commission

EN: Europaischen Normen= European standards

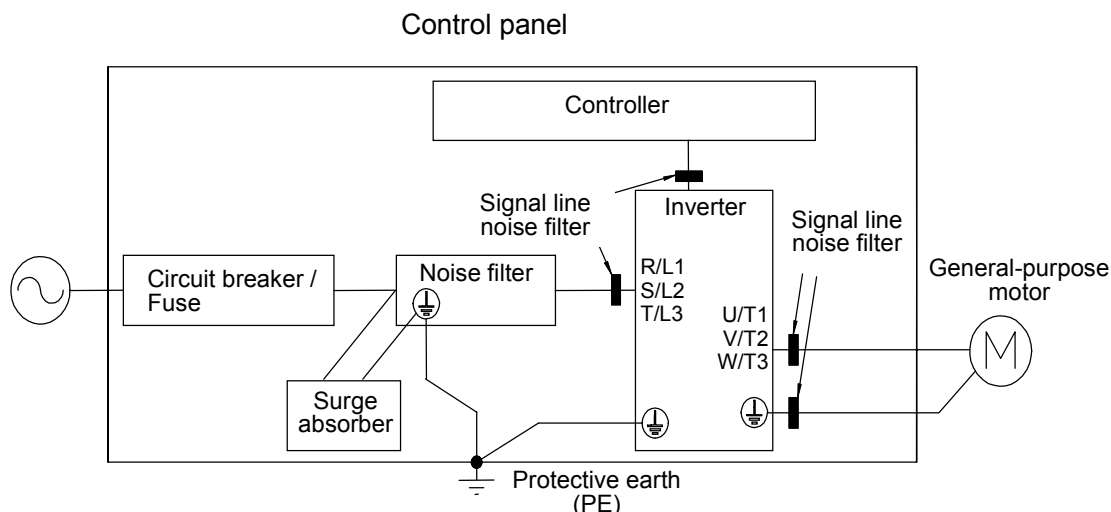
EMC: Electromagnetic Compatibility= Electromagnetic environmental compatibility

Conformity to EC Directive / UL Standard

Structure of peripheral equipment

Installation environment

Use the inverter in an environment conforming to Pollution Degree 1 or 2 prescribed in IEC60664-1.
(Example: Install the inverter in a control panel with IP54 protection structure.) *1



Power supply

400 V: 3-phase 380 V - 460 V +10% 50/60Hz
 -15%

- Use the power supply in an environment conforming to Overvoltage Category III prescribed in IEC60664-1.
- Be sure to ground the neutral terminal of the power supply.
- Select a cable size conforming to EN60204-1.

Circuit breaker / Fuse

Be sure to connect a circuit breaker conforming to the IEC and UL standards, or a fuse conforming to the UL standard between the power supply and the noise filter. *2

Noise filter

To provide a noise filter for the power supply with several inverters connected, consult the noise filter manufacturer.

Surge absorber

Connect a surge absorber in the noise filter's primary circuit.

Conformity to the UL Standard

When the above *1 and *2 installation conditions are satisfied, the inverter conforms to the UL508C standard (File No. E164620).

<Note>

Before conducting a withstand voltage test for machinery or equipment, be sure to remove the surge absorber. Otherwise, the surge absorber may be damaged.

Signal line noise filter

Connect signal line noise filters to all cables (power cable, motor cable, operation panel remote cable and interface cable).

Grounding

- (1) To prevent an electric shock, be sure to connect the inverter's protective earth terminal (⏏) with the control panel's protective earth terminal (PE).
- (2) Two protective earth terminals (⏏) are provided. Do not connect these terminals together.

List of Inverters and Applicable Peripheral Equipment

Voltage Spec.	Rated output	Circuit breaker (Rated current)	Noise filter*1	Surge absorber*1	Signal line noise filter
400V	400W 750W	5A	5A	R.A.V-801BXZ-4 Okaya Electric Industries Co., Ltd.	DV0P1460
	1.5kW	10A	10A		
	2.2kW	15A			
	3.7kW 5.5kW	20A	30A		
	7.5kW	30A			

● Recommended circuit breaker:

- Manufacturer: SANKEN-AIRPAX Co., Ltd.
- TYPE: IEL series

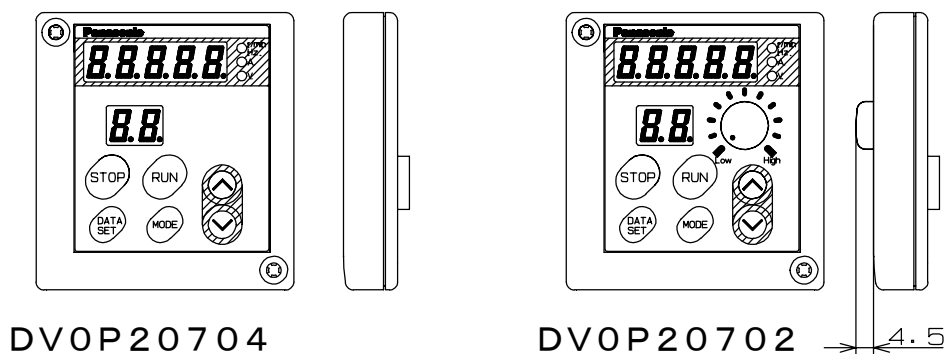
Contact at: East Japan +81-492-83-7575
 West Japan +81-6-6312-8716

*1 For the recommended noise filters and surge absorber, see P74.

Optional Accessories

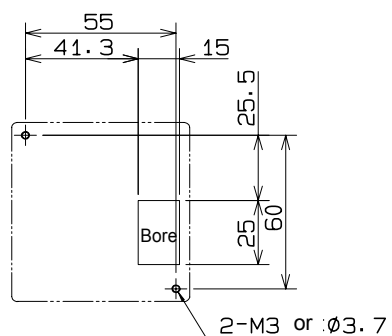
Operation panel

■ Operation panel

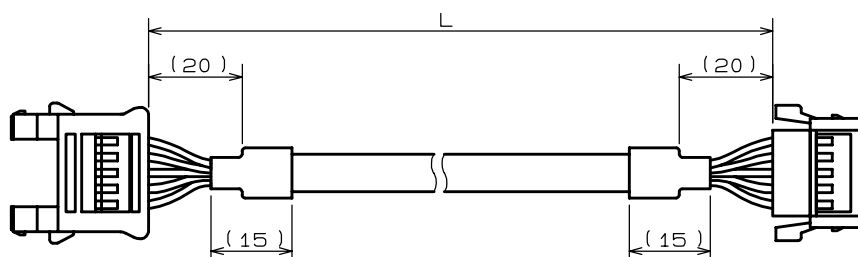


Option part number	Specification
DV0P20704	Standard
DV0P20702	With control dial

■ Operation panel cutout dimensions



Operation panel remote cable



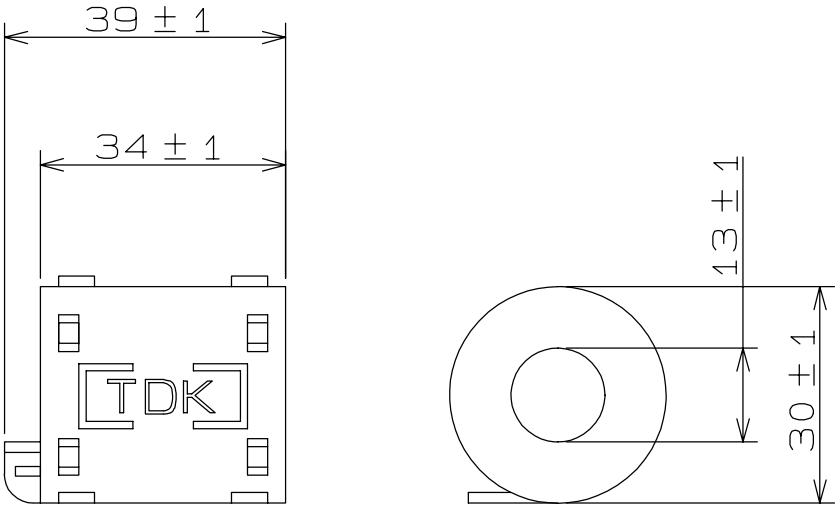
Connector
HONDA TSUSHIN KOGYO CO., LTD. HKP-Z11-10MA01#01
Pin
HONDA TSUSHIN KOGYO CO., LTD. HKP-M503

Connector
HONDA TSUSHIN KOGYO CO., LTD. HKP-Z10-10F02#01
Pin
HONDA TSUSHIN KOGYO CO., LTD. HKP-F403

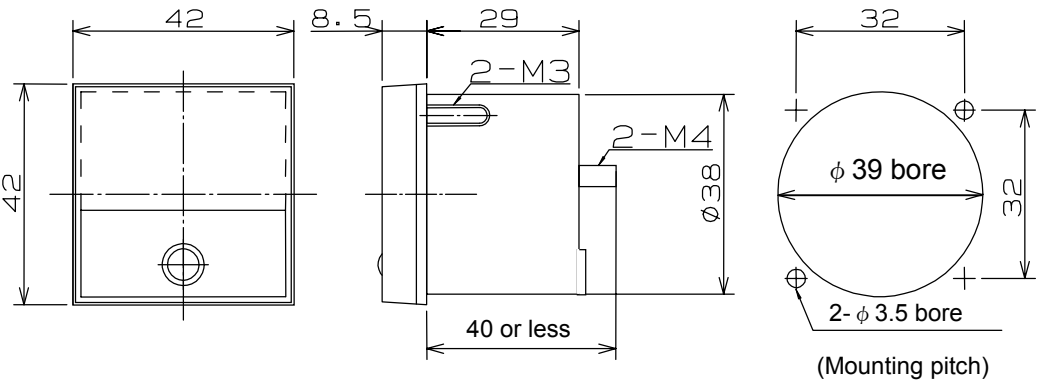
Option part number	Length L (m)
DV0P20801	0.5
DV0P20802	1.5
DV0P20803	3.0

Signal line noise filter

Option part number	Mfg P/N	Manufacturer
DV0P1460	ZCAT3035-1330	TDK Corporation



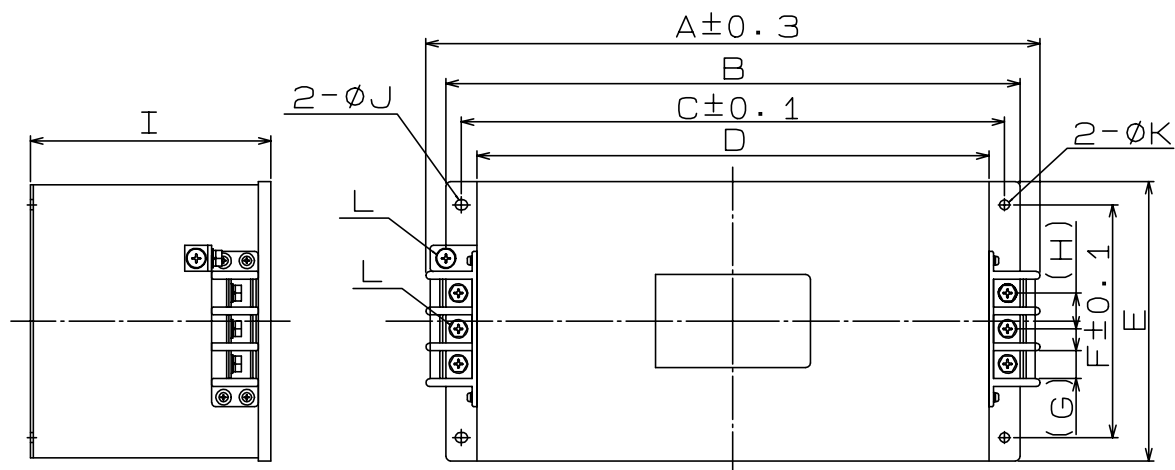
Frequency meter (DV0P313) Full scale :1 mA



Recommended Equipment

Noise filter(3SUP-HL○○-ER-6B)

- Manufacturer: Okaya Electric Industries Co., Ltd.

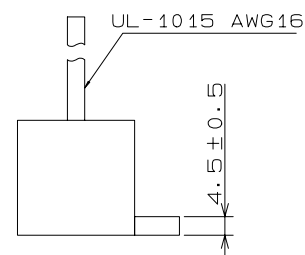
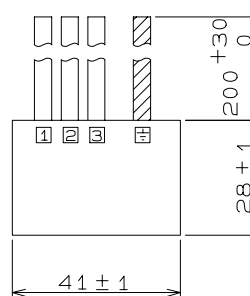
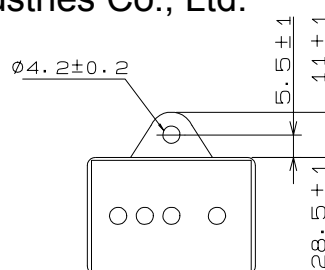
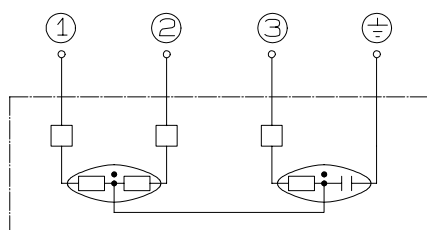


Part No.	Applicable motor	Allowable current	A	B	C	D	E	F	G	H	I	J	K	L
3SUP-HL5-ER-6B	0.4/0.75kW	5A	226	220	195	180	100	85	13	18	120	5.5X7	5.5	M4
3SUP-HL10-ER-6B	1.5/2.2kW	10A	226	220	195	180	100	85	13	18	120	5.5X7	5.5	M4
3SUP-HL30-ER-6B	3.7/5.5/7.5kW	30A	246	230	215	200	100	85	13	18	140	5.5X7	5.5	M4

Surge absorber (R.A.V-801BXZ-4)

- Manufacturer: Okaya Electric Industries Co., Ltd.

Circuit diagram



- Contact at:
Okaya Electric Industries Co., Ltd.
Okaya Electric Industries, Hong Kong

East Japan
West Japan

+81-3-3424-8120
+81-6-6392-1781
+852-2744-0628

Warranty

Period of warranty

- The warranty period for this product shall be one year from the date of purchase.

Scope of warranty

- If this product has a defect within the warranty period under the normal operating conditions following this instruction manual, it shall be repaired free of charge.
- However, the following defects shall be repaired onerously even within the warranty period.
 - 1) A defect caused by improper use, improper repair or modification.
 - 2) A defect caused by drop or damage in transit after purchase of the product.
 - 3) A defect caused by use beyond the specified operating conditions.
 - 4) A defect caused by fire, earthquake, lightning, storm/flood, salty water/breeze, abnormal voltage or other natural disasters.
 - 5) A defect caused by intrusion of water, oil, metal swarf or other foreign substances.
- The scope of warranty shall apply to the delivered unit only. Any damage or loss derived from a trouble of the delivered unit shall be beyond the scope of warranty.

After-Sale Service (Repair)

Repair

- Ask the seller where the product was purchased for details of repair work.
When the product is installed in a machine or device, consult first the manufacturer of the machine or device.

Memorandum (Fill in the blanks for convenience in case of inquiry or repair)

Date of purchase	Date:	Model No.	
Place of purchase			
	Telephone No. () –		

Motor Company, Matsushita Electric Industrial Co., Ltd.

1-1, Morofuku 7-chome, Daito City, Osaka, Japan 574-0044