RX2

The Driving Evolution

Model: 3G3RX2

200 V Class Three-Phase Input 0.4 to 55 kW

400 V Class Three-Phase Input 0.75 to 132 kW

Quick Start Guide

Introduction

This guide provides the reference information for replacement and does not contain safety information and other details that are required for actual use. Thoroughly read and understand the manuals for both the old and new inverters to ensure that the system is used safely. Review the entire contents of these manuals, including all safety precautions, precautions for safe use, and precautions for correct use.

Intended Audience

This guide is intended for the following personnel.
・ Personnel in charge of introducing control equipment
・ Personnel in charge of designing control systems
・ Personnel in charge of installing and maintaining control equipment
・ Personnel in charge of managing control systems and facilities
The personnel must also have the following knowledge.
・ Knowledge of electrical systems (an electrical engineer or the equivalent)

Applicable Products

This guide covers the following products.
・ 3G3RX-V1-series Inverter
・ 3G3RX2-series Inverter

Terms and Conditions Agreement

Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

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Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to

change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.
Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Special Information

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.

Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

Safety Precautions

To ensure that the High-function General-purpose Inverter (Model: 3G3RX2) is used safely and correctly, be sure to read this Safety Precautions section and the main text before using the product.

Learn all items you should know before use, regarding the equipment as well as required safety information and precautions.

Make an arrangement so that this manual also gets to the end user of this product.

After reading this manual, keep it in a convenient place so that it can be referenced at any time.

Indications and Meanings of Safety Information

In this user's manual, the following precautions and signal words are used to provide information to ensure the safe use of the High-function General-purpose Inverter (Model: 3G3RX2). The information provided here is vital to safety. Strictly observe the precautions provided.

Meanings of Signal Words

⚠ DANGER	Indicates an imminently hazardous situation which, if avoided, is likely to result in serious injury or may result in death. Additionally there may be severe property damage.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Explanation of Symbols

	⃠ This symbol indicates a prohibited item (an item you must not do). The specific instruction is indicated using an illustration or text inside or near ⃠ . The symbol shown to the left indicates "disassembly prohibited."
	△ This symbol indicates danger and caution. The specific instruction is indicated using an illustration or text inside or near △ . The symbol shown to the left indicates "beware of electric shock."
	△ This symbol indicates danger and caution. The specific instruction is indicated using an illustration or text inside or near △ . The symbol shown to the left indicates "non-specific general danger."
	△ This symbol indicates caution (including warning). The specific instruction is indicated using an illustration or text inside or near △ . The symbol shown to the left indicates "risk of hot surface."
	● This symbol indicates a compulsory item (an item that must be done). The specific instruction is indicated using an illustration or text inside or near ● . The symbol shown to the left indicates "general compulsory items."
	● This symbol indicates a compulsory item (an item that must be done). The specific instruction is indicated using an illustration or text inside or near ● . The symbol shown to the left indicates "grounding required."

Precautions for Correct Use

⚠ WARNING

Turn off the power supply and implement wiring correctly.

Not doing so may result in a serious injury due to an electric shock.

Wiring work must be carried out only by qualified personnel.

Not doing so may result in a serious injury due to an electric shock.

Do not change wiring and slide switches (SW1 to SW6), put on or take off Operator and optional devices, replace cooling fans while the input power is being supplied. Doing so may result in a serious injury due to an electric shock.

Be sure to ground the unit. Not doing so may result in a serious injury due to an electric shock or fire.

(200-V class: type-D grounding, 400-V class: type-C grounding)

Do not remove the terminal cover during the power supply and 15 minutes[*1*2] after the power shut off. Doing so may result in a serious injury due to an electric shock.

Do not operate the Operator or switches with wet hands.

Doing so may result in a serious injury due to an electric shock.

Inspection of the inverter must be conducted after the power supply was turned off. Not doing so may result in a serious injury due to an electric shock.

The main power supply is not necessarily shut off even if the emergency shut off function is activated.

Do not touch the inverter fins, braking resistors and the motor, which become too hot during the power supply and for some time after the power shut off. Doing so may result in a burn.

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*1. 10 minutes: For models 3G3RX2-A2004 to A2220 and 3G3RX2-A4007 to A4220

*2. 15 minutes: For models 3G3RX2-A2300 to A2550 and 3G3RX2-A4300 to B413K

! Caution

Be sure to confirm safety before conducting maintenance, inspection or parts replacement.

Do not connect resistors to the terminals (PD/+1, P/+, N/-) directly. Doing so might result in a small-scale fire, heat generation, or damage to the unit.

Install a stop motion device to ensure safety. Not doing so might result in a minor injury.
(A holding brake is not a stop motion device designed to ensure safety.)

Be sure to use a specified type of braking resistor/regenerative braking unit. In case of a braking resistor, install a thermal relay that monitors the temperature of the resistor. Not doing so might result in a moderate burn due to the heat generated in the braking resistor/regenerative braking unit. Configure a sequence that enables the inverter power to turn off when unusual over eating is detected in the braking resistor/regenerative braking unit.

The inverter has high voltage parts inside which, if short-circuited, might cause damage to itself or other property. Place covers on the openings or take other precautions to make sure that no metal objects such as cutting bits or lead wire scraps go inside when installing and wiring.

Take safety precautions such as setting up a molded-case circuit breaker (MCCB) that matches the inverter capacity on the power supply side.

Not doing so might result in damage to property due to the short circuit of the load.

Do not dismantle, repair or modify the product.

Doing so may result in an injury.

If a parameter is set incorrectly when starting up, adjusting, maintaining, or replacing, an unexpected operation may occur.

If the DriveProgramming stops during multi-function output, the output status is held. Take safety precautions such as stopping peripheral devices.

Place covers on the openings or take other precautions to make sure that no metal objects such as cutting bits or lead wire scraps go inside when installing the PG Unit and wiring.

Precautions

- When building a system, check the specifications for all devices and equipment that will make up the system and make sure that the OMRON products are used well within their rated specifications and performances. Safety measures, such as safety circuits, must be implemented in order to minimize the risks in the event of a malfunction.
- Thoroughly read and understand the manuals for all devices and equipment that will make up the system to ensure that the system is used safely. Review the entire contents of these manuals, including all safety precautions, precautions for safe use, and precautions for correct use.
- Confirm all regulations, standards, and restrictions that the system must adhere to.

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Related Manuals

Please see the manuals below for related product information. Use these manuals for reference.

Manual name	Cat. No..	Model	Application	Description
3G3RX-V1 Series High-function General-purpose Inverter User's Manual	I578	3G3RX-□□□□□-V1	Learning how to use the 3G3RX-V1-series High-function General-purpose Inverters.	Describes how to install and wire the inverter, set parameters needed to operate the inverter, and remedies to be taken and inspection methods to be used in case that problems occur.
3G3RX2 Series High-function General-purpose Inverter User's Manual	I620	3G3RX2-□□□□□	Learning how to use the 3G3RX2-series High-function General-purpose Inverters.	Describes how to install and wire the inverter, set parameters needed to operate the inverter, and remedies to be taken and inspection methods to be used in case that problems occur.

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1. Appearance and part Names

2. Specifications

2.1. Upon receipt

Please perform the following task after receiving the drive:

· Inspect the driver for damage. If the drive appears damage upon receipt, contact your supplier.

· Verify the receipt of the correct model by checking the information on the nameplate. If you have received the wrong model contact your supplier.

· Refer to the User's Manual for detailed information about the product and functions.

Basic specifications and EMC filter

Voltage	Type	ND(150% overload for 60s)		LD(120% overload for 60s)		VLD(110% overload for 60s)		EMC filter
	3G3RX2-	Max Motor (KW)	Rated current (A)	Max Motor (KW)	Rated current (A)	Max Motor (KW)	Rated current (A)	
3 x 200 V	A2004	0.4	3.2	0.75	3.7	0.75	4.4	AX-FIR2018-RE
	A2007	0.75	5	1.5	6.3	1.5	8	
	A2015	1.5	8	2.2	9.4	2.2	10.4	
	A2022	2.2	11	3.7	12	3.7	15.6	
	A2037	3.7	17.5	5.5	19.6	5.5	22.8	
	A2055	5.5	25	7.5	30	7.5	33	AX-FIR2053-RE
	A2075	7.5	32	11	40	11	46	
	A2110	11	46	15	56	15	60	
	A2150	15	64	18.5	73	18.5	80	AX-FIR2110-RE
	A2185	18.5	76	22	85	22	93	
	A2220	22	95	30	113	30	124	
	A2300	30	122	37	140	37	153	AX-FIR2145-RE
	A2370	37	146	45	169	45	185	
	A2450	45	182	55	210	55	229	AX-FIR3250-RE
	A2550	55	220	75	270	75	295	AX-FIR3320-RE
	A4007	0.75	2.5	1.5	3.1	1.5	4.1	AX-FIR3010-RE
	A4015	1.5	4	2.2	4.8	2.2	5.4	
	A4022	2.2	5.5	3.7	6.7	3.7	8.3	
	A4040	3.7	9.2	5.5	11.1	5.5	12.6	
	A4055	5.5	14.8	7.5	16	7.5	17.5	AX-FIR3030-RE
	A4075	7.5	19	11	22	11	25	
	A4110	11	25	15	29	15	31	

3 x 400 V	A4150	15	32	18.5	37	18.5	40	
	A4185	18.5	39	22	43	22	47	AX-FIR3053-RE
	A4220	22	48	30	57	30	62	
	A4300	30	61	37	70	37	77	AX-FIR3064-RE
	A4370	37	75	45	85	45	93	AX-FIR3100-RE
	A4450	45	91	55	105	55	116	
	A4550	55	112	75	135	75	147	AX-FIR3130-RE
	B4750	75	150	90	160	90	176	
	B4900	90	180	110	195	110	213	AX-FIR3250-RE
	B411K	110	217	132	230	132	252	
	B413K	132	260	160	290	160	316	AX-FIR3320-RE

2.2. Standard Specifications

Control mode (output to the motor)	Sine wave PWM control voltage output (line sine wave modulation)
Output frequency range [1]	0.00 to 590.00Hz
Frequency accuracy	Digital command ±0.01% and analog command ±0.2% (25°C±10°C) against the maximum frequency
Frequency resolution	Digital setting: 0.01Hz Analog setting: maximum frequency/4000 (Ai1 terminal/Ai2 terminal: 12bit/0 to +10V or 0 to +20mA, Ai3 terminal 12bit/-10 to +10V)

Control mode **(frequency/voltage calculation)** [2]	IM	V/f control (fixed torque/reduced torque/free), automatic boost control, cascade model sensorless vector control, 0 Hz range sensorless vector control, vector control with sensor.
	SM/PMM	Synchronous starting sensorless vector control, IVMS starting smart sensorless vector control

Speed fluctuation [3]	±0.5% (during sensorless vector control)
Acceleration or deceleration time	0.00 to 3600.00sec (linear, S-shaped, U-shaped, reverse U-shaped, EL-S shaped)
Display monitor	Output frequency, output current, output torque, trip history, I/O terminal status, I/O power [4], P-N voltage.
Starting functions	Start after DC braking, frequency collection start, frequency entrainment start, reduced voltage start, retry start
Stopping functions	Free-run stop, DC braking after deceleration stop or terminal DC braking (braking power, operating speed adjustment)
Stall prevention function	Overload restraining function, overcurrent suppression function, overvoltage suppression function
Protective function [5]	Overcurrent error, Motor overload error, Braking resister Overload error, Overvoltage error, Memory error, Undervoltage error, Current detector error, CPU error, External trip error, USP error, Ground fault error, Incoming over voltage error, Instantaneous power failure error, Temperature detector error, Cooling fan rotation speed reduction temperature error, Temperature error, Input open-phase error, IGBT error, Output open-phase error, Thermistor error, Brake error, Low-speed range overload error, Controller overload error, RS485 communication error, Operator keypad disconnection error.
Other functions	V/f free settings (7 points), Upper/lower limit frequency limiter, Frequency jump, Curve acceleration/deceleration, Manual torque boost, Energy-saving operation, Analog output adjustment function, Minimum frequency, Carrier frequency adjustment, Motor electronic thermal function (free setting is also possible), Inverter electronic thermal function, External start/end (volume/ratio), Frequency input selection, Trip retry, Restart after instantaneous stop, Output of signals, Initialization settings, PID control, Automatic deceleration at power shut-off, Brake control function, and Auto-tuning for commercial switching function (online/offline).

*1.   The output frequency range depends on the control and motor used. When running the inverter exceeding 60Hz, check the maximum allowable frequency with the manufacturer of the motor.

*2.   When the control mode is changed, unless the motor constant is appropriately configured, you cannot obtain the desired starting torque or the inverter may trip.

*3.   The variable range of motor speed may vary depending on your system or the environment where the motor is used. Please contact us for details.

*4.   Both the input power and output power are reference values, which are not appropriate for use in calculation of efficiency values, etc. To obtain an accurate value, use an external device.

*5.   The IGBT error [E030] is generated by the protective function not only for short circuit protection but also when IGBT is damaged. Depending on the operating conditions of the inverter, the overcurrent error [E001] may occur, instead of the IGBT error.

*6.   At the factory default setting, when voltage and current on Ai1/Ai2 terminal is changed using a switch, with input of voltage at 9.8V and current at 19.8mA, the maximum frequency is commanded. To change characteristics, make adjustments using the analog start/end function.

*7.   The threshold for signal output varies depending on the motor to be combined with the inverter, parameter adjustment, etc.

*8.   The output data of analog voltage monitor and analog current monitor are reference values for connecting an analog meter. Due to the meter to be connected and variation in analog output circuit, the maximum output value may slightly vary from 10V or 20mA. To change characteristics, make adjustments using the Ao1 adjustment and Ao2 adjustment functions. Some monitor data cannot be output.

*9.   To enable the EMC filter, connect with a power supply grounded at a neutral point. Otherwise, the leakage current may increase.

*10. Use the 400V class inverter at an input voltage of 500VAC or below. If input voltage exceeds 500VAC due to fluctuation of power, use the inverter at 40°Cor lower ambient temperature.

*11. The storage temperature is the temperature during transport.

*12. To be in accordance with the testing method specified in JIS C 60068-2-6: 2010 (IEC 60068-2-6:2007)

*13. When the inverter is used in a location at 1000m or higher altitude, air pressure reduces approximately 1% every 100m elevation. Perform 1% current derating and conduct evaluation for every 100m elevation.

*14. For insulation distance, comply with UL and CE standards

*15. When a clock function is used, the optional battery (CR2032, 3V) is required. When you purchase, this LCD operator does not come with the battery.

2.3. 200V Class Specifications

3G3RX2-A2□□□□□			A2004	A2007	A2015	A2022	A2037	A2055	A2075	A2110	A2150	A2185	A2220	A2300	A2370	A2450	A2550
Applicable motor (4-pole) capacity (kW)		VLD	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		LD	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Output	Rated output current (A)	VLD	4.4	8.0	10.4	15.6	22.8	33.0	46.0	60.0	80.0	93.0	124	153	185	229	295
		LD	3.7	6.3	9.4	12.0	19.6	30.0	40.0	56.0	73.0	85.0	113	140	169	210	270
		ND	3.2	5.0	8.0	11.0	17.5	25.0	32.0	46.0	64.0	76.0	95.0	122	146	182	220
	Overload current rating	VLD	110% 60sec / 120% 3sec														
		LD	120% 60sec / 150% 3sec														
		ND	150% 60sec / 200% 3sec														
	Rated output voltage		3-phase (3-wire) 200 to 240V (depending on receiving voltage)														
	Rated capacity (kVA) — 200V	VLD	1.5	2.8	3.6	5.4	7.9	11.4	15.9	20.8	27.7	32.2	43.0	53.0	64.1	79.3	102.2
		LD	1.3	2.2	3.3	4.2	6.8	10.4	13.9	19.4	25.3	29.4	39.1	48.5	58.5	72.7	93.5
		ND	1.1	1.7	2.8	3.8	6.1	8.7	11.1	15.9	22.2	26.3	32.9	42.3	50.6	63.0	76.2
	Rated capacity (kVA) — 240V	VLD	1.8	3.3	4.3	6.5	9.5	13.7	19.1	24.9	33.3	38.7	51.5	63.6	76.9	95.2	122.6
		LD	1.5	2.6	3.9	5.0	8.1	12.5	16.6	23.3	30.3	35.3	47.0	58.2	70.3	87.3	112.2
		ND	1.3	2.1	3.3	4.6	7.3	10.4	13.3	19.1	26.6	31.6	39.5	50.7	60.7	75.7	91.5
Input	Rated input current (A) *1	VLD	5.2	9.5	12.4	18.6	27.1	39.3	54.8	71.4	95.2	110.7	147.6	182.1	220.2	272.6	351.2
		LD	4.4	7.5	11.2	14.3	23.3	35.7	47.6	66.7	86.9	101.2	134.5	166.7	201.2	250.0	321.4
		ND	3.8	6.0	9.5	13.1	20.8	29.8	38.1	54.8	76.2	90.5	113.1	145.2	173.8	216.7	261.9
	Rated input AC voltage		Control power supply: Power supply single phase 200 to 240V/allowable variation range 170 to 264V, 50Hz (allowable variation range: 47.5 to 52.5Hz)/60Hz (allowable variation range: 57 to 63Hz)														
			Main circuit power supply: 3-phase (3-wire) 200 to 240V/allowable variation range 170 to 264V, 50Hz (allowable variation range: 47.5 to 52.5Hz)/60Hz (allowable variation range: 57 to 63Hz)														
	Power supply equipment capacity (kVA) *2	VLD	2.0	3.6	4.7	7.1	10.3	15.0	20.9	27.2	36.3	42.2	56.3	69.4	83.9	103.9	133.8
		LD	1.7	2.9	4.3	5.4	8.9	13.6	18.1	25.4	33.1	38.6	51.3	63.5	76.7	95.3	122.5
		ND	1.5	2.3	3.6	5.0	7.9	11.3	14.5	20.9	29.0	34.5	43.1	55.3	66.2	82.6	99.8
Carrier frequency operating range *3		VLD	0.5 to 10.0kHz														
		LD	0.5 to 12.0kHz														
		ND	0.5 to 16.0kHz														
Motor start torque *4			200%/0.3Hz														
Braking	Regenerative braking		Equipped with BRD circuit (with a discharging resistor separately installed)											Regenerative braking unit separately installed			
	Minimum resistance that can be connected (Ω)		50	50	35	35	35	16	10	10	7.5	7.5	5	---	---	---	---
Dimension	Height (mm)		255	255	255	255	255	260	260	260	390	390	390	540	550	550	700
	Width (mm)		150	150	150	150	150	210	210	210	245	245	245	300	390	390	480
	Depth (mm)		140	140	140	140	140	170	170	170	190	190	190	195	250	250	250
Protective construction			IP20*5 / UL open type														
Approximate mass (kg)			3	3	3	3	3	6	6	6	10	10	10	22	33	33	47

*1. The rated input currents shown in the table are the values when the rated current is output. The values vary depending on impedance on the power supply (wiring, breaker, input reactor option, etc.).

*2. The power supply equipment capacities shown in the table are the values when 220V rated current is output. The values vary depending on impedance on the power supply (wiring, breaker, input reactor option, etc.).

*3. The setting of rated values for carrier frequencies [bb101] / [bb201] are internally limited in accordance with the description. Also, it is recommended to set values equivalent to or above (maximum output frequency for driving ×10) Hz for the setting of carrier frequencies [bb101] / [bb201]. Also, in the case of induction motor (IM) control, for items other than those subject to V/f control, it is recommended to set carrier frequency at 2 KHz or more. In the case of synchronous motor (SM)/permanent magnet motor (PMM) control, it is recommended to set carrier frequency at 8 KHz or more.

*4. The value of the sensor-less vector control applied to the ND rating in the Standard motor. Torque characteristics may vary depending on the control method and the motor used.

*5. Based on self-declaration.

2.4. 400V Class Specifications

*1.   The rated input currents shown in the table are the values when the rated current is output. The values vary depending on impedance on the power supply (wiring, breaker, input reactor option, etc.)

*2.   The power supply equipment capacities shown in the table are the values when 220V rated current is output. The values vary depending on impedance on the power supply (wiring, breaker, input reactor option, etc.)

*3.   The setting of rated values for carrier frequencies [bb101] / [bb201] are internally limited in accordance with the description. Also, it is recommended to set values equivalent to or above (maximum output frequency for driving ×10) Hz for the setting of carrier frequencies [bb101] / [bb201]. Also, in the case of induction motor (IM) control, for items other than those subject to V/f control, it is recommended to set carrier frequency at 2 KHz or more. In the case of synchronous motor (SM)/permanent magnet motor (PMM) control, it is recommended to set carrier frequency at 8 KHz or more.

*4.   The value of the sensor-less vector control applied to the ND rating in the Standard motor. Torque characteristics may vary depending on the control method and the motor used.
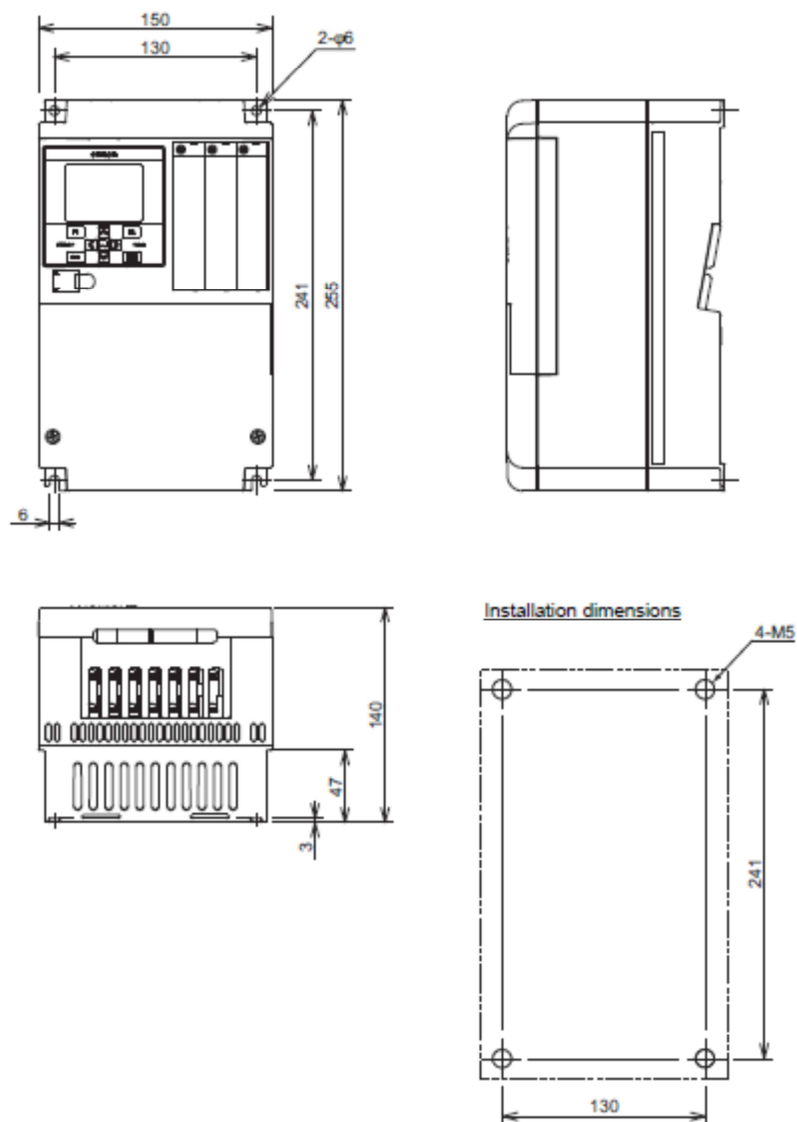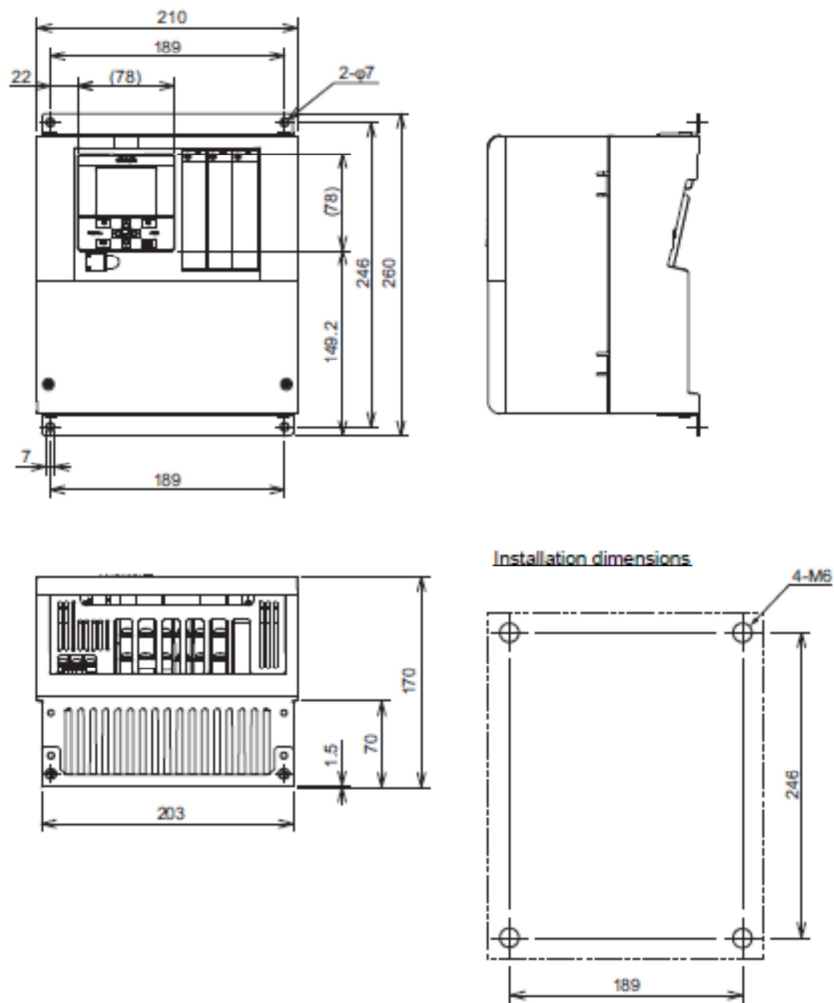
*5.   Based on self-declaration.

2.5. External Dimensions

● 3G3RX2-A2004/A2007/A2015/A2022/A2037/A4007/A4015/A4022/A4037

Installation dimensions

● 3G3RX2-A2055/A2075/A2110/A4055/A4075/A4110

Installation dimensions

![Precautions icon] **Precautions for Correct Use**

In case you operate 3G3RX2-A2110 at **Low Duty (LD)** or **Very Low Duty (VLD)**, the inverter is subject to the restriction of installing method. As for the details, refer to *2-1-2 Precaution for Installation* on page 2-4.

● 3G3RX2-A2150/A2185/A2220/A4150/A4185/A4220

Installation dimensions
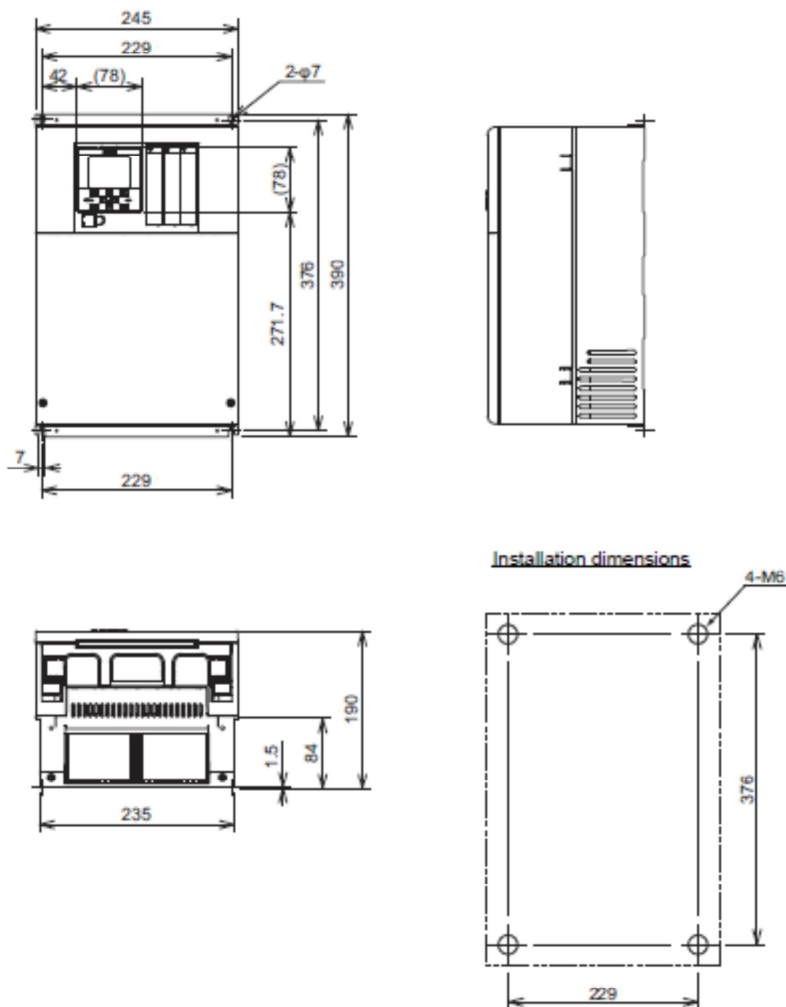
🖐 **Precautions for Correct Use**

In case you operate 3G3RX2-A2220 at **Very Low Duty (VLD)**, the inverter is subject to the restriction of installing method. As for the details, refer to *2-1-2 Precaution for Installation* on page 2-4.

● 3G3RX2-A2300/A4300

Installation dimensions
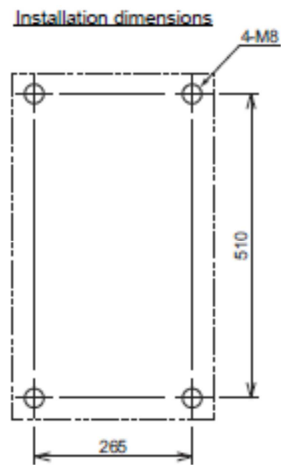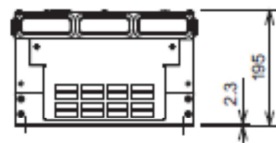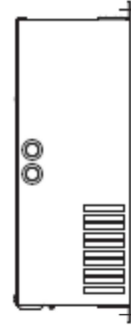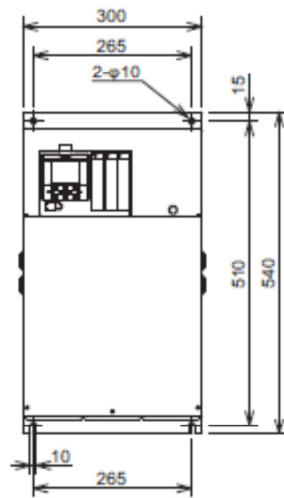
● 3G3RX2-A2370/A2450/A4370/A4450/A4550
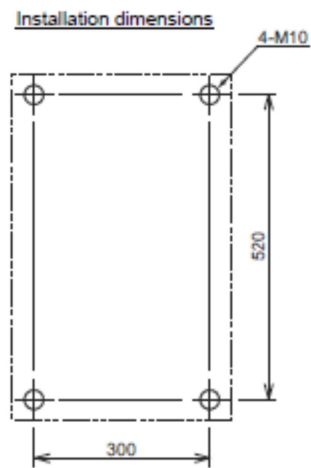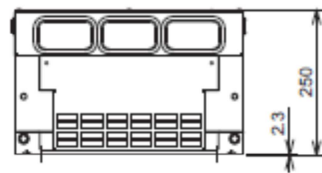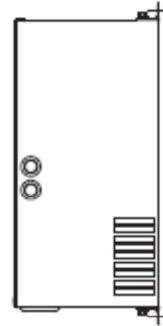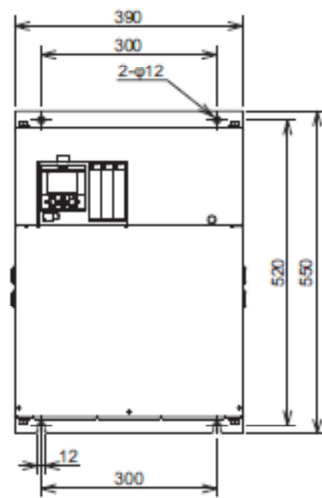
Installation dimensions

4-M10

● 3G3RX2-A2550

Installation dimensions

4-M10

● 3G3RX2-B4750/B4900

390
300
2-φ12
670
700
12
300
270
2.3
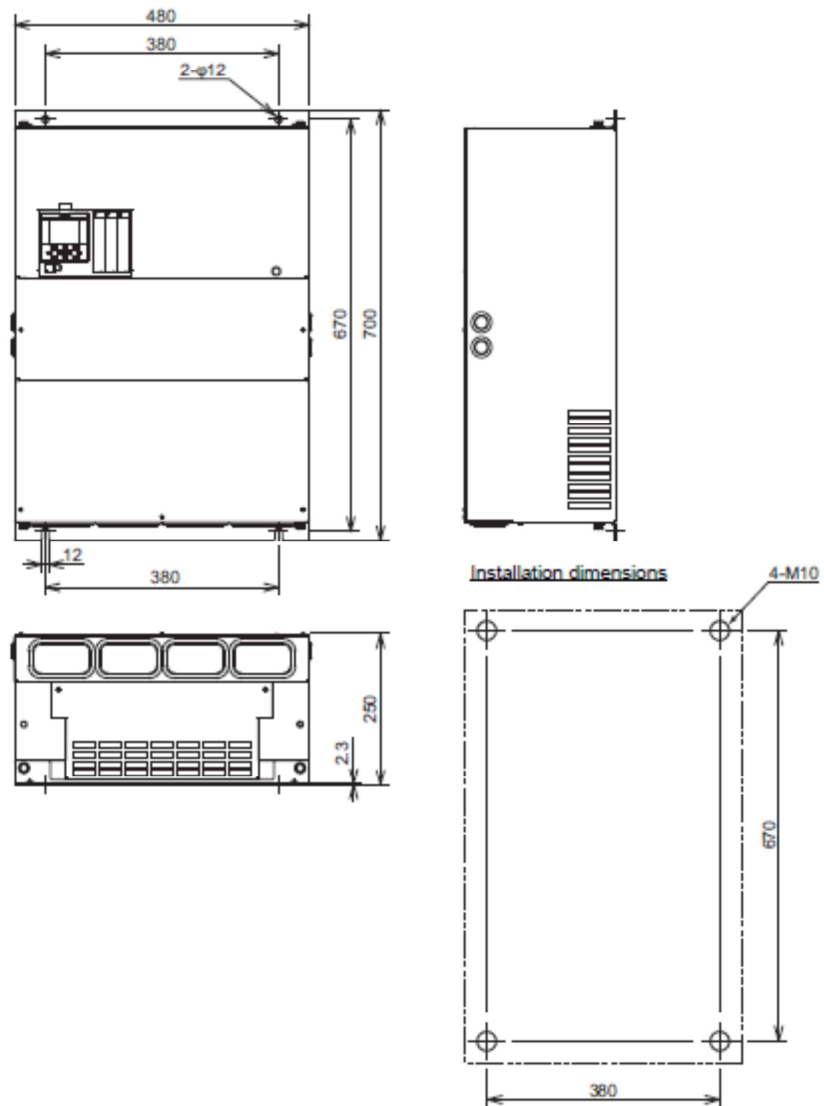
Installation dimensions
4-M10
670
300
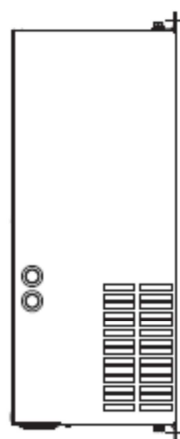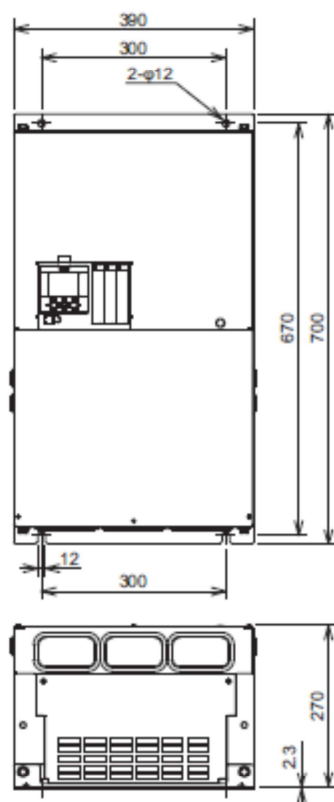
● 3G3RX2-B411K/B413K

Installation dimensions
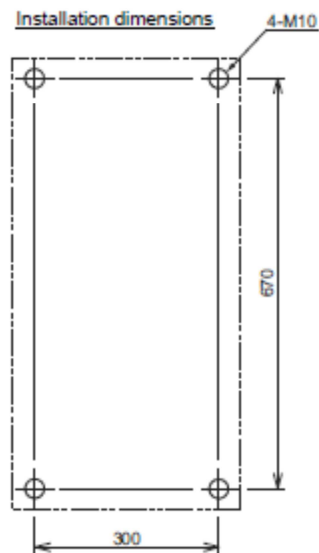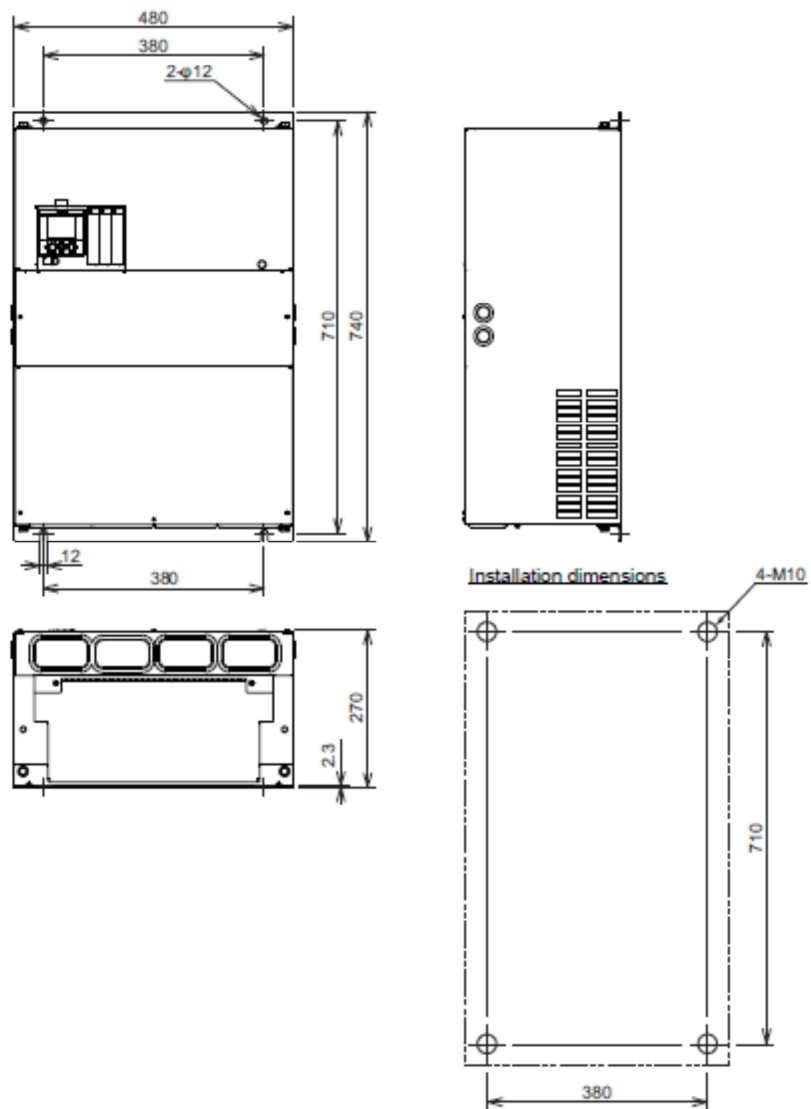
3. Installation

3.1. Wiring sizes and protection

Type 3G3RX2-	Main Circuit			Option
	R(L1),S(L2),T(L3),U(T1),V(T2),W(T3)	Ro, To	Ground (symbol)	PD(+1),P(+),N(-),RB
A2004 to A2037	M4		M4	M4
A2055,A2075	M5		M5	M5
A2110,A4110	M6		M5	M6
A2150,A2185	M6		M6	M6
A2220	M8		M6	M8
A2300	M8	M4	M6	M8
A4300	M6		M6	M6
A2370	M8		M8	M8
A4370	M8		M8	M8
A2450	M8		M8	M8
A4450,A4550	M8		M8	M8
A2550, B4750 to B413K	M10		M8*	M10

Screw Size	M3	M4	M5	M6	M8	M10
Torque	0.7 N·m (max. 0.8)	1.2 N·m (max. 1.4)	2.4 N·m (max. 4.0)	4.5 N·m (max. 4.9)	8.1 N·m (max. 8.8)	20.0 N·m (max. 22.0)

3.2. Terminal symbols, screw size and tightening torque

Motor Output	Inverter Model	Power Terminal	Torque (N·m)	Motor Output	Inverter Model	Power Terminal	Torque
0.4	A2004	14 (Stranded only)	1.8	-	-	14 (Stranded only)	1.8
0.75	A2007			0.75	A4007		
1.5	A2015			1.5	A4015		
2.2	A2022			2.2	A4022		
3.7	A2037	10 (Stranded only)		4.0	A4040		
5.5	A2055	8	4.0	5.5	A4055	12	4.0
7.5	A2075	6		7.5	A4075	10	
11	A2110	6 or 4		11	A4110	8	
15	A2150	2	4.9	15	A4150	6	4.9
18.5	A2185	1		18.5	A4185		
22	A2220	1 or 1/0	8.8	22	A4220	6 or 4	
30	A2300	2/0 or Parallel of 1/0		30	A4300	3	
37	A2370	4/0 (Prepared wire only) or	20.0	37	A4370	1	20.0
45	A2450	Parallel of 1/0		45	A4450	1	
55	A2550	350 kcmil (Prepared wire only) or Parallel of 2/0	19.6	55	A4550	2/0	
				75	B4750	Parallel of 1/0	
				90	B4900		
				110	B411K	Parallel of 3/0	35.0
				132	B413K		

3.3. Installation Environment

Ambient Temperature Control

To ensure reliable operation, use the inverter in an environment subject to minimal temperature rise as much as possible.

When mounting multiple inverters in an enclosure with a ventilation fan, carefully design the layout of the ventilation fan, air intake port, and inverters.

An inappropriate layout will reduce the inverter-cooling effect and raise the ambient temperature. Plan the layout so that the inverter ambient temperature will remain within the allowable range. A ventilation fan located directly above the inverter could drop dust on it. To prevent this, move the inverter horizontally to a suitable position.

Position of ventilation fan
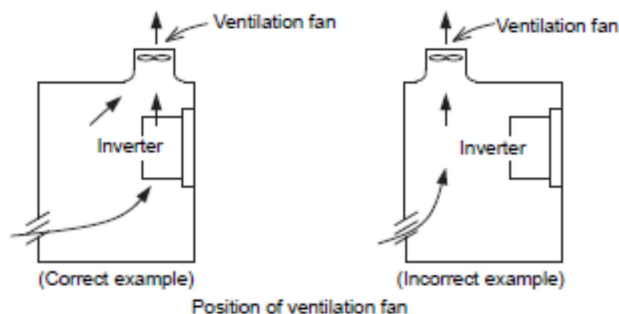
Entry of Foreign Objects during Installation

Place a cover over the inverter or take other preventative measures to prevent foreign objects, such as drill filings, from entering the inverter during installation.

Be sure to remove the cover after installation is completed. Using the inverter with the cover placed results in poor ventilation, which causes the inverter to overheat.

3.4. Wiring overview

Outline of control circuit
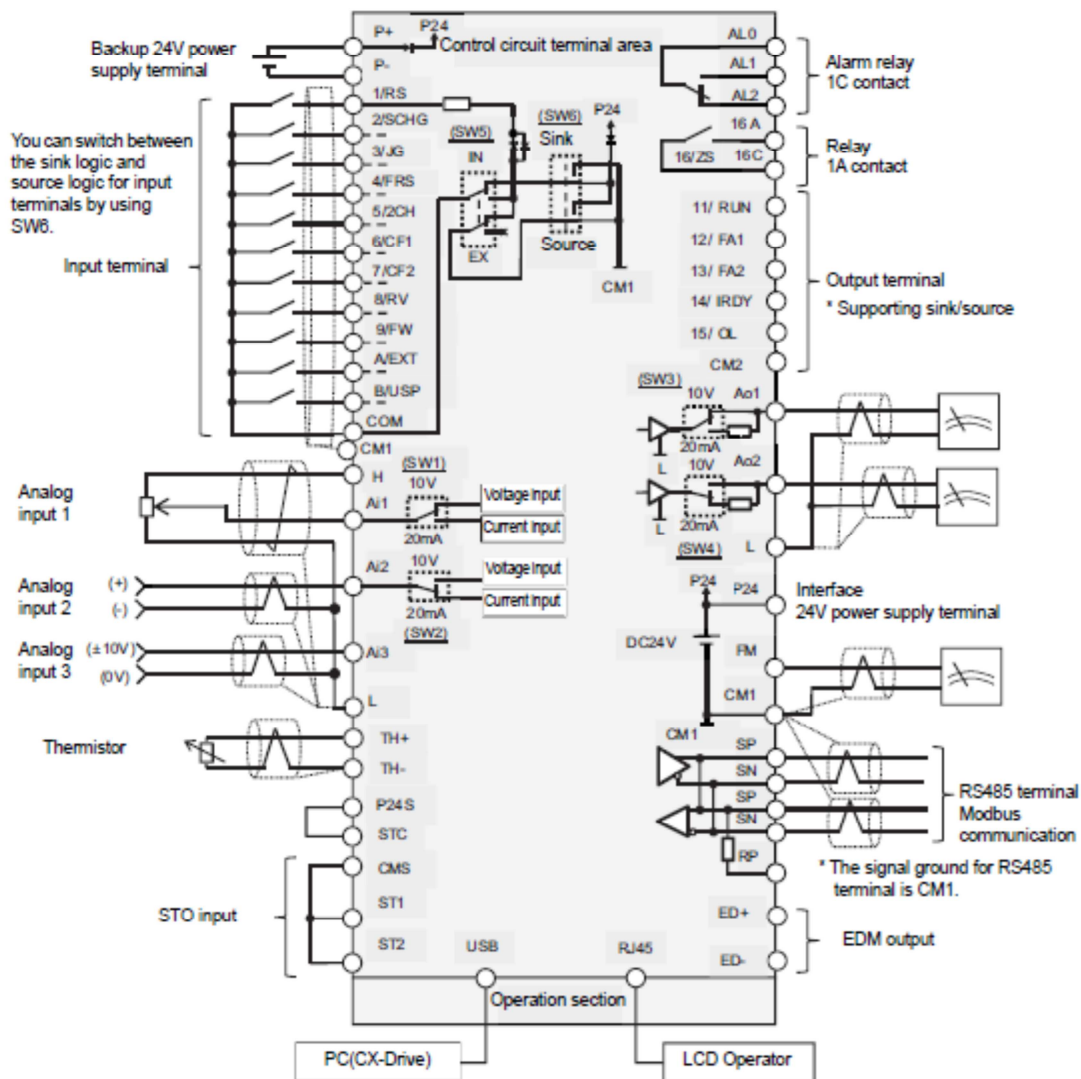
3.5. Arrangement and Function of Main Circuit Terminal Block

3.6. Arrangement and Function of Control Circuit Terminal Block

● Input Terminals

- All COM terminals are at the same potential.
- When connecting a power supply between 1-9, A, B and COM, switch SW5 to the external power supply (EX).
- You can switch between the sink/source logic of input terminals by SW6.

(Wiring example)

| B [USP] | A [EXT] | 9 [FW] | COM | 8 [RV] | 7 [CF2] | 6 [CF1] | 5 [2CH] | COM | 4 [FRS] | 3 [JG] | 2 [SCHG] | 1 [RS] | COM |
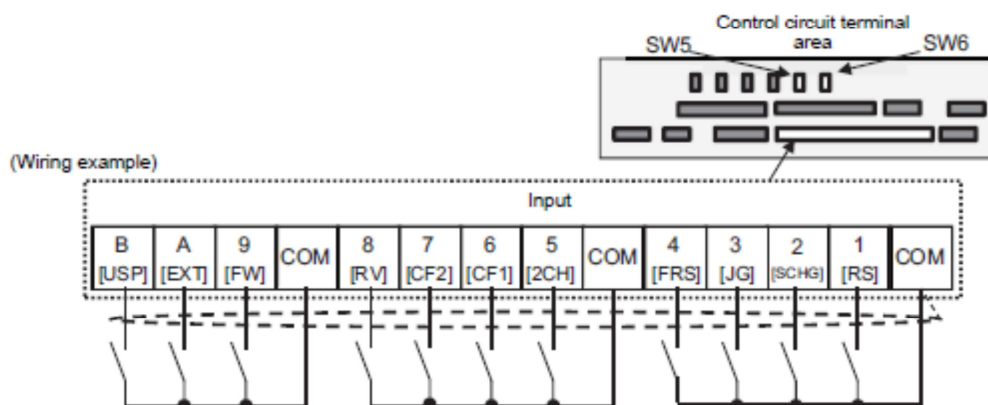
- [ ] indicates the factory default setting.

		Terminal symbol	Terminal name	Description	Electrical characteristics
Input terminal	Digital input — Contact	9, 8, 7, 6, 5, 4, 3, 2, 1	Input terminal	You can select terminal functions using the parameter settings corresponding to each terminal. You can switch between the sink logic and source logic by switching SINK/SRC of SW6.	Voltage between each input/COM • ON voltage Min. DC18V • OFF voltage Max. DC3V • Maximum allowable voltage DC27V • Load current 5.6mA (at DC27V)
	Contact/pulse	A	Pulse input-A	When [CA-90] is set to 00, A, and B terminals can be used as input terminals. You can select terminal functions using the parameter settings corresponding to each terminal. When [CA-90] is not set to 00, they are used as terminals for pulse string input. The maximum input pulse is 32kpps.	Voltage between each input/COM • ON voltage Min. DC18V • OFF voltage Max. DC3V • Maximum allowable voltage DC27V • Load current 5.6mA (at DC27V) • Maximum 32kpps pulse input
		B	Pulse input-B		
	Common	COM	Common for input terminal	Common terminals for digital input terminals (1,2,3,4,5,6,7,8,9,A,B). There are three COM terminals.	

● Power Input/Output

(Wiring example)

Control circuit terminal area

DC24V external power supply
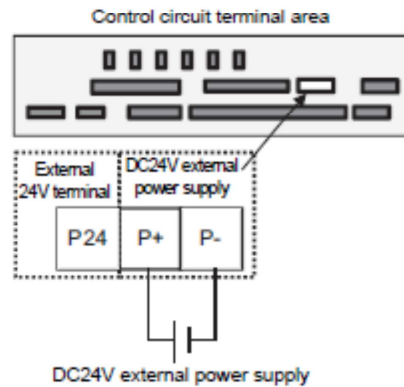
When 24 V power is supplied to P+ and P- from an external source, change of parameters and communication of optional devices are enabled even without main power supply.

		Terminal symbol	Terminal name	Description	Electrical characteristics
24V power supply	Power input	P24	24V output power terminal	24 VDC power supply for contact signal The common terminal is P-.	100mA output at maximum
		P+	External 24V input terminal (24V)	Input an external 24 VDC power to the inverter. With input of 24 V power, you can change parameter settings or operate optional communication without using a control power supply	Allowable input voltage 24 VDC±10% Maximum power consumption 1A
		P-	Terminal for P24/P+ (0 (zero) V)		
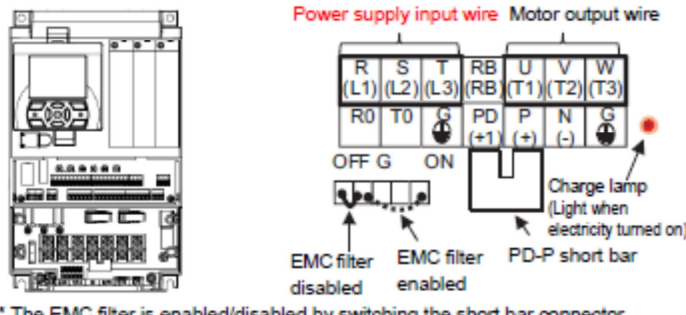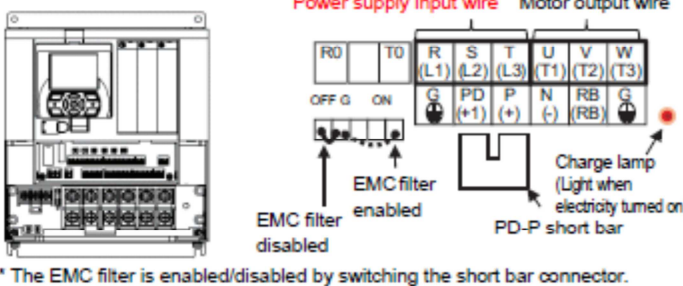
● STO Terminal

Terminal symbol	Terminal name
P24S	24V output power terminal
CMS	Common terminal for STO terminal
STC	Logic switching terminal
ST1	STO input 1
ST2	STO input 2
ED+	Monitoring output terminal
ED-	Monitoring output common

Control circuit terminal area

STO input

EDM output
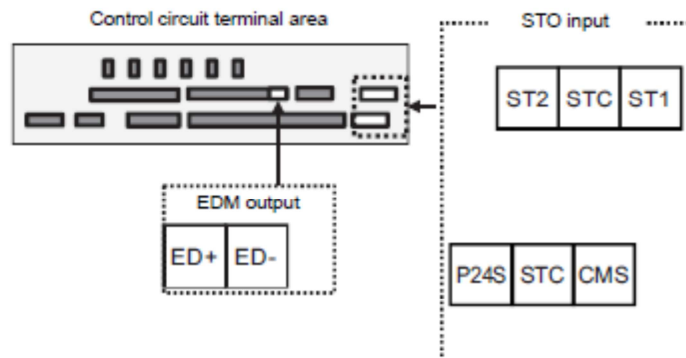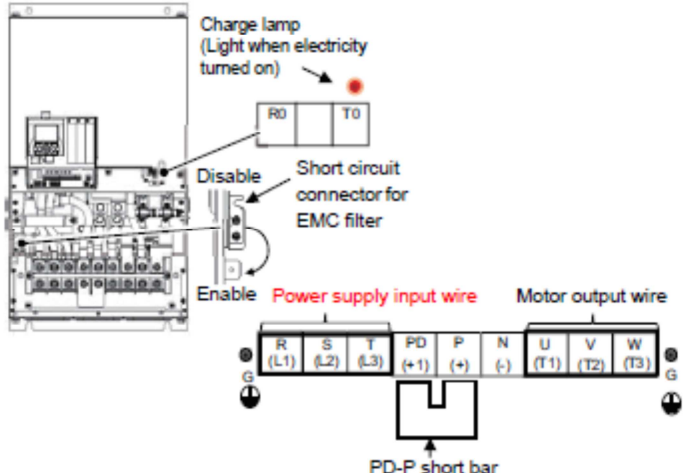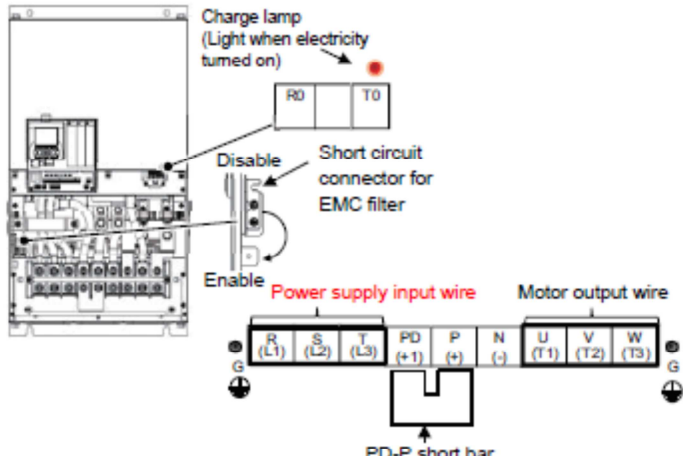
As for the terminal function, see section *2-3-9 Wiring for STO Function* on page 2-73.

3.7. Arrangement of Main Circuit Terminals

The arrangement of inverters' main circuit terminals are shown in the following diagrams.

Arrangement of Terminals	Model
Power supply input wire — Motor output wire. R (L1) S (L2) T (L3) RB (RB) U (T1) V (T2) W (T3) / R0 T0 G PD (+1) P (+) N (-) G. OFF G ON. EMC filter disabled. EMC filter enabled. PD-P short bar. Charge lamp (Light when electricity turned on). * The EMC filter is enabled/disabled by switching the short bar connector.	3G3RX2-A2004 3G3RX2-A2007 3G3RX2-A2015 3G3RX2-A2022 3G3RX2-A2037 3G3RX2-A4007 3G3RX2-A4015 3G3RX2-A4022 3G3RX2-A4037 R0, T0: M4 Earth terminal: M4 Others: M4
Power supply input wire — Motor output wire. R0 T0 R (L1) S (L2) T (L3) U (T1) V (T2) W (T3) / OFF G ON G PD (+1) P (+) N (-) RB (RB) G. EMC filter disabled. EMC filter enabled. PD-P short bar. Charge lamp (Light when electricity turned on). * The EMC filter is enabled/disabled by switching the short bar connector.	3G3RX2-A2055 3G3RX2-A2075 3G3RX2-A4055 3G3RX2-A4075 R0, T0: M4 Earth Terminal: M5 Others: M5 3G3RX2-A2110 3G3RX2-A4110 R0, T0: M4 Earth Terminal: M6 Others: M6

Arrangement of Terminals	Model
Charge lamp (Light when electricity turned on) R0 T0 Disable — Short circuit connector for EMC filter Enable — Power supply input wire / Motor output wire R (L1) S (L2) T (L3) PD (+1) P (+) N (-) U (T1) V (T2) W (T3) G G PD-P short bar * For the switching method of EMC filter, refer to the description on the bottom of the table.	3G3RX2-B4750 R0,T0 : M4 Earth terminal: M8 Others: M10
Charge lamp (Light when electricity turned on) R0 T0 Disable — Short circuit connector for EMC filter Enable — Power supply input wire / Motor output wire R (L1) S (L2) T (L3) PD (+1) P (+) N (-) U (T1) V (T2) W (T3) G G PD-P short bar * For the switching method of EMC filter, refer to the description on the bottom of the table.	3G3RX2-B4900 R0,T0 : M4 Earth terminal: M8 Others: M10

3.8. Input Terminals and Programmable Controller Connection

3.9. Output Terminals and Programmable Controller Connection

● Sink Logic

Inverter   Input unit

● Source Logic

Inverter   Input unit
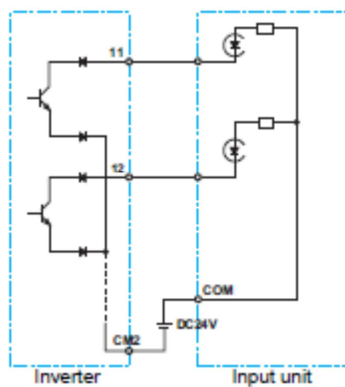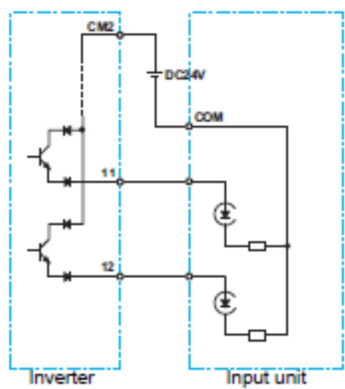
4. Overview of LCD Operator

4.1. Names of Operation Keys

4.2. LCD Display

Outline of Display Screen
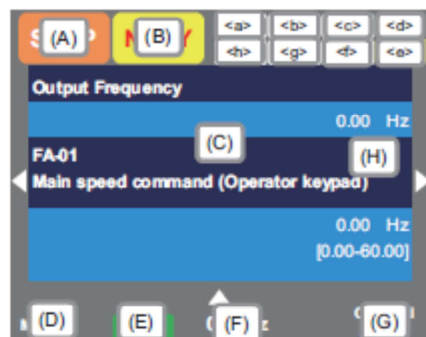
Number	Description
(A)	Displays the operational status
(B)	Displays the warning status
(C)	Displays data/parameters
(D)	Displays details of the function assigned to the F1 key.
(E)	Displays the operation of RUN key on the LCD operator.
(F)	Displays frequency command, torque command, inverter name, clock, etc. The function to be displayed in this section can be selected using the F2 key (option) on the main screen.
(G)	Displays details of the function assigned to the F2 key.
(H)	When soft-lock function is enabled, the [LKS] mark is displayed.

Number	Name	Description
<a>	Power status	Displays the type of input power supply.
<b>	SET function	SET terminal function: Displays the first setting or second setting
<c>	Parameter	Displays the status of display restriction mode.
<d>	Screen No.	Displays the screen number.
<e>	STO function	Displays the STO command.
<f>	Control mode	Displays the command control mode.
<g>	Drive Programming	Displays the program operation of DriveProgramming.
<h>	Special status	Displays the operation of special function.

Display (A): Operation Status Display

No.	Indication	Description
A1	**RUN FW**	Displayed during normal rotation operation. There is a parameter that cannot be changed during operation.
A2	**RUN RV**	Displayed during reverse rotation operation. There is a parameter that cannot be changed during operation.
A3	**RUN 0Hz**	Output is in process by 0Hz command. This is also displayed by DB, FOC, and SON functions. There is a parameter that cannot be changed during operation.
A4	**TRIP**	Displayed during trip after the occurrence of error. For errors that cannot be canceled, perform reset operation to cancel.
A5	**WARN**	Displayed when setting inconsistency occurs. Resolve the inconsistency.
A6	**STOP**	This is displayed when the device is forcibly stopped by a function although an operation command is issued. • The operation command is issued with frequency command at 0Hz. • When the operation command is issued from a source other than the LCD Operator, the device is stopped by the STOP key on the LCD Operator. • When the operation command is issued from a source other than the LCD Operator, the device is stopped by the breaking terminal function [RS], [FRS], etc. • The device is stopped by the instantaneous power failure non-stop function. At this time, the RUN lamp blinks.
A7	**STOP**	The operation is suspended due to lack of operation command. If the operation command is issued from the LCD operator, the operation is stopped when the breaking function is enabled.

No.	Display	Description
e7	P-2C	From the status that the operation of ST1 and ST2 are both STO (contact point OFF), ST1 transitions to be operation-allowed (contact point ON), and later ST2 is kept STO (contact point OFF) for the STO switching allowable time [bd-02].
e8	STO	ST1 and ST2 are both in the STO status (contact point OFF).

Display <f>: Control Command Mode Display

No.	Indication	Description
f1	(None)	The speed control mode.
f2	TRQ	The torque control mode.
f3	POS	The position control mode.

Display <g>: DriveProgramming Operation Mode Display

No.	Indication	Description
g1	(None)	DrivePrograming is not selected.
g2	Ez_S	DrivePrograming is stopped
g3	Ez_R	DrivePrograming is working

LCD Display Backlight

For LCD display backlight, two colors are provided: white and orange.

Colors varying depending on the inverter's status are shown in the table below:

Backlight color	Status
White	Normal (not related to inverter's operation and stop)
Orange	Warning (parameter discrepancy)
White and orange (blinking alternatively at one-second interval)	Trip (equivalent to alarm LED)

4.3. Transition of Screen Display
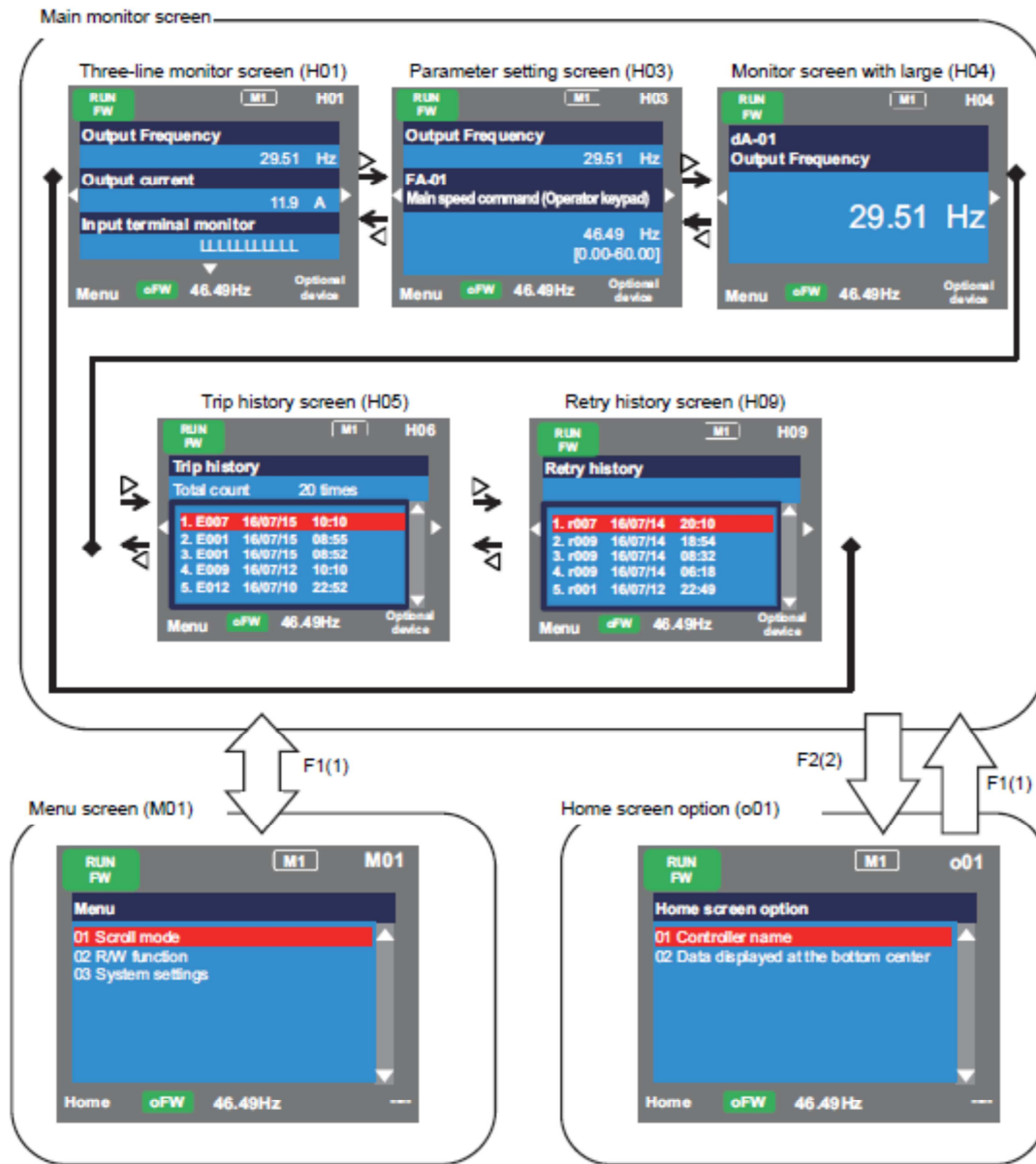
- To display time in retry history, you need to configure clock settings.
- To use the clock function, you need an optional battery that is separately sold (CR2032, 3V).
- When the clock function is not used with being retained, the display of error history is shown below.

Retry history

6. E001	–/–/–	–:–
7. E001	–/–/–	–:–
8. E007	–/–/–	–:–
9. E001	–/–/–	–:–
10 .E005	–/–/–	–:–

4.4. How to Set Battery and the Time Setting

The clock function of LCD operator can display the date and the time of trip/retry history.
To use this function, prepare an optional battery (CR2032, 3V) for the LCD operator.

The procedure to set the clock function and insert a battery is as follows:

1 Show a system setting screen of LCD operator.
Select "10: battery level warning."
Then select "01: valid."

2 Power-off the inverter.
Make sure that the power light of LCD operator is off.

3 Remove the LCD operator from the inverter.

4 Open the lid on the back side of LCD operator and insert a battery.
Make sure the positive side of the battery can be seen.

5 Close the lid and set the LCD operator to the inverter.

6 Power-on the inverter.

7 Make sure that the following screen comes up. Set the date and time.

STOP	NRDY	CTRL	M1	UTL	H03
		SIM	Ez S	TRQ	STO

Battery of keypad run-down.
Set the time again.

2000/01/01 00:00

メニュー   oFW   0.00Hz   Optional device

4.5. Scroll Mode

When configuring basic settings of motor, base frequency, rated voltage of motor, input and output of terminals, as well as when configuring individual functions, change parameters in the scroll mode.

You can check list of setting data of parameters in the scroll mode, therefore, it is also useful when checking the settings.

Press F1 (Menu) key on the screen that is displayed upon power-on (Multi-monitor in the example below) to move to the system settings screen (M01).
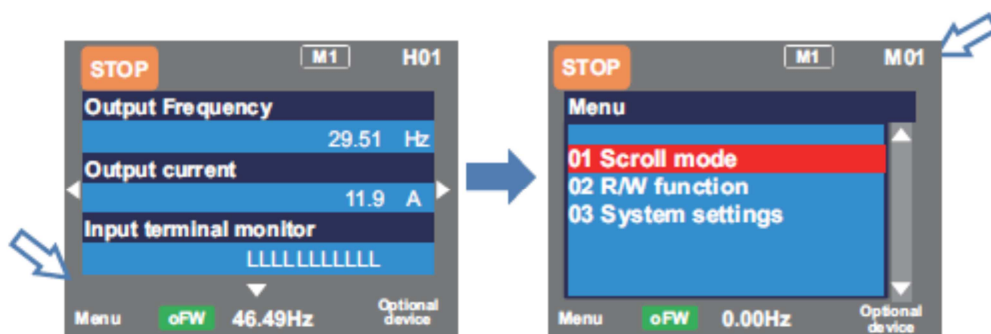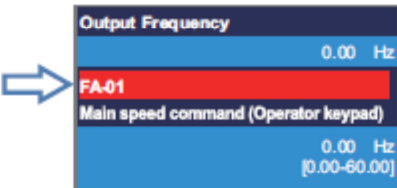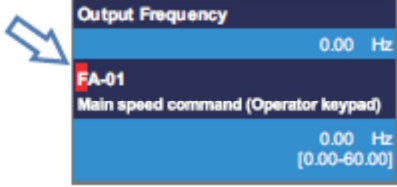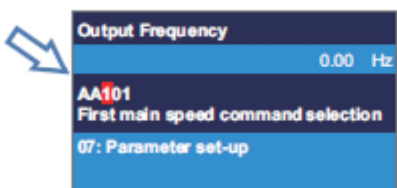
4.6. Concurrent Monitor Mode

When configuring settings such as frequency command and acceleration/deceleration time while watching the monitor during operation, you can change the settings on this monitor screen.

On the screen that is displayed upon power-on, using the right and left (≪ ≫) keys, navigate to a setting screen "Concurrent monitor" (H03).
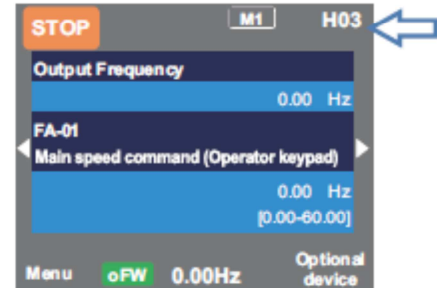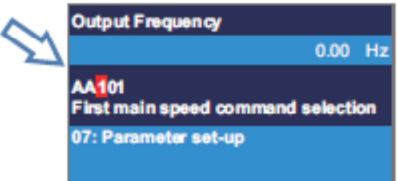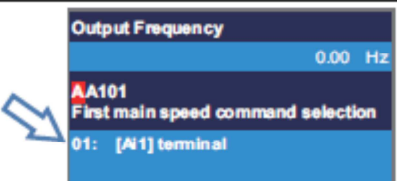
Monitor screen - Parameter selection screen

Set-up procedure	Action
	Press the Enter key to change the color of parameter field. (Tips) Using the up and down (⌃ ⌄) keys, you can choose to change the parameter or change the monitor.
	When the Enter key is pressed again, the left-most letter of the parameter can be changed.
	Using the arrow (⌃ ⌄ ≪ ≫) keys to change the parameter number that you want to change, and then press the Enter key. Example1) When the frequency command destination [AA101] First speed command selection is changed. Example2) When the frequency command value is controlled in [FA-01] while the frequency command destination is set to 07: Parameter setting.
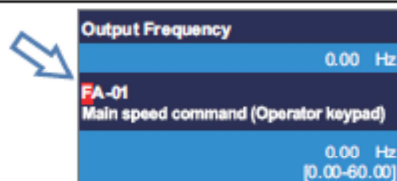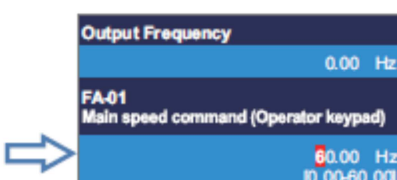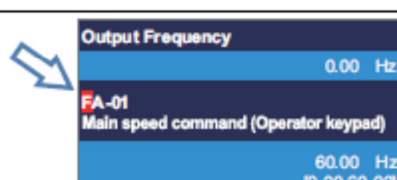
Example1) Change the [AA101] First main speed command selection to [Ai1] terminal.
The [Ai1] terminal is an analog input terminal (voltage/current).

Set-up procedure	Action
Output Frequency 0.00 Hz **AA101** First main speed command selection 07: Parameter set-up	Press the Enter key while [AA101] is displayed. (Tips) The information currently selected is shown in the lower section. "07: Parameter setting" is currently selected.
AA101 First main speed command selection 01 [Ai1] terminal 02 [Ai2] terminal 03 [Ai3] terminal	Using the up and down (⌃ ⌄) keys, select "01 [Ai1] terminal", and then press the F2(2) key. (Tips) Data is saved when the F2(2) key is pressed. It is still saved even after the device is turned off. When configuring an item, the entire screen changes to the screen for setting the item.
Output Frequency 0.00 Hz **AA101** First main speed command selection 01: [Ai1] terminal	To confirm if the data is correctly changed, check the lower section. Press the F1(1) key to return to the monitor. (Tips) The information currently selected is shown in the lower section. "01 [Ai1] terminal" is currently selected.

Example2) Change frequency command in [FA-01].
(If the frequency command selection is "07: Parameter setting")

Set-up procedure	Action
Output Frequency 0.00 Hz **FA-01** Main speed command (Operator keypad) 0.00 Hz [0.00-60.00]	Press the Enter key while [FA-01] is displayed. (Tips) In [FA-01], the set value can be changed if the string inside () of main speed command indicates the operator keypad or multi-step speed. In other cases, it is set to the command monitor.
Output Frequency 0.00 Hz **FA-01** Main speed command (Operator keypad) 60.00 Hz [0.00-60.00]	You can change the right-most digit of data. Change the value using the arrow (⌃ ⌄ ≪ ≫) keys, and then press the F2(2) key. (Tips) In the figure on the left, base frequency is changed to 60.00Hz. Data is saved when the F2(2) key is pressed. It is still saved even after the device is turned off. You can make adjustments while performing monitoring.
Output Frequency 0.00 Hz **FA-01** Main speed command (Operator keypad) 60.00 Hz [0.00-60.00]	To confirm if the data is correctly changed, check the lower section. Press the F1(1) key to return to the monitor. (Tips) The current frequency command is shown in the lower section. Currently, 60.00Hz is input as the command.

4.7. Three-line Monitor Screen

5. Basic Parameter Settings

5.1. Inverter Load Rating Settings

The duty rating mode of the inverter can be chosen from Normal Duty (ND), Low Duty (LD), and Very Low Duty (VLD).

The rated current, excess duty endurance, and rated temperature of the inverter vary depending on the duty rating mode.

A change of the inverter duty rating mode is reflected immediately after the Load type selection [Ub-03] is changed.
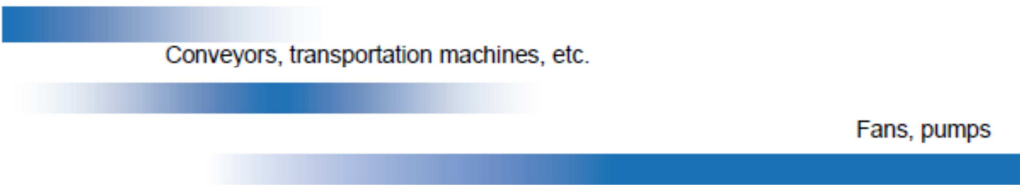
Precautions for Correct Use

- When [Ub-03] is changed, the parameter set for the electric current is automatically adjusted at the ratio of the changed rated current and the set value is changed accordingly.
- Another check is necessary if the electric current is set by using the excess duty limit function, direct current control function, electronic thermal function, excess duty warning function, or low current detection function.
- When VLD is selected and the control mode is selected out of the Control mode selection, 1st-motor [AA121], the control mode is automatically set to the V/f control. Another check is necessary when the control type setting is changed.

● Parameters

Item	Parameters	Data	Description	Default data
Load type selection	[Ub-03]	00	VLD (Very Low Duty)	02
		01	LD (Low Duty)	
		02	ND (Normal Duty)	

For details about the load rating mode that you can set in selecting load specifications, see the following tables.

Duty rating	ND (Normal Duty)	LD (Low Duty)	VLD (Very Low Duty)
Excess duty endurance	150% (1 min.) 200% (3 sec.)	120% (1 min.) 150% (3 sec.)	110% (1 min.) 120% (3 sec.)
Temperature characteristics	50°C (with derating)	45°C (with derating)	40°C (with derating)
Corresponding control type[1]	Induction motor IM • V/f control • V/f control with sensor • SLV (sensorless vector) control • 0 Hz-range SLV control • Vector control with sensor Synchronous motor SM • SLV control • IVMS start type sensorless vector control (SM/PMM)	Induction motor IM • V/f control • V/f control with sensor • SLV (sensorless vector) control Synchronous motor SM • SLV control • IVMS start type sensorless vector control (SM/PMM)	Induction motor IM • V/f control • V/f control with sensor • SLV (sensorless vector) control Synchronous motor SM • SLV control
Major applications	Lifts, cranes, etc. Conveyors, transportation machines, etc. Fans, pumps		

*1. PG option unit of the optional unit is necessary for the vector control with sensor.

5.2. Language Selection

On the screen that is displayed upon power-on, press the F1 (1) key to navigate to the menu screen "M01". Then, select the R/W function by pressing the SEL (O) key or right (▷) key.
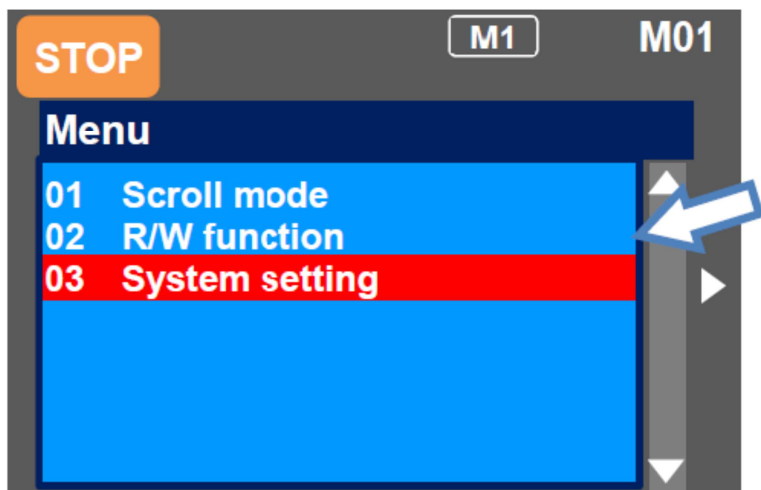
Item	Data	Descriptions
Language selection	01	Controller
	02	English
	03	Japanese
	04	Francais
	05	Espanol
	06	Turkce
	07	Jezyk polski
	08	Cesky jazyk

5.3. Inverter Initialization

5.4. Motor Basic Settings

5.5. Motor Constant Setting

The motor operation could be stabilized if the motor constants are set.

In particular, the motor constants need to be set according to the motor specifications when the automatic boost function, automatic boost function with sensor, sensorless vector control function, 0 Hz-range sensorless vector control function, or vector control function with sensor is used.

The motor constants of standard motor are automatically set to the followings when the motor capacity or number of motor poles is changed.

Some of the motor constants in the following tables are automatically set to acquired constant data when the auto-tuning function is used. For details, see the next section.

The motor constants can be chosen from the motor constant selection or manually changed or adjusted.

The standard motor constants are used as initial values of the induction motor (IM) constants.

Precautions for Correct Use

- Note that the motor constants will be overwritten if any of the following actions are taken.
  In case of induction motor (IM):
  - The motor capacity or number of motor poles is changed.
  - The auto-tuning is performed.
  - The initialization is performed.
  In case of synchronous motor (SM) and permanent magnet motor (PMM):
  - The motor capacity is changed.
  - The auto-tuning is performed.
  - The initialization is performed.

- Please be advised to save the constants using the R/W function on the LCD operator.
- For details of adjustment, see *7-1 Overview of Motor Control Methods* on page 7-3.

IM Motor Constant Parameters

Item	Parameters	Data	Description	Default data
Async.Motor constant R1, 1st-motor	[Hb110]	0.000001 to 1000.000000(Ω)	Sets the primary resistance of IM.	Varies depending on inverter models and settings of duty rating.
Async.Motor constant R2, 1st-motor	[Hb112]	0.000001 to 1000.000000(Ω)	Sets the secondary resistance of IM.	
Async.Motor constant L, 1st-motor	[Hb114]	0.000001 to 1000.000000(mH)	Sets the leakage inductance of IM.	
Async.Motor constant Io, 1st-motor	[Hb116]	0.01 to 10000.00(A)	Sets the no-load current of IM.	
Async.Motor constant J, 1st-motor	[Hb118]	0.00001 to 10000.00000(kgm^2)	Sets the moment of inertia of the system.	

Precautions for Correct Use

- Set the motor constant I0 in the following way if it is switched from 3G3RX-V1 Series.
  [Hb116]=(50Hz/A003)×H023 (or H033)
- When the base frequency is changed, the reference value of the motor constant I0 is changed and the change is recognized (the set value is kept). To obtain a correct value with the auto-tuning or call the initial value of induction motor (IM), set another value in the selection of number of motor poles [Hb103], for example, set to 2 poles from 4 and then to 4 poles again. This results in setting data corresponding to the base frequency after the change in the Async.Motor constant Io, 1st-motor [Hb116].

SM/PMM Motor Constant Parameters

Item	Parameters	Data	Description	Default data
Async.Motor constant R1, 1st-motor	[Hd110]	0.000001 to 1000.000000(Ω)	Sets the resistance of SM/PMM.	Varies depending on inverter models and settings of duty rating.
Async.Motor constant R2, 1st-motor	[Hd112]	0.000001 to 1000.000000(mH)	Sets the d-axis inductance of SM/PMM.	
Async.Motor constant L, 1st-motor	[Hd114]	0.000001 to 1000.000000(mH)	Sets the q-axis inductance of SM/PMM.	
Async.Motor constant Io, 1st-motor	[Hd116]	0.1 to 100000.0(mVs/rad)	Sets the calculated value of induced voltage of SM/PMM.	
Async.Motor constant J, 1st-motor	[Hd118]	0.00001 to 10000.00000(kgm^2)	Sets the moment of inertia of the system.	

Additional Information

- The base (maximum) frequency can be calculated from the rated number of revolutions of the motor (min^{-1}) and the number of poles in the following formula.
  Base (maximum) frequency (Hz) = rated number of revolutions (min^{-1}) × number of poles (pole)/120
- The motor constant Ke is the peak value of the phase inducted voltage (mV) per electrical angular speed (rad/s).

5.6. Auto-tuning of Motor

The auto-tuning is a function that measures and automatically sets the motor constants necessary for the motor control.

There are two types of auto-tuning functions: Offline auto-tuning where the auto-tuning function finishes after a single measurement and online auto-tuning where the auto-tuning function measures a change in the constants due to motor temperature increase every time the motor is started or stopped.

Use the offline auto-tuning to measure the motor constants if you use a motor whose constants are unknown.

The online auto-tuning can stabilize the motor behavior by correcting the temperature increase of the motor during operation.

Precautions for Correct Use

- When 02 (revolving) is chosen in the auto-tuning selection [HA-01], the motor automatically begins rotating when the tuning starts.
  Make sure of the followings.
  - No problem shall occur even with the rotation at a frequency close to 80% of the base frequency.
  - The motor shall not be driven from external.
  - The braking shall be in the open state.
- The torque is not high enough during the auto-tuning. Lift or other machine could have unexpected slipping. Remove the motor from the loading machine and perform the auto-tuning to the independent motor. (In this case, the moment of inertia J is that of the independent motor and hence the moment of inertia of the loading machine should be converted to the value about the motor axis and added to J.)
- For a machine with limited motor axis rotation (lift, ball screw, etc.), 01 (non-revolving) should be chosen in [HA-01] since rotation higher than the allowed one could occur causing a damage to the machine.

5.7. Types of Operation Commands

The operation command (operation modes) selected in a function is enabled.

For details, see the description in the next and subsequent sections.

Precautions for Correct Use

The operation of the inverter requires not only an operation command but also a frequency command.

parameter	setting data
CA-71 AA111	00: [FW]/[RV] terminal
	01: 3 wire
	02: RUN key on LCD Operator
	03: RS485
	04: Option 1
	05: Option 2
	06: Option 3

F-OP
selection
[CA-71]
(00-06)

01

Run-command
input source
selection,
1st-motor
[AA111]
(00-06)

03

Forced
operation
023[F-OP]
ON
OFF
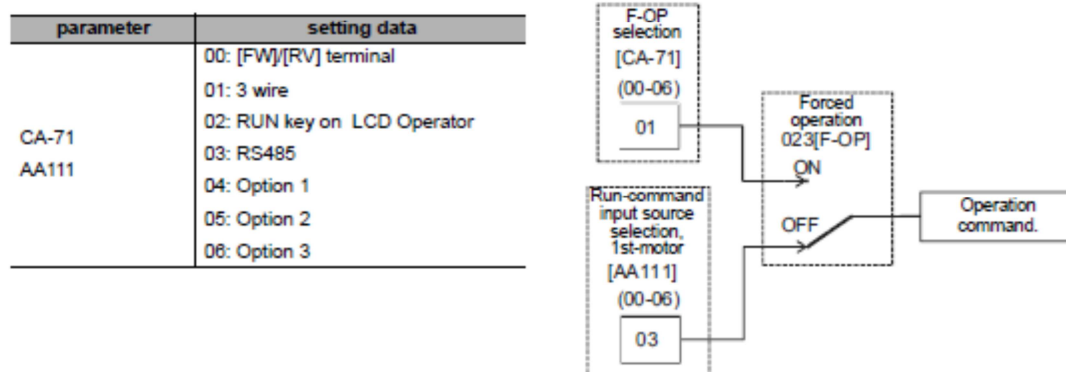
Operation
command.

Precautions for Correct Use

- The above shows an example of operation with [AA111]=02 (RUN key on the LCD operator).
- Functions not assigned to the input terminal functions [CA-01]-[CA-11] become OFF.

5.8. Frequency Command Selection

The frequency command selected in each function is enabled.

For details, see the next and subsequent sections.

The value of the enabled frequency command is shown in [FA-01].

Precautions for Correct Use

- The operation of the inverter requires not only a frequency command but also an operation command.
- To use the second setting switching [SET] of the input terminal function, replace 1 of the third digit of the parameter with 2. Ex.: [AA101]->[AA201]. If the third digit is "-", the parameter is shared for the first and second settings.
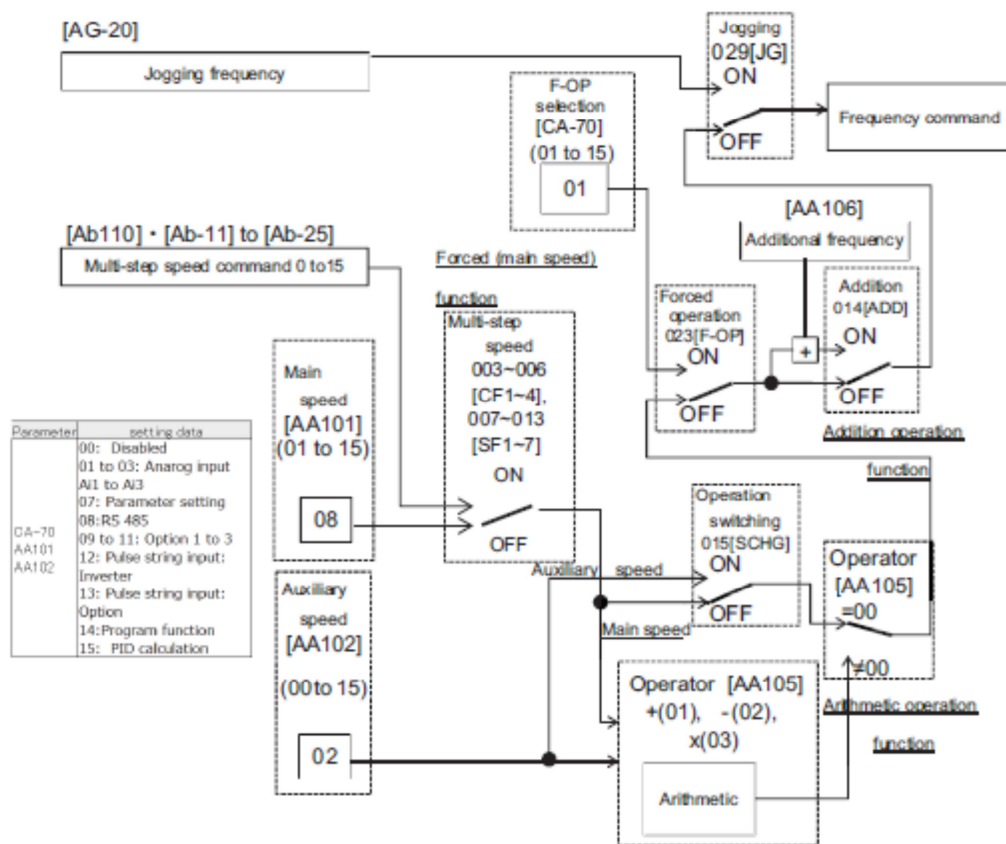
Precautions for Correct Use

- In the above example, [AA101]=08(RS 485) is enabled. For details, see the following explanation.
- Other command destinations can be chosen even when RS485 (Modbus communication, EzCOM function) and program function (Drive Programming) are being used.
- If an operation command is given from the operation screen of PC software CX-Drive, [AA101]=07 and [AA111]=03 are forcedly overwritten when the operation screen opens. Set [AA101]=07 and [AA111]=03.

5.9. Electronic Thermal Setting

Electronic thermal setting enables a motor to be protected from thermals.

Change of Electronic Thermal Level

Setting in accordance with the motor rated current protects the motor from continuous current flows. To make the protection earlier, the protection level should be set lower than the motor rated current.

(Ex.1) Motor rated current 64A ([bC110]=64.0A)

Setting range:12.8A(20%) to 204.0A(300%)

When driven at a base frequency
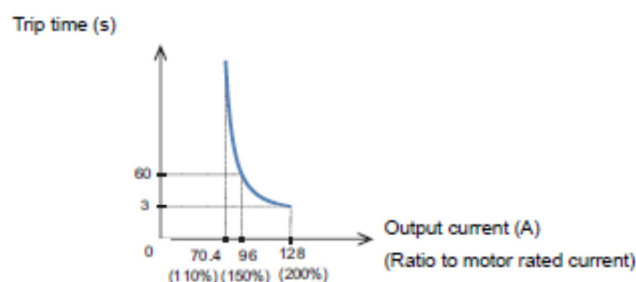
Precautions for Correct Use

- Make the setting correctly as this is necessary to protect the motor.
- When the thermal protection begins, [E005] motor electronic thermal error occurs.
- Irrespective of the thermal setting of the motor, the inverter electronic thermal protection works independently to protect the inverter.
- When the current grows rapidly, [E001] excessive current error could occur before [E005] motor electronic thermal error.
- Even electronic thermal level is set high, electronic thermal for the inverter works separately and it may be reduced from 5 Hz while the reduction ratio may be × 0.8 at 0 Hz.

The electronic thermal time-limited characteristics is shown in (Ex.1) when the electronic thermal level setting, 1st-motor [bC110] is 64A

Example 1 shows the case of reduction ratio x1. (For example, the case of the motor driven at a base frequency for [bC111]=01.)

The magnification ratio and hence the time to a trip could change depending on the choice of the electronic thermal characteristic.

A trip occurs in 60 seconds when an electric current of 150% of the electronic thermal level x1 flows continuously.

● Reduced Torque Characteristics [bC111]=00

Can be used for load reduction in accordance with the cooling performance at a low speed.

(Ex.2) Induction motor rated current 64A, [bC110]=64 (A)

For base frequency [Hb104]=60 Hz, output frequency=20 Hz
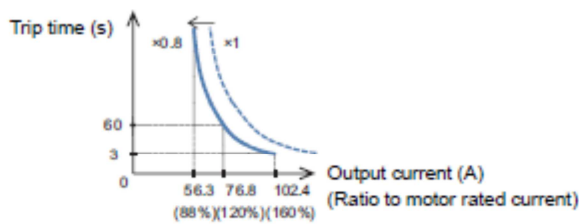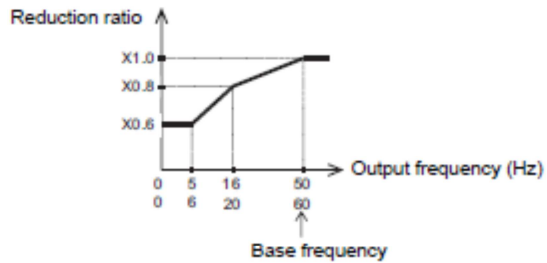
When the first electronic thermal level [bC110] is 64 A, the reduction ratio is ×0.8 for operations at a base frequency of 60 Hz and output frequency of 20 Hz and the electronic thermal time-limited characteristics are given in the lower part of Example 2.

Since Example 1 shows the case of the reduction ratio ×1, a trip occurs in 60 seconds when an electric current of 150% ×1 of the motor rated current flows continuously. However in Example 2, a trip occurs in 60 seconds when an electric current of 150%×0.8=120% of the motor rated current flows continuously.

● Constant Torque Characteristics [bC111]=01

Use this setting to use the constant-torque motor

(Ex.3) For induction motor rated current: 64A, [bC110]=64(A)

Base frequency [Hb104]=50 Hz, output frequency =5 Hz
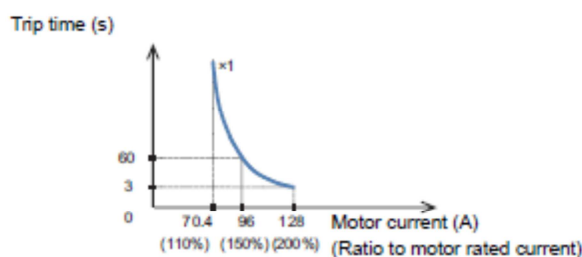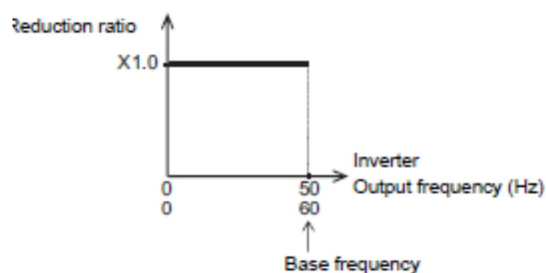
When the first electronic thermal level [bC110] is 64 A, the reduction ratio is ×1.0 for operations at a base frequency of 50 Hz and output frequency of 5 Hz and the electronic thermal time-limited characteristics are given in the lower part of Example 3.

Since Example 1 shows the case of the reduction ratio ×1, a trip occurs in 60 seconds when an electric current of 150% ×1 of the motor rated current flows continuously. The performance in the example 3 is the same as the one in the example 1.

● Free Settings [bC111]=02

To protect the motor, the electronic thermal characteristics can be freely set in accordance with the load.

When the Power Supply Is Shut off or Reset, Electronic Thermal Data Is Held

The temperature integration data of the motor are saved even after power termination or inverter trip resetting. When the motor current increases again when the power is made on or the system is reset, the system is restarted with the saved temperature integration data.

Precautions for Correct Use

When the data-holding function is used, the integration data are held even if the inverter is powered off for a long period of time, and a risk of occurrence of an error would increase. After it is powered on, a short-time operation could cause an error.

The temperature integration data of an inverter is reset when the power supply is shut-off.

Item	Parameters	Data	Description	Default data
Electronic thermal counter memory selection at Power-off	[bC-14]	00	Not holding: The temperature integration data are cleared by the power shut-off and resetting.	01
		01	Holding: The temperature integration data are not cleared and subtracted only in the subtraction mode.	

Electronic Thermal State Monitor

The integration state can be monitored from [dA-42] electronic thermal load rate monitor (motor).

If you want a warning signal when the electronic thermal exceeds a certain level, set the output signal function 026 [THM] and [CE-30] electronic thermal warning level (motor). For details, see *8-6-8 Motor Thermal Warning Signal (THM)* on page 8-133.

The integration state can be monitored from [dA-43] electronic thermal load rate monitor (controller).

If you want a warning signal when the electronic thermal exceeds a certain level, set the output signal function 027 [THC] and [CE-31] electronic thermal warning level (controller). For details, see *8-6-9 Inverter Thermal Warning Signal (THC)* on page 8-134.

5.10. Acceleration/Deceleration Settings

Set up the acceleration time and the deceleration time of the motor. Set a longer time for slower acceleration or deceleration; set a shorter time for faster acceleration or deceleration.

As for the acceleration time, set the time that it takes to rise from 0 Hz to the maximum frequency; as for the deceleration time, set the time that it takes to fall from the maximum frequency to 0 Hz.

In the initial state, the acceleration time setting 1, 1st-motor [AC120] and the deceleration time setting 1, 1st-motor [AC122] are enabled.

The currently enabled acceleration time and deceleration time can be monitored with [FA-10] and [FA-12], respectively; In the initial state, [FA-10] = [AC120] acceleration time 1 and [FA-12] = [AC122] deceleration time 1

Precautions for Correct Use

- When the function of acceleration or deceleration action cancellation 071 [LAC] is selected as the Input terminal function and the signal is turned ON, the set acceleration or deceleration time will be reset to 0 seconds and the output frequency will be made instantaneously to follow the frequency command.

- The target of command for the acceleration or deceleration time can be selected with [AC-01].
  - Employ the internally-set acceleration or deceleration time.
  - Employ the acceleration or deceleration time of the program function Drive Programming.

- The acceleration or deceleration time may be changed in response to the command given by the multi-speed function. For details, see *6-4-9 Case where Command Is Given with Multi-Step Speed* on page 6-36.

(Example 2) In the case of setting [AC115] = 01

FW | ON

Output
frequency

[AC116]

[AC117]

Acceleration time 1 | Acceleration time 2 | Deceleration time 2 | Deceleration time 1
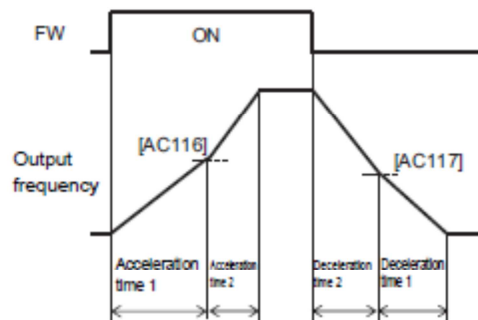
(Example 3) In the case of setting [AC115] = 02

FW | ON

RV | ON

Forward-revolution
output frequency

Acceleration time 2 | Deceleration time 1

Backward-revolution
output frequency

Acceleration time 1 | Deceleration time 2
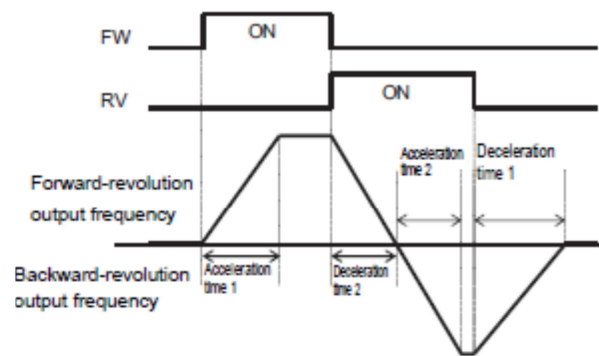
6. Advanced Settings

6.1. V/f Control (Constant Torque Characteristics)

It is suitable when constant torque is required regardless of the rotation speed of bogies, conveyor and crane, etc.

With constant torque characteristics, the output voltage is outputted proportionally to a given command frequency along the straight line drawn from the point 0 Hz/0 V to the intersection of the base frequency and the rated voltage.

The output voltage corresponding to a frequency range from 0 Hz to the base frequency is determined proportionally to the given frequency, but the output voltage corresponding to a frequency range from the base frequency to the maximum frequency is constant irrespective of the frequency.

Use of the manual boost function renders the output voltage higher than that on the basic proportional line by the boost voltage.
The manual boost function is effective in the cases of low speeds and insufficient torque.

Additional Information

- When a motor is hunting and vibrating, an adjustment of the stabilization constant, 1st-motor [HA110] may improve the state of the motor.
- When a single inverter runs multiple motors and the motors are vibrating, a downward adjustment of the stabilization constant, 1st-motor [HA110] may stabilize the state of the motors.
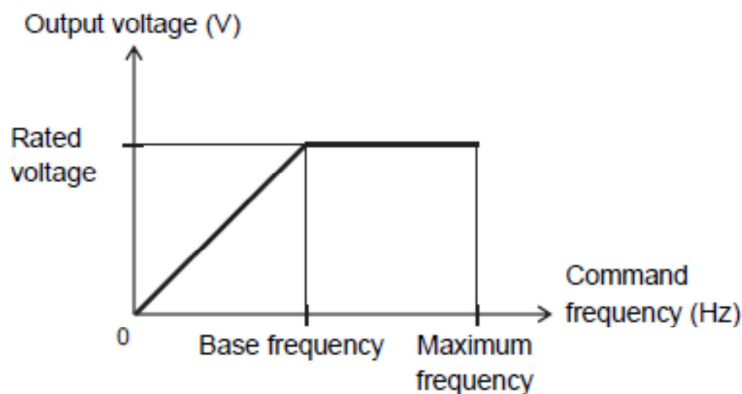
● Parameter

Item	Parameter	Data	Description	Default data
Control mode selection, 1st-motor	[AA121]	00	To be used with the V/f control and the constant torque characteristics (IM).	00
Stabilization constant, 1st-motor	[HA110]	0 to 1000(%)	To adjust the control for reducing the hunting of motors.	100
Async.Motor Base frequency setting, 1st-motor	[Hb104]	10.00 to the maximum frequency (Hz)	To set the base frequency of motors.	50[*1]
Async.Motor Maximum frequency setting, 1st-motor	[Hb105]	Base frequency to 590.00 (Hz)	To set the maximum frequency of motors.	50[*1]
Async.Motor rated voltage, 1st-motor	[Hb106]	1 to 1000 (V)	Set the rated voltage of motors.	200V: 230[*1] 400V: 400[*1]

*1. Default data when default data selection (UB-02) is set to 01.

6.2. V/f Control (Reducing Torque Characteristics)

Suitable for applications, such as a fan/pump, that require no large torque at a low-speed range.

As the output voltage is low at a low-speed range, improved efficiency, lower noise, and less vibration can be expected.
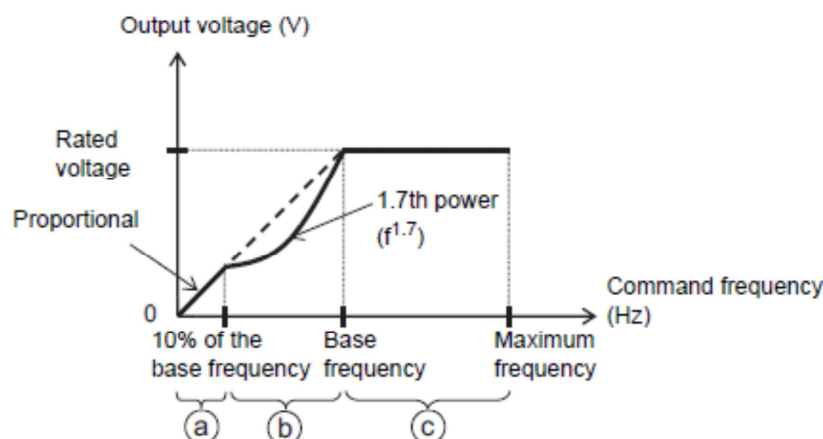
Period a: Constant torque characteristics are employed for a period from 0 Hz to the frequency that is 10% of the base frequency. (e.g.) A 60-Hz base frequency yields constant torque characteristics for a range from 0 to 6 Hz.

Period b: Reducing torque characteristics are employed for a period from the frequency that is 10% of the base frequency to the base frequency. For a given frequency, the voltage on the curve of the 1.7th power to the given frequency is outputted.

Period c: The voltage has constant-output characteristics for a range from the base frequency to the maximum frequency.

Precautions for Correct Use

When a motor is hunting and vibrating, an adjustment of the stabilization constant, 1st-motor [HA110] may improve the state of the motor.

● Parameter

Item	Parameter	Data	Description	Default data
Control mode selection, 1st-motor	[AA121]	01	To be used with the V/f control and the reducing torque characteristics (IM).	00
Stabilization constant, 1st-motor	[HA110]	0 to 1000(%)	To adjust the control for reducing the hunting of motors.	100
Async.Motor Base frequency setting, 1st-motor	[Hb104]	10.00 to the maximum frequency (Hz)	To set the base frequency of motors.	50[*1]
Async.Motor Maximum frequency setting, 1st-motor	[Hb105]	Base frequency to 590.00 (Hz)	To set the maximum frequency of motors.	50[*1]
Async.Motor rated voltage, 1st-motor	[Hb106]	1 to 1000 (V)	Set the rated voltage of motors.	200V: 230[*1] 400V: 400[*1]

*1. Default data when default data selection (UB-02) is set to 01.

6.3. V/f Control (Free V/f)

It is suitable for an application in which load varies considerably in rotation speed.

In the free V/f set-up, any intended V/f characteristics can be set by setting the voltage and the frequency at 7 points.

Output voltage of an inverter can be adjusted according to applications. For example, when you use applications on which loads drastically vary in a rotation speed (output frequency), set frequency that makes the load heavier and adjust the output voltage. In such way, a motor can be controlled with the output torque according to loads.
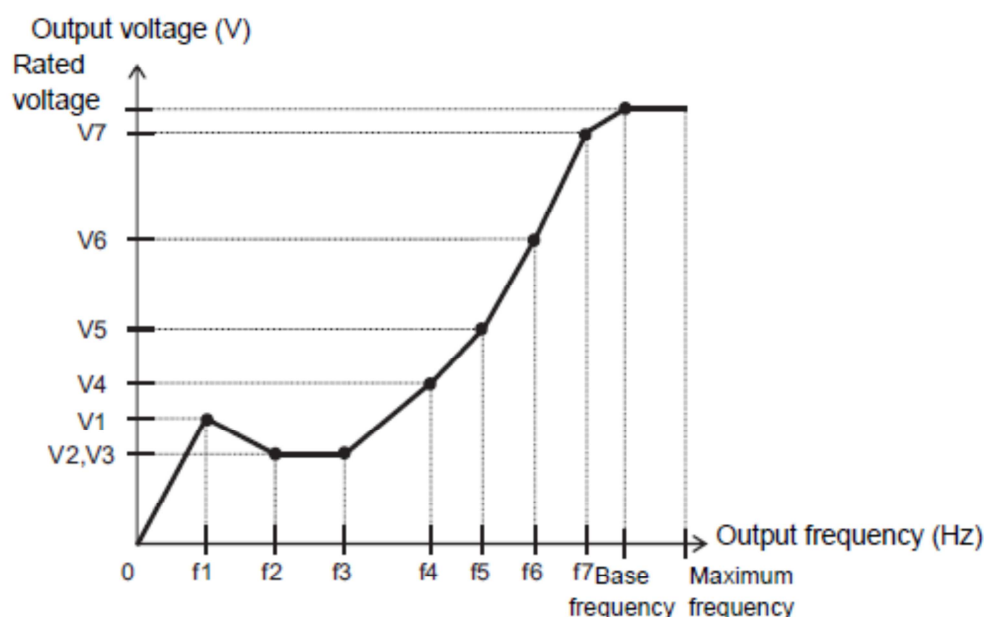
Precautions for Correct Use

- When a motor is hunting and vibrating, an adjustment of the stabilization constant, 1st-motor [HA110] may improve the state of the motor.

- The frequencies set by free V/f set-up have to always meet the following requirement: f1 ≤ f2 ≤ f3 ≤ f4 ≤ f5 ≤ f6 ≤ f7 ≤ base frequency. The initial value for each of the frequencies set by the free V/f set-up is 0 Hz. Set the maximum frequency and the base frequency first, and then set the frequencies f7, f6, f5, f4, f3, f2, and f1 in this order by the free V/f set-up.

- Setting the [AA121] at 02 (free V/f set-up) disables the manual torque boost operational mode selection, 1st-motor [Hb140].

- Default data of frequency for Free V/f setting is 0Hz. Even when you set Control mode selection, 1st-motor [AA121] to 02 ([V/f] Free V/f (IM)), you can not operate an inverter. Be sure to set the frequency for Free V/f setting.

Precautions for Correct Use

- Even the setting of 1000 V for all of the free V/f voltages 1 to 7 will not enable the inverter to output a voltage that is higher than the input voltage or the motor's voltage selection.
- Set the characteristics very carefully because inappropriately set characteristics may cause over current to happen during the acceleration or deceleration and/or may cause machine vibration.
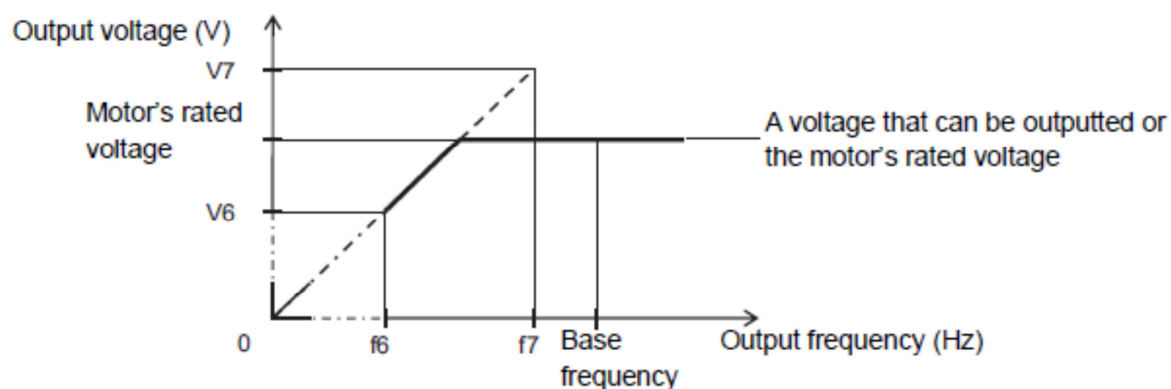
6.4. Manual Torque Boost

● Parameter

Item	Parameter	Data	Description	Default data
Manual torque boost operational mode selection, 1st-motor	[Hb140]	00	Disabled	01*1
		01	Always enabled	
		02	Enabled only for forward revolution	
		03	Enabled only for backward revolution	
Manual torque boost value, 1st-motor	[Hb141]	0.0 to 20.0(%)	Setting the maximum amount of torque boost for the motor's rated voltage [Hb106] at the time of setting the manual torque boost break point.	0.0
Manual torque boost Peak speed, 1st-motor	[Hb142]	0.0 to 50.0(%)	Set, as the break point, the proportion of the boost amount to the base frequency [Hb104]	0.0

*1. Default data when default data selection (UB-02) is set to 01.

6.5. Automatic Torque Boost

Automatically adjust the frequency and the output voltage so as to achieve a higher torque.

The automatic boost corrects the frequency and the output in order to control the motor. Accordingly, it requires the acquisition of the motor constant by means of auto-tuning or the like.

Precautions for Correct Use

- When a motor is hunting and vibrating, an adjustment of the stabilization constant, 1st-motor [HA110] may improve the state of the motor.
- In the automatic torque boost, set appropriately the motor capacity, the number of motor poles, the base frequency, the rated voltage, and the rated current in order to conduct motor control.
- When a trip caused by overcurrent is generated while the deceleration, set a over magnetization deceleration function selection, 1st-motor (bA146) to 00: Enabled.
- When the motor performs below its potential characteristics, conduct the auto-tuning and make adjustment by referring to the next section.

Precautions for Correct Use

- When the revolution of the motor is hindered by such causes as the braking or the motor lock caused by foreign objects, such hindrance may cause over current or the like. When no such adjustment as ones mentioned above improves the state, checking the portion around the motor may sometimes improves it.

- If an application of load results in a great amount of change in the inverter's output frequency monitor [dA-01], a function to automatically change the frequencies for the overload limiting function, the momentary-stop non-stop function, the over voltage suppression function may work depending upon the settings of the functions.

6.6. Input Terminal Selections

Input terminals 1 to 9, A, and B are open collector inputs. Pulse inputting is possible for Terminals A and B.

For the content of an input signal, by allocating the functions that you want to operate to [CA-01] to [CA-11], you will be able to operate the functions with a corresponding input terminal operation.

You can switch a contact for an input signal with the Contacts a/b selection functions of [CA-21] to [CA-31].

When a function is selected for many targets, the targets will be set to 00 [without allocation], excluding the finally set function selection.

You can set input specifications for Contact a or Contact b separately for Input terminals 1 to 9, A, and B.

Precautions for Correct Use

Even when the "Selection of Input terminals a/b" is used, a terminal allocated with a "028 [RS] signal" always operates as Contact a (NO).

● **Parameter**

Item	Parameter	Data	Description
Input terminal function selection	[CA-01] to [CA-11]	Next item: Table of input terminal selections	Outputs the allocated function to the corresponding input terminal.
Selection of Input terminals a/b (NO/NC)	[CA-21] to [CA-31]	00	Operates as Contact a (NO).
		01	Operates as Contact b (NC).

- Contact a: Closes with "ON," and opens with "OFF."
- Contact b: Closes with "OFF," and opens with "ON."

Input terminal	Switching between Contact a and Contact b
1	[CA-21]
2	[CA-22]
3	[CA-23]
4	[CA-24]
5	[CA-25]
6	[CA-26]
7	[CA-27]
8	[CA-28]
9	[CA-29]
A	[CA-30]
B	[CA-31]

6.7. Analog Input

Output frequency to the following analog input (frequency command) is set.

- Ai1 (0 to 10 V/0 to 20 mA)
- Ai2 (0 to 10 V/0 to 20 mA)
- Ai3 (-10 to 10 V)

Relation between Analog Input Ai1 and Frequency Command

The following table is a relation between Analog Input Ai1 and Frequency Command.

Item	Parameter	Data	Description	Default data
Filter time constant of Terminal [Ai1]	[Cb-01]	1 to 500(ms)	Filters the input.	16
Start value of Terminal [Ai1]	[Cb-03]	0.00 to 100.00(%)	Sets a frequency instruction ratio when setting a start ratio for analog input.	0.00
End value of Terminal [Ai1]	[Cb-04]	0.00 to 100.00(%)	Sets a frequency instruction ratio when setting an end ratio for analog input.	100.00
Start rate of Terminal [Ai1]	[Cb-05]	0.0 to [Cb-06](%)	With respect to a minimum ratio for analog input for 0 to 10 V/0 to 20 mA, sets a start ratio.	0.0
End rate of Terminal [Ai1]	[Cb-06]	[Cb-05] to 100.0(%)	With respect to an external frequency instruction for 0 to 10 V, 0 to 20 mA, sets an end ratio.	100.0
Start point selection of Terminal [Ai1]	[Cb-07]	00	For an instruction for a value of one of 0.00% to the "Start amount [Cb-03]" and to the "End amount [Cb-04]," whichever is lower, one of the values of the "Start amount [Cb-03]" and the "End amount [Cb-04]," whichever is lower, is output.	01
		01	For an instruction for a value of one of 0.00% to the "Start amount [Cb-03]" and to the "End amount [Cb-04]," whichever is lower, a value of 0.00% is output.	

(Ex.3)
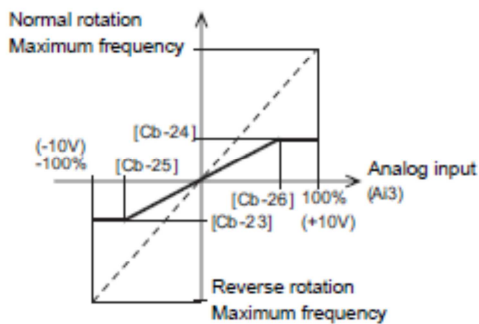
Adding Analog Input [Ai3] to [Ai1][Ai2]

You can forcibly add an input of the [Ai3] terminal to [Ai1]/[Ai2].

You are able to make an input of ±10 V to the [Ai3] terminal. Use [Cb-22] to select whether the output of reversibility for normal rotation or reverse rotation is possible after making an addition.

(Ex.4-1) [Cb-22]=01 (with reversibility)
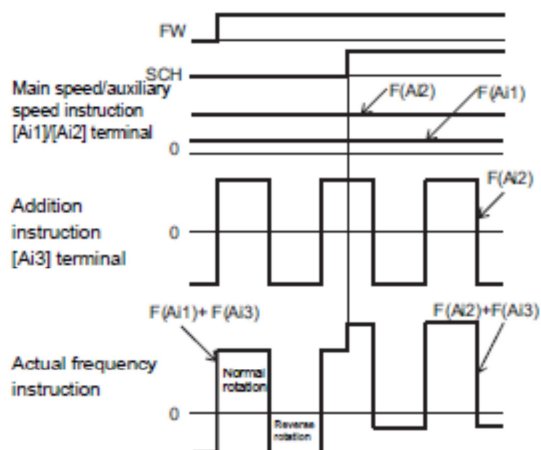
(Ex.4-2) [Cb-22]=02 (without reversibility)
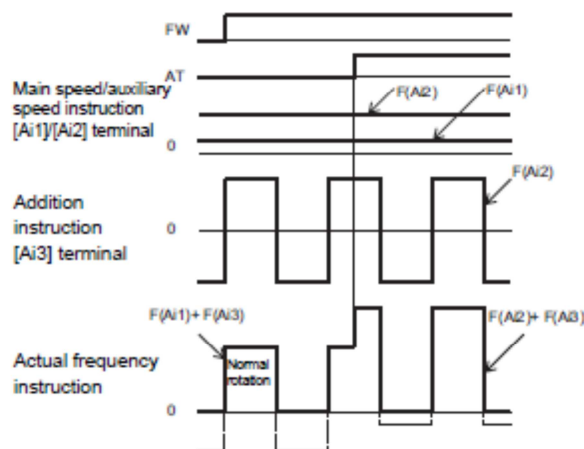
6.8. Output Terminal Function

Output terminals 11 to 15 are used for open collector output, and Relay output terminals 16 and 17 are used for relay output. Relay output 16 serves as a contact a relay, and Relay output 17 serves as a contact c relay.

For the content of an output signal, by allocating the functions that you want to output to [CC-01] to [CC-07], you will be able to allow the corresponding output terminal contacts to operate.

You can switch an output signal level with the Contacts a/b selection functions of [CC-11] to [CC-17].

Precautions for Correct Use

To use the contact c relay, please check the control circuit power supply and the relay output terminals whether they are turned on or off.

● Parameter

Item	Parameter	Data	Description
Output terminal function selection	[CC-01] to [CC-05]	Next item: Table of output terminal selections	Outputs the allocated function to the corresponding output terminal.
Relay output terminal function selection	[CC-06]		
Relay output terminal function selection	[CC-07]		
Output terminal function selection	[CC-11] to [CC-15]	00	Operates as Contact a (NO).
Relay output terminal function selection a/b (NO/NC) selection	[CC-16]	01	Operates as Contact b (NC).
Relay output terminal function selection a/b (NO/NC) selection	[CC-17]		

● Terminals Corresponding to Parameters

Alarm relay output terminals		
AL2	AL1	AL0

[CC-07]

Relay output terminals	
16A	16C

[CC-06]

Output terminals					
15	14	13	12	11	CM2

[CC-05]   [CC-03]   [CC-01]
[CC-04]   [CC-02]

Function No.	Abbreviation	Function name
062	LOG1	Result of logical operation 1
063	LOG2	Result of logical operation 2
064	LOG3	Result of logical operation 3
065	LOG4	Result of logical operation 4
066	LOG5	Result of logical operation 5
067	LOG6	Result of logical operation 6
068	LOG7	Result of logical operation 7
069	MO1	General purpose output 1
070	MO2	General purpose output 2
071	MO3	General purpose output 3
072	MO4	General purpose output 4
073	MO5	General purpose output 5
074	MO6	General purpose output 6
075	MO7	General purpose output 7
076	EMFC	During-Em-Force signal
077	EMBP	During-bypass-mode signal
080	LBK	Flat battery of LCD operator
081	OVS	Excessive voltage of accepted power
084	AC0	Alarm code bit 0
085	AC1	Alarm code bit 1
086	AC2	Alarm code bit 2
087	AC3	Alarm code bit 3
089	OD3	PID3 excessive deviation
090	FBV3	PID3 feedback comparison
091	OD4	PID4 excessive deviation
092	FBV4	PID4 feedback comparison
093	SSE	PID soft start abnormality

You can set output specifications for Contact a or Contact b separately for Output terminals 11 to 15 and Relay output terminals 16 and 17.

● Parameter

Item	Parameter	Data	Description
Output terminal function selection	[CC-11] to [CC-15]	00, 01	00: Contact a (normally open) operation 01: Contact b (normally closed) operation
Relay output terminal function selection a/b (NO/NC) selection	[CC-16]		
Relay output terminal function selection a/b (NO/NC) selection	[CC-17]		

• Contact a: Closes with "ON," and opens with "OFF."
• Contact b: Closes with "OFF," and opens with "ON."

Open Collector Output Terminals

The specifications of Output terminals 11 to 15 are as shown below. The same specifications are applied.

	Electrical characteristics
Terminals (11 to 15)-CM2	Voltage drop at ON: 4 V or below Allowable maximum voltage: DC 27 V Allowable maximum current: 50 mA

Inside of inverter

15	14	13	12	11	CM2
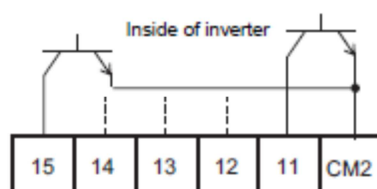
The open collector output operation is as shown below.

[CC-11] to [CC-15]	Control power supply	Output of inverter function	Open collector operation
00 (Contact a)	On	ON	Close
		OFF	Open
	Off	-	-
01 (Contact b)	On	ON	Open
		OFF	Close
	Off	-	-

6.9. Analog Output Terminal Adjustment

You can select, using some parameter codes, data to be output to the Analog output Ao1-L and Ao2-L terminals and the Digital pulse output FM-CM1 terminal.

Selectable Parameter Codes

The below table shows selectable parameter codes.

The output scale ranges are specified when bias settings are each set to 0.0%, and gain settings are each set to 100.0%.

You can adjust the output scale ranges with bias settings and gain settings.

Using the bias function, you can output, from data that can output "(±) data," "(-) data" in a range from which outputting is available.

When selecting the output monitor, set the registered number of each code. For example, when using dA-02 of output current monitor via [Ao1] terminal, set "10002(2712h)" to Cd-04.

Code	Name	Output scale range (Corresponding to 0 to 10 V / 0 to 20 mA / 0 to 100%)	Remarks
dA-01	Output frequency monitor	0.00 to Maximum speed (Hz)	Outputting is possible with (±).
dA-02	Output current monitor	(0.00 to 2.00) × Inverter rated current (A)	Outputting is possible with (±).
dA-04	Frequency command	0.00 to Maximum speed (Hz)	Outputting is possible with (±).
dA-08	Detected speed value monitor	0.00 to Maximum speed (Hz)	Outputting is possible with (±).
dA-12	Output frequency monitor (with sign)	0.00 to Maximum speed (Hz)	Outputting is possible with (±).
dA-14	Frequency upper limit monitor	0.00 to Maximum speed (Hz)	
dA-15	Torque command monitor	0 to Motor rated torque × 500% (Nm)[1]	Outputting is possible with (±).
dA-16	Torque limit monitor	0 to Motor rated torque × 500% (Nm)[1]	Outputting is possible with (±).
dA-17	Output torque monitor	0 to Motor rated torque × 500% (Nm)[1]	Outputting is possible with (±).

7. Parameter List

Code	Function name	Monitoring and setting items	Units
AA101	Main speed input source selection, 1st-motor	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function) /16 (Volume on keypad)	—
AA102	Sub frequency input source selection, 1st-motor	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function) /16 (Volume on keypad)"	—
AA104	Sub speed setting, 1st-motor	0.00~590.00	Hz
AA105	Calculation symbol selection for Speed reference, 1st-motor	00 (Disable) /01 (Addition(ADD)) /02 (Subtraction(SUB)) /03 (Multiplication(MUL))	—
AA106	Add frequency setting, 1st-motor	−590.00~+590.00 (Hz)	0.01Hz
AA111	Run-command input source selection, 1st-motor	00 (Terminal [FW]/[RV]) /01 (3-wire) /02 (RUN key on keypad) /03 (Setting by RS485) /04 (Option-1) /05 (Option-2) /06 (Option-3)	—
AA114	RUN-direction restriction, 1st-motor	00 (Disable) /01 (Enable only Forward rotation) /02 (Enable only Reverse rotation)	—
AA115	STOP mode selection, 1st-motor	00 (Deceleration until stop) /01 (Free-run stop)	—
AA-12	RUN-key of keypad Rotation Direction, 1st-motor	00 (Forward) /01 (Reverse)	—
AA121	Control mode selection, 1st-motor	IM control: 00 (VF control (Constant torque)) /01 (VF control (Reduced torque)) /02 (VF control (Free-V/f)) /03 (Constant torque with Automatic- trq boost)) /04 (VF control with encoder (Constant torque)) /05 (VF control with encoder (Reduced torque)) /06 (VF control with encoder (Free-V/f)) /07 (VF control with PG (Constant torque with Automatc-trq boost)) /08 (Sensorless vector control) /09 (0Hz Sensorless vector control) /10 (Vector control with encoder) SM/PMM control: 11 (Synchronous start up for smart sensorless vector control) /12 (IVMS start up for smart sensorless vector control)	0
AA123	Vector control mode selection, 1st-motor	00 (Speed/Torque control mode) /01 (Pulse train position control) /02 (Position control) /03 (High-resolution position control)	—
AA-13	STOP-key enable at RUN-command from terminal, 1st-motor	00 (Disable) /01 (Enable) /02 (Enable at only trip reset)	—
AA201	Main speed input source selection, 2nd-motor	same to AA101	—
AA202	Sub speed input source selection, 2nd-motor	same to AA102	—
AA204	Sub speed setting, 2nd-motor	same to AA104	—
AA205	Calculation symbol selection for Speed reference, 2nd-motor	same to AA105	—
AA206	Add frequency setting, 2nd-motor	same to AA106	—
AA211	Run-command input source selection, 2nd-motor	same to AA111	—
AA214	RUN-direction restriction, 1st-motor	same to AA114	—
AA215	STOP mode selection, 1st-motor	same to AA115	—
AA221	Control mode selection, 2nd-motor	Same as AA121, except 12	0
AA223	Vector control mode selection, 2nd-motor	same to AA123	—
Ab-01	Frequency conversion gain	0.01~100.00	0.01
Ab-03	Multispeed operation selection	00 (Binary (16-speeds)) /01 (Bit (8-speeds))	—
Ab-11	Multispeed-1 setting	0.00~590.00 (Hz)	0.01Hz
Ab110	Multispeed-0 setting, 1st-motor	0.00~590.00 (Hz)	0.01Hz
Ab-12	Multispeed-2 setting	0.00~590.00 (Hz)	0.01Hz
Ab-13	Multispeed-3 setting	0.00~590.00 (Hz)	0.01Hz
Ab-14	Multispeed-4 setting	0.00~590.00 (Hz)	0.01Hz
Ab-15	Multispeed-5 setting	0.00~590.00 (Hz)	0.01Hz
Ab-16	Multispeed-6 setting	0.00~590.00 (Hz)	0.01Hz
Ab-17	Multispeed-7 setting	0.00~590.00 (Hz)	0.01Hz
Ab-18	Multispeed-8 setting	0.00~590.00 (Hz)	0.01Hz
Ab-19	Multispeed-9 setting	0.00~590.00 (Hz)	0.01Hz
Ab-20	Multispeed-10 setting	0.00~590.00 (Hz)	0.01Hz
Ab-21	Multispeed-11 setting	0.00~590.00 (Hz)	0.01Hz
Ab210	Multispeed-0 setting, 2nd-motor	Same as Ab110	0.01Hz
Ab-22	Multispeed-12 setting	0.00~590.00 (Hz)	0.01Hz
Ab-23	Multispeed-13 setting	0.00~590.00 (Hz)	0.01Hz
Ab-24	Multispeed-14 setting	0.00~590.00 (Hz)	0.01Hz
Ab-25	Multispeed-15 setting	0.00~590.00 (Hz)	0.01Hz
AC-01	Acceleration/ Deceleration time input selection	00 (Setting by parameter) /01 (Setting from Option-1) /02 (Setting from Option-2) /02 (Setting from Option-3) /04 (Setting by programing function)	—
AC-02	Acceleration/ Deceleration selection	00 (Common setting) /01 (Multi stage Acceleration/ Deceleration)	—
AC-03	Acceleration curve selection	00 (Liner Acceleration) /01 (S-curve Acceleration) /02 (U-curve Acceleration) /03 (Reverse U-curve Acceleration) /04 (Eleveter S-curve Acceleration)	—
AC-04	Deceleration curve selection	00 (Liner Acceleration) /01 (S-curve Acceleration) /02 (U-curve Acceleration) /03 (Reverse U-curve Acceleration) /04 (Eleveter S-curve Acceleration)	—
AC-05	Acceleration curve constant setting	1~10	—
AC-06	Deceleration curve constant setting	1~10	—
AC-08	EL-S-curve ratio @start of acceleration	0~100	1%
AC-09	EL-S-curve ratio @end of acceleration	0~100	1%
AC-10	EL-S-curve ratio @start of deceleration	0~100	1%
AC-11	EL-S-curve ratio @start of deceleration	0~100	1%
AC115	Select method to switch to Accel2/Decel2 Profile, 1st-motor	00 (Switching by [2CH] terminal) /01 (Switching by setting) /02 (Switching only when rotation is reversed)	—
AC116	Accel1 to Accel2 Frequency transition point, 1st-motor	0.00~590.00 (Hz)	0.01Hz
AC117	Decel1 to Decel2 Frequency transition point, 1st-motor	0.00~590.00 (Hz)	0.01Hz
AC120	Acceleration time setting 1, 1st-motor	0.00~3600.00 (s)	0.01s
AC122	Deceleration time setting 1, 1st-motor	0.00~3600.00 (s)	0.01s
AC124	Acceleration time setting 1, 1st-motor	0.00~3600.00 (s)	0.01s
AC126	Deceleration time setting 1, 1st-motor	0.00~3600.00 (s)	0.01s
AC215	Select method to switch to Accel2/Decel2 Profile, 2nd-motor	00 (Switching by [2CH] terminal) /01 (Switching by setting) /02 (Switching only when rotation is reversed)	—

Code	Function name	Monitoring and setting items	Units
AC216	Accel1 to Accel2 Frequency transition point, 2nd-motor	0.00～590.00 (Hz)	0.01Hz
AC217	Decel1 to Decel2 Frequency transition point, 2nd-motor	0.00～590.00 (Hz)	0.01Hz
AC220	Acceleration time setting 1, 2nd-motor	0.00～3600.00 (s)	0.01s
AC222	Deceleration time setting 1, 2nd-motor	0.00～3600.00 (s)	0.01s
AC224	Acceleration time setting 1, 2nd-motor	0.00～3600.00 (s)	0.01s
AC226	Deceleration time setting 1, 2nd-motor	0.00～3600.00 (s)	0.01s
AC-30	Acceleration time setting for Multispeed-1	0.00～3600.00 (s)	0.01s
AC-32	Deceleration time setting for Multispeed-1	0.00～3600.00 (s)	0.01s
AC-34	Acceleration time setting for Multispeed-2	0.00～3600.00 (s)	0.01s
AC-36	Deceleration time setting for Multispeed-2	0.00～3600.00 (s)	0.01s
AC-38	Acceleration time setting for Multispeed-3	0.00～3600.00 (s)	0.01s
AC-40	Deceleration time setting for Multispeed-3	0.00～3600.00 (s)	0.01s
AC-42	Acceleration time setting for Multispeed-4	0.00～3600.00 (s)	0.01s
AC-44	Deceleration time setting for Multispeed-4	0.00～3600.00 (s)	0.01s
AC-46	Acceleration time setting for Multispeed-5	0.00～3600.00 (s)	0.01s
AC-48	Deceleration time setting for Multispeed-5	0.00～3600.00 (s)	0.01s
AC-50	Acceleration time setting for Multispeed-6	0.00～3600.00 (s)	0.01s
AC-52	Deceleration time setting for Multispeed-6	0.00～3600.00 (s)	0.01s
AC-54	Acceleration time setting for Multispeed-7	0.00～3600.00 (s)	0.01s
AC-56	Deceleration time setting for Multispeed-7	0.00～3600.00 (s)	0.01s
AC-58	Acceleration time setting for Multispeed-8	0.00～3600.00 (s)	0.01s
AC-60	Deceleration time setting for Multispeed-8	0.00～3600.00 (s)	0.01s
AC-62	Acceleration time setting for Multispeed-9	0.00～3600.00 (s)	0.01s
AC-64	Deceleration time setting for Multispeed-9	0.00～3600.00 (s)	0.01s
AC-66	Acceleration time setting for Multispeed-10	0.00～3600.00 (s)	0.01s
AC-68	Deceleration time setting for Multispeed-10	0.00～3600.00 (s)	0.01s
AC-70	Acceleration time setting for Multispeed-11	0.00～3600.00 (s)	0.01s
AC-72	Deceleration time setting for Multispeed-11	0.00～3600.00 (s)	0.01s
AC-74	Acceleration time setting for Multispeed-12	0.00～3600.00 (s)	0.01s
AC-76	Deceleration time setting for Multispeed-12	0.00～3600.00 (s)	0.01s
AC-78	Acceleration time setting for Multispeed-13	0.00～3600.00 (s)	0.01s
AC-80	Deceleration time setting for Multispeed-13	0.00～3600.00 (s)	0.01s
AC-82	Acceleration time setting for Multispeed-14	0.00～3600.00 (s)	0.01s
AC-84	Deceleration time setting for Multispeed-14	0.00～3600.00 (s)	0.01s
AC-86	Acceleration time setting for Multispeed-15	0.00～3600.00 (s)	0.01s
AC-88	Deceleration time setting for Multispeed-15	0.00～3600.00 (s)	0.01s
Ad-01	Torque reference input source selection	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function)	—
Ad-02	Torque reference value setting	−500.0～500.0 (%)	0.1%
Ad-03	Polarity selection for torque reference	00 (As indication by the sign) /01 (Depending on the operation direction)	—
Ad-04	Switching time of Speed contorl to Torque control	0～1000 (ms)	—
Ad-11	Torque bias input source selection	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /15 (PID function)	—
Ad-12	Torque bias value setting	−500.0～500.0 (%)	0.1%
Ad-13	Polarity selection for torque bias	00 (As indication by the sign) /01 (Depending on the operation direction)	—
Ad-14	Terminal [TBS] active	00 (Disable) /01 (Enable)	—
Ad-40	Input selection for speed limit at torque control	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))″	—
Ad-41	Speed limit at torque control (at Forward rotation)	0.00～590.00 (Hz)	0.01Hz
Ad-42	Speed limit at torque control (at Reverse rotation)	0.00～590.00 (Hz)	0.01Hz
AE-01	Electronic gear setting point selection	00 (Feedback side) /01 (Reference side)	—
AE-02	Electronic gear ratio numerator	1～10000	—
AE-03	Electronic gear ratio denominator	1～10000	—
AE-04	Positioning complete range setting	0～10000 (Pulse)	1pls
AE-05	Positioning complete delay time setting	0.00～10.00 (s)	0.01s
AE-06	Position feed-forward gain setting	0～655.35	0.01
AE-07	Position loop gain setting	0.00～100.00	0.01
AE-08	Position bias setting	−2048～2048 (Pulse)	—
AE-10	Stop position selection of Home search function	00 (Setting by parameter) /01 (Option-1) /02 (Option-2) /03 (Option-3)	—
AE-11	Stop position of Home search function	0～4095	1
AE-12	Speed reference of Home search function	0.00～120.00 (Hz)	0.01Hz
AE-13	Direction of Home search function	00 (forward) /01 (reverse)	—

Code	Function name	Monitoring and setting items	Units
AE-20	Position reference 0 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-22	Position reference 1 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-24	Position reference 2 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-26	Position reference 3 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-28	Position reference 4 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-30	Position reference 5 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-32	Position reference 6 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-34	Position reference 7 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-36	Position reference 8 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-38	Position reference 9 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-40	Position reference 10 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-42	Position reference 11 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-44	Position reference 12 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-46	Position reference 13 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-48	Position reference 14 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-50	Position reference 15 setting	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-52	Position control range setting(forward)	when [AA123] ≠03, 0〜+268435455 (pulse) when [AA123] =03, 0〜+107374182 (pulse)	—
AE-54	Position control range setting(reverse)	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	—
AE-56	Position control mode selection	00 (Enabling Position control range) /01 (Disabling Position control range)	—
AE-60	Teach-in function target selection	00〜15 (X00〜X15)	1
AE-61	Current position saving at power-off	00 (disabled) /01 (enabled)	1
AE-62	Preset position data	when [AA123] ≠03, −268435455〜+268435455 (pulse) when [AA123] =03, −1073741823〜+1073741823 (pulse)	1
AE-64	Deceleration stop distance calculation Gain	50.00〜200.00 (%)	1
AE-65	Deceleration stop distance calculation Bias	0.00〜655.35 (%)	1
AE-66	Speed Limit in APR control	0.00〜100.00 (%)	1
AE-67	APR start speed	0.00〜100.00 (%)	1
AE-70	Homing function selection	00 (Low speed homing) /01 (High speed homing 1) /01 (High speed homing 2)	—
AE-71	Direction of Homing function	00 (Foward) /01 (Reverse)	—
AE-72	Low-speed of homing function	0.00〜10.00 (Hz)	0.01Hz
AE-73	High-Speed of homing function	0.00〜590.00 (Hz)	0.01Hz
AF101	DC braking selection, 1st-motor	00 (Disable) /01 (Enable) /02 (Enable (Activate only by a speed reference))	—
AF102	Braking type selection, 1st-motor	00 (DC braking) /01 (Speed servo lock) /02 (Position servo lock)	—
AF103	DC braking frequency, 1st-motor	0.00〜590.00 (Hz)	0.01Hz
AF104	DC braking delay time, 1st-motor	0.00〜5.00 (s)	0.01s
AF105	DC braking force setting, 1st-motor	0〜100 (%)	1%
AF106	DC braking active time at stop, 1st-motor	0.00〜60.00 (s)	0.01s
AF107	DC braking operation method selection, 1st-motor	00 (Edge) /01 (Level)	—
AF108	DC braking force at start, 1st-motor	0〜100 (%)	1%
AF109	DC braking active time at start, 1st-motor	0.00〜60.00 (s)	0.01s
AF120	Contactor Control Enable, 1st-motor	00 (Disable) /01 (Enable(Power side)) /02 (Enable(Motor side))	0.01s
AF121	Run delay time, 1st-motor	0.00〜2.00 (s)	0.01s
AF122	Contactor off delay time, 1st-motor	0.00〜2.00 (s)	0.01s
AF123	Contactor answer back check time, 1st-motor	0.00〜5.00 (s)	0.01s

Code	Function name	Monitoring and setting items	Units
AF130	Brake Control Enable, 1st-motor	00 (Disable) /01 (Brake control 1 enable) /02 (Brake control 1 enable (FWD/REV separate setting)) /03 (Brake control 2 enable)	—
AF131	Brake Wait Time for Release, 1st-motor (Forward side)	0.00〜5.00 (s)	0.01s
AF132	Brake Wait Time for Accel. , 1st-motor (Forward side)	0.00〜5.00 (s)	0.01s
AF133	Brake Wait Time for Stopping, 1st-motor (Forward side)	0.00〜5.00 (s)	0.01s
AF134	Brake Wait Time for Confirmation, 1st-motor (Forward side)	0.00〜5.00 (s)	0.01s
AF135	Brake Release Frequency Setting, 1st-motor (Forward side)	0.00〜590.00 (Hz)	0.01Hz
AF136	Brake Release Current Setting, 1st-motor (Forward side)	INV rated current × (0.00〜2.00)	0.1A
AF137	Braking Frequency, 1st-motor (Forward side)	0.00〜590.00 (Hz)	0.01Hz
AF138	Brake Wait Time for Release, 1st-motor (Reverse side)	0.00〜5.00 (s)	0.01Hz
AF139	Brake Wait Time for Accel. , 1st-motor (Reverse side)	0.00〜5.00 (s)	0.01Hz
AF140	Brake Wait Time for Stopping, 1st-motor (Reverse side)	0.00〜5.00 (s)	0.01Hz
AF141	Brake Wait Time for Confirmation, 1st-motor (Reverse side)	0.00〜5.00 (s)	0.01Hz
AF142	Brake Release Frequency Setting, 1st-motor (Reverse side)	0.00〜590.00 (Hz)	0.01Hz
AF143	Brake Release Current Setting, 1st-motor (Reverse side)	INV rated current × (0.00〜2.00)	0.01Hz
AF144	Braking Frequency, 1st-motor (Reverse side)	0.00〜590.00 (Hz)	0.01Hz
AF150	Brake open delay time, 1st-motor	0.00〜2.00 (s)	0.01Hz
AF151	Brake close delay time, 1st-motor	0.00〜2.00 (s)	0.01Hz
AF152	Brake answer back check time, 1st-motor	0.00〜5.00 (s)	0.01Hz
AF153	Servo lock/ DC injection time at start, 1st-motor	0.00〜10.00 (s)	0.01Hz
AF154	Servo lock/ DC injection time at stop, 1st-motor	0.00〜10.00 (s)	0.01Hz
AF201	DC braking selection, 2nd-motor	same to AF101	—
AF202	Braking type selection, 2nd-motor	same to AF102	—
AF203	DC braking frequency, 2nd-motor	same to AF103	—
AF204	DC braking delay time, 2nd-motor	same to AF104	—
AF205	DC braking force setting, 2nd-motor	same to AF105	—
AF206	DC braking active time at stop, 2nd-motor	same to AF106	—
AF207	DC braking operation method selection, 2nd-motor	same to AF107	—
AF208	DC braking force at start, 2nd-motor	same to AF108	—
AF209	DC braking active time at start, 2nd-motor	same to AF109	—
AF220	ContactorControl Enable, 2nd-motor	same to AF120	—
AF221	Run delay time, 2nd-motor	same to AF121	—
AF222	Contactor off delay time, 2nd-motor	same to AF122	—
AF223	Contactor answer back check time, 2nd-motor	same to AF123	—
AF230	Brake Control Enable, 2nd-motor	same to AF130	—
AF231	Brake Wait Time for Release, 2nd-motor (Forward side)	same to AF131	—
AF232	Brake Wait Time for Accel. , 2nd-motor (Forward side)	same to AF132	—
AF233	Brake Wait Time for Stopping, 2nd-motor (Forward side)	same to AF133	—
AF234	Brake Wait Time for Confirmation, 2nd-motor (Forward side)	same to AF134	—
AF235	Brake Release Frequency Setting, 2nd-motor (Forward side)	same to AF135	—
AF236	Brake Release Current Setting, 2nd-motor (Forward side)	same to AF136	—
AF237	Braking Frequency, 2nd-motor (Forward side)	same to AF137	—
AF238	Brake Wait Time for Release, 2nd-motor (Reverse side)	same to AF138	—
AF239	Brake Wait Time for Accel. , 2nd-motor (Reverse side)	same to AF139	—
AF240	Brake Wait Time for Stopping, 2nd-motor (Reverse side)	same to AF140	—
AF241	Brake Wait Time for Confirmation, 2nd-motor (Reverse side)	same to AF141	—
AF242	Brake Release Frequency Setting, 2nd-motor (Reverse side)	same to AF142	—
AF243	Brake Release Current Setting, 2nd-motor (Reverse side)	same to AF143	—
AF244	Braking Frequency, 2nd-motor (Reverse side)	same to AF144	—
AF250	Brake open delay time, 2nd-motor	same to AF150	—
AF251	Brake close delay time, 2nd-motor	same to AF151	—
AF252	Brake answer back check time, 2nd-motor	same to AF152	—
AF253	Servo lock/ DC injection time at start, 2nd-motor	same to AF153	—
AF254	Servo lock/ DC injection time at stop, 2nd-motor	same to AF154	—
AG101	Jump frequency 1, 1st-motor	0.00〜590.00 (Hz)	0.01Hz
AG102	Jump frequency width 1, 1st-motor	0.00〜10.00 (Hz)	0.01Hz
AG103	Jump frequency 2, 1st-motor	0.00〜590.00 (Hz)	0.01Hz
AG104	Jump frequency width 2, 1st-motor	0.00〜10.00 (Hz)	0.01Hz
AG105	Jump frequency 3, 1st-motor	0.00〜590.00 (Hz)	0.01Hz
AG106	Jump frequency width 3, 1st-motor	0.00〜10.00 (Hz)	0.01Hz
AG110	Acceleration stop frequency setting, 1st-motor	0.00〜590.00 (Hz)	0.01Hz
AG111	Acceleration stop time setting, 1st-motor	0.00〜60.00 (s)	0.1s
AG112	Deceleration stop frequency setting, 1st-motor	0.00〜590.00 (Hz)	0.1s
AG113	Acceleration stop time setting, 1st-motor	0.00〜60.00 (s)	0.1s

Code	Function name	Monitoring and setting items	Units
AG-20	Jogging frequency	0.00～10.00 (Hz)	0.01Hz
AG201	Jump frequency 1, 2nd-motor	same to AG101	0.01Hz
AG202	Jump frequency width 1, 2nd-motor	same to AG102	0.01Hz
AG203	Jump frequency 2, 2nd-motor	same to AG103	0.01Hz
AG204	Jump frequency width 2, 2nd-motor	same to AG104	0.01Hz
AG205	Jump frequency 3, 2nd-motor	same to AG105	0.01Hz
AG206	Jump frequency width 3, 2nd-motor	same to AG106	0.01Hz
AG-21	Jogging stop mode selection	00 (Free run at Jogging stop (Disable at run)) /01 (Deceleration stop at Jogging stop (Disable at run)) /02 (Dynamic brake at Jogging stop (Disable at run)) /03 (Free run at Jogging stop (Enable at run)) /04 (Deceleration stop at Jogging stop (Enable at run)) /05 (Dynamic brake at Jogging stop (Enable at run))	—
AG210	Acceleration stop frequency setting, 2nd-motor	same to AG110	—
AG211	Acceleration stop time setting, 2nd-motor	same to AG111	—
AG212	Deceleration stop frequency setting, 2nd-motor	same to AG112	—
AG213	Acceleration stop time setting, 2nd-motor	same to AG113	—
AH-01	PID1 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))	—
AH-02	PID1 deviation inverse	00 (Disable) /01 (Enable)	—
AH-03	Unit selection for PID1	refer to the table for unit	—
AH-04	PID1 scale adjustment(at 0%)	−10000～10000	—
AH-05	PID1 scale adjustment(at 100%)	−10000～10000	—
AH-06	PID1 scale adjustment(point position)	0～4	—
AH-07	Input source selection of Set-point for PID1	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))″	—
AH-10	Set-point-1 setting for PID1	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-12	PID1 Multi stage set-point 1 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-14	PID1 Multi stage set-point 2 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-16	PID1 Multi stage set-point 3 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-18	PID1 Multi stage set-point 4 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-20	PID1 Multi stage set-point 5 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-22	PID1 Multi stage set-point 6 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-24	PID1 Multi stage set-point 7 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-26	PID1 Multi stage set-point 8 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-28	PID1 Multi stage set-point 9 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-30	PID1 Multi stage set-point 10 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-32	PID1 Multi stage set-point 11 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-34	PID1 Multi stage set-point 12 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-36	PID1 Multi stage set-point 13 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-38	PID1 Multi stage set-point 14 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-40	PID1 Multi stage set-point 15 setting	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-42	Input source selection of Set-point 2 for PID1	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))″	0.0001
AH-44	Set-point 2 setting for PID1	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-46	Input source selection of Set-point 3 for PID1	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))″	0.0001
AH-48	Set-point 2 setting for PID1	0.00～100.00 (%) Display range can be changed with [AH-04], [AH-05], [AH-06]	0.0001
AH-50	Calculation symbol selection of Set-point 1 for PID1	01 (Addition) /02 (Subtraction) /03 (Multiplication) /04 (Division) /05 (Minimum deviation) /06 (Maximum deviation)	0.0001
AH-51	Input source selection of Process data 1 for PID1	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))	0.0001
AH-52	Input source selection of Process data 2 for PID1	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))	0.0001
AH-53	Input source selection of Process data 3 for PID1	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))	0.0001
AH-54	Calculation symbol selection of Process data for PID1	01 (Addition) /02 (Subtraction) /03 (Multiplication) /04 (Division) /05 (Square root of FB1) /06 (Square root of FB2) /07 (Square root of (FB1-FB2)) /08 (Average of PV-1 to PV-3) /09 (Minimum data of PV-1 to PV-3) /10 (Maximum data of PV-1 to PV-3)″	0.0001
AH-60	PID1 gain change method selection	00 (Using gain-1 only) /01 (Changed by Terminal[PRO])	0.0001
AH-61	PID1 proportional gain 1	0.0～100.0	0.1
AH-62	PID1 integral time constant 1	0.0～3600.0 (s)	0.1s
AH-63	PID1 derivative gain 1	0.00～100.00 (s)	0.01s
AH-64	PID1 proportional gain 2	0.0～100.0	0.01
AH-65	PID1 integral time constant 2	0.0～3600.0 (s)	0.01s
AH-66	PID1 derivative gain 2	0.00～100.00 (s)	0.01s
AH-67	PID1 gain change time	0～10000 (ms)	0.01s
AH-70	PID feed-forward selection	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6])	—
AH-71	PID1 output variable	0.00～100.00 (%)	0.01%
AH-72	PID1 Deviation over level	0.00～100.00 (%)	0.01%
AH-73	PID1 Feedback compare signal turn-off level	0.00～100.00 (%)	0.01%
AH-74	PID1 Feedback compare signal turn-on level	0.00～100.00 (%)	0.01%

Code	Function name	Monitoring and setting items	Units
AH-75	PID soft start function enable	00 (Disable) /01 (Enable)	0.01%
AH-76	PID soft start target level	0.00~100.00 (%)	0.01%
AH-78	Acceleration time setting for PID soft start function	0.00~3600.00 (s)	0.01%
AH-80	PID soft start time	0.00~100.00 (s)	0.01%
AH-81	PID soft start error detection enable	00 (Disable) /01 (Enable(Error output)) /02 (Enable(Warning output))	0.01%
AH-82	PID soft start error detection level	0.00~100.00 (s)	0.01%
AH-85	PID sleep trigger selection	00 (Disable) /01 (Low output) /02 (Terminal [SLEP] input)	0.01%
AH-86	PID sleep start level	0.00~590.00 (Hz)	0.01%
AH-87	PID sleep active time	0.0~100.0 (s)	0.01%
AH-88	Setpoint boost before PID sleep enable	00 (Disable) /01 (Enable)	0.01%
AH-89	Setpoint boost time	0.00~100.00 (s)	0.01%
AH-90	Setpoint boost value	0.00~100.00 (s)	0.01%
AH-91	Minimum RUN time befor PID sleep	0.00~100.00 (s)	0.01%
AH-92	Minimum active time of PID sleep	0.00~100.00 (s)	0.01%
AH-93	PID sleep trigger selection	01 (Deviation value) /02 (Low feedback) /03 (Terminal [WAKE] input)	0.01%
AH-94	PID wake start level	0.00~100.00 (%)	0.01%
AH-95	PID wake start time	0.00~100.00 (s)	0.01%
AH-96	PID wake start deviation value	0.00~100.00 (%)	0.01%
AJ-01	PID2 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))	0.01%
AJ-02	PID2 deviation inverse	00 (Disable) /01 (Enable)	0.01%
AJ-03	PID2 unit selection	refer to the separated list for unit	0.01%
AJ-04	PID2 scale adjustment(at 0%)	−10000~10000	0.01%
AJ-05	PID2 scale adjustment(at 100%)	−10000~10000	0.01%
AJ-06	PID2 scale adjustment(point position)	0~4	0.01%
AJ-07	Input source selection of Set-point for PID2	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /15 (PID function)	0.01%
AJ-10	Set-point setting for PID2	0.00~100.00 (%) Display range can be changed with [AJ-04] , [AJ-05] , [AJ-06]	0.01%
AJ-12	Input source selection of Process data for PID2	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))"	0.01%
AJ-13	PID2 proportional gain	0.0~100.0	0.01%
AJ-14	PID2 integral time constant	0.0~3600.0 (s)	0.01%
AJ-15	PID2 derivative gain	0.00~100.00 (s)	0.01%
AJ-16	PID2 output variable	0.00~100.00 (%)	0.01%
AJ-17	PID2 Deviation over level	0.00~100.00 (%)	0.01%
AJ-18	PID2 Feedback compare signal turn-off level	0.00~100.00 (%)	0.01%
AJ-19	PID2 Feedback compare signal turn-on level	0.00~100.00 (%)	0.01%
AJ-21	PID3 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))	0.01%
AJ-22	PID3 deviation inverse	00 (Disable) /01 (Enable)	0.01%
AJ-23	PID3 unit selection	refer to the separated list for unit	0.01%
AJ-24	PID3 scale adjustment(at 0%)	−10000~10000	0.01%
AJ-25	PID3 scale adjustment(at 100%)	−10000~10000	0.01%
AJ-26	PID3 scale adjustment(point position)	0~4	0.01%
AJ-27	Input source selection of Set-point for PID3	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))"	0.01%
AJ-30	Set-point setting for PID3	0.00~100.00 (%) Display range can be changed with [AJ-24] , [AJ-25] , [AJ-26]	0.01%
AJ-32	Input source selection of Process data for PID3	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))"	0.01%
AJ-33	PID3 proportional gain	0.0~100.0	0.01%
AJ-34	PID3 derivative gain	0.0~3600.0 (s)	0.01%
AJ-35	PID3 derivative gain	0.00~100.00 (s)	0.01%
AJ-36	PID3 output variable	0.00~100.00 (%)	0.01%
AJ-37	PID3 Deviation over level	0.00~100.00 (%)	0.01%
AJ-38	PID3 Feedback compare signal turn-off level	0.00~100.00 (%)	0.01%
AJ-39	PID3 Feedback compare signal turn-on level	0.00~100.00 (%)	0.01%
AJ-41	PID4 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))	0.01%
AJ-42	PID4 deviation inverse	00 (Disable) /01 (Enable)	0.01%
AJ-43	PID4 unit selection	refer to the separated list for unit	0.01%
AJ-44	PID4 scale adjustment(at 0%)	−10000~10000	0.01%
AJ-45	PID4 scale adjustment(at 100%)	−10000~10000	0.01%
AJ-46	PID4 scale adjustment(point position)	0~4	0.01%
AJ-47	Input source selection of Set-point for PID4	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))"	0.01%
AJ-50	Set-point setting for PID4	0.00~100.00 (%) Display range can be changed with [AJ-44] , [AJ-45] , [AJ-46]	0.01%
AJ-52	Input source selection of Process data for PID4	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))"	0.01%
AJ-53	PID4 proportional gain	0.0~100.0	0.01%
AJ-54	PID4 derivative gain	0.0~3600.0 (s)	0.01%
AJ-55	PID4 derivative gain	0.00~100.00 (s)	0.01%
AJ-56	PID4 output variable	0.00~100.00 (%)	0.01%
AJ-57	PID4 Deviation over level	0.00~100.00 (%)	0.01%
AJ-58	PID4 Feedback compare signal turn-off level	0.00~100.00 (%)	0.01%
AJ-59	PID4 Feedback compare signal turn-on level	0.00~100.00 (%)	0.01%