Sumitomo Drive Technologies

HF-430NEO Series

High-performance Inverter
5.5 to 55kW/200V Class
5.5 to 55kW/400V Class

Operating and Maintenance Manual

NOTICE

1. Make sure that this operating and maintenence manual is delivered to the end user of inverter unit.
2. Read this manual before installing or operating the inverter unit, and store it in a safe place for reference.

Sumitomo Heavy Industries, Ltd. Maintenance Manual DM3401E-1

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Introduction

Thank you for purchasing HF-430NEO series inverter.
This instruction manual describes how to handle and maintain HF-430NEO. Please read this manual carefully before using HF-430NEO, and keep it handy for those who operate, maintain and inspect it.
For the purpose of reducing paper consumption and provision of the latest information, we enclose the instruction manual only, while providing the User's Guide for more detailed description through electronic data instead of CD or printed document.

■About the instruction manual(this document)

The instruction manual provides the minimum information necessary for handling the product.
Please make sure to read the Instruction manual as well as the User's Guide for more detailed information.

■About the User's Guide

The User's Guide provides detailed information necessary for handling the product.
Please make sure to read User's Guide for proper use.
If future updated descriptions differ from the Instruction Manual, the description in the User's Guide will have higher priority. Always use HF-430NEO strictly within the range described in the User's Guide and perform proper inspection and maintenance to prevent failures or accidents.
The latest version of the User's guide can be obtained through our website.

■Handling an optional products

If you use HF-430NEO with optional products, you should also read the instruction enclosed in those products.

■For a proper use

Before using HF-430NEO, please read carefully HF-430NEO's Instruction manual, User's Guide and each optional products instruction manuals.
In addition any personnel handling or performing maintenance of the product must read carefully HF-430NEO's Instruction manual, User's Guide and each optional products instruction manuals.
Before any attempt to install, operate, maintain or inspect this equipment, a complete understanding of the equipment specifications, safety instructions, precautions, handling and operation instructions is required. Please follow all the specifications and instructions for a proper use. Additionally, periodically review HF-430NEO's Instruction manual, User's Guide and each optional products instruction manuals.

■Precautions

It is prohibited to reproduce or reform this document partially or totally in any form without the publisher's permission. The contents of the document are subject to change without prior notice.
Any handling, maintenance or operation method NOT described on HF-430NEO's Instruction manual, User's Guide and each optional products instruction manuals is not covered by the product warranty.
Please DO NOT perform any procedure NOT described on HF-430NEO and each optional products instruction manuals since it can be the cause of unexpected failures or accidents.
We are not responsible for any impact from operations regardless of unexpected failure or accident due to operation or handling of the product in a manner not specified on HF-430NEO's Instruction manual, User's Guide and each optional products instruction manuals. We appreciate your understanding.
Note that, in case HF-430NEO's Instruction manual, User's Guide and each optional products instruction manuals are enclosed, they should be delivered to the end user of HF-430NEO. Also make sure to download and keep accessible any other related guides or instruction manuals for the end user.

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1.1 Types of Warnings

In the Instruction Manual, the severity levels of safety precautions and residual risks are classified as: "DANGER", "WARNING" and "CAUTION".

Display meanings

⚠DANGER Indicates that incorrect handling may cause hazardous situations, which would most likely result in serious personal injury or death, and may result in major physical loss or damage.
⚠WARNING Indicates that incorrect handling may cause hazardous situations, which may result in serious personal injury or death, and may result in major physical loss or damage.
⚠CAUTION Indicates that incorrect handling may cause hazardous situations, which may result in moderate or slight personal injury or damage, and may result only physical loss or damage.

Furthermore, "⚠**CAUTION**" level description may lead to a serious risk depend on the circumstances. Be sure to follow the instruction because whichever contains important safety description.

1.2 Description of Safety Symbols

It describes annotation of the symbols in context. Be sure to follow and pay attention of content.

Symbols meaning

△	Indicates a danger, warning or caution notice for fire, electric shock and high temperature while handling the product. Details are indicated in or near△by pictures or words.	
		The drawing on the left indicates “a non-specific and general danger or caution”.
		The drawing on the left indicates “a possible damage due to electric shock”.
	Indicates “what you must not do” to prohibit the described acts in the operation of the product.	
	Indicates “what you must do” according to the instructions in the operation of the product.	

1.3 Cautions

1.3.1 Please be Careful!

⚠DANGER

- If handled incorrectly or improperly, it might cause death, serious physical injuries, or damage to the inverter, motor or even the entire system.
- Before installation, wiring, operation, inspection, or usage please read and fully understand this guide.

- In order to explain this device details the illustrations in this guide might show this device without covers.
- Before operating this device please return all the covers to the original position, and follow all the necessary regulations and instructions written in this guide.

1.3.2 Precautions during the installation!

WARNING

Fire Hazard

● Risk of Fire!

- DO NOT place inflammable objects nearby.
- DO NOT let scraps of wire, welding sputtering, irons scraps or other objects get inside the device.

Prohibited

- Avoid installing this device in places with high temperature, high humidity, Condensation-prone conditions, dusty conditions, corrosive gas, grinding fluid mist and hydrogen sulfide or salt damage prone conditions. Additionally, it is recommended to install this device in ventilated room not exposed to direct sunlight.

Do

Injury

● Risk of Injury!

Prohibited

- DO NOT install or operate products with damage or missing parts.

Fall Injury

● Risk of injury due to the inverter falling!

Prohibited

- DO NOT hold its cover parts when carrying the inverter.

Do

- Install the inverter on a structure able to bear the weight specified in this Basic Guide.
- Install the inverter on a vertical wall that is free of vibrations.

Failure

● Risk of failure of the inverter!

Prohibited

- The device is a precision equipment, do not drop it, or give it a strong shock.
- DO NOT get on (step on) or place heavy objects on this device.

1.3.3 Precautions for Wiring

DANGER

Electric shock Fire

● Risk of an electric shock and/or fire!

- Be sure to ground the inverter.
- Entrust the wiring work only to a qualified electrician.

Do

- Before the wiring work make sure to turn off the power supply and wait for more than 10 or 15 minutes depending on the invertor model [Note].
  (Confirm than the charge lamp is OFF and the DC voltage between terminals P and N is 45V or less.)

Note: For HF4322-5A5 to HF4322-022, HF4324-5A5 to HF4324-022 models the wait time is 10 minutes.
For HF4322-030 to HF4322-055, HF4324-030 to HF4324-055 models the wait time is 15 minutes.

Failure

● Risk of failure of the inverter!

Prohibited

- Do not pull the wire after wiring.

● **Risk of an electric shock and/or injury!**

- Perform the wiring only after installing the inverter.

● **Risk of short circuit and ground fault!**

- Do not remove rubber bushings from the wiring section.
  Otherwise, the edges of the wiring cover may damage the wire.

⚠ WARNING

● **Risk of injury or fire!**

- Do not connect AC power supply to any of the output terminals (U, V, and W).
- Make sure that the voltage of AC power supply matches the rated voltage of your inverter.

● **Risk of electric shock and injury!**

- Before operating slide switch SW in the inverter, be sure to turn off the power supply.
- Since the inverter supports two modes of cooling-fan operation, the inverter power is not always off, even when the cooling fan is stopped. Therefore, be sure to confirm that the power supply is off before wiring.

● **Risk of fire!**

- DO NOT use a single-phase input.
- DO NOT connect a resistor directly to any of the DC terminals (P1, P, and N).
- DO NOT use the magnetic contactor installed on the primary and secondary sides of the inverter to stop its operation.
- Tighten each screw to the specified torque. No screws must be left loose.

- Connect an earth-leakage breaker to the power input circuit.
- Use only the power cables, earth-leakage breaker, and magnetic contactors that have the specified capacity (ratings).

1.3.4 Precautions to Run and Test Running

⚠ DANGER

● **Risk of electric shock or fire!**

- While power is supplied to the inverter, do not touch any internal part or terminal of the inverter.
  Also do not check signals, or connect or disconnect any wire or connector.
- While power is supplied to the inverter, do not touch any internal part of the inverter.
  Also do not insert a material such as a rod and etc.

● **Risk of electric shock!**

- Be sure to close the terminal block cover before turning on the inverter power.
  Do not open the terminal block cover while power is being supplied to the inverter or voltage remains inside.
- Do not operate switches with wet hands.

● **Risk of injury or fire!**

- While power is supplied to the inverter, do not touch the terminal of the inverter, even if it has stopped.

● **Risk of injury and damage to machine!**

- Do not select the retry mode for controlling an elevating or traveling device because free-running status occurs in retry mode.

● **Risk of injury!**

- If the retry mode has been selected, the inverter will restart suddenly after a break in the tripping status.
  Stay away from the machine controlled by the inverter when the inverter is under such circumstances.
  (Design the machine so that human safety can be ensured, even when the inverter restarts suddenly.)

- The [STOP] key on the operator keypad is effective only when its function is enabled by setting.
  Prepare an emergency stop switch separately.
- If an operation command has been input to the inverter before a short-term power failure, the inverter may restart operation after the power recovery. If such a restart may put persons in danger, design a control circuit that disables the inverter rom restarting after power recovery.

- If an operation command has been input to the inverter before the inverter enters alarm status, the inverter will restart suddenly when the alarm status is reset. Before resetting the alarm status, make sure that no operation command has been input.

⚠ WARNING

● **Risk of injury and damage to machine!**

- The inverter easily allows you to control the speed of operating motor. Confirm the capacity and ratings of the motor or machine before operating.

- When you run the motor at a high frequency, check and confirm to each a permitting revolution of the gear motor and machine.
- Check the rotate motor direction, abnormal sound, and vibrations while operating.

● **Risk of burn injury.**

- Inverter heat sink will heat up during operation.
- Do not touch the heat sink.

● **Risk of injury!**

Install an external brake system if needed.

1.3.5 Precautions for Maintenance/Inspection

DANGER

- **Risk of electric shock!**
- Before inspecting the inverter, be sure to turn off the power supply and wait for more than 10 or 15 minutes depending on the invertor model [Note]. (Before inspection, confirm that the Charge lamp on the inverter is off and the DC voltage between terminals P and N is 45 V or less.)
- Commit only a designated person to maintenance, inspection, and the replacement of parts. (Be sure to remove wristwatches and metal accessories, e.g., bracelets, before maintenance and inspection work and to use insulated tools for the work.)

Note: For HF4322-5A5 to HF4322-022, HF4324-5A5 to HF4324-022 models the wait time is 10 minutes.
For HF4322-030 to HF4322-055, HF4324-030 to HF4324-055 models the wait time is 15 minutes.

1.3.6 Precautions for disposal

DANGER

- **Risk of injury and explosion!**
- For disposal of the inverter, outsource to a qualified industrial waste disposal contractor. Disposing of the inverter on your own may result in an explosion of the capacitor or produce poisonous gas.
- A qualified waste disposer includes industrial waste collector/transporter and industrial waste disposal operator.
- Follow the act related to procedures stipulated in the waste management and public cleansing for disposing of the inverter.

1.3.7 Other Cautions

DANGER

- **Risk of electric shock, fire and injury!**
- Never modify the inverter.

CAUTION

- **Risk of significantly shortening the life cycle of a product!**
- Sterilizing and disinfecting a packaging wood materials use a means other than wood fumigation method. If the product is included in the fumigation treatment, electronic parts receive a critical damage from emitted gases or steams. Especially, halogen disinfectants (including fluorine, chlorine, bromine and iodine) can cause corrosion in the capacitor.

1.4 Compliance to European Directive (CE)

1.4.1 Caution for EMC (Electromagnetic Compatibility)

HF-430NEO inverter conforms to requirements of Electromagnetic Compatibility (EMC) Directive (2014/30/EU). However, when using the inverter in Europe, you must comply with the following specifications and requirements to meet the EMC Directive and other standards in Europe:

WARNING: This equipment must be installed, adjusted, and maintained by qualified engineers who have expert knowledge of electric work, inverter operation, and the hazardous circumstances that can occur. Otherwise, personal injury may result.

1. Power supply requirements
   a. Voltage fluctuation must be -15% to +10% or less.
   b. Voltage imbalance must be ±3% or less.
   c. Frequency variation must be ±4% or less.
   d. Total harmonic distortion (THD) of voltage must be ±10% or less.

2. Installation requirement
   a. HF-430NEO includes a built-in EMC filter. The built-in EMC filter must be activated.
   b. According to EN61800-3 it is mandatory to mention that any inverter with only C3 filter inside may NOT be connected to a low voltage public power supply in residential areas since for these installations C1 is required.
   c. In case of external filter for C2, an additional note is required according to EN61800-3 that “this product may emit high frequency interference in residential areas which may require additional EMC measures”.
   d. According to the EN6100-3-12, an additional AC reactor or DC choke should be installed for reducing harmonics in power line.

3. Wiring requirements
   a. A shielded wire (screened cable) must be used for motor wiring, and the length of the cable must be according to the following table (Table 1 on page 1-5).
   b. The carrier frequency must be set according to the following table to meet an EMC requirement (Table1 on page 1-6).
   c. The main circuit wiring must be separated from the control circuit wiring.

4. Environmental requirements
   (to be met when a filter used)
   a. HF-430NEO inverter that is activated built-in EMC filter must be according to HF-430NEO specifications.

Table 1

Model	Cat.	Cable Length (m)	Carrier Frequency (kHz)	Model	Cat.	Cable Length (m)	Carrier Frequency (kHz)
HF4322-5A5	C3	5	2	HF4324-5A5	C3	5	2
HF4322-7A5				HF4324-7A5			
HF4322-011				HF4324-011			
HF4322-015		10	1	HF4324-015		10	
HF4322-022				HF4324-022			
HF4322-030		5	2	HF4324-030		5	
HF4322-037				HF4324-037			
HF4322-045				HF4324-045			
HF4322-055				HF4324-055			

1.4.2 Note of European Directive (CE)

This product complies with the requirement of IEC 60364-4-41:2005/AMD1: 2017 Clause 411“Protective measure: automatic disconnection of supply”, since it complies with the requirement of IEC 61800-5-1: 2007+AMD1: 2016: Clause 4.3.9.

In order to comply with above mentioned requirements, installation must be in line with the conditions in “1.4 Compliance to European Directive (CE)”and “1.5 UL Compliance to UL standards”.

Regarding IEC61800-5-1: Clause 5.2.3.6.3.3 “Short-circuit between phase terminals of power output and protective earth”, circuitry in compliance test is as described as “Figure13 - Example of short-circuit test between COM/BDM d.c. link power output and protective earth” and “Class J 30A non time delay fuse” is used as “OCPD” in “Fault loop”.

1.5 Compliance to UL standards

1.5.1 UL CAUTION

GENERAL:
HF-430NEO inverter is open type AC Inverter with three phase input and three phase output. It is intended to be used in an enclosure. It is used to provide both an adjustable voltage and adjustable frequency to the AC motor. The inverter automatically maintains the required volts-Hz ratio allowing the capability through the motor speed range. It is multi-rated device and the ratings are selectable according to load types by operator with key pad operation.

Markings:
Maximum Surrounding Temperature:

- ND (Normal Duty): 50degC
- LD (Low Duty): 45degC
- VLD (Very Low Duty): 40degC

Storage Environment rating:

- 65degC (for transportation)

Instruction for installation:

- Pollution degree 2 environment and Overvoltage category III

Electrical Connections:

- See “7.5 Connect Wire to the Main Circuit Terminal Block” of user's guide

Interconnection and wiring diagrams:

- See “7.7 Control Circuit Terminal Area” of user's guide

Short circuit rating and overcurrent protection device rating:

200V class series models, HF4322-5A5 to 022
- Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 240 V maximum”.

200V class series models, HF4322-030 to 055
- Suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes, 240 V maximum”.

400V class series models, HF4324-5A5 to 022
- Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 500 V maximum”.

400V class series models, HF4324-030 to 055
- Suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes, 500 V maximum”.

Integral:

- Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes
- Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the Canadian Electrical Code, Part 1. (For Canada)

Terminal size and terminal tightening torque for field wiring:

Model	Load Type	Required Torque (N.m)	Conductor size (AWG)	Model	Load Type	Required Torque (N.m)	Conductor size (AWG)
HF4322-5A5	VLD	3	8	HF4322-5A5	VLD	3	10
	LD				LD		12
	ND				ND		
HF4322-7A5	VLD		6	HF4322-7A5	VLD		8
	LD		8		LD		10
	ND				ND		
HF4322-011	VLD	4	4	HF4322-011	VLD	4	8
	LD				LD		
	ND		6		ND		
HF4322-015	VLD	2.5-3.0	3	HF4322-015	VLD		
	LD				LD		
	ND		4		ND		
HF4322-022	VLD	5.5 – 6.6	2/0	HF4322-022	VLD		4
	LD		1/0		LD		
	ND		1		ND		6
HF4322-030	VLD	6.0	Parallel of 1/0	HF4322-030	VLD	6.0	1
	LD				LD		2
	ND		2/0		ND		3
HF4322-037	VLD	6.0 – 10.0	Parallel of 1/0	HF4322-037	VLD	15.0	1
	LD				LD		
	ND	15.0	4/0		ND		
HF4322-045	VLD	6.0 – 10.0	Parallel of 2/0	HF4322-045	VLD	15.0	1/0
	LD		Parallel of 1/0		LD		
	ND				ND		1
HF4322-055	VLD	10.0-12.0	Parallel of 3/0	HF4322-055	VLD	6.0 – 10.0	Parallel of 1/0
	LD				LD	15.0	2/0
	ND		350kcmil		ND		1/0

- Use 75degC only for temperature rating of field wiring.
- Use Cupper conductors only.

Required protection by Fuse:

200V class series models

Model	Fuse		
	Type	Maximum Rating	
		Voltage (V)	Current (A)
HF4324-5A5	Class J or T	600	100
HF4324-7A5			150
HF4324-011			
HF4324-015			
HF4324-022			200
HF4324-030			300
HF4324-037			
HF4324-045			400
HF4324-055			500

400V class series models

Model	Fuse		
	Type	Maximum Rating	
		Voltage (V)	Current (A)
HF4324-5A5	Class J or T	600	75
HF4324-7A5			
HF4324-011			
HF4324-015			100
HF4324-022			
HF4324-030			200
HF4324-037			
HF4324-045			
HF4324-055			250

1.6 Precautions for installation

◆ Notes for HF4322-011 (200V class 11kW)

For the use of HF4322-011 at low duty (LD)/very low duty (VLD), follow the installation procedures shown in the figure below.
Change [Ub-03] to 00 and [Ub-03] to 01 to set VLD and LD, respectively.

Procedures:
(1) Remove four truss head screws that hold the (upper and lower) brackets provided by factory configuration.
(2) Change the position of the screw holes for the (upper and lower) brackets.
(3) Tighten the (upper and lower) brackets using four truss head screws removed in (1).
(Tightening torque 2.2 to 2.5 Nm)
(4) Install HF4322-011 on the wall using four screws prepared on your own.

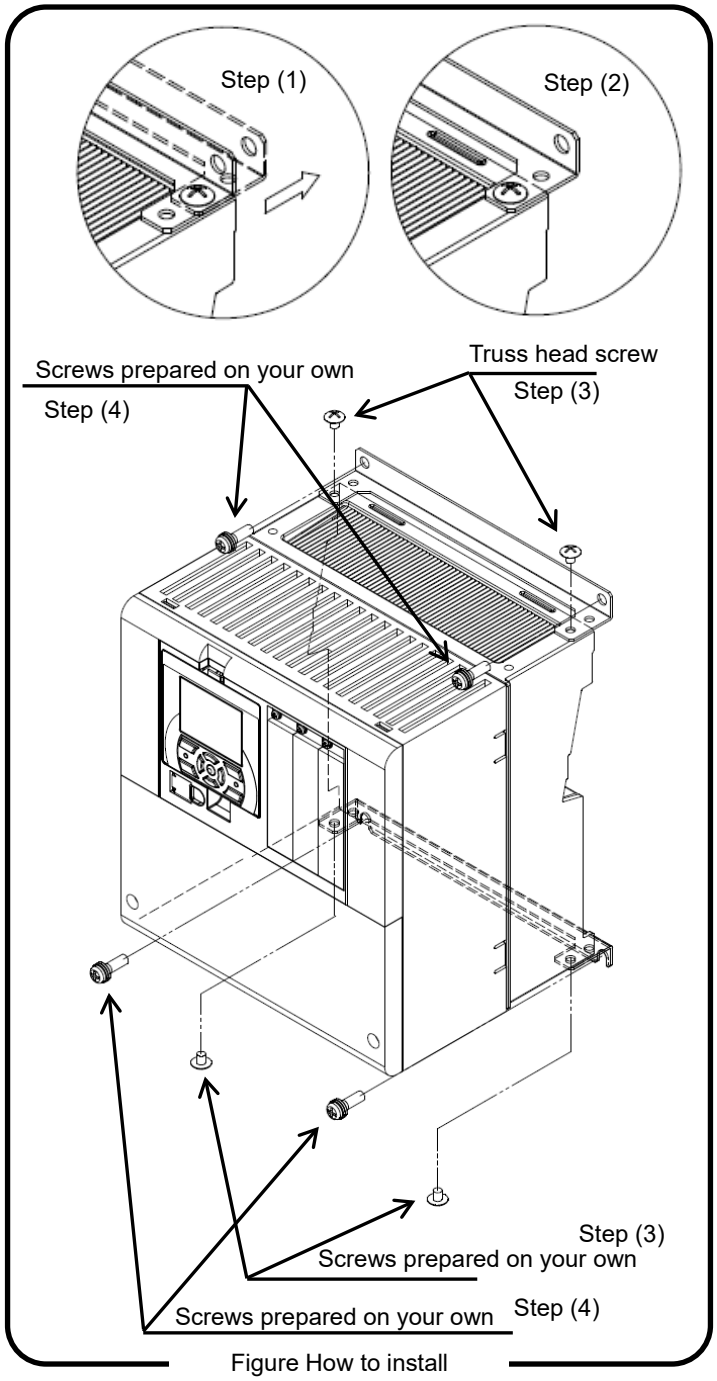


Figure How to install

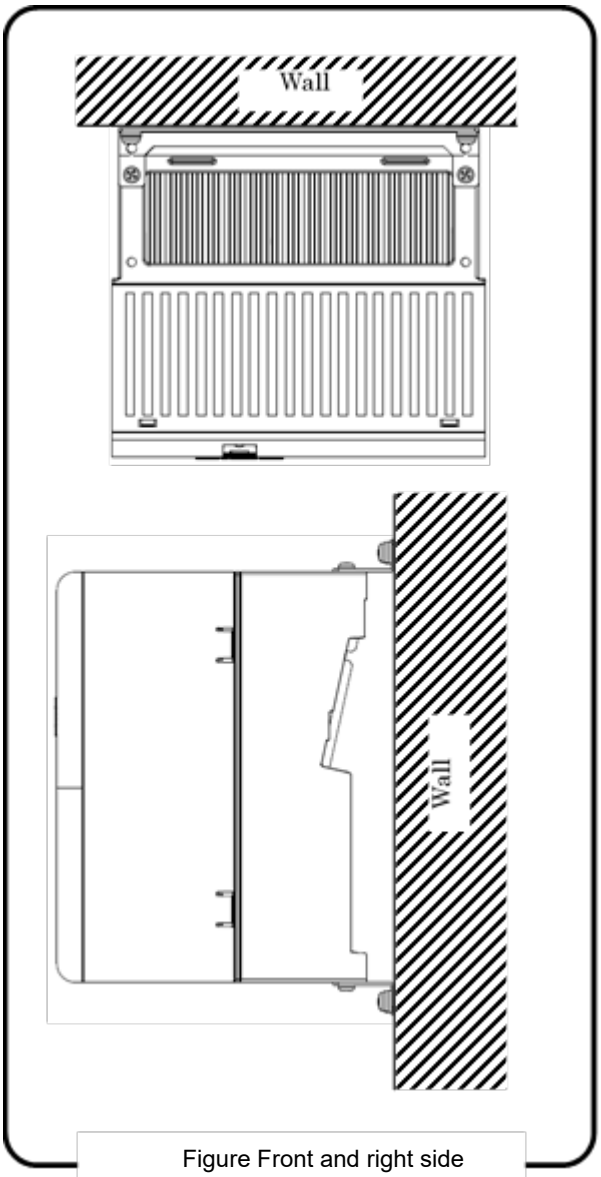


Figure Front and right side

Note:
By shifting the mounting bracket, the depth dimension of the inverter will be increased by 15mm.
Please be careful as to installation in the cabinet or etc.

◆ Notes for HF4322-022 (200V class 22kW)

For the use of HF4322-022 at very low duty (VLD), follow the installation procedures shown in the drawings below.
Change [Ub-03] to 00 to set VLD.

Procedures:
(1) Tighten spacers to the (upper and lower) brackets as shown in Figure 1 using M3×8 screws included in the package.
(Tightening torque 0.6 to 0.8 Nm)
(2) Install HF4322-022 on the wall using four screws prepared on your own.

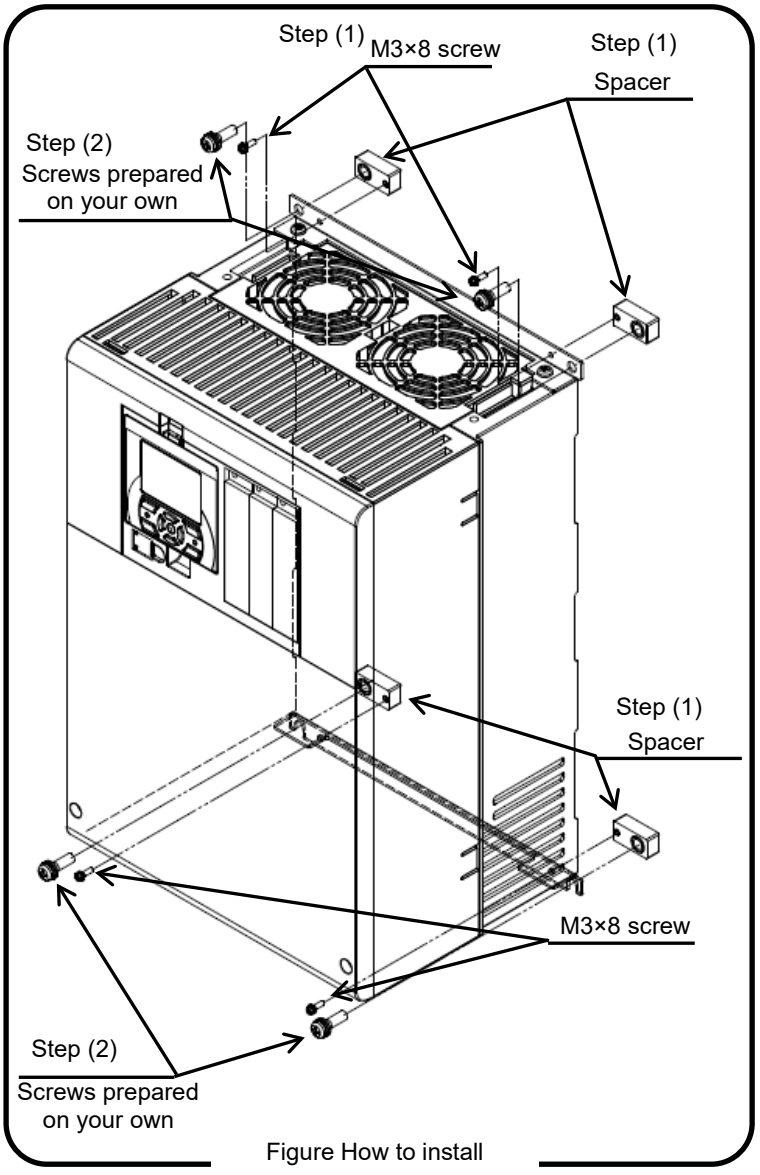


Figure How to install

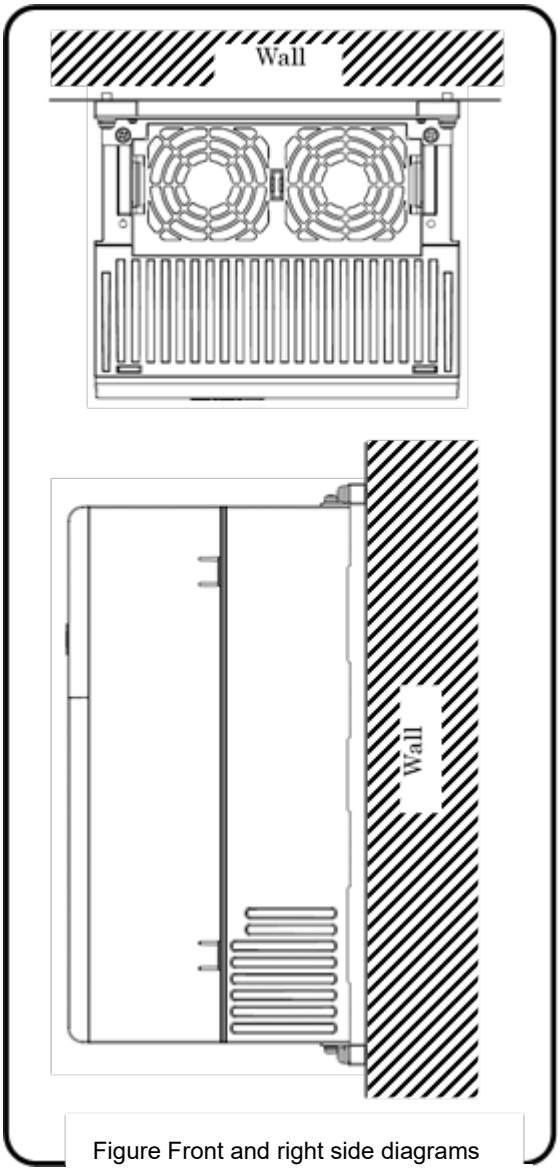


Figure Front and right side diagrams

Note :
By adding spacers, the depth dimension of the inverter will be increased by 10mm. Please be careful as to installation in the cabinet or etc.

Safety Guideline

Safety Guideline

EN

As "Warning" and "Caution" are critical information to prevent hazardous situation, make sure to read this guideline fully along with the instruction manual and follow the instructions therein.

Warning : Improper handling may cause hazardous situation (electric shock, fire, personal injury, etc.), resulting in a potentially serious personal injury and/or death.

Caution : Improper handling may cause hazardous situation (fire, injuries, physical damage, etc.), resulting in a possible medium damage or personal injury. It may cause physical damages only.

Warning

- Please ensure the grounding (ground wire).
- An electrician with expertise should work on wiring.
- Make sure the power is turned OFF before starting up the system.
- Make sure that the unit is installed before wiring.
- Do not touch internal components or terminals of the inverter (or servo amplifier) or attach/remove the wiring or connectors while an inverter is energized.
- Do not open the front cover of the inverter when it is energized or has residual voltage left.
- Do not manipulate controls using wet hands.
- Do not touch terminals or connectors even while the inverter (or servo amplifier) is energized but suspended.
- Make sure that the inverter has been switched to a mode in which it will not be operative after recovered when otherwise it may be hazardous to the operator.
- Please provide an emergency stop switch separately.
- Reset the alarm after making sure that an operation command has been disabled.
- Turn OFF the power and wait for 10 minutes or more before working on a service.
- Unauthorized operators should not work on maintenance, service, and part replacement.

Caution

- Attach the inverter to such incombustible as metal, and keep combustibles away.
- Do not contaminate the inverter with foreign materials, including dusts, etc.
- Install the inverter on a vertical wall without oscillations which can reliably support the unit weight described on the instruction manual.
- Keep it away from hot and humid ambient environment with corrosive gas, and explosive gas, etc. and install in a room without direct sunlight.
- Make sure that the product's rated voltage matches the alternator's voltage.
- Do not connect the alternator to output terminals (U, V, and W).
- Do not connect a resistance directly to a direct current terminal.
- Use a power line, leakage detection breaker, or electromagnetic contactor with a designated (rated) capacity or equivalent.
- Do not stop the operation of the inverter (or servo amplifier) by turning ON/OFF the electromagnetic contactor placed at the power supply and output.
- Tighten a screw with a rated torque. In addition, do not leave the screw loosened.
- Do not touch the cooling fan.
- The cooling fin and the damping resistor are heated and hot. Do not touch.
- Check if rotation, abnormal noise, oscillations of the motor could be detected during operation.

Sicherheitsrichtlinien

GR

Da es sich bei „Warnung“ und „Achtung“ um überaus wichtige Hinweise zur Verhinderung von Gefahrensituationen handelt, müssen Sie diese Richtlinien sowie die Betriebsanleitung gründlich lesen und alle darin angesprochenen Anweisungen befolgen.

Warnung : Unsachgemäße Handhabung führt unter Umständen zu Gefahrensituationen (elektrischer Schlag, Feuer, Personenschaden, usw.), welche wiederum zu schwerwiegenden körperlichen Verletzungen und/oder Tod führen können

Achtung : Unsachgemäße Handhabung führt unter Umständen zu Gefahrensituationen (Feuer, Verletzungen, Sachschaden, etc.), welche wiederum zu mittelschweren Sach- oder Personenschäden führen können.

Warnung

- Stellen Sie eine ordnungsgemäße Erdung (Erdungskabel) sicher.
- Nur erfahrenes Personal sollte an der Verkabelung arbeiten.
- Vergewissern Sie sich, dass der Strom abgestellt ist, bevor Sie mit der Arbeit am System beginnen.
- Vergewissern Sie sich, dass die Einheit korrekt eingebaut ist, bevor Sie mit dem Verlegen der Kabel beginnen.
- Berühren Sie keine inneren Bauteile oder Klemmen des Frequenzumrichters (oder Servoverstärkers) und und befestigen oder entfernen Sie keinesfalls die Verkabelung oder Anschlüsse, solange der Frequenzumrichter am Stromnetz hängt.
- Öffnen Sie nicht die vordere Abdeckung des Frequenzumrichters, solange dieser am Stromnetz hängt oder Restspannung hat.
- Berühren Sie keine Bedienelemente mit nassen Händen.
- Berühren Sie keine Klemmen oder Anschlüsse, auch dann nicht, wenn der Frequenzumrichter (oder Servoverstärker) bereits abgeklemmt ist, da gefährliche Restspannungen vorhanden sein können.
- Vergewissern Sie sich, dass sich der Frequenzumrichter in einem Modus befindet, in dem er nach Netzwiederkehr nicht arbeitet, da ansonsten eine Gefahrensituation für den Bediener besteht.
- Sorgen Sie bitte für die Bereitstellung eines separaten Not-Aus-Schalters.
- Setzen Sie den Alarm zurück, nachdem Sie sichergestellt haben, dass ein Betriebsbefehl deaktiviert wurde.
- Schalten Sie den Strom AUS und warten Sie mindestens 10 Minuten bevor Sie mit den Wartungsarbeiten beginnen.
- Nicht autorisiertes Personal darf keine Reparatur- und Wartungsarbeiten vornehmen und keine Teile austauschen austauschen,

Achtung

- Bringen Sie den Frequenzumrichter an nicht brennbaren Oberflächen wie Metall an und halten Sie ihn von brennbaren Flächen fern.
- Verunreinigen Sie den Frequenzumrichter nicht mit Fremdstoffen, wie z.B. Staub o.ä.
- Installieren Sie den Frequenzumrichter an einer senkrechten, feststehenden Wand, die das in der Bedienungsanleitung angegebene Gewicht des Frequenzumrichters sicher tragen kann.
- Installieren Sie den Frequenzumrichter in einem Raum ohne direkte Sonneneinstrahlung und vermeiden Sie feucht-warme Bedingungen und korrosives sowie explosives Atmosphäre.
- Vergewissern Sie sich, dass die Nennspannung des Produkts mit der Netzspannung übereinstimmt.
- Schließen Sie den Generator nicht an Abgangsklemmen (U, V, und W) an.
- Schließen Sie keinen Widerstand direkt an eine Gleichstromklemme an.
- Verwenden Sie für die Netzversorgung einen Motorschutzschalter, ein Schaltschütz oder etwas Ähnliches mit passender Leistung.
- Schalten Sie den Frequenzumrichters (oder Servoverstärker) nicht über das Netzschütz aus.
- Ziehen Sie die Schraube mit dem angegebenen Drehmoment fest. Es ist überaus wichtig, dass Sie die Schraube immer festziehen.
- Berühren Sie nicht das Gerätelüfter.
- Der Bremswiderstand und der Kühlkörper werden heiß. Fassen Sie diese nicht an.
- Überprüfen Sie, ob der Motor dreht, ungewöhnliche Geräusche macht oder ob Vibrationen während des Betriebs auftreten.

Consignes de sécurité

FR

Les sections «Danger» et «Attention» fournissent d'importantes informations sur la prévention des situations dangereuses. Veillez par conséquent à lire les présentes consignes dans leur intégralité, conjointement avec le manuel d'instructions, et à respecter les instructions contenues dans ce manuel.

⚠ Danger : une mauvaise manipulation peut entraîner une situation dangereuse (choc électrique, incendie, blessure, etc.) et par conséquent, des blessures potentiellement graves voire mortelles.

⚠ Attention : une mauvaise manipulation peut entraîner une situation dangereuse (incendie, blessures, dégâts matériels, etc.) et par conséquent, des blessures ou dégâts matériels moyennement sévères. Cela peut entraîner des dégâts matériels uniquement.

⚠ Danger

- Veuillez vérifier la mise à la terre (câble de mise à la terre).
- Un électricien qualifié doit intervenir sur le câblage.
- Assurez-vous que l'alimentation est coupée avant de démarrer le système.
- Assurez-vous que l'unité est installée avant le câblage.
- Ne touchez pas les composants internes ni les bornes de l'onduleur (ou servoamplificateur), ni ne fixez/déposez le câblage ou les connecteurs lorsque l'onduleur est alimenté.
- N'ouvrez pas le capot avant de l'onduleur lorsque celui-ci est alimenté ou parcouru par une tension résiduelle.
- Ne manipulez pas les commandes avec des mains mouillées.
- Ne touchez pas les bornes ni les connecteurs même lorsque l'onduleur (ou servoamplificateur) est alimenté mais que son fonctionnement est suspendu.
- Après rétablissement de l'alimentation électrique, assurez-vous que l'onduleur est dans un mode dans lequel il est inopérant, sinon il peut présenter un risque pour l'opérateur.
- Veuillez fournir un contacteur d'arrêt d'urgence séparément.
- Réinitialisez l'alarme après vous être assuré qu'une commande de fonctionnement a été désactivée.
- Coupez l'alimentation et attendez 10 minutes minimum avant d'effectuer un entretien.
- Les opérateurs non autorisés ne doivent pas effectuer de maintenance, d'entretien ou de remplacement de pièces.

⚠ Attention

- Fixez l'onduleur à un matériau non combustible tel que le métal, et maintenez les combustibles à l'écart.
- Ne contaminez pas l'onduleur avec des matériaux étrangers, notamment de la poussière, etc.
- Installez l'onduleur sur une paroi verticale sans oscillation et pouvant supporter le poids de l'unité, indiqué dans le manuel d'instructions.
- Conservez-le à l'abri de la chaleur, de l'humidité, des gaz corrosifs et explosifs, etc., et installez-le à l'abri du soleil.
- Assurez-vous que la tension nominale du produit correspond à la tension de l'alternateur.
- Ne connectez pas l'alternateur aux bornes de sortie (U, V et W).
- Ne connectez pas de résistance directement à une borne de courant continu.
- Utilisez une ligne d'alimentation, un disjoncteur anti-fuite ou un contacteur électromagnétique avec une capacité (nominale) désignée ou équivalente.
- N'interrompez pas le fonctionnement de l'onduleur (ou servoamplificateur) en allumant/coupant le contacteur électromagnétique placé au niveau de l'alimentation électrique et de la sortie.
- Serrez une vis à un couple nominal. En outre, ne laissez pas la vis desserrée.
- Ne touchez pas le ventilateur de refroidissement.
- Le ventilateur de refroidissement et la résistance d'amortissement sont chauffés et chauds. N'y touchez pas.
- Recherchez d'éventuels bruits anormaux, rotations ou oscillations du moteur pendant son fonctionnement.

Linee guida sulla sicurezza

IT

Poiché "Avvertenza" e "Attenzione" forniscono informazioni fondamentali per prevenire situazioni pericolose, leggere interamente le presenti linee guida e il manuale di istruzioni, attenendosi alle istruzioni fornite.

⚠ Avvertenza : L'errata manipolazione può generare situazioni pericolose (scossa elettrica, incendio, lesioni personali, ecc.), inoltre potrebbe causare gravi lesioni personali e/o il decesso.

⚠ Attenzione : L'errata manipolazione può generare situazioni pericolose (incendio, lesioni, danni fisici, ecc.), inoltre potrebbe causare danni di media entità o lesioni personali. Può causare solo danni fisici.

⚠ Avvertenza

- Controllare la messa a terra (filo di messa a terra).
- Gli interventi sul cablaggio devono essere eseguiti da un elettricista esperto.
- Assicurarsi che l'alimentazione sia SCOLLEGATA prima di avviare il sistema.
- Verificare che l'unità venga installata prima del cablaggio.
- Non toccare i componenti interni o i morsetti dell'inverter (o del servoamplificatore), non collegare/rimuovere il cablaggio o i connettori quando un inverter è sotto tensione.
- Non aprire il coperchio anteriore dell'inverter quando è sotto tensione o in presenza di tensione residua.
- Non toccare i comandi con le mani bagnate.
- Non toccare i morsetti o i connettori neanche quando l'inverter (o il servoamplificatore) è sotto tensione ma è sospeso.
- Assicurarsi che l'inverter sia stato commutato su una modalità in cui non sarà operativo dopo il ripristino dell'alimentazione, poiché altrimenti potrebbe rappresentare un pericolo per l'operatore.
- Predisporre separatamente un interruttore di arresto di emergenza.
- Reimpostare l'allarme dopo essersi assicurati che sia stato disabilitato un comando operativo.
- Scollegare l'alimentazione e attendere 10 o più minuti prima di un intervento di assistenza.
- Gli operatori non autorizzati non devono eseguire interventi di manutenzione, assistenza e sostituzione dei componenti.

⚠ Attenzione

- Collegare l'inverter a materiali non combustibili come il metallo e tenere lontani i combustibili.
- Non contaminare l'inverter con materiali estranei, quali le polveri, ecc.
- Installare l'inverter su una parete verticale che non sia soggetta a oscillazioni e che sia in grado di supportare in maniera affidabile il peso dell'unità descritto nel manuale di istruzioni.
- Mantenerlo lontano da ambienti caldi e umidi, da ambienti con gas corrosivi ed esplosivi, ecc.; installarlo in una stanza in cui non penetri luce solare diretta.
- Assicurarsi che la tensione nominale del prodotto corrisponda alla tensione dell'alternatore.
- Non collegare l'alternatore ai morsetti di uscita (U, V e W).
- Non collegare una resistenza direttamente a un morsetto che porta corrente continua.
- Utilizzare una linea di alimentazione, un interruttore di rilevamento di dispersione, oppure un contattore elettromagnetico con capacità designata (nominale) o equivalente.
- Non interrompere il funzionamento dell'inverter (o del servoamplificatore) accendendo o spegnendo il contattore elettromagnetico posizionato sull'alimentazione e sull'uscita.
- Serrare una vite con coppia nominale. Inoltre, non lasciare la vite allentata.
- Non toccare la ventola di raffreddamento.
- L'aletta di raffreddamento e la resistenza di smorzamento vengono riscaldate e scottano. Non toccare.
- Controllare se, durante il funzionamento, si rilevano rotazione, rumori anomali, oscillazioni del motore.

Directrices de seguridad

ES

"Advertencia" y "Precaución" indican elementos de información esenciales para evitar situaciones peligrosas. Por lo tanto, asegúrese de leer detenidamente estas directrices junto con el manual de instrucciones, y de seguir las indicaciones que contienen.

⚠ Advertencia : Una manipulación incorrecta puede originar situaciones peligrosas (descargas eléctricas, incendios, lesiones personales, etc.), que pueden causar lesiones personales graves e incluso la muerte.

⚠ Precaución : Una manipulación incorrecta puede originar situaciones peligrosas (incendios, lesiones, daños físicos, etc.), que pueden causar daños materiales o lesiones personales. Puede que cause solamente daños físicos.

⚠ Advertencia

- Asegure la conexión a tierra (cable de masa).
- Un electricista cualificado debe ocuparse del cableado.
- Asegúrese de que la alimentación está desconectada antes de activar el sistema.
- Asegúrese de que la unidad está instalada antes de tender el cableado.
- No toque los componentes internos ni los terminales del inversor (o servoamplificador), ni conecte/desconecte el cableado o los conectores con el inversor conectado a la alimentación.
- No abra la cubierta delantera del inversor si está conectado a la alimentación o si tiene tensión residual.
- No manipule los controles con las manos húmedas.
- No toque los terminales o los conectores con el inversor (o el servoamplificador) conectado a la alimentación, ni siquiera aunque esté suspendido.
- Asegúrese de que el inversor se encuentra en un modo en el que no pueda reactivarse cuando se restablezca la alimentación y esto suponga un peligro para el operario.
- Asegúrese de incorporar un interruptor de parada de emergencia independiente.
- Restablezca la alarma una vez se haya asegurado de haber desactivado el comando de funcionamiento.
- Desconecte la alimentación y espere como mínimo 10 minutos antes de iniciar un trabajo de reparación.
- Los operarios que no cuenten con la autorización necesaria no deben realizar tareas de mantenimiento, reparación ni sustitución de piezas.

⚠ Precaución

- Instale el inversor sobre materiales no combustibles, como metales en general, y mantenga los materiales combustibles a una distancia prudencial.
- Evite contaminar el inversor con materiales extraños, como el polvo, etcétera.
- Instale el inversor en una pared vertical sin oscilaciones y lo bastante resistente como para soportar el peso de la unidad, tal y como se describe en el manual de instrucciones.
- Mantenga la unidad alejada de ambientes calurosos y húmedos con gases corrosivos y explosivos. Realice la instalación en una sala sin luz solar directa.
- Asegúrese de que la tensión nominal del producto coincide con la tensión del alternador.
- No conecte el alternador a los terminales de salida (U, V y W).
- No conecte una resistencia directamente a un terminal de corriente continua.
- Use un cable de alimentación, un disyuntor de detección de fugas o un contactor electromagnético con la capacidad nominal designada o equivalente.
- No detenga el inversor (o el servoamplificador) apagando o encendiendo el contactor electromagnético ubicado en la fuente de alimentación y en la salida.
- Apriete el tornillo al par especificado. Asegúrese de no dejar el tornillo sin apretar.
- No toque el ventilador.
- El disipador de calor y la resistencia de amortiguación se calientan considerablemente. No los toque.
- Compruebe si se producen rotaciones, ruidos u oscilaciones anormales en el motor durante su funcionamiento.

Indicações de segurança

PO

As secções "Aviso" e "Cuidado" contêm informações essenciais para evitar situações de perigo; certifique-se de que lê estas indicações na totalidade, juntamente com o manual de instruções e siga as instruções neles contidas.

⚠ Aviso : O manuseamento incorreto pode causar uma situação de perigo (choque elétrico, incêndio, lesões, etc.), resultando em potenciais lesões pessoais sérias e/ou morte.

⚠ Cuidado : O manuseamento incorreto pode causar uma situação de perigo (incêndio, lesões, danos físicos, etc.), resultando num possível dano ou lesão pessoal de dimensões médias. Pode causar apenas danos físicos.

⚠ Aviso

- Certifique-se de que o dispositivo é ligado à terra corretamente (cabo de ligação à terra).
- A instalação elétrica deve ser efetuada por um eletricista com formação para o efeito.
- Certifique-se de que a alimentação está DESLIGADA antes de ligar o sistema.
- Certifique-se de que a unidade está instalada antes da montagem da instalação elétrica.
- Não toque em terminais ou componentes internos do conversor (ou servomecanismo) nem ligue/retire os cabos ou conectores quando o conversor está com corrente.
- Não abra a cobertura dianteira do conversor quando este está com corrente ou tem tensão residual.
- Não manipule os controlos com as mãos molhadas.
- Não toque em terminais ou conectores mesmo quando o conversor (ou servomecanismo) está com corrente mas suspenso.
- Certifique-se de que o conversor foi ligado num modo em que não estará operacional após a restauração da alimentação de corrente, caso contrário pode ser perigoso para o operador.
- Disponibilize um interruptor de paragem de emergência separadamente.
- Reponha o alarme depois de se certificar de que o comando de funcionamento foi desativado.
- DESLIGUE a alimentação e espere pelo menos 10 minutos antes de realizar um trabalho.
- A manutenção, revisão e a substituição de peças não devem ser realizadas por operadores não autorizados.

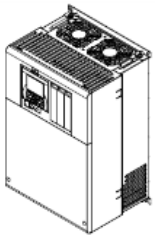
⚠ Cuidado

- Ligue o conversor a materiais não combustíveis, como metal, e mantenha-o afastado de materiais combustíveis.
- Não contamine o conversor com materiais estranhos, incluindo poeiras, etc.
- Instale o conversor na vertical, numa parede sem oscilações e com capacidade para suportar de forma fiável o peso da unidade descrito no manual de instruções.
- Certifique-se de que o dispositivo não é colocado em locais com ambientes húmidos e quentes com gás corrosivo e gás explosivo, etc.. Instale-o num compartimento sem luz natural direta.
- Certifique-se de que a tensão nominal do produto corresponde à tensão do alternador.
- Não ligue o alternador a terminais de saída (U, V, e W).
- Não ligue uma resistência diretamente a um terminal de corrente contínua.
- Utilize um cabo de alimentação, um disjuntor de deteção de fugas ou um contactor eletromagnético com uma capacidade (nominal) designada ou equivalente.
- Não interrompa o funcionamento do conversor (ou servomecanismo) LIGANDO/DESLIGANDO o contactor eletromagnético localizado na fonte e saída de alimentação.
- Aperte o parafuso ao binário nominal. Para além disso, não deixe o parafuso desapertado.
- Não toque no ventilador de arrefecimento.
- O ventilador de arrefecimento e a resistência de amortecimento estão quentes. Não toque.
- Verifique se ocorrem oscilações, ruídos irregulares ou rotação do motor durante o funcionamento.

Chapter 2 Installation and Wiring

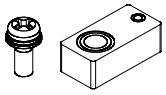
2.1 Check the Inverter

Check the contents in the package, and confirm the inverter model with a specification label.



HF-430NEO

Instruction Manual
(This document)



M3×8 screw : 4pcs
Spacer : 4pcs
(HF4322-022)

Eye bolts for hanging the inverter
HF4322-030 to 055
HF4324-030 to 055
(enclosed in the package)

Configuration and description contents vary depending on the model. Refer to User's Guide for more details

The unit number of the product is as follows:

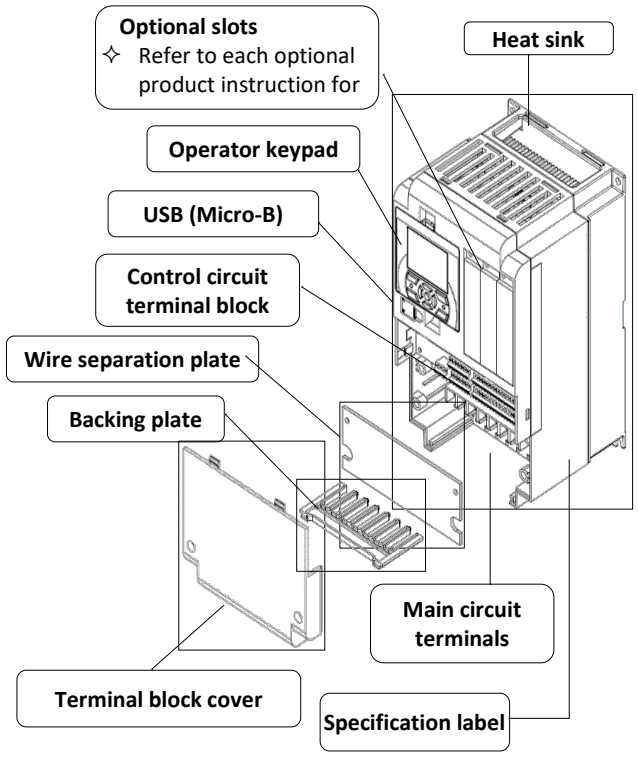
HF432	4	-	5	A	5
	(1)		(2)		(3)

(1) Series name HF-430NEO

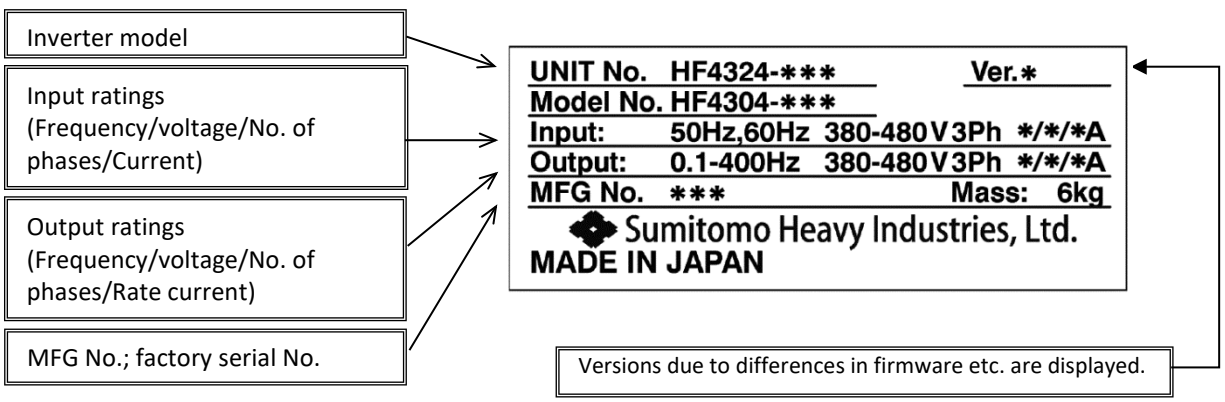
(2) Input power specification
2: three-phase 200V class;
4: three-phase 400V class

(3) Applicable motor
5A5 : 5.5kW 7A5 : 7.5kW
011 : 11kW 015 : 15kW
022 : 22kW 030 : 30kW
037 : 37kW 045 : 45kW
055 : 55kW

HF4322-037 example illustration in below.



・Specification label example
Description example for HF4324-5A5



2.2 Install the Inverter

Transportation

- The inverter is made of plastics component. When carrying the inverter, handle it carefully to prevent the parts from damaging.
- Do not carry the inverter by holding the front or terminal block cover. Doing so may cause the inverter to fall.
- Do not install and operate the inverter if it is damaged or its parts are missing.

Ambient temperature

- Avoid installing the inverter in a place where the ambient temperature goes above or below the allowable range defined by the standard inverter specification.
  Ambient temperature:
  ND rated : -10 to 50°C
  LD rated : -10 to 45°C
  VLD rated : -10 to 40°C

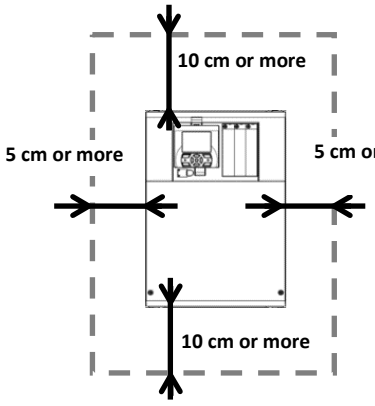
- Keep sufficient space around the inverter. Measure the temperature in a position about 5 cm distant from the bottom-center point of the inverter, and check that the measured temperature is within the allowable range. Operating the inverter at a temperature outside this range will shorten the inverter life (especially the capacitor life), resulting in damage to the inverter.

Do not install on a high temperature, high humidity or easily condensation area

- Avoid installing the inverter in a place where the relative humidity goes above or below the range (20% to 90% RH), as defined by the standard inverter specification. Avoid a place where the inverter is subject to condensation.
- Condensation inside the inverter will result in short circuits, which may cause damage to the inverter. Also avoid places where the inverter is exposed to direct sunlight.
-

Install inverter on nonflammable (E.g. metal) surface

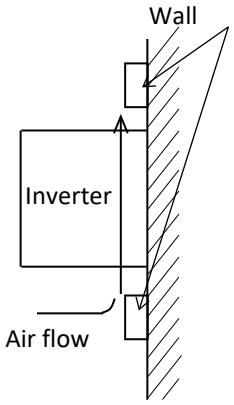
- The inverter will reach a high temperature (up to about 150°C) during operation. Install the inverter on a vertical wall surface made of nonflammable material (e.g., metal) to avoid the risk of fire.
- In particular, keep sufficient distance between the inverter and other heat sources (e.g., braking resistors and reactors) if they are installed in the vicinity.



In order to replace life cycle parts on following models require a clearance of 22cm or more:
- HF4322-015, HF4322-022
- HF4324-015, HF4324-022

In order to replace life cycle parts on following models is required to remove the installed units:
- HF4322-5A5 to HF4322-011
- HF4324-5A5 to HF4324-011

- Keep enough clearance between the inverter and the above and below wiring ducts to prevent cooling air ventilation from obstructing. For dimension drawing of inverter see chapter 2-3.



Installation environment

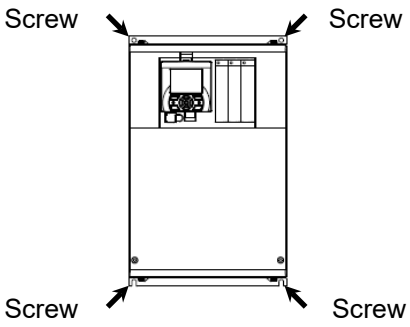
- Avoid installing the inverter in a place where the inverter is subject to dust, corrosive gases, explosive gases, flammable gases, grinding fluid mist, or salt water.
- Foreign particles entering the inverter will be the cause of failure. If you use the inverter in a considerably dusty environment, install the inverter inside a totally enclosed panel.

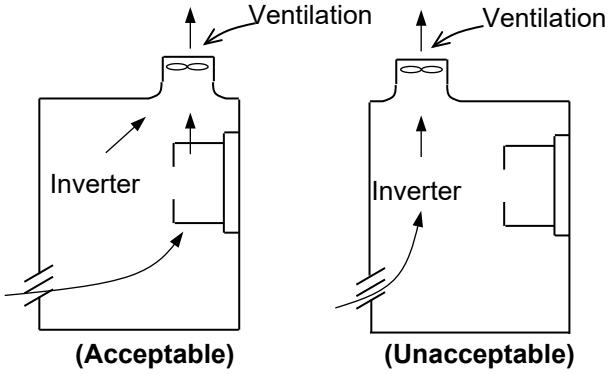
Installation method and position

- Install the inverter vertically and securely with screws or bolts on a surface that is free from vibrations and that can bear the inverter weight.
- If the inverter is not installed properly, its cooling performance may be degraded and tripping or inverter damage may result.

Mounting in an enclosure

- 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 properly so that the inverter ambient temperature will remain within the range specified in the specification table.





Position of ventilation fan

- When the inverter is installed below ventilation fan, the incoming dust may adhere to the inverter. Place in a position to avoid this falling dust.

Reduction of enclosure size

- External heat sink installation may reduce internal heat emission and reduce the enclosure size.
- External heat sink installation is required to replace the metal fitting which are installed on the inverter.
- To mount the inverter for external heat sink, cut out the enclosure panel according to the specified cutting dimensions.
- The cooling section (including the heat sink) positioned outside the enclosure has a cooling fan. Therefore, do not place the enclosure in any environment where it is exposed to water drops, oil mist, or dust.
- The heat sink part reaches a high temperature. Install a protection cover as needed.
- Watt loss (W) (at 100% load, approximate)

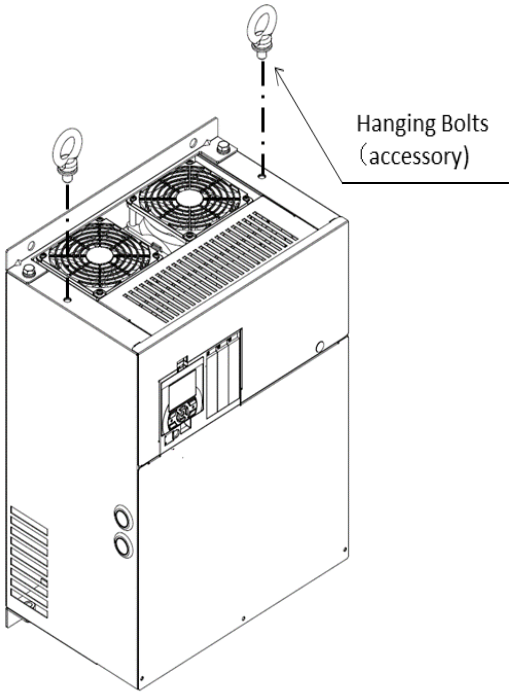
Model No.		HF4322-								
		5A5	7A5	011	015	022	030	037	045	055
Watt loss (W)	ND	348	376	498	742	1163	1317	1534	1625	1878
	LD	365	400	625	922	1263	1536	1801	1940	2669
	VLD	420	520	754	1059	1377	1698	2092	2300	3046

Model No.		HF4324-								
		5A5	7A5	011	015	022	030	037	045	055
Watt loss (W)	ND	235	240	260	361	687	783	812	1047	1130
	LD	260	280	306	444	805	854	880	1218	1488
	VLD	290	306	380	482	860	920	971	1300	1592

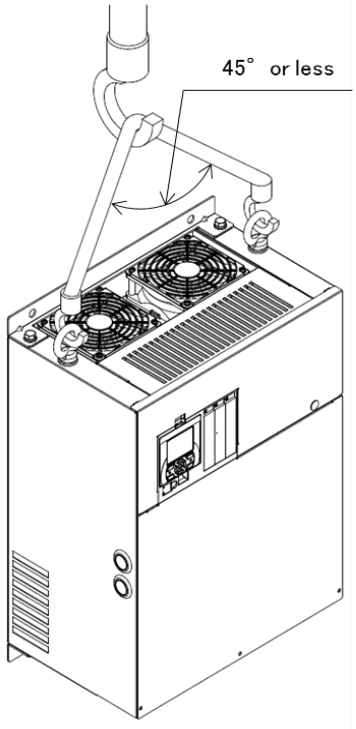
Note: This data are reference values at our site and varies depending on the power supply environment and motor power factor.

Procedure to hang an inverter
When lifting the inverter, please lift according to the figure below.

(1) Rigidly tighten the accessory hanging bolts to top of left and right.



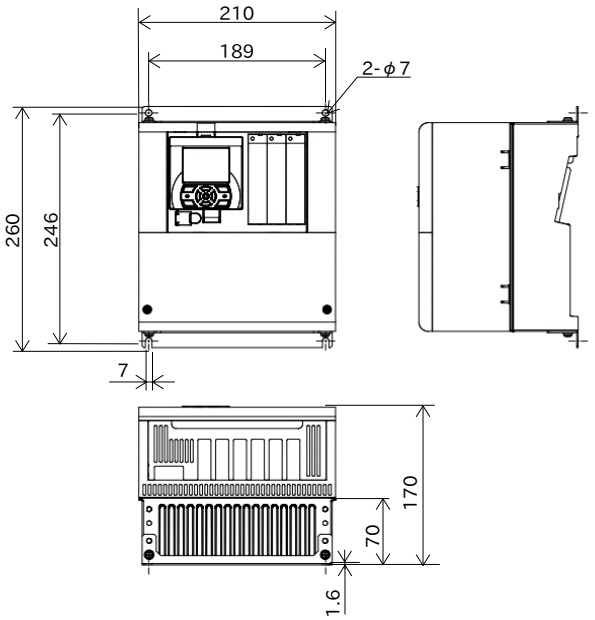
(2) Keep an angle less than 45 degree when hanging with wire.



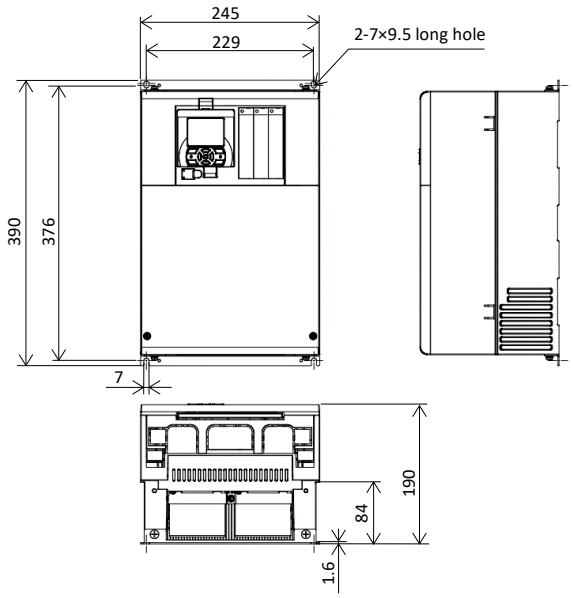
2.3 Dimension Drawing

・If you add optional parts to the inverter, some extra space is required in the direction of the depth of the inverter depending on the wiring layout. Keep a clearance of 50 mm or more. For details, refer to the instruction manual for each optional product.

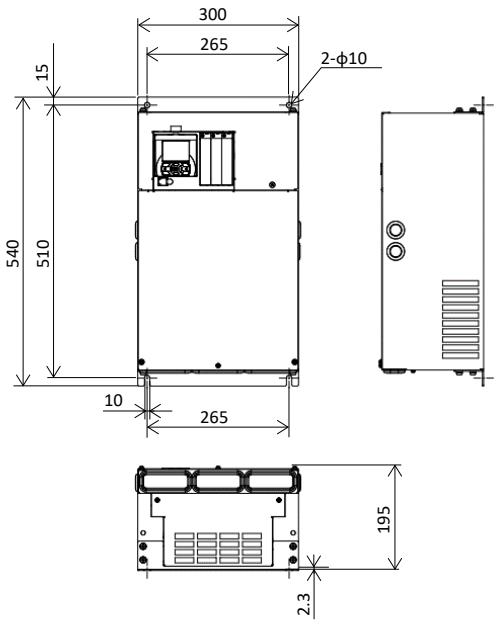
Model			
200V class: HF4322-5A5 to HF4322-011（5.5 to 11kW） 400V class: HF4324-5A5 to HF4324-011（5.5 to 11kW）			
Dimension	W(mm)	H(mm)	D(mm)
	210	260	170



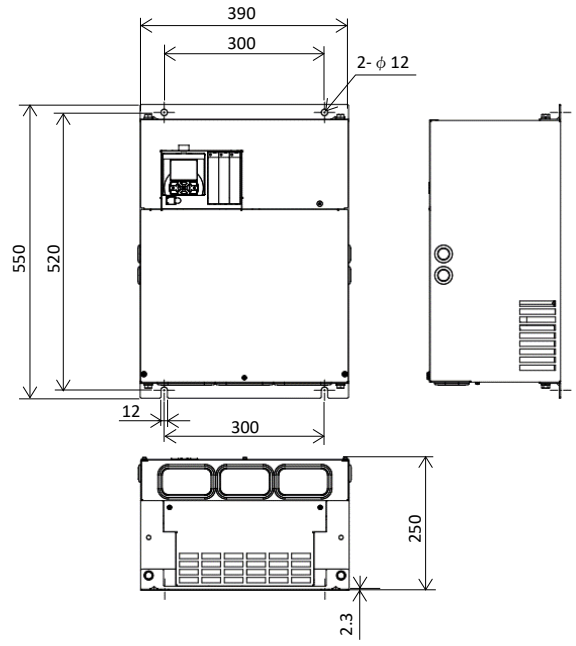
Model			
200V class: HF4322-015 , HF4322-022（15 and 22kW） 400V class: HF4324-015 , HF4324-022（15 and 22kW）			
Dimension	W(mm)	H(mm)	D(mm)
	245	390	190



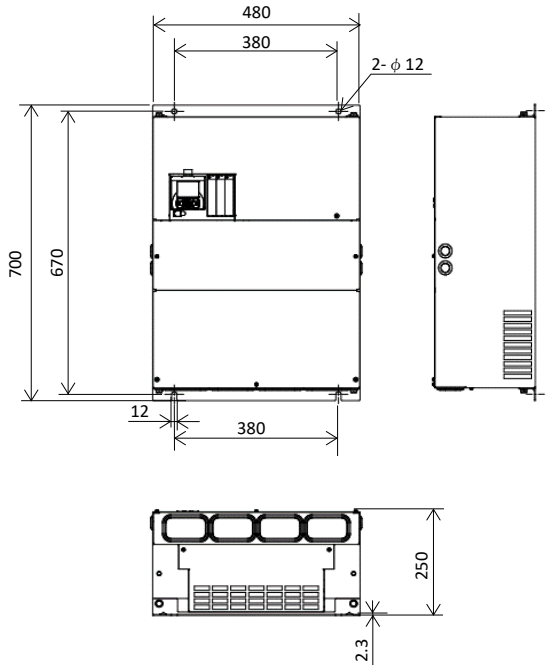
Model			
200V class: HF4322-030（30kW） 400V class: HF4324-030（30kW）			
Dimension	W(mm)	H(mm)	D(mm)
	300	540	195



Model			
200V class : HF4322-037, HF4322-045（37 and 45kW） 400V class : HF4324-037 to HF4324-055（37 to 55kW）			
	W(mm)	H(mm)	D(mm)
	390	550	250

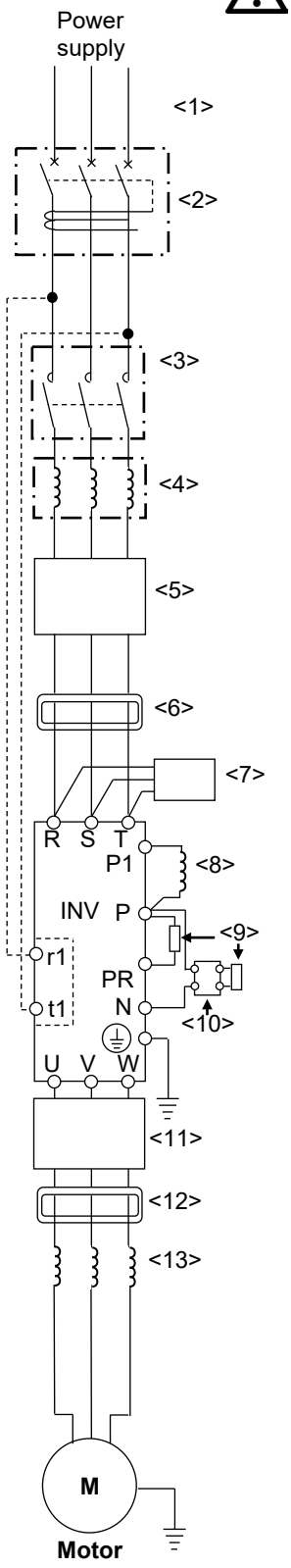


Model			
200V class: HF4322-055（55kW）			
Dimension	W(mm)	H(mm)	D(mm)
	480	700	250



2.4 Inverter Wiring

Applicable peripheral equipment



Notes:

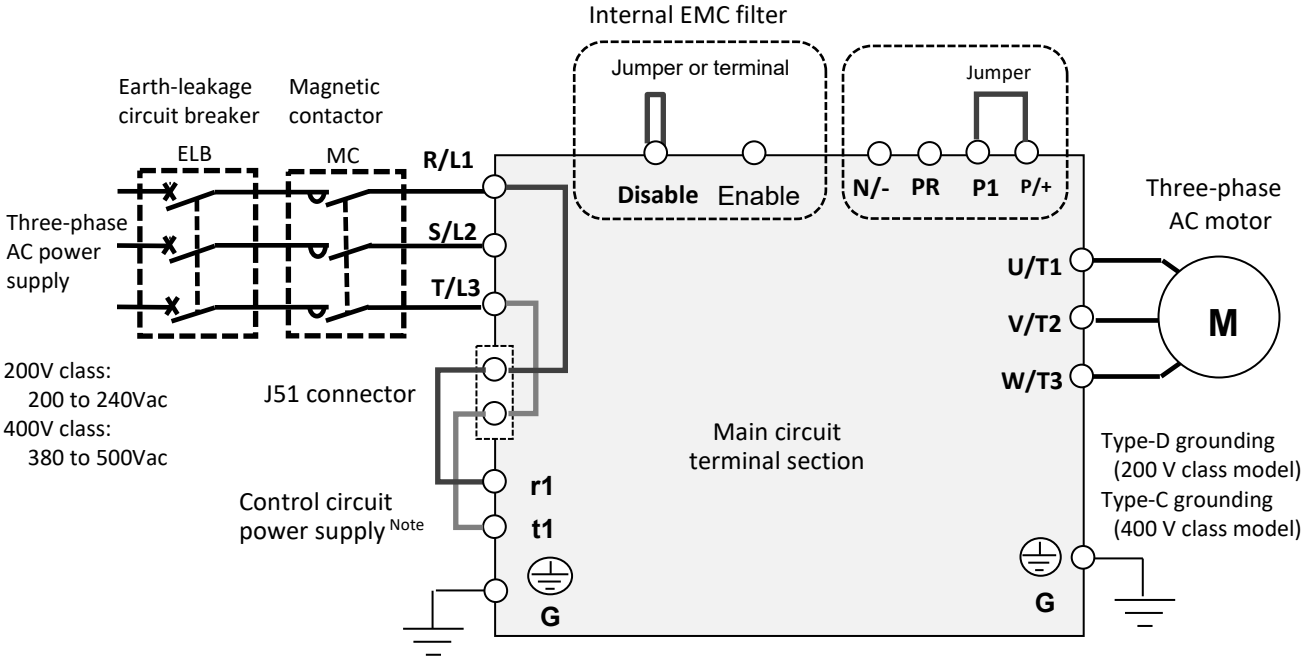
- The description of peripheral equipment is for 3-phase, 4-pole squirrel-cage motor.
- Select breakers with proper interrupting capacity. (Use inverter-ready breakers)
- Use earth-leakage circuit breakers (ELB or MCB) to ensure safety.
- Use copper electric wire (HIV cable) with allowable temperature rating 75°C or more.
- If the power line exceeds 20 m, use cable with major wire size for the power line.
- Tighten each terminal screw with the specified tightening torque.
  Loose terminal screws may cause short circuits and fire.
  Excessive tightening torque may cause damage to the terminal block or inverter body.
- When selecting a rated sensitivity current for earth-leakage circuit breaker, use a separated breaker considering a total cable length of between Inverter-Power supply and Inverter–Motor distance. Do not use a high-speed type of earth-leakage circuit breaker. Use a inverter-ready breaker, because the high-speed type may malfunction.
- When using a CV cable for wiring through a metal conduit, the average current leakage would be 30mA/km.
- When using a high relative dielectric constant cable such as IV cable, the leakage current is about eight times as high as the standard cable. Therefore, when using an IV cable, use Earth-leakage circuit breaker (ELCB) with rated sensitivity leakage current by eight times higher in the table below. If the total cable length exceeds 100 m, use a CV cable.
- Do not pull the power line cable after wiring. Doing so may cause screw loosening.
- When wiring separately to the control circuit power supply r1 and t1, see App.2-8.

Total cable length	Sensitivity current (mA)
100 m or less	50
300 m or less	100

No.	Name	Function
<1>	Electric wire	See "Recommended cable gauges, wiring accessories, and crimp terminals" on Chapter 2.6.
<2>	Earth-leakage circuit breaker ELCB or Magnet circuit breaker MCB	
<3>	Magnetic contactor MC	
<4>	Input AC reactor (For harmonic control, power supply coordination, and power factor correction)	Use input reactor for harmonic wave control, or when power supply voltage imbalance exceeds 3% or more, or when the power supply capacity is over 500 kVA or more, or when the power voltage may change rapidly. This reactor also improves the power factor.
<5>	Noise filter for inverter	This noise filter reduces the conductive noise that is generated by the inverter and transmitted in cables. Connect this noise filter to the primary side (input side) of the inverter.
<6>	Zero-phase reactor	The inverter may generate radio noise through power supply wiring during operation. Use this noise filter to reduce the radio noise (radiant noise).
<7>	Radio noise filter on the input side (Capacitor filter)	Use this noise filter to reduce the radiant noise radiated from input cables.
<8>	DC reactor	Use DC reactor to reduce the harmonic generated by the inverter.
<9>	Braking resistor	Use these devices to increase the braking torque of the inverter for operation in which the inverter turns the connected load on and off very frequently or decelerates the load running with a high moment of inertia.
<10>	Regenerative braking unit	
<11>	Noise filter on the output side	Connect this noise filter between the inverter and motor to reduce the radiant noise radiated from cables for the purpose of reducing the electromagnetic interference with radio and television reception and preventing malfunctions of measuring equipment and sensors.
<12>	Zero-phase reactor	Use this noise filter to reduce the noise generated on the output side of the inverter. (This noise filter can be used on both the input and output sides.)
<13>	Output AC reactor	Inverter driven motor may cause large vibrations compared to commercial power supply direct start motor. Connect Output AC reactor between inverter and motor to lessen the pulsation of motor. Also, connect output AC reactor, when the cable length between inverter and motor is longer (10 m or more), to prevent thermal relay malfunction due to the harmonic waves generated by switching operation of inverter. Note that the thermal relay can be replaced with a current sensor to avoid the malfunction.

2.5 Wiring of the main circuit

Wire the main circuit of the inverter.
The following illustration shows the power supply and wiring connections to a motor only.
Open a terminal block cover to wire the terminal block in the main circuit.



Note: When wiring separately to the control circuit power supply r1 and t1, see App.2-8.

Explanation of main circuit terminal block

Symbol	Terminal name	Description
R,S,T (L1,L2,L3)	Main power input	Connect to the AC power supply.
U,V,W (T1,T2,T3)	Inverter output	Connect a Three-phase motor. Note
P1, P (+)	DC choke connection terminal	Remove the P1-P jumper from terminals, and connect the optional DC choke for power factor improvement.
P,PR (+)	External chopper braking resistor connection terminal	Connect the optional external braking resistor. See “Chapter 7 Specifications” for built-in braking circuit inverter models.
P,N (+,-)	Regenerative braking unit connection terminal	Connect the optional regenerative braking unit.
E(G) ⏚	Inverter ground terminal	This serves as a ground terminal for the inverter chassis to ground. Connect 200V class and 400V class models to Type-D grounding and Type-C grounding, respectively.

- See “Chapter 1 Safety Instructions” for response to CE and UL standards.
- The screw size may vary depending on terminal. Refer to Page 2-9/2-10 for the size of the terminal screw for the power line cable while for other terminals, refer to the drawings of the wiring on Page 2-14 or later.
- The tables on Page 2-9/2-10 list the specifications of cables, crimp terminals, and terminal screw tightening torques for reference.
- Recommended wire gauges vary depending on the rated load settings (ND/LD/VLD).

Note: When operating the inverter without connecting the motor using the sensor-less vector control, the maximum voltage [Hb106 (Motor Rated Voltage) equivalent voltage] is generated the output terminal (U, V, W).
For that reason, when connecting the peripheral equipment to the output terminal, connect to the motor at the same time.
When operating the inverter without connecting the motor using at V/F control, the output voltage Is generated proportional to the frequency.

2.6 Recommended wire gauges, wiring accessories and crimp terminals

■200V class

Model	Rating setting	Power line cable AWG(mm²) R,S,T,U,V,W, P,P1,N	Grounding cable AWG(mm²)	External braking resistor between P and PR AWG(mm²)	Power line cable Terminal screw size	Crimp terminal Power/Ground	Tightening torque(N•m) Power/Ground (maximum value)
HF4322-5A5	ND	8(8.4)	8(8.4)	8(8.4)	M5	8-5/8-5	3.0/3.0 (3.0/3.0)
	LD						
	VLD						
HF4322-7A5	ND	8(8.4)	6(13.3)	8(8.4)		8-5/8-5	
	LD						
	VLD	6(13.3)		6(13.3)		14-5/8-5	
HF4322-011	ND	6(13.3)		6(13.3)	M6	14-6/14-6	4.0/4.0 (5.2/5.2)
	LD	4(21.2)		4(21.2)		22-6/14-6	
	VLD						
HF4322-015	ND	4(21.2)		4(21.2)		22-6/14-6	2.5-3.0/4.9 (4.1/5.2)
	LD	3(26.7)		3(26.7)		38-6/14-6	
	VLD						
HF4322-022	ND	1(42.4)		1(42.4)	M8	60-8/14-6	5.5-6.6/4.9 (9.0/5.2)
	LD	1/0(53.5)		1/0(53.5)			
	VLD	2/0(67.4)		2/0(67.4)		70-8/14-6	
HF4322-030	ND	2/0(67.4)	4(21.2)	-		70-8/22-8	6.0/11.7 (9.0/12.5)
	LD	1/0×2(53.5×2)				60-8/22-8	
	VLD						
HF4322-037	ND	4/0(107.2)				100-8/22-8	15.0/11.7 (15.0/12.5)
	LD	1/0×2(53.5×2)				60-8/22-8	6.0-10.0/11.7 (12.0/12.5)
	VLD						
HF4322-045	ND	1/0×2(53.5×2)				60-8/22-8	6.0-10.0/11.7 (12.0/12.5)
	LD						
	VLD	2/0×2(67.4×2)				70-8/22-8	
HF4322-055	ND	350kcmil(177)	3(26.7)		M10	180-10/38-8	10.0-12.0/11.7 (16.5/12.5)
	LD	3/0×2(85.0×2)				80-10/38-8	
	VLD						

・The wire gauges in the above table shows the designed values based on HIV cable (with thermal resistance of 75°C).

・Please use the round type crimp terminals (for the UL standard) suitable for the use electric wire when you connect the electric wire with the main circuit terminal block. Please put on pressure to the crimp terminals with a crimp tool that the crimp terminal maker recommends.

・When applying the UL standard, please refer to "1.5 Compliance to UL standards ". Tightening torque is recommended “maximum value” in the above table.

400V class

Model	Rating setting	Power line cable AWG(mm²) R,S,T,U,V,W, P,P1,N	Grounding cable AWG(mm²)	External braking resistor between P and PR AWG(mm²)	Power line cable Terminal screw size	Crimp terminal Power/Ground	Tightening torque(N•m) Power/Ground (maximum value)
HF4324-5A5	ND	12(3.3)	12(3.3)	12(3.3)	M5	5.5-5/5.5-5	3.0/3.0 (3.0/3.0)
	LD						
	VLD	10(5.3)	10(5.3)	10(5.3)			
HF4324-7A5	ND	10(5.3)	10(5.3)	10(5.3)		5.5-5/5.5-5	
	LD						
	VLD	8(8.4)	8(8.4)	8(8.4)		8-5/8-5	
HF4324-011	ND	8(8.4)	8(8.4)	8(8.4)	M6	8-6/8-6	4.0/4.0 (5.2/5.2)
	LD						
	VLD						
HF4324-022	ND						
	LD						
	VLD						
HF4324-011	ND	6(13.3)	8(8.4)	6(13.3)		14-6/8-6	
	LD	4(21.2)		4(21.2)		22-6/8-6	
	VLD						
HF4324-030	ND	3(26.7)	6(13.3)	3(26.7)		38-6/14-6	2.5-3.0/4.9 (4.1/5.2)
	LD	2(33.6)		2(33.6)			
	VLD	1(42.4)		1(42.4)		60-6/14-6	
HF4324-037	ND	1(42.4)		1(42.4)	M8	60-8/14-8	15.0/11.7 (15.0/12.5)
	LD						
	VLD						
HF4324-045	ND	1(42.4)		-			
	LD	1/0(53.5)					
	VLD						
HF4324-055	ND	1/0(53.5)	4(21.2)			60-8/22-8	15.0/11.7 (15.0/12.5)
	LD	2/0(67.4)				70-8/22-8	
	VLD	1/0×2(53.5×2)				60-8/22-8	6.0-10.0/11.7 (12.0/12.5)

- The wire gauges in the above table shows the designed values based on HIV cable (with thermal resistance of 75°C).
- Please use the round type crimp terminals (for the UL standard) suitable for the use electric wire when you connect the electric wire with the main circuit terminal block. Please put on pressure to the crimp terminals with a crimp tool that the crimp terminal maker recommends.
- When applying the UL standard, please refer to "1.5 Compliance to UL standards ". Tightening torque is recommended “maximum value” in the above table.

2.7 Applicable circuit breaker

200V class

- For ND rating

Model	Applicable Motor (kW)	Applicable devices (Input Voltage 200 to 220V)							
		Without reactor (DCL or ACL)				With reactor (DCL or ACL)			
		Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor	Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor
		Mitsubishi Elec.			Fuji Elec.	Mitsubishi Elec.			Fuji Elec.
		Model	Rated Current (A)	Example model	Example model	Example model	Rated Current (A)	Example model	Example model
HF4322-5A5	5.5	NV63-SV	50	NF63-SV	SC-N1	NV63-SV	40	NF63-SV	SC-N1
	7.5	NV125-SV	60	NF125-SV	SC-N2		50		SC-N2
HF4322-7A5	11		75		SC-N2S	NV125-SV	60	NF125-SV	SC-N2S
HF4322-011	15		100		SC-N3		75		SC-N3
HF4322-015	18.5	NV250-SV	125	NF250-SV	SC-N4		100		SC-N4
HF4322-022	22		175		SC-N5	NV250-SV	125	NF250-SV	SC-N5
	30		200		SC-N7		150		SC-N6
HF4322-030	37	NV400-CW	250	NF400-CW	SC-N8		175		SC-N7
HF4322-037	45		300		SC-N10	NV400-CW	225	NF400-CW	SC-N8
HF4322-045	55		350		SC-N11		250		SC-N10

- For LD/VLD rating

Model	Applicable Motor (kW)	Applicable devices(Input Voltage 200 to 220V)							
		Without reactor (DCL or ACL)				With reactor (DCL or ACL)			
		Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor (MC)	Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor (MC)
		Mitsubishi Elec.			Fuji Elec.	Mitsubishi Elec.			Fuji Elec.
		Example model	Current Rate	Example model	Example model	Example model	Current Rate	Example model	Example model
HF4322-5A5	5.5	NV63-SV	40	NF63-SV	SC-N1	NV32-SV	30	NF32-SV	SC-5-1
	7.5		50		SC-N2	NV63-SV	40	NF63-SV	SC-N1
HF4322-7A5	11	NV125-SV	75	NF125-SV	SC-N2S	NV125-SV	60	NF125-SV	SC-N2
HF4322-011	15	NV250-SV	125	NF250-SV	SC-N4		100		SC-N3
HF4322-015	18.5								
HF4322-022	22		150		SC-N5	NV250-SV	125	NF250-SV	SC-N4
	30		200		SC-N7		150		SC-N5
HF4322-030	37	NV400-CW	250	NF400-CW	SC-N8		200		SC-N7
HF4322-037	45		300		SC-N10	NV400-CW	225	NF400-CW	SC-N8
HF4322-045	55		400		SC-N11		300		SC-N10
HF4322-055	75	NF630-CW	500	NF630-CW	SC-N12		400		SC-N11

- Device model name on above table shows example selection.
  The device selection should be made in base on rated current, short circuit current capability and accordance to the local electrical legislation.
- Applicable motor capacity is based on 200Vac, 60Hz, 4 pole IE3 motor.
- Refer to the wire gauge table on chapter 2.6 for power line cable.
- When selecting oversize inverter capacity compare to motor rating, select magnetic contactor according to the inverter capacity.

400V class

- For ND rating

Model	Applicable Motor (kW)	Applicable devices (Input Voltage 400 to 440V)							
		Without reactor (DCL or ACL)				(DCL or ACL) With reactor			
		Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor (MC)	Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor (MC)
		Mitsubishi Elec.			Fuji Elec.	Mitsubishi Elec.			Fuji Elec.
		Example model	Current Rate	Example model	Example model	Example model	Current Rate	Example model	Example model
HF4324-5A5	5.5	NV32-SV	30	NF32-SV	SC-5-1	NV32-SV	20	NF32-SV	SC-5-1
HF4324-7A5	7.5								
HF4324-011	11	NV63-SV	50	NF63-SV	SC-N1		30		SC-N1
HF4324-015	15	NV125-SV	60	NF125-SV	SC-N2	NV63-SV	40	NF63-SV	SC-N2
HF4324-022	18.5		75		SC-N2S		50		SC-N2S
	22		100			NV125-SV	60	NF125-SV	
HF4324-030	30	NV250-SV	125	NF250-SV	SC-N3		75		SC-N3
HF4324-037	37		150		SC-N4		100		SC-N4
HF4324-045	45		175		SC-N5	NV250-SV	125	NF250-SV	SC-N5
HF4324-055	55		200		SC-N7		150		SC-N6

- For LD/VLD rating

Model	Applicable Motor (kW)	Applicable devices (Input Voltage 400 to 440V)							
		Without reactor (DCL or ACL)				With reactor (DCL or ACL)			
		Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor (MC)	Earth-leakage breaker (ELB)		Circuit Breaker	Magnetic Contactor (MC)
		Mitsubishi Elec.			Fuji Elec.	Mitsubishi Elec.			Fuji Elec.
		Example model	Current Rate	Example model	Example model	Example model	Current Rate	Example model	Example model
HF4324-5A5	5.5	NV32-SV	20	NF32-SV	SC-5-1	NV32-SV	20	NF32-SV	SC-5-1
	7.5		30						
HF4324-7A5	11	NV63-SV	40	NF63-SV	SC-N1		30		
HF4324-011	15		50		SC-N2	NV63-SV	40	NF63-SV	SC-N1
HF4324-015	18.5	NV125-SV	60	NF125-SV	SC-N2S		50		SC-N2
HF4324-022	22		75			NV125-SV	60	NF125-SV	SC-N2S
	30		100		SC-N3		75		
HF4324-030	37	NV250-SV	125	NF250-SV	SC-N4		100		SC-N3
HF4324-037	45		150		SC-N5	NV250-SV	125	NF250-SV	SC-N4
HF4324-045	55		200		SC-N7		150		SC-N5
HF4324-055	75	NV400-CW	250	NV400-CW	SC-N8		200		SC-N7

- Device model name on above table shows example selection. The device selection should be made in base on rated current, short circuit current capability and accordance to the local electrical legislation.
- Applicable motor capacity is based on 400Vac, 60Hz, 4 pole IE3 motor.
- Refer to the wire gauge table in chapter 2.6.
- When selecting oversize inverter capacity compare to motor rating, select according to the inverter capacity.

2.8 Chopper Braking Resistor

- HF-430NEO has a built-in chopper braking circuit in model below.
  HF4322-5A5 to HF4322-022
  HF4324-5A5 to HF4324-037
- By using an optional braking resistor, permit to use for high regeneration load application such as lift or high speed load.
- Using optional braking unit, permit to use on high regenerative load application even for models without built-in chopper braking circuit.
- The table below shows an example selection of braking resistor to output 100% of braking torque for each motor rating on list.

200V class

Model	Applicable motor (kW)	Braking Resistor				Braking Unit and Braking Resistor				
		Min. Resistor (Ω)	Braking resistor Model No.	Connection	Thermal relay Setting(A)	Braking unit Model	Min. Resistor(Ω)	Braking resistor Model No.	Connection	Thermal relay Setting(A)
HF4322-5A5	5.5	16	X435AC069 (10Ω750W)	2S	5.5	-	-	-	-	-
HF4322-7A5	7.5	10								
HF4322-011	11		X435AC094 (7Ω750W) Note	3S	6.7					
HF4322-015	15	7.5	X435AC064 (2.5Ω750W)	4S	11.0					
HF4322-022	18.5	5	X435AC054 (1.6Ω750W)	5S	14.1					
	22		X435AC065 (1.1Ω750W)	6S	16.5					
HF4322-030	-	-	-	-	-	BRD-E3-30K	4	X435AC066 (0.6Ω750W)	8S	22.4
HF4322-037						BRD-E3-55K	2	X435AC054 (1.6Ω750W)	5S×2P	27.4
HF4322-045								X435AC065 (1.1Ω750W)	6S×2P	33.0
HF4322-055								X435AC066 (0.6Ω750W)	8S×2P	44.7

・Using 5 series and parallel resistors, will require in total 10 resistors.

・P : parallel connection S: series connection

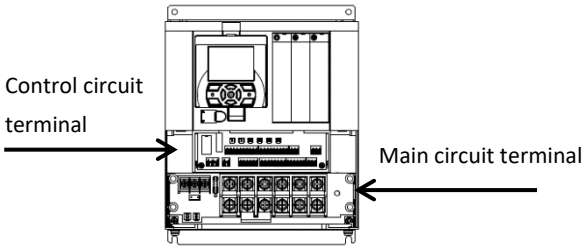
Note: Braking torque＝70%

400V class

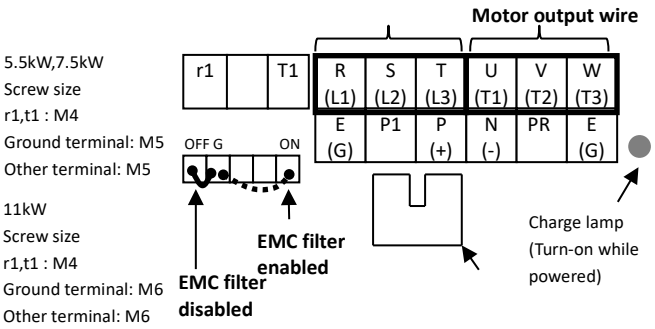
Model	Applicable motor (kW)	Braking Resistor				Braking Unit and Braking Resistor				
		Min. Resistor (Ω)	Braking resistor Model No.	Connection	Thermal relay Setting(A)	Braking Unit Model	Min. Resistor(Ω)	Braking Resistor Model No.	Connection	Thermal relay Setting(A)
HF4324-5A5	5.5	70	Y135AA209 (250Ω400W)	3P	2.7	-	-	-	-	-
HF4324-7A5	7.5	35	X435AC058 (30Ω750W)	2S	3.5					
HF4324-011	11		X435AC103 (20Ω750W)	3S	3.9					
HF4324-015	15	24	X435AC069 (10Ω750W)	4S	5.5					
HF4324-022	18.5	20	X435AC063 (4.5Ω750W)	6S	8.2					
	22									
HF4324-030	30	15	X435AC064 (2.5Ω750W)	8S	11.0					
HF4324-037	37		X435AC054 (1.6Ω750W)	10S	13.7					
HF4324-045	45	-	-	-	-	BRD-EZ3-30K	10	X435AC065 (1.1Ω750W)	12S	16.5
HF4324-055	55							X435AC064 (2.5Ω750W)	8S×2P	21.9

2.9 Wiring

Model
200V class : HF4322-5A5 to HF4322-011（5.5 to 11kW）
400V class : HF4324-5A5 to HF4324-011（5.5 to 11kW）

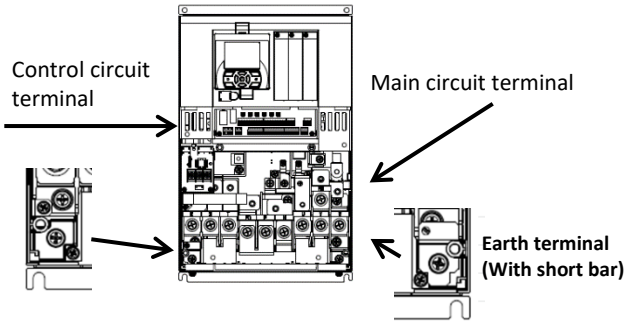


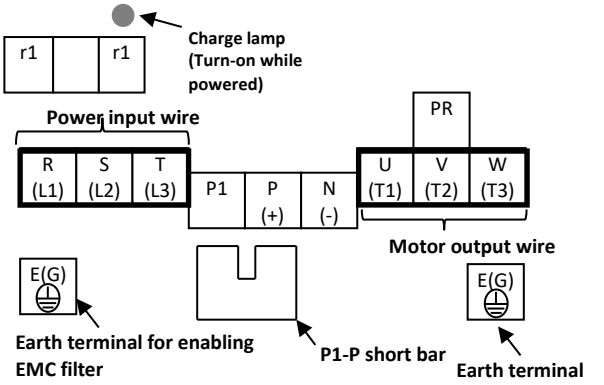
Main Circuit Terminal



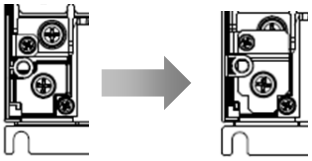
・Switch the short circuit connector to enable or disable the EMC filter.

Model
200V class : HF4322-015,HF4322-022（15 and 22kW）





・To enable the EMC filter, fix the grounding screw equipped with short bar to the earth terminal for enabling the EMC filter.

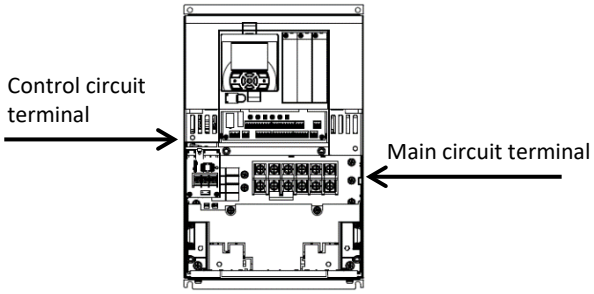


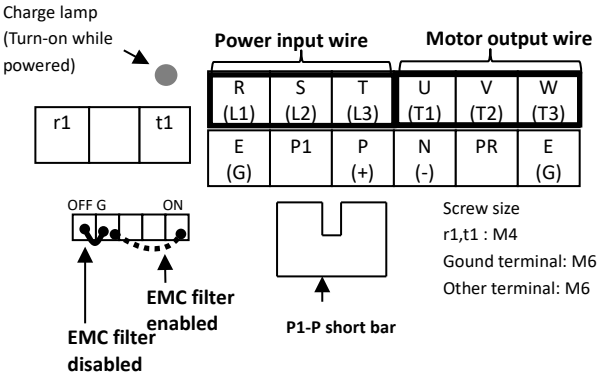
15kW
Screw size
r1,t1 : M4
Ground terminal: M6
Other terminals : M6

22kW
Screw size
r1,t1 : M4
Ground terminal: M6
Other terminals : M8

When J51 connector is removed, charge lamp doesn't indicate r1-t1 status. Please make sure that power is off and care for safety. For own safety, make sure to power off before handling the inverter.

Model
400V class : HF4324-015,HF4324-022（15 and 22kW）

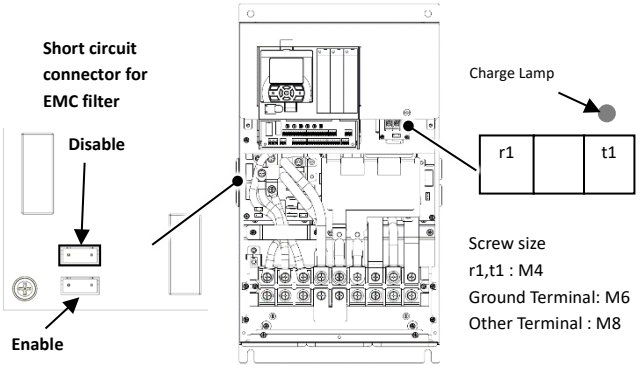


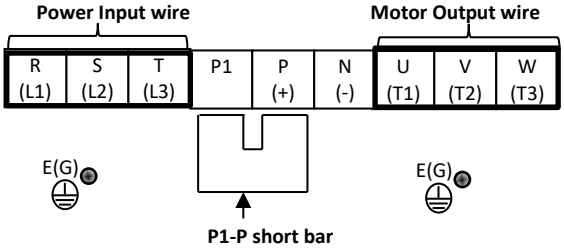


・Switch the short circuit connector to enable or disable the EMC filter.

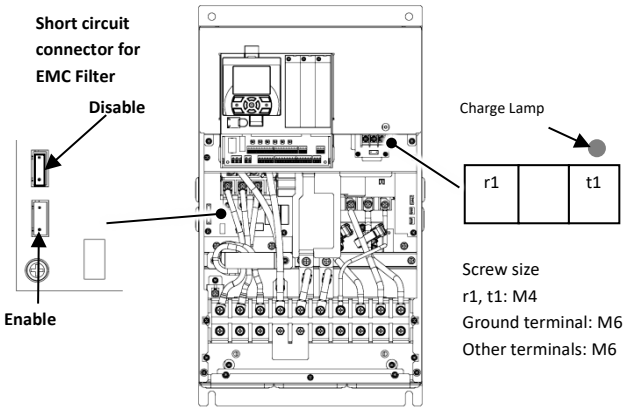
Model
200V class : HF4322-030（30kW）

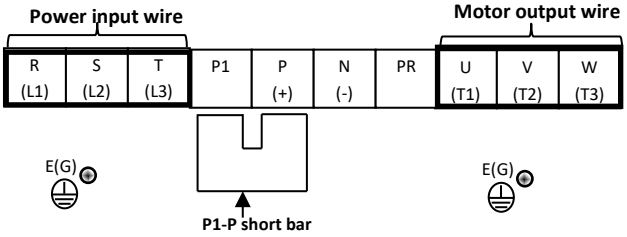
Main Circuit Terminal



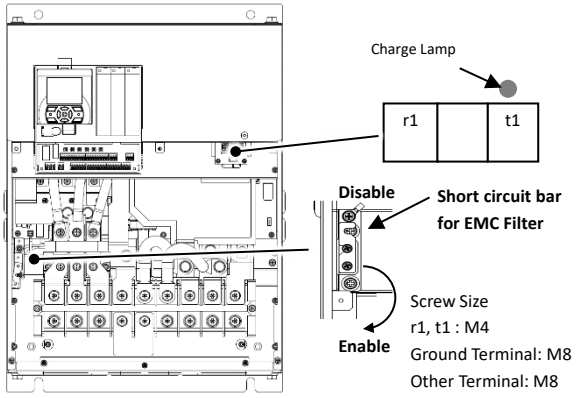


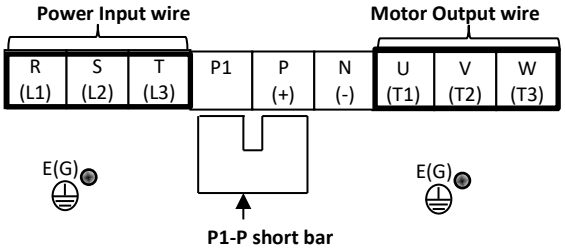
Model
400V class : HF4324-030（30kW）



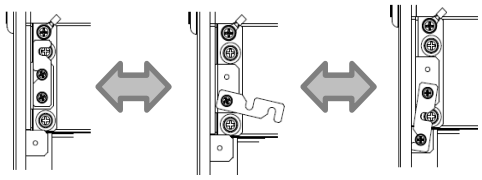


Model
200V class : HF4322-037（37kW）





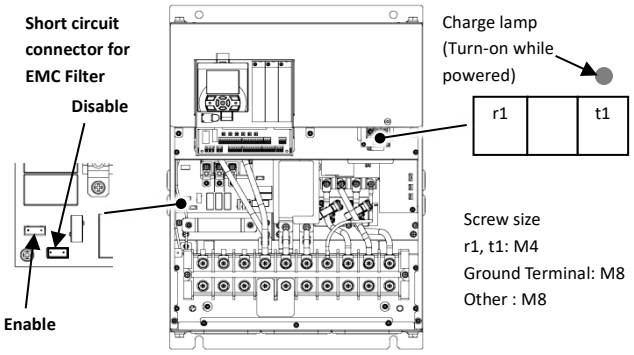
・Switch the short circuit bar to enable or disable the EMC filter.

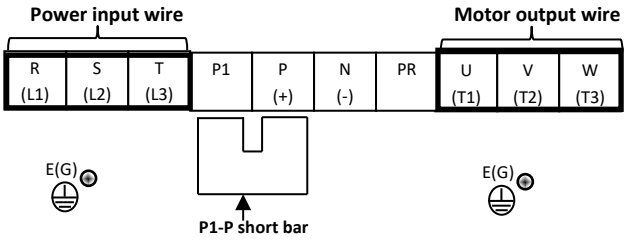


Disable Switching(screw) Enable

Model
400V class : HF4324-037（37kW）

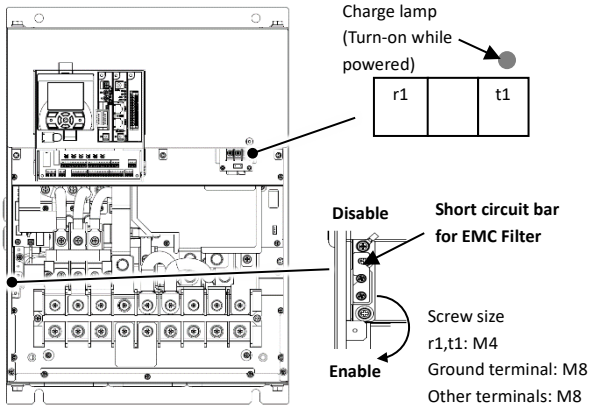
Main Circuit Terminal

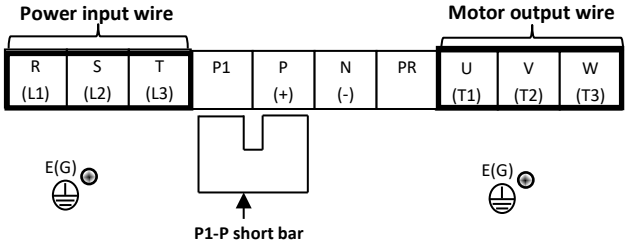




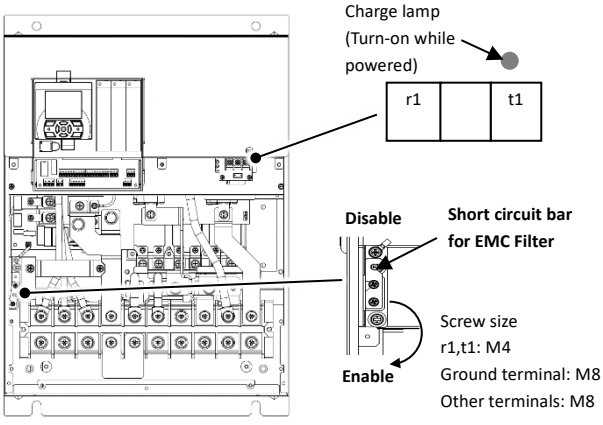
・Switch the short circuit connector to enable/disable the EMC filter.

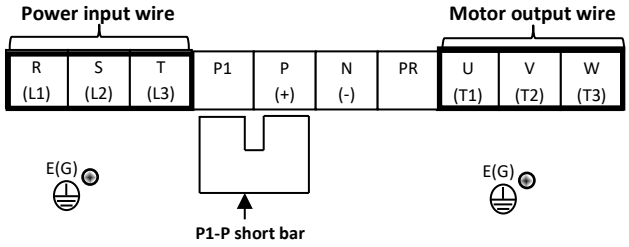
Model
200V class : HF4322-045（45kW）



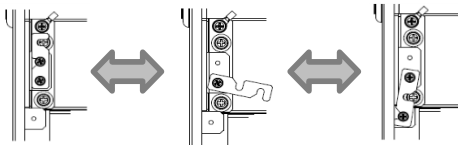


Model
400V class : HF4324-045（45kW）



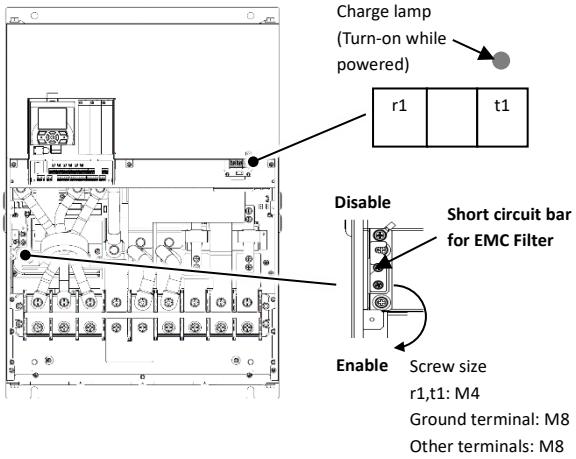


・Switching method of EMC filter
Switch the short circuit bar to enable/disable the EMC filter.

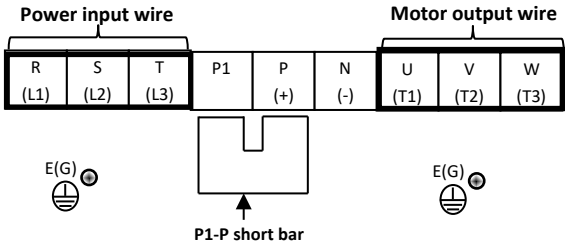


Disable Switching(screw) Enable

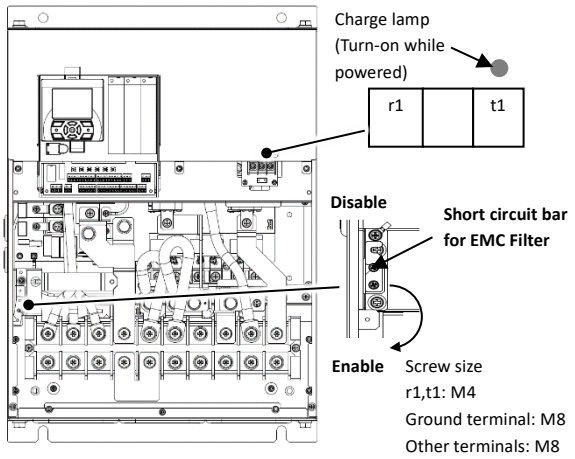
Model
200V class : HF4322-055（55kW）

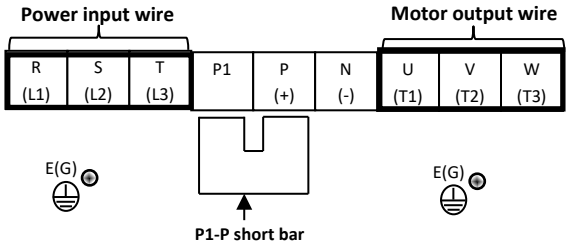


Main Circuit Terminal

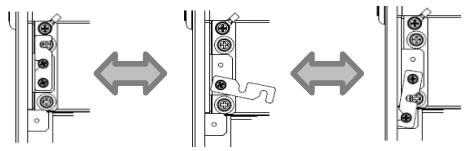


Model
400V class : HF4324-055（55kW）





・Switching method of EMC filter
Switch the short circuit bar to enable/disable the EMC filter.

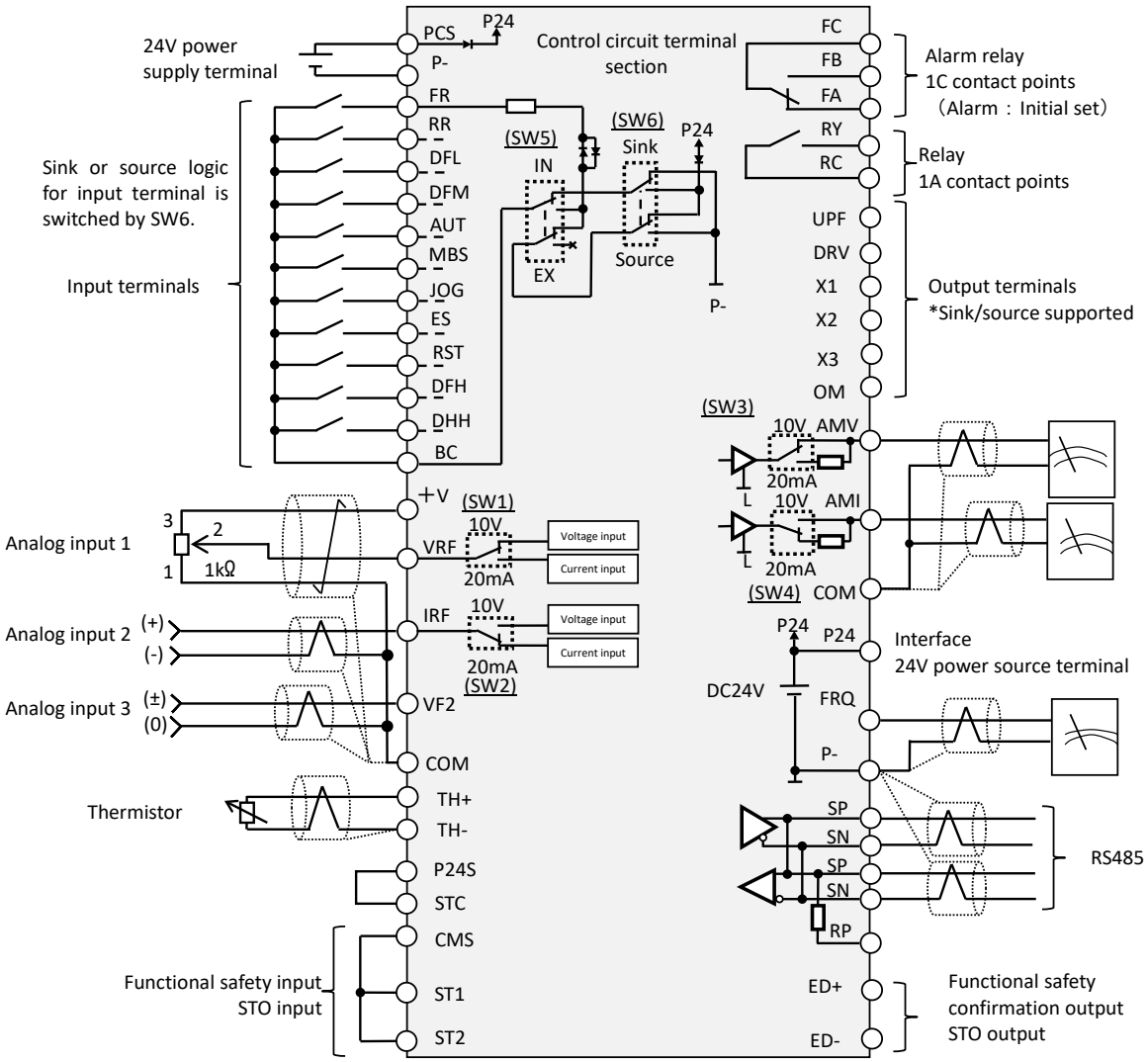


Disable Switching(screw) Enable

Note: When the EMC filter is set effective, the leakage current increases.
Leakage current (EMC filter ON: 32 to 95mA, OFF: 0 to 0.6mA)

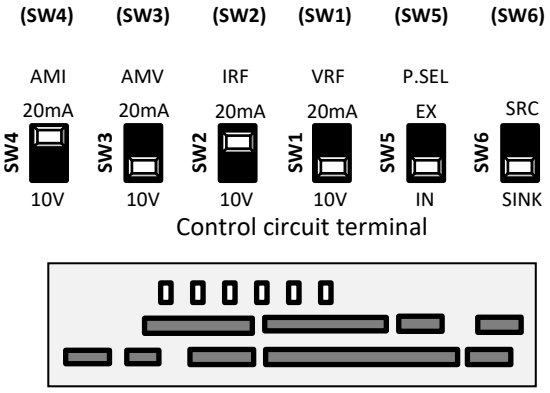
2.10 Wiring of the control circuit

・An example for sink logic.



Switch configuration

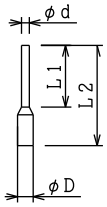
Label	Switch Name	Description
VRF (SW1)	Analog input 1 switch	It changes the input specification of Analog input 1 (VRF terminal). 10V: Voltage input is available. 20mA: Current input is available.
IRF (SW2)	Analog input 2 switch	It changes the input specification of Analog input 2 (IRF terminal). 10V: Voltage input is available. 20mA: Current input is available.
AMV (SW3)	Analog output 1 switch	It changes the output specification of Analog output 1 (AMV terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
AMI (SW4)	Analog output 2 switch	It changes the output specification of Analog output 2 (AMI terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
P.SEL (SW5)	Power supply input switch	It changes the power source for input terminals. IN: Internal power source. EX: External power source. (While setting EX, it requires an external power supply between input terminals and COM terminal)
SRC/SINK (SW6)	Input terminal Sink/Source logic switching	It changes the sink or source logic for input terminal. This is enabled when SW5 is in IN position. SINK: Switch to Sink logic. SRC: Switch to Source logic.



・Be sure to power-off previous to change any switches. Otherwise, may damage the inverter.

Recommended terminals for wiring

• The following ferrule terminals are recommended for signal cable for easy wiring and improving reliability of connectivity.

Power cable size mm² (AWG)	Ferrule terminal model Note	L1 [mm]	L2 [mm]	ϕd [mm]	ϕD [mm]	
0.25 (24)	AI 0,25-8YE	8	12.5	0.8	2.0	
0.34 (22)	AI 0,34-8TQ					
0.5 (20)	AI 0,5-8WH		14	1.1	2.5	
0.75 (18)	AI 0,75-8GY			1.3	2.8	

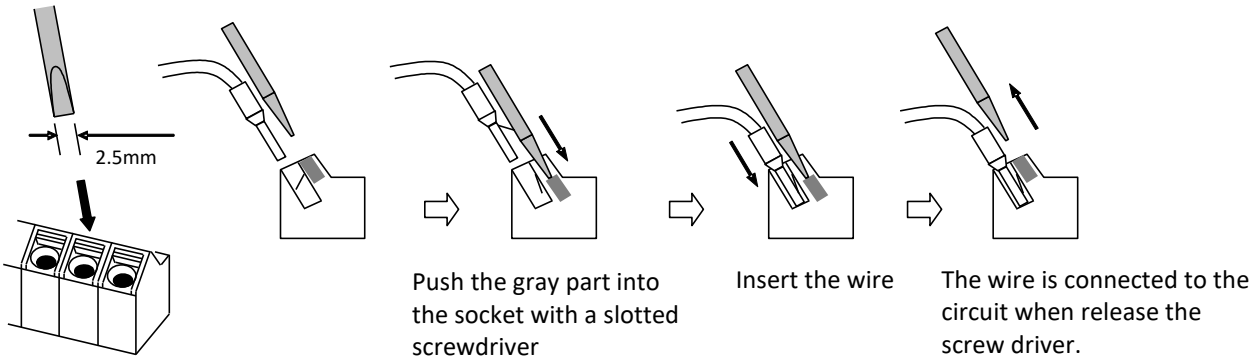
Note: Ferrule terminal with sleeves

- Manufacturer: Phoenix Contact
- Crimping tool: CRIMPFOX UD 6-4 or CRIMPFOX ZA 3

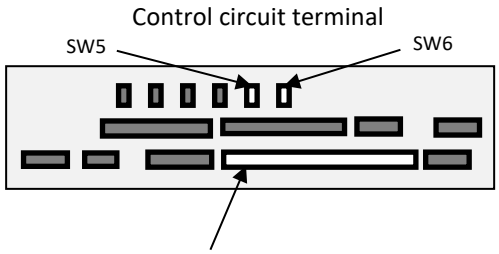
Wiring procedure

1. Push the gray part on the control circuit terminal block into the socket with a slotted screwdriver (with a wide of 2.5mm or less). (Insertion hole will open)
2. Insert the wire or ferrule terminal into the wire insertion hole (round) while pressing the gray part with a slotted screwdriver.
3. The wire is connected to the circuit when release the screw driver.

• Even for pulling out the wire from the socket, press the gray part with a slotted screwdriver (the insertion hole will be opened while pressing).



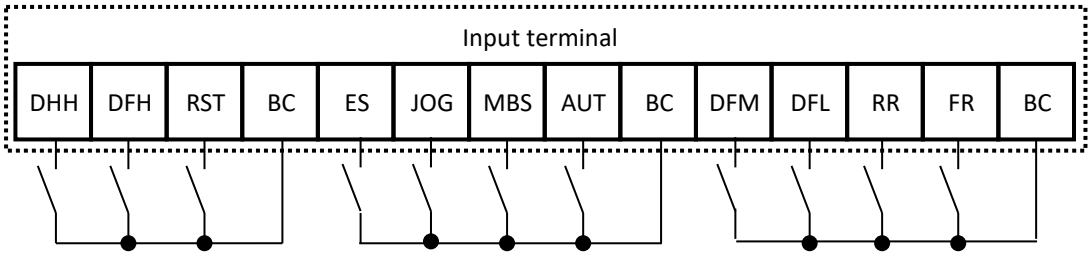
2.11 Control circuit wiring section



Input terminals

- All COMs have the same electric potential.
- Change SW5 to external power source (EX) to connect the power source between Input terminals and COM.
- Sink or source logic of the input terminal is switched by SW6.

(Wiring example)



- [ ] it means factory default settings.

			Terminal label	Terminal name	Description	Electric characteristics
Intelligent input terminal	Digital input	Contact	FR, RR, DFL,DFM AUT,MBS, JOG, ES,RST	Input terminal	Terminal functions are selectable according to the parameter settings for each terminal. Switching SW6 to SRC or SINK allows you to select SINK or Source logic.	Voltage between each input and COM terminals • ON voltage Min.DC18V • OFF voltage Max.DC3V • Max. allowable voltage DC27V • Load current 5.6mA(at DC27V)
		Pulse	DFH	Pulse input-A	This is a terminal for pulse input. A and B terminals can be used also as an input terminal. Terminal functions are selectable according to the parameter settings for each terminal. The maximum input pulse rate is 32kpps.	Voltage between an input and COM terminals • ON voltage Min.DC18V • OFF voltage Max.DC3V • Max. allowable voltage DC27V • Load current 5.6mA(at DC27V) • Max input pulse rate 32kpps
			DHH	Pulse input-B		
		Common	COM	Input (common)	This is a common terminal for digital input terminals (1, 2, 3, 4, 5, 6, 7, 8, 9, A and B). Three COM terminals are available.	-

Terminal's default function ([symbol: setting No.])

Terminal label	Description
[AUT: 015]Command change	Change to the main speed command [AA101] (OFF) or sub-speed command [AA102] (ON).
[MBS: 032]Free-run stop	[MBS] ON sets the motor in a free-run state.
[JOG: 029]Jogging	Run at a frequency of [AG-20] upon receipt of the operation command by [JOG] ON.
[ES: 033]External trip	[ES]ON issues Trip [Er012].
[RST: 028]Reset	Reset at every trip.

[FR:001]Forward rotation and [RR:002] Reverse rotation

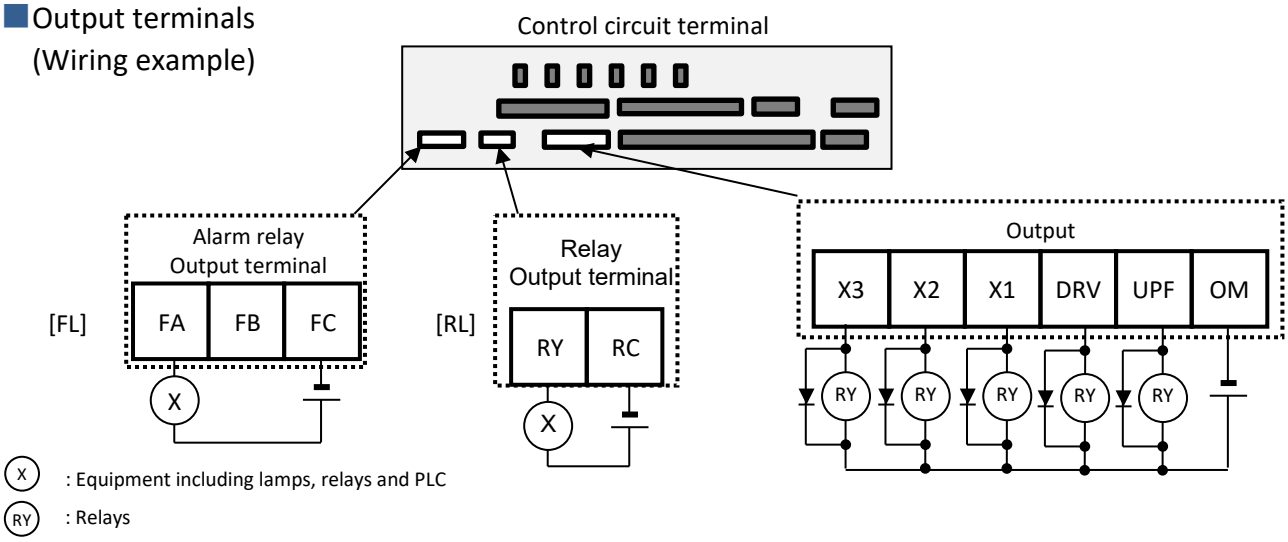
Forward	Reverse	Description
OFF	OFF	No command
ON	OFF	Forward rotation command operation
OFF	ON	Reverse rotation command operation
ON	ON	No command (inconsistent logic)

[DFL:003]Multispeed-1 and [DFM:004]Multispeed-2 commands

Multispeed-1 DFL	Multispeed-2 DFM	Description
OFF	OFF	The set frequency source is enabled.
ON	OFF	The frequency source of [Ab-11] is enabled.
OFF	ON	The frequency source of [Ab-12] is enabled.
ON	ON	The frequency source of [Ab-13] is enabled.

- Setting DFH and DHH allows you to set up to 16-speed.

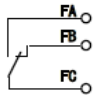
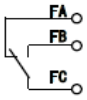
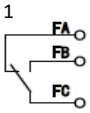
Output terminals (Wiring example)



(X) : Equipment including lamps, relays and PLC

(RY) : Relays

			Terminal label	Terminal name	Description	Electric characteristics
Output terminals	Digital output	Open collector	UPF DRV X1 X2 X3	Output terminal	Terminal functions are selectable according to the parameter settings for each terminal. This is available for both SINK and Source logics.	Open collector output Between each terminal and OM • Voltage drop when turned on: 4 V or less • Max. allowable voltage 27V • Max. allowable current 50mA
			OM	Output (common)	This is a common terminal for output terminals UPF to X3.	-
		Relay	RY RC	[RL] 1a relay terminal	Relays for A contact output	Maximum contact capacity • AC250V, 2A(resistance) • AC250V, 1A(inductive load) (Minimum contact capacity) • DC1V, 1mA
			FA FB FC	[FL] 1c relay terminal	Relays for C contact output [CC-17] =01 (Factory setting) Power supply OFF is same as fig. 1. Fig. 1	Maximum contact capacity FB/FC: • AC250V, 2A(resistance) • AC250V, 0.2A(inductive load) FA/FC: • AC250V, 1A(resistance) • AC250V, 0.2A(inductive load) Minimum contact capacity (common) • AC100V, 10mA • DC5V, 100mA

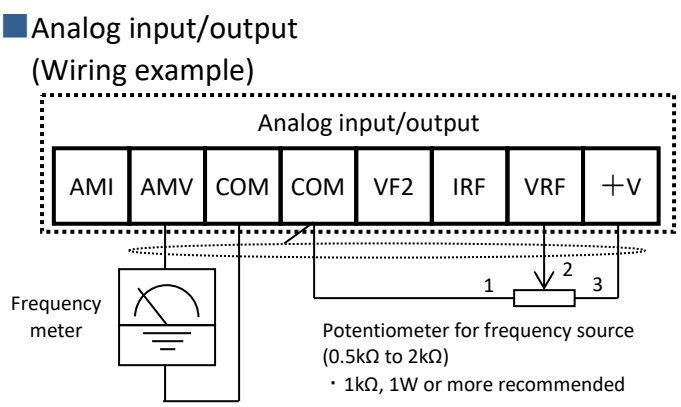
CC17	Power supply ON: 01	Power supply ON: 00
Normal Operation		
Tripping		

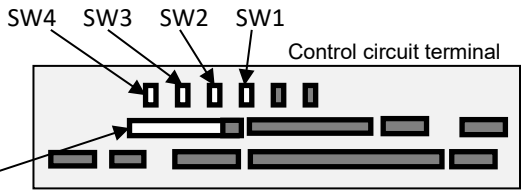
Terminal function for Initial setting ([symbol: setting No.])

Terminal label	Description
[DRV: 001]Running signal	Turns ON during operation (PWM output).
[UPF: 002]Frequency-arrival signal	Turns ON when the output frequency reaches the control frequency.
[X1:003]Frequency-arrival signal 2	Turns ON when the output frequency reaches the control frequency [CE-10] to [CE-13].
[X2:007]Ready	Turns ON when is ready for operation.
[X3:035]Overload notice advance signal	Turns ON when the current exceeds the overload warning level.
[RL: 000] No function assigned	-
[FL: 017] Alarm signal	Turns ON when a trip occurs.

[CC-17]	Power supply	Inverter Status	Digital Output	
			FB-FC	FA-FC
00	ON	Tripping	Closed	Open
		Normal Operation	Open	Closed
	OFF	-	Open	Closed
01 (Initial setting)	ON	Tripping	Open	Closed
		Normal Operation	Closed	Open
	OFF		Open	Closed

Analog input/output (Wiring example)



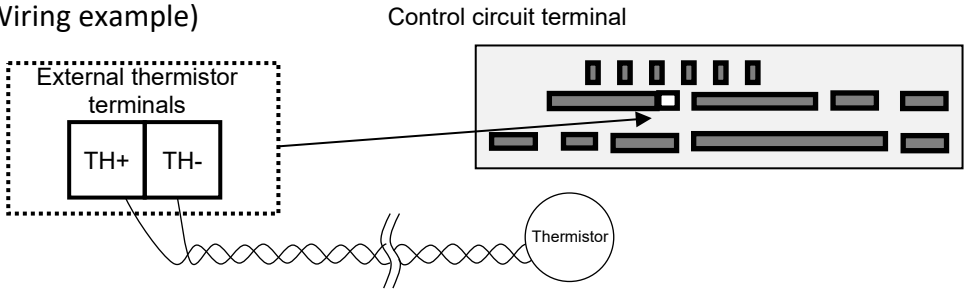


・When variable resistor is connected on +V-VRF-COM terminal, voltage input is given to inverter, Sw1 for analog input 1 (VRF) is to be set on "voltage" side therefore.
・If a frequency meter connected in left example is current type (4 to 20mA), set SW3 for analog output 1 (AMV) as current output.

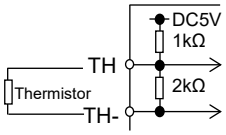
		Terminal label	Terminal name	Description	Electric characteristics
Voltage/current switchable analog input/output terminal	Power supply	L	COM for analog power supply	COM terminals for analog input terminals (VRF, IRF, VF2) and analog output terminals (AMV, AMI). Two COM terminals are available.	-
		H	Speed setting power supply	DC10V power supply. Used for voltage input with analog input terminals (VRF, IRF, VF2) using a variable resister.	Max. allowable input current 20mA
	Analog input	VRF	Analog input terminal 1 (Voltage/current selector SW1)	Either VRF or IRF can be used by switching the selector switch to DC0 to 10V voltage input or 0- to 20mA current input. Used as speed input and feedback input.	For voltage input: • Input impedance Approx.10kΩ • Allowable input voltage DC-0.3V to 12V For current input: • Input impedance Approx.100Ω • Max. allowable input current 24mA
		IRF	Analog input terminal 2 (Voltage/current selector SW2)		
		VF2	Analog input terminal 3	DC-10 to 10V voltage input is available. Used as speed input and feedback input.	Voltage input only: • Input impedance Approx.10kΩ • Allowable voltage input DC-12V to 12V
	Analog output	AMV	Analog output terminal 1 (Voltage/current selector SW3)	Either AMV or AMI can be used as an output for inverter monitoring data by switching the selector switch to DC0 to 10V voltage output or 0 to 20mA current output.	For voltage output: • Max. allowable output current 2mA • Output voltage accuracy ±10% (Ambient temperature: 25±10 degrees C) For current input: • Allowable load impedance 250Ω or less • Output current accuracy ±20% (Ambient temperature: 25±10 degrees C)
		AMI	Analog output terminal 2 (Voltage/current selector SW4)		

Note: Refer to chapter 3.7 to 3.13 for adjustment example.

External thermistor (Wiring example)

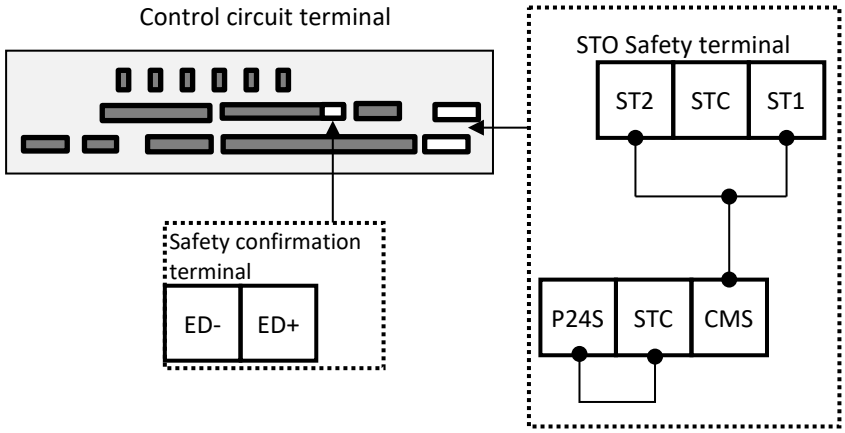


- Twist the cables connected from a thermistor to the TH terminal only between TH+ and TH-, and separate the twisted cables from other cables.
- Since very low current flows through the cables connected to the thermistor, separate the cables from those (power line cables) connected to the main circuit. The length of the cables connected to the thermistor must be 20m or less.

		Terminal label	Terminal name	Description	Electric characteristics
Thermistor terminal	Analog input	TH+	External thermistor input	Connect to an external thermistor to make the inverter trip if an abnormal temperature is detected. Connect the thermistor to TH+ and TH-. The impedance to detect temperature errors can be adjusted within the range 0Ω to 10,000Ω. [Recommended thermistor properties] Allowable rated power: 100 mW or more Impedance at temperature error: 3kΩ	DC0 to 5V [Input circuit] 
		TH-	Common terminal for external thermistor input		

Functional safety STO terminals

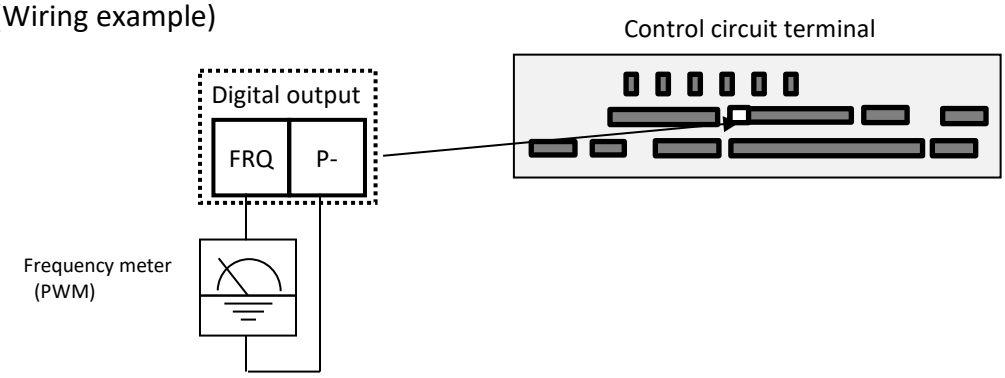
Terminal label	Terminal name
P24S	24V output power source terminal
CMS	COM terminal for functional safety
STC	Logic switching terminal
ST1	STO input1
ST2	STO input2
ED+	Output terminal for monitoring
ED-	Output COM terminal for monitoring



Note: Do not connect P24S, CMS, STC, ST1, ST2 to other control circuit terminals.

FRQ output terminals

(Wiring example)

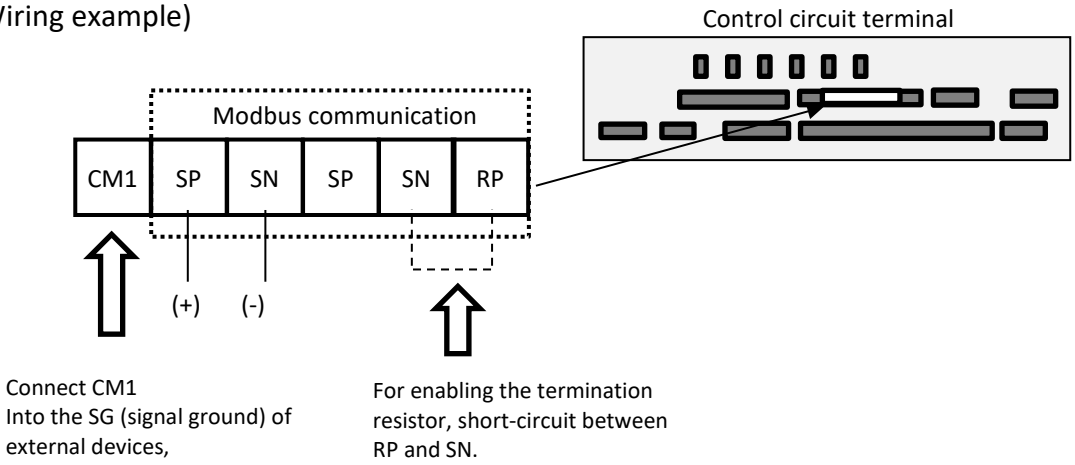


- FRQ output is selectable from PWM output with a fixed cycle of 6.4ms or pulse output with a variable cycle.
- FRQ output is adjustable by parameter settings.

Note: Refer to chapter 3.10 for adjustment example.

		Terminal label	Terminal name	Description	Electric characteristics
FRQ output terminal	Monitor output	FRQ	Digital monitor (voltage)	Digital monitor output is selectable from PWM output with 6.4ms cycle or pulse output with a variable duty cycle of approx. 50%.	Pulse train output DC0 to 10V Max. allowable output current 1.2mA Maximum frequency 3.60kHz
		P-	COM for digital monitor	This is a common terminal for digital monitor. This is also used as 0V reference potential for P24.	-

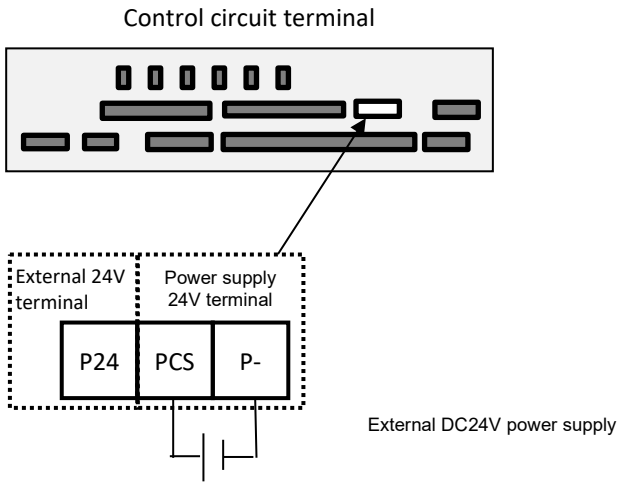
Serial communication (Wiring example)



- SP and SN with the same name are internally connected, which are available for a plurality of wiring.
- For the use of Modbus communication, refer to the "User's guide" to obtain a more detailed description.

		Terminal label	Terminal name	Description	Electric characteristics
RS485 communication	Serial communication	SP SN RP (P−)	MODBUS terminal (RS-485)	SP terminal: RS-485 differential(+) signal SN terminal: RS-485 differential(-) signal RP terminal: Connect to SP through a termination resistor CM1 terminal: Connect to the signal ground of external communication devices. There are two SP and two SN terminals, which are connected internally. The maximum baud rate is 115.2kbps.	Termination resistor (120Ω) integrated Enabled: RP-SN shorted Disabled: RP-SN opened

24V power supply input/output (Wiring example)

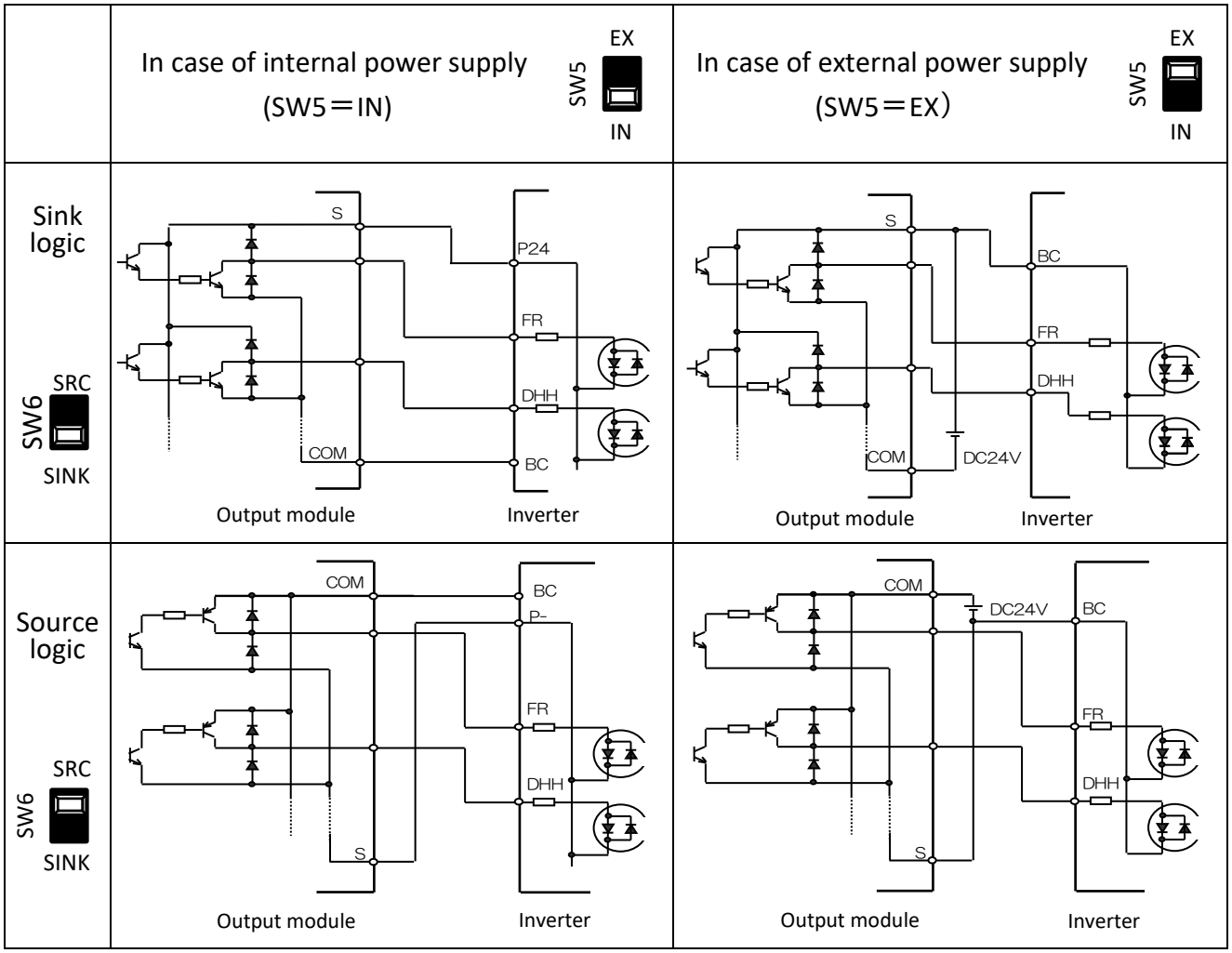


- If connecting DC24V external power supply into the terminal PCS and P-, it is able to change parameters, perform optional communication, digital/analog input/output and running without the main power supply.

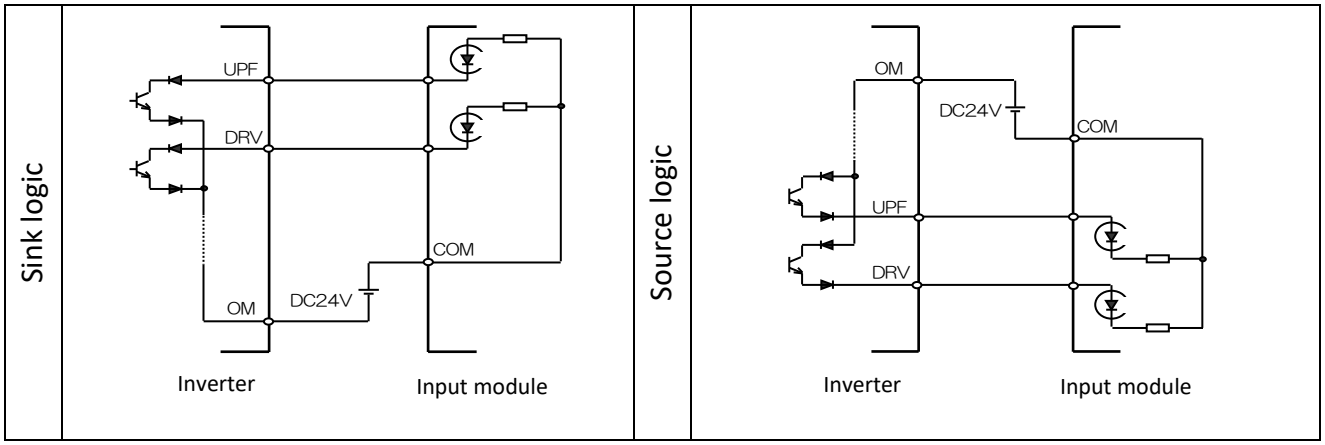
		Terminal label	Terminal name	Description	Electric characteristics
24V power supply	Power input	P24	24V output power source terminal	This terminal supplies DC24V power for contact signals.	Max. output 100mA
		PCS	Terminal for external 24V input (24V)	Input external DC24V power supply to the inverter. 24V power supply input permit to change parameter settings and perform optional communication operations without control power supply.	Allowable input voltage DC24V±10% Max. allowable current 1A
		P-	Terminal for external 24V input (0V)		

2.12 Connection for the Programmable controller

Connection for the Programmable controller and Input terminals



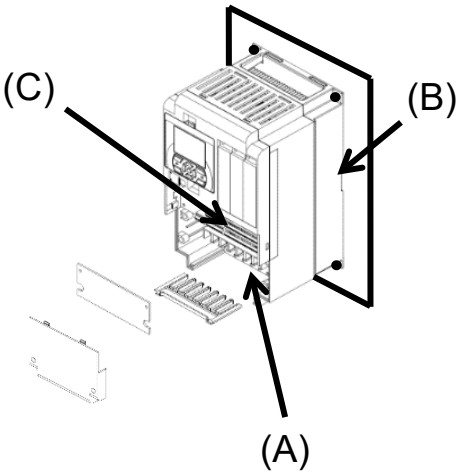
Connection for the Programmable controller and Output terminals



2.13 Residual risk

Parts subject to residual risk

Please check for any residual risk upon completion of the installation before power on.



Residual risk checklist No.

No.	Name of part	⚠ DANGER	⚠ WARNING	⚠ CAUTION
(A)	Main circuit terminal block	8,10	-	-
(B)	Heat sink	4		1
(C)	Input/output terminal block	11,13		-
-	Unspecified parts	9,12,14		2,3,5,6,7

Residual risk checklist

No.	Operational phase	Work	Part	Residual risk	Details of harm or damage	Preventive measures	✓
1	Installation	Installation	(B)	CAUTION	Damage due to rough transportation.	Do not let the product fall. Do not apply force when handing the cover and operator keypad.	□
2			-		Shortened lifetime of parts due to the use in places where the product is exposed to direct sunlight or the temperature is not within the specified range.	Verify that the ambient temperature is within the specified range throughout the year by means of cooling or ventilation.	□
3			-		Short-circuit failure due to the use in places where the temperature is not within the specified range or condensation occurs.	Verify that the ambient temperature is within the specified range throughout the year by means of cooling or ventilation. Install the product in places where no condensation occurs.	□
4			(B)	DANGER	A cooling fan reaching a high temperature exceeding 150 °C causes a fire on a flammable wall.	Install the product on a non-flammable metal wall.	□
5			-	CAUTION	Damage to parts due to entry of dust and corrosive gases.	Install the product inside a totally enclosed panel.	□
6			-		Shortened lifetime of parts due to reduced cooling capability by placing the product horizontally.	Install the product vertically.	□
7			-		A cooling fan failed due to water drops or oil mist when the heat sink is positioned outside.	With the heat sink positioned outside, install the product in places free from water drops and oil mist.	□
8	Installation Maintenance	Wiring	(A)	DANGER	A fire is caused inside by an arc due to screws loosened by vibrations.	Regularly check the tightening of screws.	□
9			-		A fire from flammable materials caused by an arc due to screws loosened by vibrations.	Regularly check the tightening of screws. Do not place flammable materials near the product.	□
10	Use Maintenance	Wiring Inspection	(A)	DANGER	Electric shock by touching a high voltage part with the cover removed.	Do not open the cover when the power is on. Wait for 10 minutes or more after the power is off, and then confirm that the voltage between P and N is significantly less than 45Vdc to start the work.	□
11			(C)		Electric shock by touching a high voltage part with a tool with the cover removed.	Do not open the cover when the power is on. Wait for 10 minutes or more after the power is off, and then confirm that the voltage between P and N is significantly less than 45Vdc to start the work.	□

・The installation, wiring and setting work must be conducted by qualified engineers.

No.	Operational phase	Work	Part	Residual risk	Details of harm or damage	Preventive measures	✓
12 (a)	Installation	Wiring	-	DANGER	Motor insulation damage due to surge caused by long distance motor wiring.	When the motor wiring distance exceeds 20m or more, try to shorten the wiring. Use LCR filter or output AC reactor.	□
12 (b)					Motor damage due to insulation failure caused by motor voltage unmatched.	Use motor according to the inverter voltage class.	□
12 (c)					Motor damage due to unstable power supply, caused by power supply unbalance, low voltage or excessive voltage drop.	Confirm the inverter power supply voltage, feeding method and capacity.	□
12 (d)	Use Maintenance	Wiring Inspection	-	DANGER	Motor damage due to continue ran in open phase on motor output line.	Verify the motor output line that not being in open phase.	□
12 (e)	Use Maintenance	Setting	-	DANGER	Motor damage due high current on motor caused by inadequate parameter setting.	Set adequate value for related function parameter of motor electronic thermal level [bC-01] to [bC125]. Set adequate value for base frequency, motor rated current, control mode, motor constant, load rating, direct current output related parameters. (representative parameter) Motor related parameter: IM: [Hb102] to [Hb118] SM(PMM): [Hd102] to [Hd118] Control mode: [AA121] Load rating: [Ub-03] DC braking: [AF101] to [AF109]	□
13	Use	Operation	(C)	DANGER	The motor once stopped runs automatically.	If automatic restart after motor stop is set by a function, make sure to clearly describe that in the system.	□
14	General	General	-	DANGER	Damage or injury occurrence from a hidden risk.	Confirm that system is structured for fail safe considering a risk assessment.	□
15			-	-	Damage or injury occurrence by missing acquisition of information related to risk	Obtain the latest version of user's guide to make those information available. Inform users appropriately.	□

・The installation, wiring and setting work must be conducted by qualified engineers.

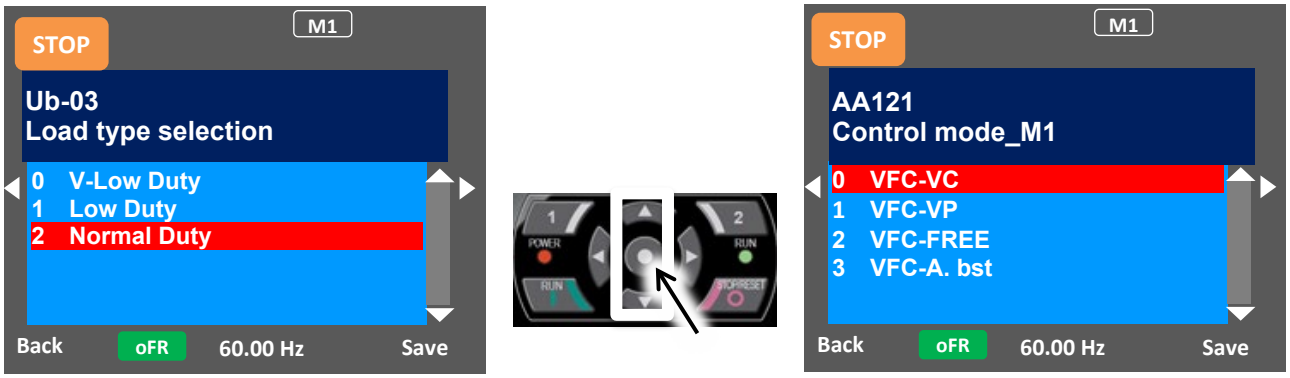
・For using [SET] function of input terminal, similarly, set the related 2nd parameters settings.

Chapter 3 Operation Setting and Examples of I/O Adjustment

This chapter describes basic settings, frequency source required for operation, examples of run command source settings and examples of adjusted I/O terminals. See “Chapter 4 Settings” for detailed operating instructions.

3.1 Set the load rating

Select [Ub-03] load specification selection on the parameter setting screen.



- When [Ub-03] is changed, the parameters set for the current are automatically adjusted in proportion to the changed rated current, and the set values are changed.
- Therefore, Please set [Ub-03] at first because of the rated current value will be changed in overload restriction, electronic thermal or warning functions.

■Parameter

Parameter	Details	Setting data
[Ub-03]	Select the load specification.	00: V-Low Duty (VLD) 01: Low Duty (LD) 02: Normal Duty (ND)

- The underlined value is set by default.

3.2 Set the motor data

Set the parameters listed in the table below on the parameter setting screen according to the motor you use (e.g. induction motor and permanent-magnet motor).

■Parameter

Induction motor (IM)

Parameter	Details	Setting data
[AA121]	Control pulse setting	00: V/f control constant torque characteristic , etc.
[Hb101]	Motor setting	03: IE3 motor, etc.
[Hb102]	Capacity selection	0.01 to 75.00 (kW)
[Hb103]	Motor poles setting	2 to 48 (poles)
[Hb104]	Base frequency	10.00 to 590.00 (Hz)
[Hb105]	Maximum frequency	
[Hb106]	Rated voltage	1 to 1000 (V)
[Hb108]	Rated current	0.01 to 10000.00 (A)

Note: When AA121 setting is 03, 07 to 12 (Vector control), the motor constant setting is required for driving IM.

Synchronous motor (permanent-magnet motor) (SM(PMM))

Parameter	Details	Setting data
[AA121]	Control pulse setting	11: SM(PMM) Sensor less vector control
[Hd102]	Capacity selection	0.01 to 75.00 (kW)
[Hd103]	Motor poles setting	2 to 48 (poles)
[Hd104]	Base frequency	10.00 to 590.00 (Hz)
[Hd105]	Maximum frequency	
[Hd106]	Rated voltage	1 to 1000 (V)
[Hd108]	Rated current	0.01 to 10000.00 (A)

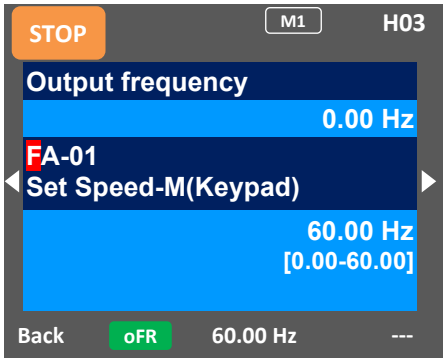
Note: Motor constant setting is required for driving SM.

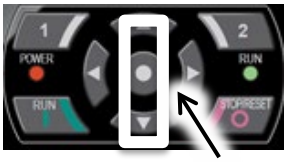
The frequency source and run command source are necessary to drive the motor.

3.3 Frequency setting from keypad

- Select [AA101] = 07 Frequency source from parameter setting screen.
- Changing frequency setting from each source
  (1) [FA-01] for frequency setting from keypad or
  (2) [Ab110] for frequency setting at multispeed profile.

E.g.) For [FA-01]





■Frequency source

- Change the frequency source setting [Ab110] to "Multispeed-0 speed No.1" by using the up and down arrow keys.

■Parameter

Parameter	Details	Setting data
[AA101]	Frequency source setting from keypad	07
[FA-01] Note	Main speed command	0.00Hz
[Ab110] Note	Multispeed-0 speed No. 1	

Note: While [AA101] = 07, a change made in either [FA-01] or [Ab110] will be automatically reflected in the other.
When no change can be made or is reflected in [FA-01], the operator keypad is not specified as a command source by the terminal function or [AA101].
You need to set the frequency value to a value other than 0.00.

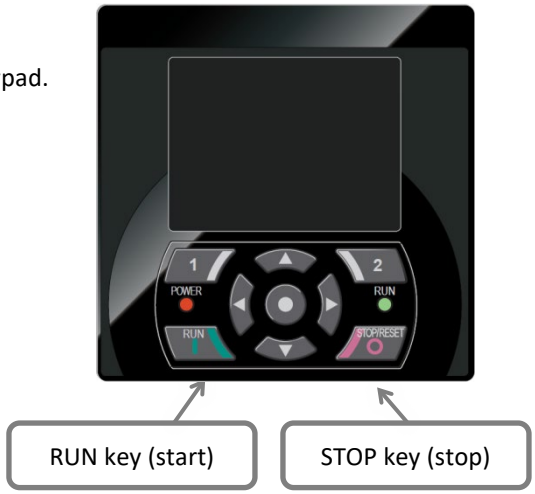
3.4 Run using the operator keypad

- Select [AA111] = 02 on the parameter setting screen to RUN from keypad.

■Run/stop command
Press the RUN key and STOP key on the operator keypad to start and stop the inverter, respectively.

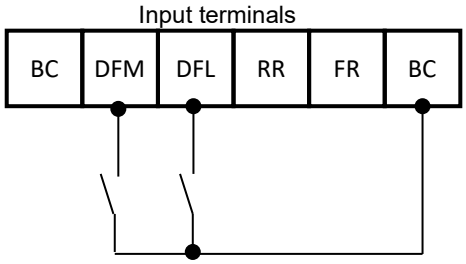
■Parameter

Parameter	Details	Setting data
[AA111]	Run by pressing the RUN key of keypad.	02



3.5 Multispeed terminals command

・While multispeed command is off, the speed command will follow the parameter setting [AA101].
・To use multispeed 0, select [AA101] = 07 frequency source selection.



■Frequency command source
・Change the frequency command by turning ON/OFF from multispeed input terminals [DFL] and [DFM].

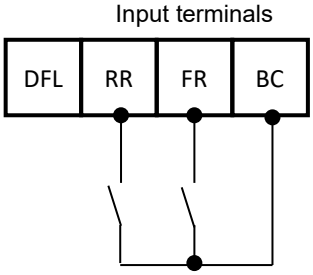
■Parameter

Parameter	Details	Setting data
[AA101]	Frequency setting from keypad	07
[FA-01] Note:1	Main speed source	0.00Hz
[Ab110] Note:1	Multispeed 0 setting 1st motor ([DFL]OFF/[DFM]OFF)	
[Ab-11] Note:2	Multispeed 1 setting ([DFL]ON/[DFM]OFF)	
[Ab-12] Note:2	Multispeed 2 setting ([DFL]OFF/[DFM]ON)	
[Ab-13] Note:2	Multispeed 3 setting ([DFL]ON/[DFM]ON)	
[CA-03]	The terminal 3 for [DFL]	001
[CA-04]	The terminal 4 for [DFM]	002

Note: 1. While [AA101] = 07, a change made in either [FA-01] or [Ab110] will be automatically reflected in the other. When no change can be made nor is reflected in [FA-01], the operator keypad is not specified as a command source by the terminal function or [AA101].
2. Set the frequency value for multispeed selection.

3.6 Operate using FR/RR terminal

・Select [AA111] = 00 [FR] [RR] terminal from parameter setting screen.



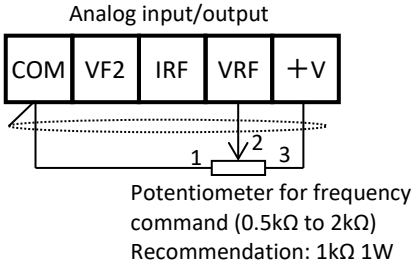
■Run/stop command
・Run or stop by turning either [FR] terminal or [RR] terminal ON/OFF.

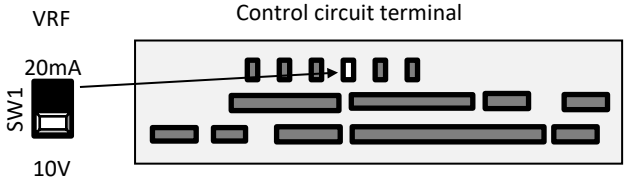
■Parameter

Parameter	Details	Setting data
[AA111]	Run using FR/RR terminal	00
[CA-01]	The terminal 9 for [FR]	001
[CA-02]	The terminal 8 for [RR]	002

3.7 Potentiometer frequency command

・Select [AA101] = 01 VRF terminal input from parameter setting screen.
・Select voltage input (0 to 10V) for VRF switch of control circuit board.





■Frequency command
・Adjust the position of the knobs on the potentiometer to change the frequency command.

■Parameter

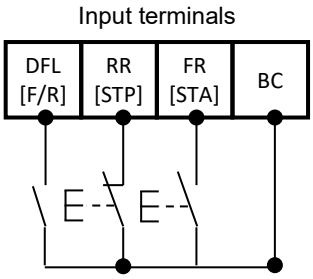
Parameter	Details	Setting data
[AA101]	Set as frequency command for VRF input terminal.	01

■Regarding Frequency command input from the IRF terminal.
・The IRF terminal is current input (4 to 20 mA) in factory setting. It can switch to voltage input by setting the IRF switch on the control board to the voltage side.
・When setting the voltage input to 0 to 10 V, please change the parameter [Cb-15] from the initial value of 20.0 to 0.0. To set the frequency command with the IRF terminal input, please select the parameter [AA101] = 02.

3.8 Operate using 3WIRE terminal

・Select [AA111] = 01 to 3WIRE function from parameter setting screen. In this section, 3WIRE functions are assigned into the input terminals.
・Terminal FR[CA-01] = 016 ; terminal RR[CA-02] = 017 ; terminal DFL[CA-03] = 018

■Run/stop command
・To run turn ON [STA] terminal, and turn ON [STP] terminal to stop. Select the rotation direction with [F/R] terminal.



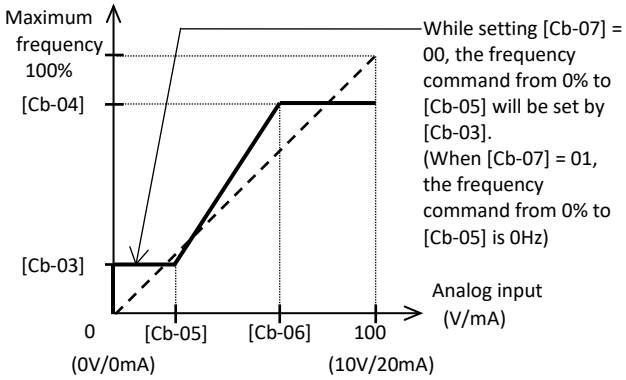
■Parameter

Parameter	Details	Setting data
[AA111]	Set the operation command for 3WIRE function.	01
[CA-01]	The terminal FR is [STA].	016
[CA-02]	The terminal RR is [STP].	017
[CA-03]	The terminal DFL is [F/R].	018

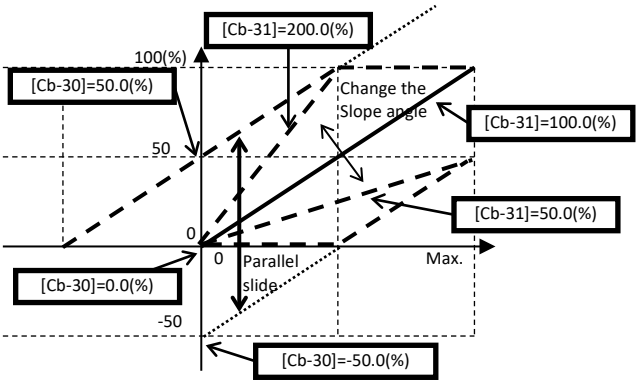
3.9 Adjust the analog input (VRF/IRF)

E.g.) Adjust operation (E.g. for VRF)

・Set the ratio to input to limit the operating range of the frequency command.
(When selecting the frequency through terminal input)



E.g.) Make a fine adjustment (E.g. for VRF)



■Parameter

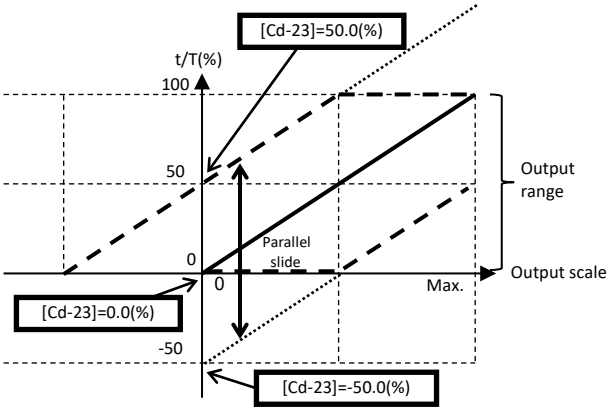
Parameter		Details
VRF	IRF	
[Cb-03]	[Cb-13]	Set the frequency source ratio to the start ratio of the analog input.
[Cb-04]	[Cb-14]	Set the frequency source ratio to the end ratio of the analog input.
[Cb-05]	[Cb-15]	Set the start ratio of the analog input 0 to 10V/0 to 20mA.
[Cb-06]	[Cb-16]	Set the end ratio of the analog input 0 to 10V/0 to 20mA.
[Cb-30]	[Cb-32]	Adjust the zero-point reference line for voltage input 10V/current input 20mA and the maximum frequency.
[Cb-31]	[Cb-33]	Adjust the slope of the reference line for voltage input 10V/current input 20mA.

・IRF adjustment can be done in similar way to VRF by using IRF parameters in order to VRF.
Use the switch on control circuit terminal board to change for voltage/current input.

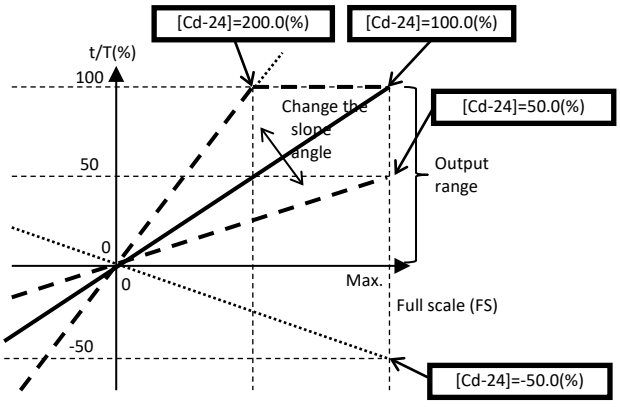
3.10 Adjust the analog output (AMV/AMI/FRQ)

E.g.) Adjust operation (E.g. for AMV)

・Set a value equivalent to 0% output first.



・Then, adjust a value equivalent to 100% output.



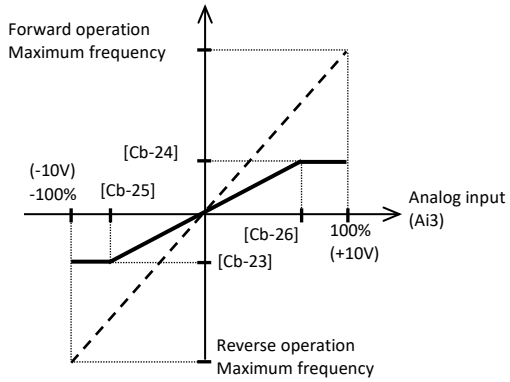
■Parameter

Parameter			Details
AMV	AMI	FRQ	
[Cd-23]	[Cd-33]	-	Adjust the zero-point reference line for voltage output 10V/current output 20mA and data at 100%.
[Cd-24]	[Cd-34]	-	Adjust the slope for voltage output 10V/current output 20mA and data at 100%.
-	-	[Cd-13]	Adjust the zero-point reference line for 100% duty cycle output and data at 100%.
-	-	[Cd-14]	Adjust the slope for 100% duty cycle output and data at 100%.

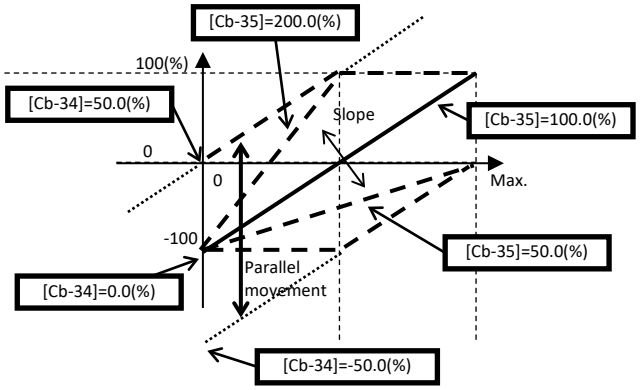
・Analog output terminals AMV/AMI can be switched to voltage or current output with a Dip Switch on the control board.
Factory setting is AMI=voltage output and AMI=current output. When changing the voltage or current output of AMV or AMI, please always review the above table parameter [Cd-23] [Cd-24] [Cd-33] [Cd-34].

3.11 Adjust the analog input (VF2)

E.g.) Adjust operation (E.g. for VF2)



E.g.) Make a fine adjustment



■Parameter

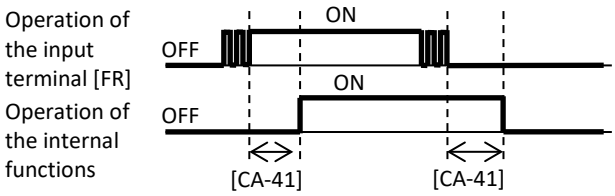
Parameter VF2	Details
[Cb-23]	Set the frequency source ratio to the start ratio of the analog input.
[Cb-24]	Set the frequency source ratio to the end ratio of the analog input.
[Cb-25]	Set the start ratio of the analog input -10V to 10V.
[Cb-26]	Set the end ratio of the analog input -10V to 10V.
[Cb-34]	Adjust -10V on the reference line for -10V/10V and the frequency.
[Cb-35]	Adjust the slope of the reference line.

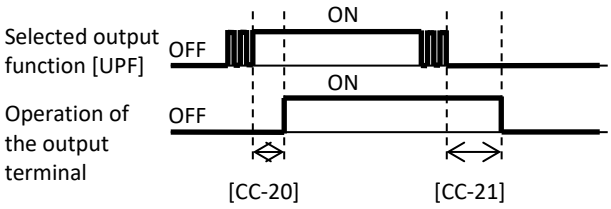
3.12 Prevent input terminal malfunction

・Set a response time for input terminal to prevent a malfunction due to noise input.

3.13 Stabilize an output terminal

・Set the delay time to stabilize an output terminal from a sensitive reaction of internal functions.





■Parameter

Input terminal	Response time	Input terminal	Response time
FR	[CA-41]	JOG	[CA-47]
RR	[CA-42]	ES	[CA-48]
DFL	[CA-43]	RST	[CA-49]
DFM	[CA-44]	DFH	[CA-50]
AUT	[CA-45]	DHH	[CA-51]
MBS	[CA-46]		

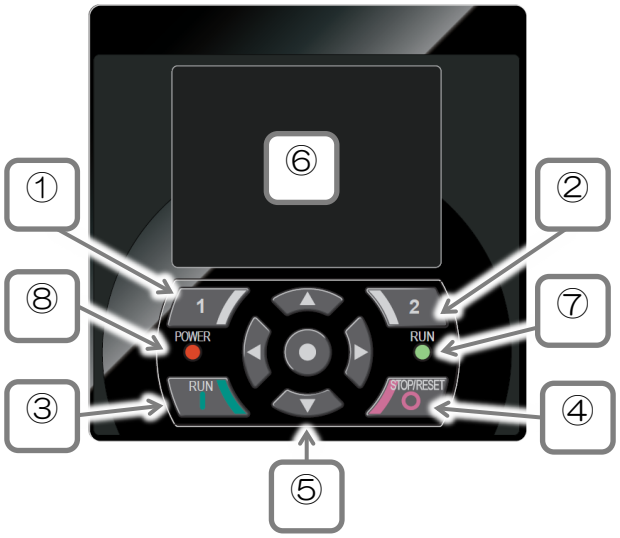
Output terminal	On-delay time	Off-delay time
UPF	[CC-20]	[CC-21]
DRV	[CC-22]	[CC-23]
X1	[CC-24]	[CC-25]
X2	[CC-26]	[CC-27]
X3	[CC-28]	[CC-29]
RL	[CC-30]	[CC-31]
FL	[CC-32]	[CC-33]

Chapter 4 Parameter Setting

4.1 Keypad overview

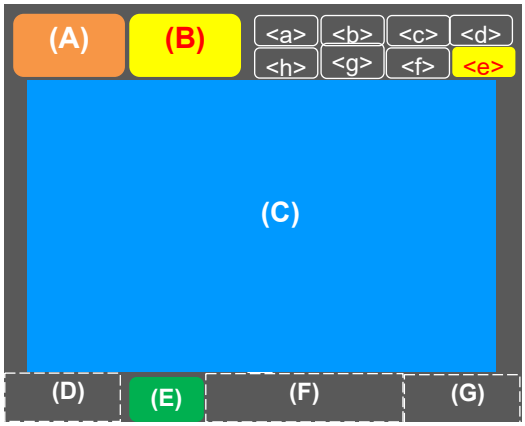
4.1.1 How to use the keypad

- Image colour may differ from the real product.



No.	Name	Description
①	F1 key	Transition to home, cancel, etc. Function of the key is indicated at the bottom left of the screen.
②	F2 key	Save data, etc. Function of the key is indicated at the bottom right of the screen.
③	RUN key	Motor motion starts when this key is pressed.
④	STOP/RESET keys	Decelerate to stop or reset the tripping.
⑤	UP/DOWN LEFT/RIGHT keys & SEL key (centre)	To move between the screen/data use UP/DOWN LEFT/RIGHT. To select the data, press the SEL key.
⑥	Monitor screen	Display parameters and data.
⑦	RUN LED	Turns ON while RUN command is in execution.
⑧	POWER LED	Turns ON while the keypad is powered-on.

4.1.2 Display mode ⑥



No.	Description
(A)	Operation status
(B)	Warning status
(C)	Data/parameters
(D)	Function assigned to F1 key
(E)	Function of RUN key
(F)	Frequency reference, Torque reference, Inverter Name, Clock, etc. Selected by F2 Option
(G)	Function assigned to F2 key

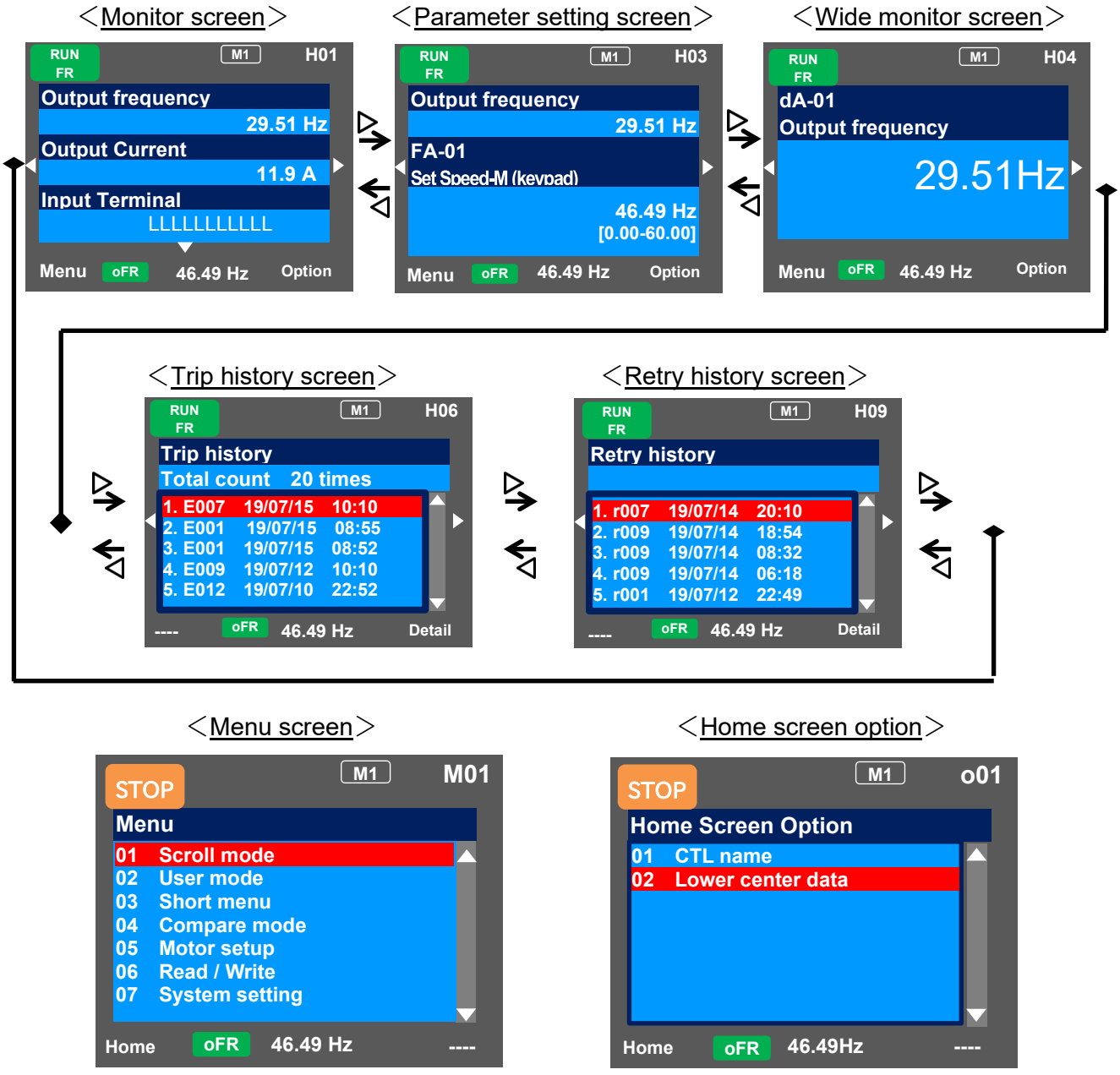
No.	Name	Description
<a>	Pow	Type of power supply (Input)
<b>	SET	SET terminal for 1st/2nd motor setting.
<c>	Prm	Parameter display mode
<d>	No.	Screen number
<e>	STO	Functional Safety. STO
<f>	Cntrl	Control mode
<g>	-	Reserved
<h>	Spcl	Special functions

With the system configuration, you can set the keypad display language. Refer to “4.1.11 System setting (07)”.

Menu 07: System setting = 01 → Language selection = 02 (English)

4.1.3 Monitor mode

For screens not described below, refer to User's Guide.
Pressing F1 key will return to any monitor screen.



By selecting the F2(2) key option from the home screen, you can change the content of display of assist bar.

＜Menu screen＞

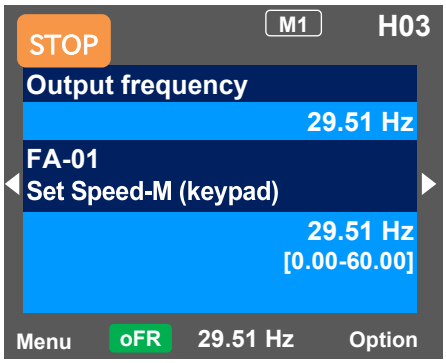
No.	Name	Description	Reference
01	Scroll mode	Parameters can be change while monitoring.	4.1.5
02	User mode	The user mode display user-registered parameters only.	4.1.6
03	Short menu	The short menu displays regularly used parameters for the inverter	4.1.7
04	Compare mode	This mode display the parameters that have been modified from initial settings.	4.1.8
05	Motor setup	This mode display the parameters that are related to basic motor settings.	4.1.9
06	Read / Write	Data can be stored in the keypad and then copied to other inverter unit.	4.1.10
07	System setting	With the system configuration, set and adjust keypad related parameters.	4.1.11

＜Home Screen Option Menu＞

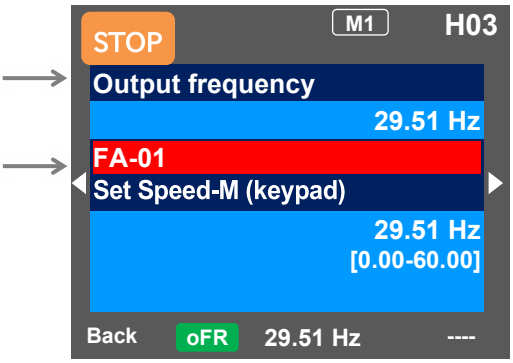
Option		Description
01 Controller (Inverter) name		You can specify 8-digit string from alphanumeric letters and symbols.
02 Lower center data	00 Frequency command	The current frequency command is displayed.
	01 Torque command	The current torque command is displayed (during torque control).
	02 Real time	The current time is displayed.
	03 Controller name	The specified controller (inverter) name is displayed.

4.1.3.1 Parameter setting screen

Change the parameter.

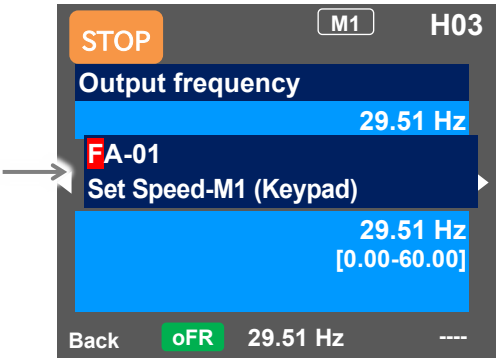


Press the SEL (O) key.



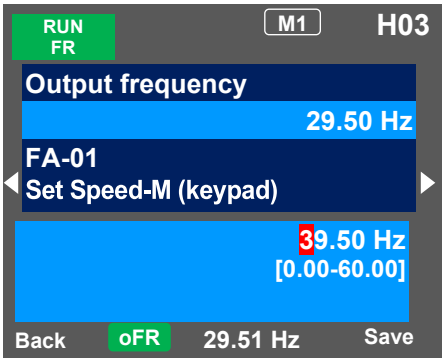
An area in the screen will be highlighted.

With UP/DOWN (△▽) keys select either parameter or monitor area then will be highlighted.
If SEL (O) key is pressed, the parameter code can be changed.

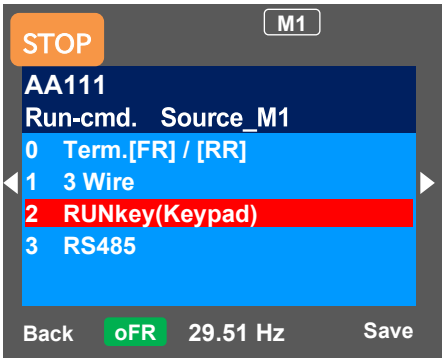


Using UP/DOWN/LEFT/RIGHT (△▽◁▷) keys the function code to be monitored can be changed, pressing again the SEL (O) key give access to the function parameter. Press 1 key to return back.

＜In case of changing numeric type parameter value＞



＜In case of changing choice type parameter value＞
The lower area of the display shows the selectable item.

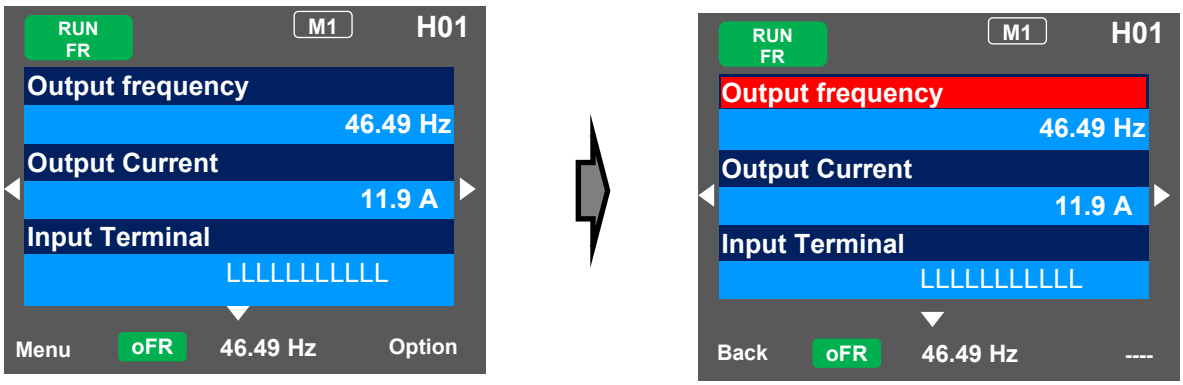


With UP/DOWN/LEFT/RIGHT (△▽◁▷) keys change the parameters value, **And then press the SEL (O) key to save the changes.**

4.1.3.2 Monitor

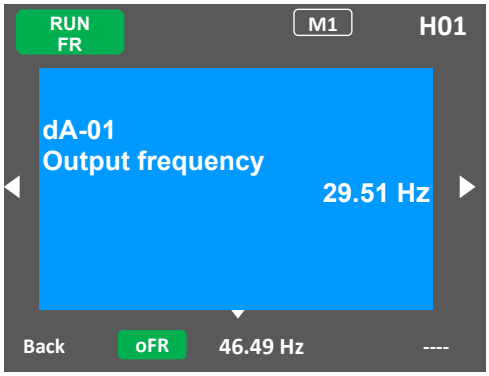
To change the monitor details.

Press the SEL (O) key while on the monitor screen, highlighting the first line as result.



Then with UP/DOWN (△▽) is possible to highlight the one desired of the three monitors.

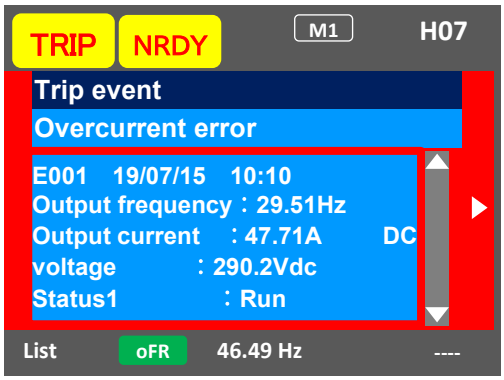
Pressing the SEL (O) key, the code can be accessed.



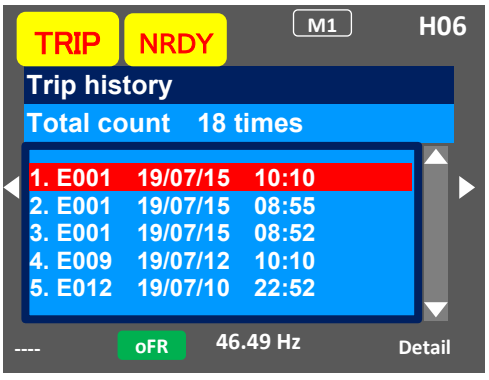
Making use of UP/DOWN/LEFT/RIGHT (△▽◁▷) keys, the code of the parameter to be monitored can be changed, and then with the SEL (O) key confirm the change.
Press 1 key to return back.

4.1.3.3 Trip history screen

＜On tripping event＞



＜In case checking trip history＞



With UP/DOWN (△▽) keys, the trip status can be confirmed. Also, the background will become red.
In the Trip history screen press the SEL (O) key, and with UP/DOWN (△▽) keys highlight a history, then press SEL (O) key to access the details regarding that trip status.

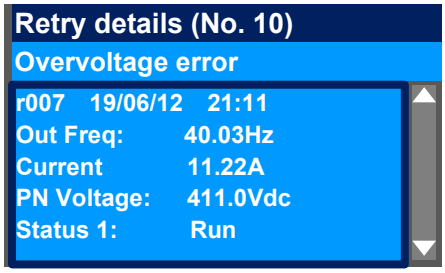
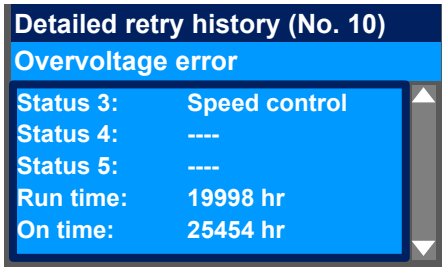
- For more details about the detailed history, please refer to “Chapter 5 Troubleshooting”.
  Put a battery (CR2032) for using clock function.

4.1.3.4 Retry history screen

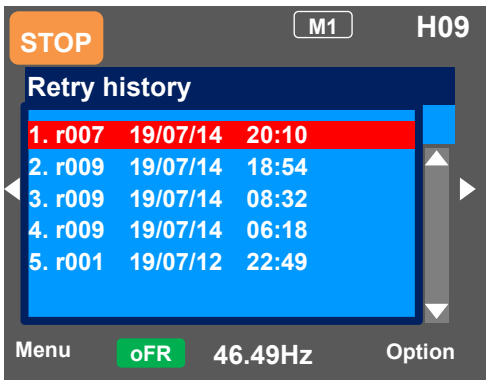
To display time in retry history, you need to configure clock settings.

To use the clock function, you need an optional battery(CR2032).

On the screen that is displayed upon power-on, using the right and left (◁▷) keys, navigate to "H09".

Set-up procedure	Action
	Using the up and down (△▽) keys, select history information you want to check.
	Press the SEL(O) key to show details of the selected history information.
	Using the up and down (△▽) keys, you can check details. Press the F1(1) key to return to the monitor.

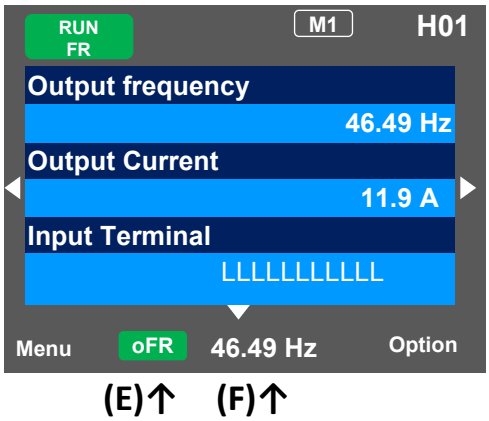
- The retry history screen "Why retry monitor" shows details of the errors that have occurred and the total number of times retry was performed.
- For details of errors, see "Chapter 18 Troubleshooting".



4.1.4 Test run

This explains the method to how to do a test run using the keypad.

＜Home screen＞



4.1.4.1 Confirm the operation command.

- In the position (E) of the upper illustration, when is displayed FR or RR, the RUN key of the keypad is enabled.
  ⇒Go to [4.1.4.2]
- In the cases that is not displayed, and want to operate from the keypad, or want to change the RUN command reference to FR terminal, is necessary to change the RUN command selection.
  ⇒Go to [4.1.4.4]

4.1.4.2 Frequency reference status checking.

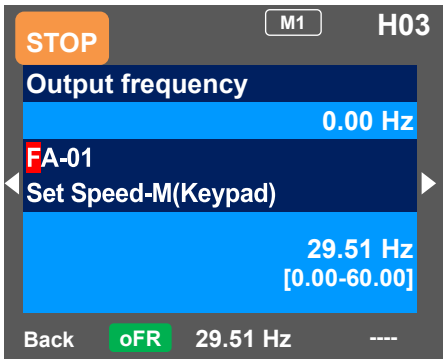
- In the upper illustration, in the position (F), when values other than 0.00 are displayed, the frequency reference is already set.
  ⇒Go to [4.1.4.3]
- In the case that 0.00 is displayed, is necessary to change the value of the frequency reference.
  In the case that you want to change to an analog input and such, the frequency command selection must be changed.
  ⇒Go to [4.1.4.5]

4.1.4.3 Start the output by pressing the RUN key and the motor will accelerate.

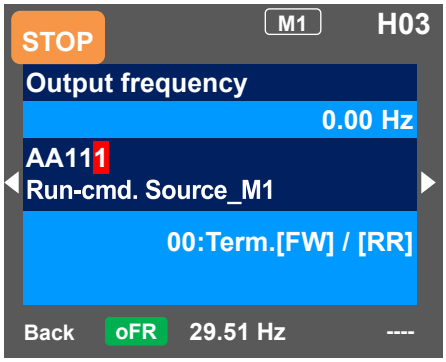
- When the motor does not rotate, please refer to the troubleshooting.

4.1.4.4 RUN command reference change

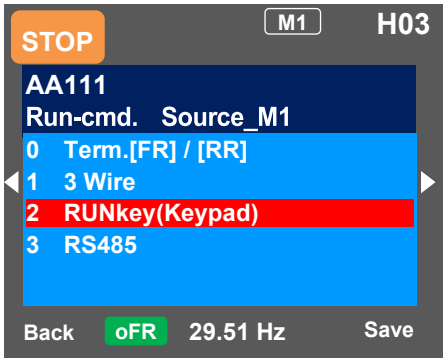
① Press the RIGHT(▷) key, after moving to the parameter setting screen and by pressing the SEL(O) key, the parameter section of the parameter setting screen will blink.



② Change the code with UP/DOWN/LEFT/RIGHT (△▽◁▷) keys to [AA111].



③ Press the SEL(O) key and then with UP/DOWN(△▽) keys select the RUN operation to be executed between all the choices. In this case [03:Keypad's RUN key] is the one selected.

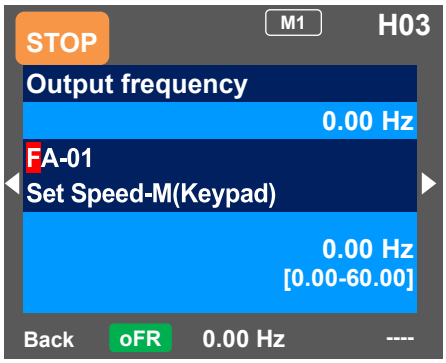


④ To save the changes press the SEL (O) key and then in the position (E) FR or RR should be displayed. Press the F1 key, and will go to Home screen.

⇒Go to [4.1.4.2]

4.1.4.5 Changing frequency reference

① Press the RIGHT (▷) key and after moving to the parameter setting screen, press the SEL (O) key, the parameter section of the parameter setting screen will blink.

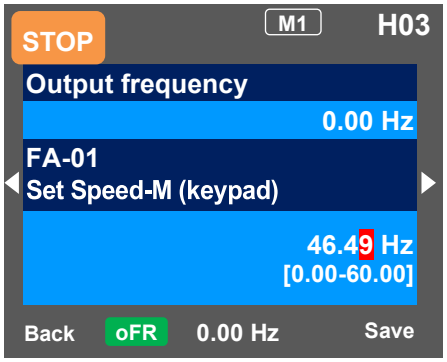


② With UP/DOWN/LEFT/RIGHT(△▽◁▷) keys change the code to [FA-01], then [Main speed reference (keypad)] shall be displayed, the frequency setting can be chosen.

⇒Go to ③

If the displayed screen is different, change the frequency reference source. ⇒Go to ⑤

③ Press the SEL(O) key, with UP/DOWN/LEFT/RIGHT(△▽◁▷) keys change the frequency value.

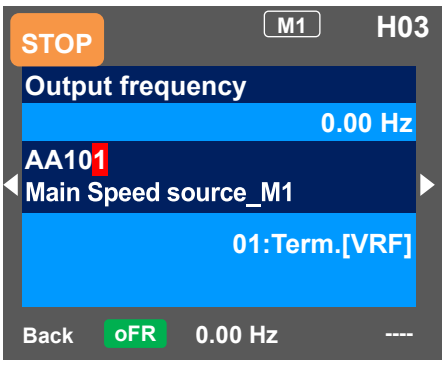


(F)↑

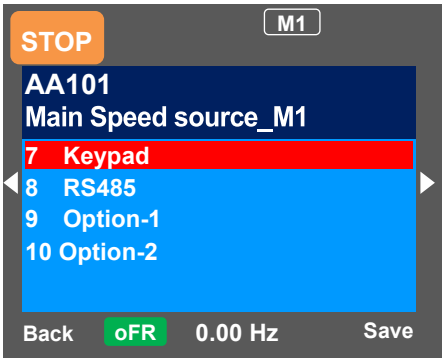
④ To save the changes press the SEL (O) key, and after that in the position (F) should be displayed the set frequency. Press the F1 key, and will go to Home screen.

⇒Go to **[4.1.4.3]**

⑤ With UP/DOWN/LEFT/RIGHT (△▽◁▷) keys change the function code to [AA101].



⑥ Press the SEL(O) key and with UP/DOWN(△▽) keys, select the frequency reference source to be used. [07: Keypad] is selected in this case.



⑦ To save changes press the SEL (O) key, and then in the position (E), FR or RR should be displayed. Press the F1 key, and will go to Home screen.

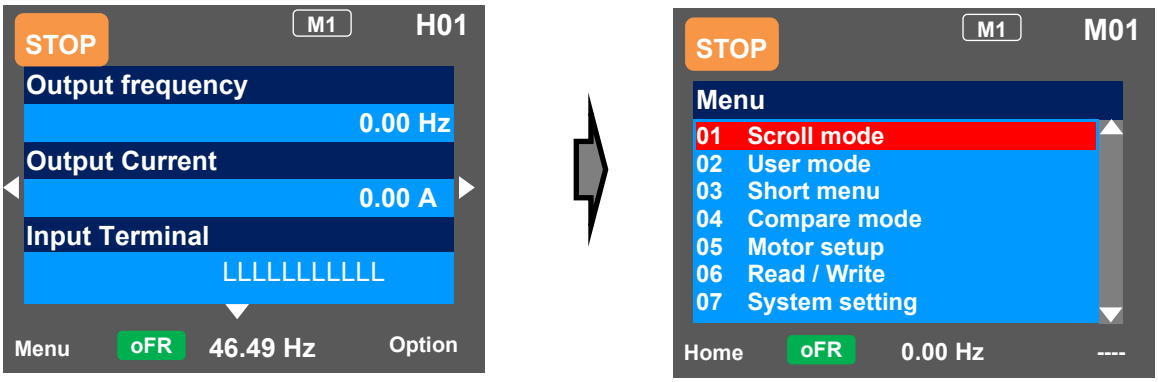
⇒Go to **[4.1.4.2]**

4.1.5 Scroll mode（01）

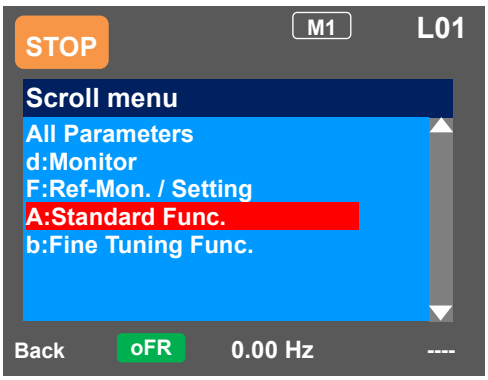
In scroll mode, to set parameters by monitoring monitor, please refer to “4.1.3.1 Parameter setting screen.

4.1.5.1 Try scroll mode

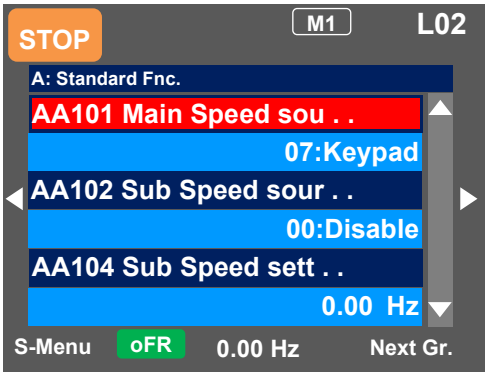
① Press the F1 key [Menu] on [home] screen



② With UP/DOWN (△▽) key select scroll mode to display scroll menu, then, press SEL (0) key to display scroll menu screen.

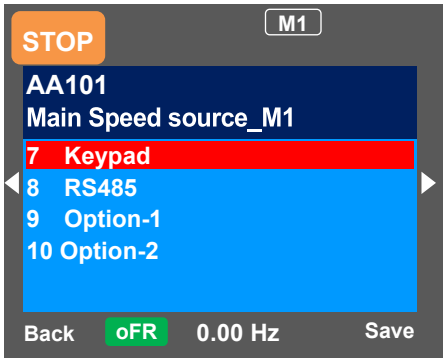


③ Press SEL (0) key follow to UP/DOWN (△▽) key select the monitor group, then return to parameter list.
For example, selecting “A: Standard Func.” then press SEL (0) key.

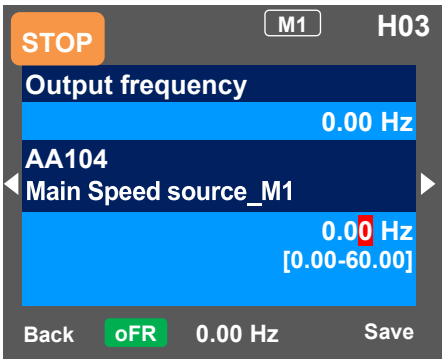


④ Press the SEL (O) key, then, with UP/DOWN (△▽) keys select parameters to change.

⑤ When the parameter is to be set as alternative, Press UP/DOWN (△▽) key to select data and press F2 (Save) key to store then return to parameter list.



⑥ When the parameter is to be set is a numerical value,
Press UP/DOWN/LEFT/RIGHT (△▽◁▷) key to change data and press F2 (Save) key to store to return to parameter list.



- Press F1 (Return) key to return to parameter list without storing the parameter change.
- Parameter selected for reference screen is show in upper line on ⑥.
- When scroll screen is set as initial mode, dA-01, dA-02, dA-03 are displayed as initial setting.

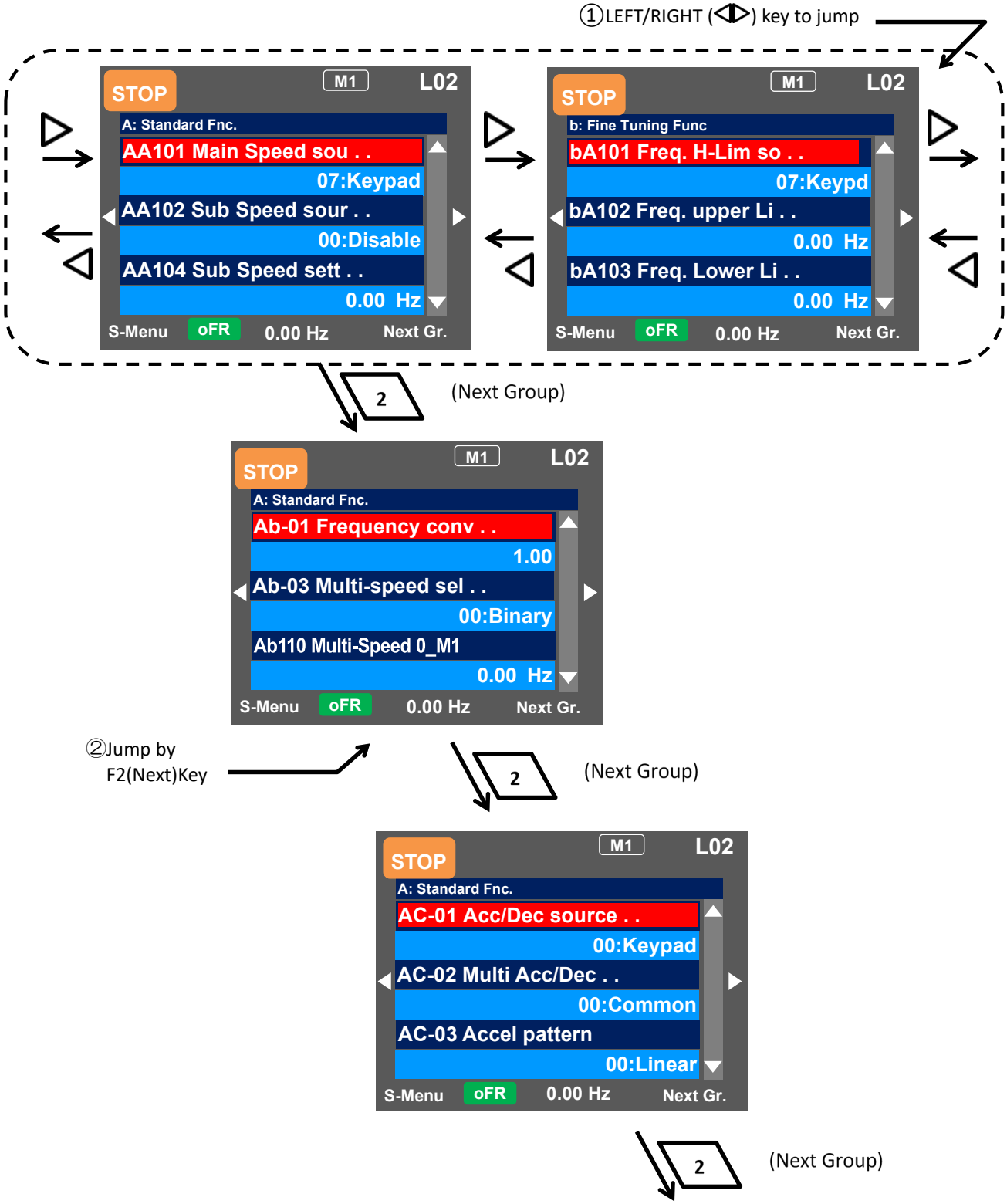
4.1.5.2 Group Jump Function

① Press LEFT/RIGHT (◁▷) key to jump to 1st parameter of each group.

(…⇔All parameters ⇔ d:Monitor ⇔ F:Command Monitor/Setting ⇔…⇔ U:Initial Setting、PDN⇔All Parameters ⇔…)

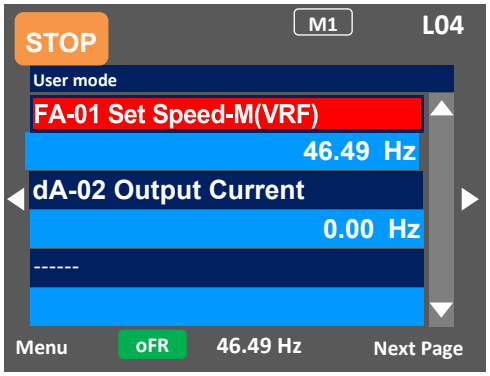
② When to jump to the detailed subgroup (AA, Ab etc) in parameter group, press F2 key.

A group for example : …⇒AA⇒Ab⇒AC⇒…⇒AJ⇒AA⇒



4.1.6 User mode（02）

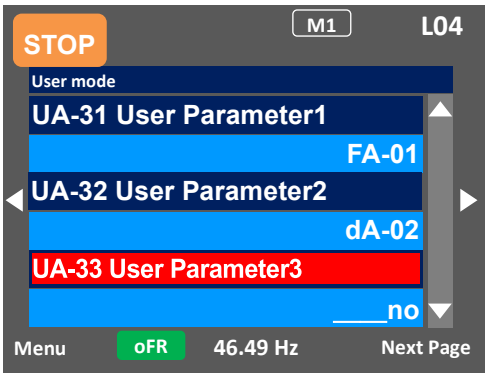
- The user mode will display user-registered parameters only. This will allow to quickly access the parameters that are frequently used or are essential to the user.
- Select the "02 User mode" option from the menu screen, then press the SEL(O) to display the main user mode screen.
- This user mode screen displays the parameters that have been previously registered on the user parameters [UA-31] to [UA-62] in that order.(「-----」 will be displayed in case there is no registered parameter)



＜Main user mode screen＞

＜User mode parameter registration＞

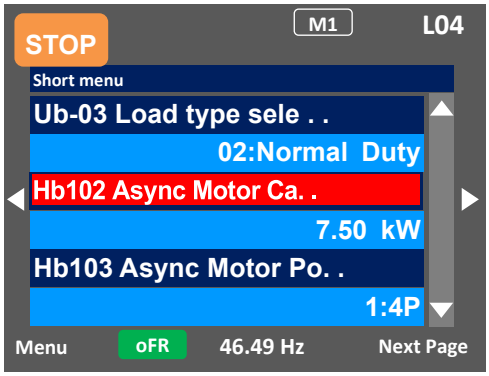
- By pressing the RIGHT(▷)button, the screen will move to the parameter registration screen where the parameters UA-31 to UA-64 are displayed.
- Use the UP/DOWN(△▽)or the F2 key(Next page) to select the required user parameter then press the SEL(0) to display the parameter setting screen, then search and register the required parameter.
- Registering a non-existent parameter will release the registration in that user parameter(「___no」 will be shown instead).



＜User mode screen＞
(Parameter registration screen)

4.1.7 Short menu（03）

- The short menu displays regularly used parameters for the inverter operation allowing the user to configure the inverter more quickly and efficiently.
- Select the "03 Short menu" option from the menu screen, then press the SEL(O) to display the short menu screen.
- The short menu will display the parameters shown in the table below. (These are pre-defined parameters for the short menu)



＜Short menu Screen＞

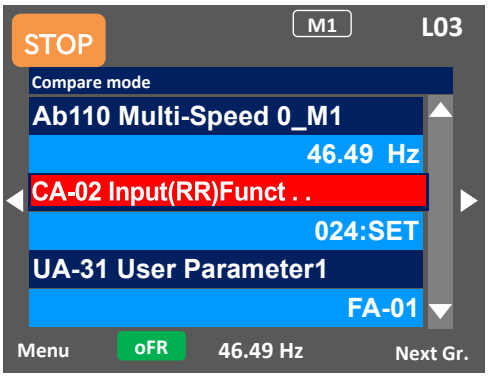
＜Short menu pre-defined parameters＞

No	Code	Name	No	Code	Name
1	Ub-03	Load type selection	15	AA115	STOP mode selection, 1st-motor
2	Hb102	Motor constant selection, 1st-motor	16	Ab110	Multispeed-0 setting, 1st-motor
3	Hb103	Motor poles setting, 1st-motor	17	Ab-11	Multispeed-1 setting
4	Hb104	Motor base frequency setting, 1st-motor	18	Ab-12	Multispeed-2 setting
5	Hb105	Motor maximum frequency setting, 1st-motor	19	Ab-13	Multispeed-3 setting
6	Hb106	Motor rated voltage, 1st-motor	20	bA101	Frequency limit selection, 1st-motor
7	Hb108	Motor rated current, 1st-motor	21	bA102	Upper frequency limit, 1st-motor
8	bC110	Electronic thermal level setting,1st-motor	22	bA103	Lower frequency limit, 1st-motor
9	AA121	Control mode selection, 1st-motor	23	Cb-40	Thermistor type selection
10	bb101	Carrier frequency setting, 1st-motor	24	CC-07	Relay output terminal [RL] function
11	AA101	Main speed input source selection, 1st-motor	25	CC-06	Relay output terminal [FL] function
12	AA111	Run-command input source selection, 1st-motor	26	bA-61	Dynamic brake selection
13	AC120	Acceleration time setting 1, 1st-motor	27	bA-60	Dynamic brake usage rate
14	AC122	Deceleration time setting 1, 1st-motor	28	bA-63	Dynamic brake resistor value

- The number in the No. column represents the short menu display order.

4.1.8 Compare mode (04)

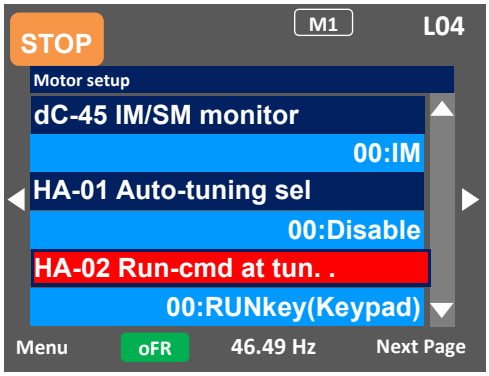
- The compare mode will only display the parameters that have been modified from its initial settings, allowing the user to quickly verify or modify the implemented changes.
- Select the "04 Compare mode" option from the menu screen, then press the SEL(O) to display the compare mode screen.
- The compare mode will not display the parameters that have not been modified from their initial settings.
  Additionally this mode will not display any monitor parameters (Groups d and F).



＜Compare mode screen＞

4.1.9 Motor set up menu (05)

- The motor setup menu displays the parameters that are related to a basic motor setting, allowing the user to quickly configure the inverter to operate a motor.
- Select the "05 Motor setup" option from the menu screen, then press the SEL(O) to display the motor setup screen.
- The motor setup menu will display the parameters shown in the table below. (These are pre-defined parameters for the motor setup menu)



＜Motor setup screen＞

＜Motor setup pre-defined parameters＞

No.	Code	Name	No.	Code	Name
1	dC-45	IM/SM monitor	20	Hd103	Sync. Motor poles setting, 1st-motor
2	HA-01	Auto-tuning selection	21	Hd104	Sync. Motor base frequency setting, 1st-motor
3	HA-02	RUN command selection at auto-tuning	22	Hd105	Sync. Motor maximum frequency setting, 1st-motor
4	HA-03	Online auto-tuning selection	23	Hd106	Sync. Motor rated voltage, 1st-motor
5	Hb102	Motor capacity setting, 1st motor	24	Hd108	Sync. Motor rated current, 1st-motor
6	Hb103	Motor poles setting, 1st-motor	25	Hd110	Sync. Motor constant R, 1st-motor
7	Hb104	Motor base frequency setting, 1st-motor	26	Hd112	Sync. Motor constant Ld, 1st-motor
8	Hb105	Motor maximum frequency setting, 1st-motor	27	Hd114	Sync. Motor constant Lq, 1st-motor
9	Hb106	Motor rated voltage, 1st-motor	28	Hd116	Sync. Motor constant Ke, 1st-motor
10	Hb108	Motor rated current, 1st-motor	29	Hd118	Sync. Motor constant J, 1st-motor
11	Hb110	Motor constant R1, 1st-motor	30	Hd130	Mnimum frequency for Sync. M., 1st-motor
12	Hb112	Motor constant R2, 1st-motor	31	Hd131	No-Load current for Sync. M., 1st-motor
13	Hb114	Motor constant L, 1st-motor	32	Hd132	Starting method for Sync. M., 1st-motor
14	Hb116	Motor constant Io, 1st-motor	33	Hd133	IMPE 0V wait number for Sync. M., 1st-motor
15	Hb118	Motor constant J, 1st-motor	34	Hd134	IMPE detect wait number for Sync. M., 1st-motor
16	HA110	Stabilization constant, 1st-motor	35	Hd135	IMPE detect number for Sync. M., 1st-motor
17	HA115	Speed response, 1st-motor	36	Hd136	IMPE 0V voltage gain for Sync. M., 1st-motor
18	Hb180	Output voltage gain, 1st-motor	37	Hd137	IMPE 0V Mg-pole position offset for Sync. M., 1st-motor
19	Hd102	Sync. Motor capacity setting, 1st motor			

- The number in the No. column represents the short menu display order

4.1.10 Read/Write function (06)

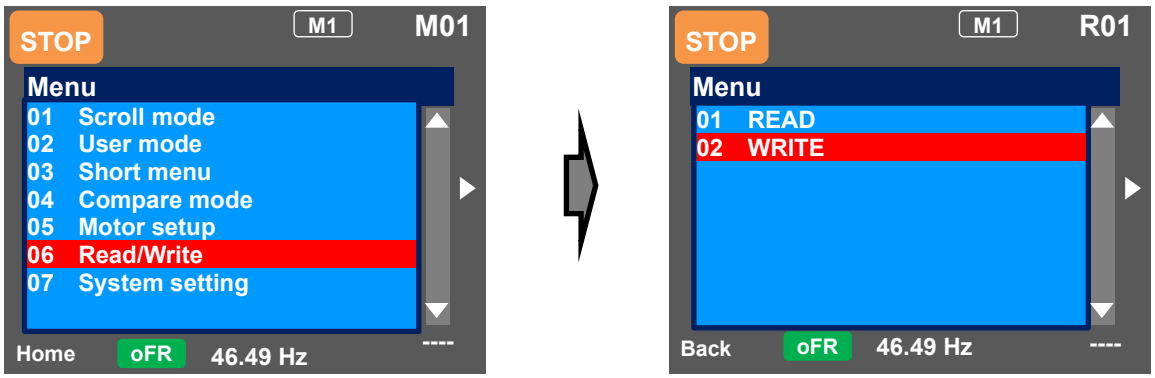
Data can be stored in the keypad and then copied to other inverter unit.

It is strongly recommended to make backup of the data just in case.

Refer to user's guide for a more detailed explanation.

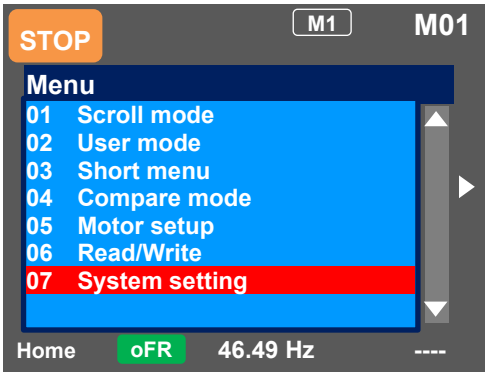
(1) Select R/W from menu

(2) "Read" function is used for storing the data from the inverter to the keypad.
"Write" function is used for copying the data stored in the keypad to the inverter



4.1.11 System setting (07)

With the system configuration, you can set and adjust keypad related parameters.



Available actions in the system configuration

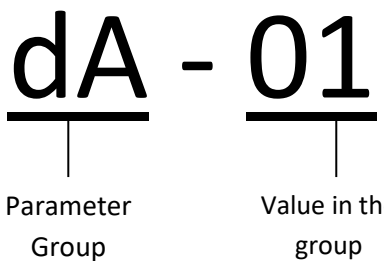
No.	Name	Description
01	Language selection	Set the keypad display language. (02:English/03:Japanese)
02	Dimming	Set the dimming.
03	Lights-off time Note:1	Set the no-operation time to the lights-off.
04	Dimming (at off)	Set the dimming at lights-off.
05	Auto-home time	Set the no-operation time to home screen.
06	Initial display	Set initial display. (01:Quick View/02:Verify View/03:Clear View/04:Scroll mode)
07	Read lock	Set the READ data protection. (00:OFF/01:ON)
08	Trip flashing	Set the backlight flashing by trip. (00:Invalid/01:Valid)
09	Date and time Note:2	01:Time setting/02:Display format
10	Battery-less alarm	Select the battery-less alarm. (00:Invalid/01:Valid)
11	Background color	Set the background color. (00:Blue/01:Green/02:Gray)
12	Inverter information monitor	Check HF-430NEO information.
13	Controller Type select	Select 01: HF-430NEO.
14	Keypad version	Display the keypad version.
15	Keypad initialization	Initialize the keypad. (00:No/01:Yes)
16	Self-check mode	This function will be executed Self-check mode. (01:Key & Led check/02:TFT check 03:RTC check/04:Data Flash check/05:RS422 check/06:Debug mode 07:Version)
17	Remote mode	Select the Remote mode. (F1 Key) (00:Disable/01:Enable)
18	Reserved	Do not change this parameter. (01:OFF)

Note: 1. The auto backlight-off function will deactivate during in trip status until trip reset.

2. Battery is required to use date function. Recommend: CR2032, 3V
The battery is to be replacing every two years while the inverter is power off.

[dA-01] to [dA-41]

4.2 Monitor naming (Nomenclature)



4.3 Description of monitor functions

• For more detail, please refer to HF-430NEO user's guide.

Monitors for all data

■Monitor mode (D code：Monitor)

Code/Name	Range (unit)
dA-01 Output frequency monitor	0.00 to 590.00(Hz) <Actual frequency output>
dA-02 Output current monitor	0.00 to 655.35(A)
dA-03 Rotation direction monitor	F(forward)/r(reverse) d(0Hz output)/o(stop)
dA-04 Frequency reference monitor (after calculation)	-590.00 to 590.00(Hz) <as target value>
dA-06 Output frequency scale conversion monitor	0.00 to 59000.00(Hz)
dA-08 Detect speed monitor	-590.00 to 590.00(Hz) <Encoder feedback required>
dA-12 Output frequency monitor (signed)	-590.00 to 590.00(Hz)
dA-14 Frequency upper limit monitor	0.00 to 590.00(Hz)
dA-15 Torque reference monitor (after calculation)	-1000.0 to 1000.0(%) <Torque control mode required>
dA-16 Torque limit monitor	0.0 to 500.0(%)
dA-17 Output torque monitor Note:1	-1000.0 to 1000.0(%)
dA-18 Output voltage monitor	0.0 to 800.0(V)
dA-20 Current position monitor	When [AA121]≠10 or [AA123]≠03 -536870912 to +536870911 (pulse) Parameter setting other than above -2147483648 to +2147483647(pulse)
dA-26 Pulse train position deviation monitor	-2147483647 to +2147483647(pulse)
dA-28 Pulse count monitor	0 to 2147483647(pulse)
dA-30 Input power monitor	0.0 to 75(kW)
dA-32 Accumulated input power monitor	0.0 to 1000000.0(kWh)
dA-34 Output power monitor	0.00 to 75(kW)
dA-36 Accumulated output power monitor	0.0 to 1000000.0 (kWh)
dA-38 Motor temperature monitor	-20.0 to 200.0(degree Celsius)
dA-40 DC bus voltage monitor	0.0 to 1000.0(V)
dA-41 DBTR load rate monitor	0.00 to 100.00(%)

[dA-42] to [dA-83]

Code/Name	Range (unit)
dA-42 Electronic thermal load rating monitor (Motor)	0.00 to 100.00(%)
dA-43 Electronic thermal load rating monitor (Inverter)	
dA-45 Safety STO monitor	00(no input)/01(P-1A) 02(P-2A)/03(P-1b) 04(P-2b)/05(P-1C) 06(P-2C)/07(STO)
dA-46 to 47 Reserved	-
dA-50 Control terminal type	00(P1-TM)/02(P1-TM2) 15(not connect)
dA-51 Input terminal monitor	LLLLLLLLLLL to HHHHHHHHHHH [L:OFF/H:ON] [Left](DHH)(DFH)(RST)(ES)(JOG)(MBS) (AUT)(DFM)(DFL)(RR)(FR)[Right]
dA-54 Output terminal monitor	LLLLLLL to HHHHHHH [L:OFF/H:ON] [Left](FL)(RL)(X3)(X2)(X1) (DRV)(UPF)[Right]
dA-60 Analog input/output status monitor Note:2	AAAAAAAA to VVVVVVVV [A: Current/V: Voltage] [Left](Ao4(Io4/Vo4))(Ao3(Io3/ Vo3))(Ai5(Ii5/Vi5)) (Ai4(Ii4/Vi4))(AMI)(AMV)(IRF) (VRF)[Right]
dA-61 Analog input [VRF] monitor	0.00 to 100.00(%)
dA-62 Analog input [IRF] monitor	
dA-63 Analog input [VF2] monitor	-100.00 to 100.00(%)
dA-64 Analog input [Ai4] monitor	0.00 to 100.00(%)
dA-65 Analog input [Ai5] monitor	
dA-66 Analog input [Ai6] monitor	-100.00 to 100.00(%)
dA-70 Pulse train input monitor (internal)	
dA-71 Pulse train input monitor (option)	
dA-81 Option slot-1 status	00:(none) /01:(P1-EN) 03:(P1-PN) /06:(P1-PB) 07(P1-CCL) 18:(P1-AG) 33:(HF-FB)
dA-82 Option slot-2 status	
dA-83 Option slot-3 status	

Note: 1. dA-17 is invalid when the Control mode selection (AA121/AA221) setting is 00 to 06 (V/f control mode).
2. dA-60 is available also for the terminals of the option terminal board

[db-01] to [db-64]

Code/Name	Range (unit)
db-01 to 23 Reserved	-

Code/Name	Range (unit)
db-30 PID1 feedback value 1 monitor	0.00 to 100.00(%) (it also depends on [AH-04], [AH-05], [AH-06])
db-32 PID1 feedback value 2 monitor	
db-34 PID1 feedback value 3 monitor	
db-36 PID2 feedback value monitor	0.00 to 100.00(%) (it also depends on [AJ-04], [AJ-05], [AJ-06])
db-38 PID3 feedback value monitor	0.00 to 100.00(%) (it also depends on [AJ-24], [AJ-25], [AJ-26])
db-40 PID4 feedback value monitor	0.00 to 100.00(%) (it also depends on [AJ-44], [AJ-45], [AJ-46])
db-42 PID1 target value monitor	0.00 to 100.00(%) (it also depends on [AH-04], [AH-05], [AH-06])
db-44 PID1 feedback value monitor	
db-50 PID1 output monitor	-100.00 to +100.00(%)
db-51 PID1 deviation monitor	-200.00 to +200.00(%)
db-52 PID1 deviation 1 monitor	
db-53 PID1 deviation 2 monitor	
db-54 PID1 deviation 3 monitor	
db-55 PID2 output monitor	-100.00 to +100.00(%)
db-56 PID2 deviation monitor	-200.00 to +200.00(%)
db-57 PID3 output monitor	-100.00 to +100.00(%)
db-58 PID3 deviation monitor	-200.00 to +200.00(%)
db-59 PID4 output monitor	-100.00 to +100.00(%)
db-60 PID4 deviation monitor	-200.00 to +200.00(%)
db-61 Current PID P-Gain monitor	0.0 to 100.0
db-62 Current PID I-Gain monitor	0.0 to 3600.0(s)
db-63 Current PID D-Gain monitor	0.0 to 100.0(s)
db-64 PID feedforward monitor	-100.00 to 100.00(%)

[dC-01] to [dE-50]

Code/Name	Range (unit)
dC-01 Inverter load type status	00(Very Low duty) 01(Low duty) 02(Normal duty)
dC-02 Rated current monitor	0.0 to 6553.5(A)
dC-07 Main speed input source monitor	01 to 34 Note:1
dC-08 Sub speed input source monitor	00 to 06,08,25 to 33 Note:1
dC-10 RUN command input source monitor	00 to 06 Note:2
dC-15 Cooling fin temperature monitor	-20.0 to 200.0(°C)
dC-16 Life assessment monitor	LL to HH [L:Normal/H:Fatigued] [Left](FAN lifespan) (board capacitor life span)[Right]
dC-20 Accumulated number of starts monitor	1 to 65535(cycles)
dC-21 Accumulated number of power-on times monitor	
dC-22 Accumulated RUN time monitor	1 to 1000000(hour)
dC-24 Accumulated power-on time monitor	
dC-26 Accumulated cooling-fan run time monitor	
dC-37 Icon 2 LIM monitor	00(Other than below) 01(OC suppress) 02(OL restriction) 03(OV suppress) 04(TRQ Limit) 05(Freq. Limit) 06(Min. Freq.)
dC-38 Icon 2 ALT monitor	00(Other than below) 01(OL notice) 02(Motor thermal notice) 03(Controller thermal notice) 04(Motor overheating notice)
dC-39 Icon 2 RETRY detail monitor	00(Other than below) 01(Waiting for retry) 02(Waiting for restart)
dC-40 Icon 2 NRDY detail monitor	00(Other than below) 01(Trip occurrence) 02(Power supply error) 03(Resetting) 04(STO) 05(Standby) 06(Data Warning, etc.) 07(Reserved) 08(Free run) 09(Forced stop)
dC-45 IM/SM monitor	00 (IM selected) 01 (SM selected)
dC-50 Firmware ver. Monitor	00.000 to 99.255
dC-53 Firmware Gr. Monitor	00(Standard)

Note: 1. 00(disabled)/01(VRF)/02(IRF)/03 (VF2)/04(Ai4)/05(Ai5)/06(Ai5) 07(Multi-speed 0)/08(auxiliary speed)/09 to 23(Multi-speed1 to 15)/ 24(JOG[AG-20])/25(RS485)/26(option-1)/27(option-2)/28(option-3)/ 29(Pulse train input (internal))/30(Pulse train input (option) 31(Reserved) 32(PID)/33(Reserved)/34(AHD retention speed)/

2. 00([FR]/[RR] terminal)/01(3-wire)/02(Keypad's RUN key) 03(RS485)/04(Option1)/05(Option2)/06(Option3)

Code/Name	Range (unit)
dE-50 Warning monitor	Refer to users guide

[FA-01] to [FA-40]

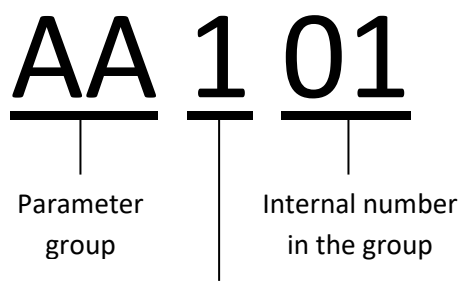
■Variable mode monitor(F code)

(Reference Monitor/Setting)

- If a parameter that is being monitored by one of the [FA] parameters can be modified, it can directly be modified through that [FA] parameter.

Code/Name	Range (unit)
FA-01 Main speed reference monitor	0.00 to 590.00(Hz)
FA-02 Sub-speed reference monitor	-590.00 to 590.000(Hz)(at monitor) 0.00 to 590.00(Hz)(at setting)
FA-10 Acceleration time monitor	0.00 to 3600.00(s)
FA-12 Deceleration time monitor	
FA-15 Torque reference monitor	-500.0 to 500.0(%)
FA-16 Torque bias monitor	
FA-20 Position reference monitor	When [AA121]≠10 or [AA123]≠03 -268435455 to +268435455 (pulse) Other than above. -1073741823 to +1073741823 (pulse)
FA-30 PID1 set-point 1 monitor	-100.00 to 100.00(%) (Adjustable with[AH-04] [AH-05][AH-06])
FA-32 PID1 set-point 2 monitor	
FA-34 PID1 set-point 3 monitor	
FA-36 PID2 set-point monitor	-100.00 to 100.00(%) (Adjustable with[AJ-04][AJ-05] [AJ-06])
FA-38 PID3 set-point monitor	
FA-40 PID4 set-point monitor	

4.4 Parameter naming (Nomenclature)



－：Common for 1st and 2nd motor
1：1st motor enabled if function [SET] is OFF
2：2nd motor enabled if function [SET] is ON

- By default the motor 1 is enabled in the case that 08:[SET] is not assigned in the Intelligent Input terminals [CA-01] to [CA-11].

[SET] function enable code example.

[SET]OFF	[SET]ON
[**-**] type	[**-**] type
[**1**] type	[**2**] type

(Example)

[SET]OFF	[SET]ON
[AH-01]	[AH-01]
[Ub-01]	[Ub-01]
・・・	・・・
[Hb101]	[Hb201]
[Ab110]	[Ab210]
[bA122]	[bA222]
・・・	・・・

- **When using 2nd motor parameter setting by [SET] function of terminal, description as 1st motor setting in the following part is to be replaced with that of 2nd motor setting.**

4.5 Parameter arrangement

Next is the parameter explanation, such as the parameter group and the internal group number line-up.
The [SET] classification numbers "-" and "1" are lined without distinction, except "2" which is lined-up after "-" and "1".

Example) Regarding the order
[AA101]⇒[AA102]⇒[AA104]⇒[AA105]⇒…
⇒[AA123]⇒[AA201]⇒…⇒[AA223]⇒
[Ab-01]⇒[Ab-03]⇒[Ab110]⇒[Ab-11]⇒…
(Parameters order depends on the last 2 digit.)
⇒[Ab-25]⇒[Ab210]⇒
[AC-01]⇒…
(At first the parameters which middle character is "-" or "1" are shown, next the parameters which middle character is "2" are shown, then the group will change.)

- **Depending on display restriction function, Parameters may not be displayed in order.**
Refer to [UA-10][UA-21][UA-22].

4.6 Parameter explanation

Working

- To set parameters, please read an understand HF-430NEO user's guide first.
- For the motor protection, the following parameters are necessary to be set.
-[Hb101] to [Hb108](If [IM])
-[Hd102] to [Hd108](If [SM/PMM])
-[bC110](Motor overload protection current)

- **When option is connected, parameters to display or setting range may be added. For more details, refer to respective User's Guide.**

■Parameter mode (A code：Standard Function)

Frequency reference selection

Code/Name	Range (unit)	Initial value
AA101 Main speed input source selection, 1st-motor	01 to 16 Note	07
AA102 Sub speed input source selection, 1st-motor		00
AA104 Sub speed setting, 1st-motor	0.00 to 590.00(Hz)	0.00
AA105 Speed reference calculation symbol selection, 1st-motor	00(Disable) 01(Addition) 02(Subtraction) 03(Multiplication)	00

Note: 00(Disable)/01(Terminal [VRF])/02(Terminal [IRF])/03(Terminal [VF2]) 04(Terminal [Ai4])/05(Terminal [Ai5])/06(Terminal [Ai6])/07(Parameter Setting)/08(RS485)/09(Option1) 10(Option-2)/11(Option-3)/12(Pulse train input (internal)) 13(Pulse train input (option))/14(Reserved)/15(PID) 16(Reserved)

- To change the frequency input reference, use [AA111].
Example: to set by [FA-01] -> [AA101] =07
To set by Analog (voltage) to set -> [AA101] =01(Ai1)
- To change between main and sub speed is possible with the math operator.
- If [AA105]=00, the Intelligent input terminal 032[AUT] can change between the main(OFF) and sub(ON) speed.
- Through the [AA105] selection, the operator for the main and sub speed frequency calculation is set.

Temporary frequency addition

Code/Name	Range (unit)	Initial value
AA106 Add frequency setting, 1st-motor	-590.00 to +590.00 (Hz)	0.00

- When the [ADD] terminal is active the frequency set in [AA106] will be temporally added to the frequency reference.

[AA111] to [AA115][bb-40]

RUN command selection

Code/Name	Range (unit)	Initial value
AA111 RUN command input source selection, 1st-motor	00([FR]/[RR] terminal) 01(3-wire) 02(Keypad's RUN-key 03(RS485) 04(Option-1) 05(Option-2) 06(Option-3)	02

- Select in which way will be operated.
  In case it does not work, please review it.

Keypad keys settings

Code/Name	Range (unit)	Initial value
AA-12 RUN-key command rotation direction	00(Forward) 01(Reverse)	00
AA-13 STOP-key enable	00(Disable) 01(Enable) 02(Enable only at trip)	01

- [AA-12] specifies in which direction (forward/reverse) will be the rotation after pressing the RUN key in the operation keypad.
- [AA-13] changes the operation of the STOP key. Independently of the actual setting of the STOP key it performs a stop. The STOP circumstances can be changed only by the setting selected in [AA-13].

RUN command direction restriction

Code/Name	Range (unit)	Initial value
AA114 RUN direction restriction,1st-motor	00(No restriction) 01(Only forward) 02(Only reverse)	00

- It will prevent the output to go over the imposed limitation in case of a mistaken operation.

Restart operation after decel/free-run STOP

Code/Name	Range (unit)	Initial value
AA115 STOP mode selection, 1st-motor	00(Deceleration stop) 01(Free-run stop)	00
bb-40 Restart mode after FRS release	00(Start with 0Hz) 01(Start with frequency matching) 02(Start with Active frequency matching) 03(Detect speed) Note	

Note: Feedback input to input terminals DFH and DHH or feedback input to option cassette HF-FB is necessary.

- For when a stop command is executed, deceleration stop or free-run stop can be selected.
- If input terminal 032[MBS] is active (ON), free-run stop is possible.
- With [bb-40], a restart with the release of the [MBS], or a restart operation that will be executed after the free-run-stop operation will be selected.
- If selected free-run-stop (the torque will be lost), it can be configured to stop by inertia in case of the [E007] overvoltage error occurs during deceleration.

[AA121] to [AA223]

Control mode selection

Code/Name	Range (unit)	Initial value
AA121 Control mode selection, 1st-motor	00 ([V/f] Constant torque characteristics) 01 ([V/f] Reducing torque characteristics) 02 ([V/f] Free V/f) 03 ([V/f] Auto torque boost) 04 ([V/f with encoder] Fixed torque characteristics 05 ([V/f with encoder] Reduced torque characteristics 06 ([V/f with encoder] Free V/f 07 ([V/f with encoder] Auto torque boost 08 (Sensor less vector control 09 (Zero-Hz-range sensor less vector control 10 (Vector control with encoder 11(Synchronous start type sensor less vector control(SM/PMM)) 12 (IVMS start type sensor less vector control (SM/PMM))	00

- Generally for a light duty control (such as fans or pumps), the [V/f] control with constant torque or the [V/f] control with reduced torque are more closer to the operation characteristics of fans and pumps.
- For heavy load (Cranes, etc.), sensor less vector control is the typically used.
- For a magnet motor select the sensor less vector control (SM/PMM).
- With the Load Type(Ub-03) is in standard duty (ND) all the options are available. But at the Load type is in Light duty (LD), 09 and 10 is not available. And at the Load type is in very light duty (VLD) 09, 10 and 12 is not available.
- When AA121 setting is 03, 07 to 12 (Vector control), the motor constant setting is required for driving IM.

Vector control with encoder mode

Code/Name	Range (unit)	Initial value
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)	00

- For Vector control with encoder ([A121]=10) select Speed/Torque control (00) or Position control (02).
- For more information, refer to the user's guide.

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
AA201 Main speed input source selection, 2nd-motor	Same as AA101	
AA202 Sub speed input source selection, 2nd-motor	Same as AA102	
AA204 Sub speed setting, 2nd-motor	Same as AA104	
AA205 Speed reference calculation symbol selection, 2nd-motor	Same as AA105	
AA206 Add frequency setting, 2nd-motor	Same as AA106	
AA211 RUN command input source selection, 2nd-motor	Same as AA111	
AA214 RUN-direction restriction selection, 2nd-motor	Same as AA114	
AA215 STOP mode selection, 2nd-motor	Same as AA115	
AA221 Control mode selection 2nd-motor	Same as AA121	
AA223 Vector control mode selection, 2nd-motor	Same as AA123	

[Ab-01] to [Ab-25]

Scaled Output Frequency gain monitor [dA-06]

Code/Name	Range (unit)	Initial value
Ab-01 Frequency conversion gain	0.01 to 100.00	1.00

• The visualized "Scaled Output frequency [dA-06]" is equal to the "Output frequency [dA-01]" multiplied by the "Frequency scaling conversion factor[Ab-01]".

Multi-speed command

Code/Name	Range (unit)	Initial value
Ab-03 Multi-speed operation selection	00(Binary(16 speeds)) 01(Bit(8 speeds))	00
Ab110 Multi-speed 0 setting, 1st-motor	0.00 to 590.00(Hz) Note	10.00
Ab-11 Multi-speed 1 setting		20.00
Ab-12 Multi-speed 2 setting		30.00
Ab-13 Multi-speed 3 setting		40.00
Ab-14 Multi-speed 4 setting		0.00
Ab-15 Multi-speed 5 setting		
Ab-16 Multi-speed 6 setting		
Ab-17 Multi-speed 7 setting		
Ab-18 Multi-speed 8 setting		
Ab-19 Multi-speed 9 setting		
Ab-20 Multi-speed 10 setting		
Ab-21 Multi-speed 11 setting		
Ab-22 Multi-speed 12 setting		
Ab-23 Multi-speed 13 setting		
Ab-24 Multi-speed 14 setting		
Ab-25 Multi-speed 15 setting		

Note: The actual setting range depends on the maximum frequency setting ([Hb105/205] [Hd105/205]).

• For the 16 speeds selection, set [Ab-03]=00 for assigning the intelligent terminals 003[DFL] to 006[DHH] makes available the use of the speeds 0 to 15.

Multi-speed	DHH	DFH	DFM	DFL
Speed 0	OFF	OFF	OFF	OFF
Speed 1	OFF	OFF	OFF	ON
Speed 2	OFF	OFF	ON	OFF
Speed 3	OFF	OFF	ON	ON
Speed 4	OFF	ON	OFF	OFF
Speed 5	OFF	ON	OFF	ON
Speed 6	OFF	ON	ON	OFF
Speed 7	OFF	ON	ON	ON
Speed 8	ON	OFF	OFF	OFF
Speed 9	ON	OFF	OFF	ON
Speed 10	ON	OFF	ON	OFF
Speed 11	ON	OFF	ON	ON
Speed 12	ON	ON	OFF	OFF
Speed 13	ON	ON	OFF	ON
Speed 14	ON	ON	ON	OFF
Speed 15	ON	ON	ON	ON

[Ab210][AC-01] to [AC-02]

• For the 8 speeds selection, set [Ab-03]=01 assigning the intelligent terminals 007[SF1] to 013[SF7] makes available the use of the speeds 0 to 7.

Multi-speed	SF7	SF6	SF5	SF4	SF3	SF2	SF1
Speed 0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Speed 1	-	-	-	-	-	-	ON
Speed 2	-	-	-	-	-	ON	OFF
Speed 3	-	-	-	-	ON	OFF	OFF
Speed 4	-	-	-	ON	OFF	OFF	OFF
Speed 5	-	-	ON	OFF	OFF	OFF	OFF
Speed 6	-	ON	OFF	OFF	OFF	OFF	OFF
Speed 7	ON	OFF	OFF	OFF	OFF	OFF	OFF

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
Ab210 Multi-speed 0 setting, 2nd-motor	Same as Ab110	

Input method for Accel/Decel time

Code/Name	Range (unit)	Initial value
AC-01 Acceleration/Deceleration time input type selection	00(Parameter setting) 01(Option-1) 02(Option-2) 03(Option-3) 04(Reserved)	00

• [AC-01] changes the reference target for the Accel/Decel command.

Individual Accel/Decel for Multispeed

Code/Name	Range (unit)	Initial value
AC-02 Acceleration Deceleration selection	00(Common setting) 01(Multi stage accel/decel)	00

• When [AC-02]=00, the acceleration/deceleration time settings [AC120][AC122] or [AC124][AC126] will be in effect.
• 2-stage acceleration/deceleration functions from [AC115] to [AC117] can be set.
• When [AC-02]=01, the acceleration/deceleration time [AC-30] to [AC-88] for each multispeed control (from speed 1 to 15) are enabled.
• Even if [AC-02]=01, while in Multspeed-0 command, Accel/Decel setting [AC120] [AC122] or Accel/Decel setting [AC124] [AC126] are enabled.
• During remote control up/down [UP]/[DWN] (parameters [CA-64] and [CA-66]) and PID soft start (parameter [AH-78]), those parameters can be overwritten.

[AC-03] to [AC117]

Acceleration/deceleration curve selection

Code/Name	Range (unit)	Initial value
AC-03 Acceleration curve selection	00(Linear) 01(S-curve) 02(U-curve) 03(Inverted-U-curve) 04((Elevator)EL-S-curve)	00
AC-04 Deceleration curve selection		
AC-05 Acceleration curve constant setting	1 to 10	2
AC-06 Deceleration curve constant setting		
AC-08 EL-S-curve ratio @start of acceleration	0 to 100 Note	25
AC-09 EL-S-curve ratio @end of acceleration		
AC-10 EL-S-curve ratio @start of deceleration		
AC-11 EL-S-curve ratio @end of deceleration		

Note: The setting range is limited so that AC-08+AC-09≦100.
For example, when AC-09=25, the setting range of AC-08 is 0 to 75.
AC-10 and AC-11 are the same as above.

- When [AC-03]/[AC-04]=00(Linear), accel/decel at regular intervals towards the target value.
- When [AC-03]/[AC-04]=01(S-curve), for a shockless operation proceeds gradually at the beginning and at the end of the acceleration and deceleration.
- When [AC-03]/[AC-04]=02(U-curve), proceeds gradually at the start of the acceleration and deceleration.
- When [AC-03]/[AC-04]=03(Inverted-U-curve), proceeds gradually at the end of the acceleration and deceleration.
- For S-curve, U-curve and Inverted-U-curve, the curve degree of acceleration and deceleration can be set with [AC-05]/[AC-06].
- When [AC-03]/[AC-04]=04 (EL-S-curve), proceeds gradually at the beginning and the end of the acceleration and deceleration.
- For EL-S-curve shockless operation, the beginning and the end of the acceleration and deceleration [AC-08] to [AC-11] should be adjusted.

Two-stage Accel/Decel change

Code/Name	Range (unit)	Initial value
AC115 Accel/Decel change trigger, 1st-motor	00(Switch by [AD2] terminal) 01(Switching by setting) 02(Switch only when rotation is reversed)	00
AC116 Accel1 to Accel2 frequency transition point, 1st-motor	0.00 to 590.00(Hz)	0.00
AC117 Decel1 to Decel2 frequency transition point, 1st-motor		

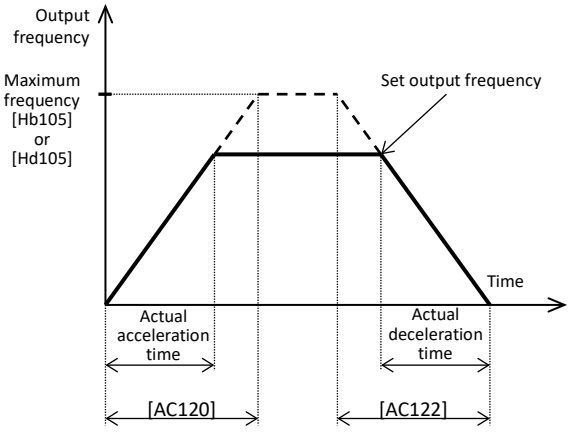
- The accel/decel time is changed by the accel2/decel2 time, if intelligent input terminal 031[AD2] is ON or the operate frequency is reached to [AC116]/ [AC117].
- Sets Accel/Decel time 1[AC120][AC122] and Accel/Decel time 2 [AC124] [AC126].

[AC120] to [AC126]

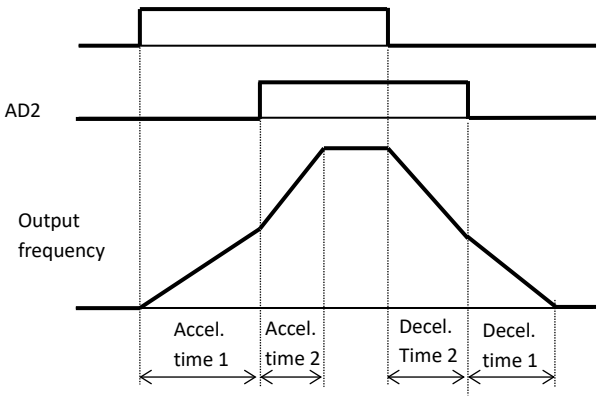
Acceleration/deceleration time setting

Code/Name	Range (unit)	Initial value
AC120 Acceleration time setting 1, 1st-motor	0.00 to 3600.00 (s)	30.00
AC122 Deceleration time setting 1, 1st-motor		
AC124 Acceleration time setting 2, 1st-motor		
AC126 Deceleration time setting 2, 1st-motor		

- Assign the Accel/Decel time that takes from 0Hz to reach the maximum frequency.
- In case that the two-stage Accel/Decel function is not meant to be used, the Acceleration time 1 [AC120] and Deceleration time 1 [AC122] are used.



- Example of using the two-stage Accel/Decel function is following.
With [AC115] = 00



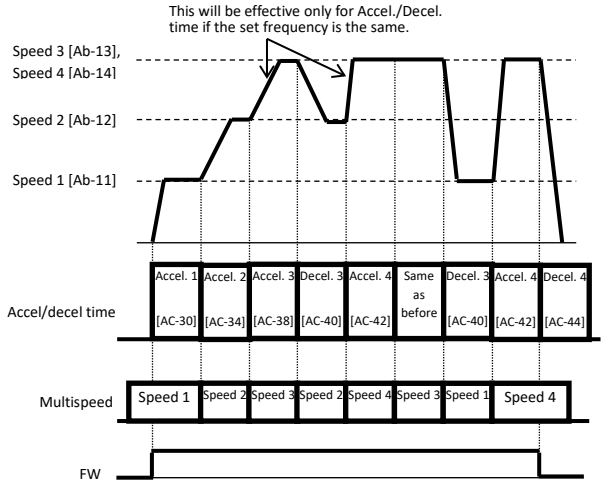
- Accel/Decel time is what takes from 0Hz to reach the maximum frequency.

[AC-30] to [AC-88]

Setting for two-stage Accel/Decel time

Code/Name	Range (unit)	Initial value
AC-30 Accel. time for Multi-speed 1	0.00 to 3600.00(s)	0.00
AC-32 Decel. time for Multi-speed 1		
AC-34 Accel. time for Multi-speed 2		
AC-36 Decel. time for Multi-speed 2		
AC-38 Accel. time for Multi-speed 3		
AC-40 Decel. time for Multi-speed 3		
AC-42 Accel. time for Multi-speed 4		
AC-44 Decel. time for Multi-speed 4		
AC-46 Accel. time for Multi-speed 5		
AC-48 Decel. time for Multi-speed 5		
AC-50 Accel. time for Multi-speed 6		
AC-52 Decel. time for Multi-speed 6		
AC-54 Accel. time for Multi-speed 7		
AC-56 Decel. time for Multi-speed 7		
AC-58 Accel. time for Multi-speed 8		
AC-60 Decel. time for Multi-speed 8		
AC-62 Accel. time for Multi-speed 9		
AC-64 Decel. time for Multi-speed 9		
AC-66 Accel. time for Multi-speed 10		
AC-68 Decel. time for Multi-speed 10		
AC-70 Accel. time for Multi-speed 11		
AC-72 Decel. time for Multi-speed 11		
AC-74 Accel. time for Multi-speed 12		
AC-76 Decel. time for Multi-speed 12		
AC-78 Accel. time for Multi-speed 13		
AC-80 Decel. time for Multi-speed 13		
AC-82 Accel. time for Multi-speed 14		
AC-84 Decel. time for Multi-speed 14		
AC-86 Accel. time for Multi-speed 15		
AC-88 Decel. time for Multi-speed 15		

- Individual Accel/Decel times can be set for multispeed functions[Ab-11] to [Ab-25].



[AC215] to [Ad-42]

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
AC215 Accel/Decel change trigger, 2nd-motor	Same as AC115	
AC216 Accel1 to Accel2 frequency transition point, 2nd-motor	Same as AC116	
AC217 Decel1 to Decel2 frequency transition point, 2nd-motor	Same as AC117	
AC220 Acceleration time 1, 2nd-motor	Same as AC120	
AC222 Deceleration time 1, 2nd-motor	Same as AC122	
AC224 Acceleration time 2, 2nd-motor	Same as AC124	
AC226 Deceleration time 2, 2nd-motor	Same as AC126	

Torque control function setting

Code/Name	Range (unit)	Initial value
Ad-01 Torque reference input source selection	01 to 13/15 Note:1	01
Ad-02 Torque reference value setting	-500.0 to 500.0(%)	0.0
Ad-03 Polarity selection for torque reference	00(According to sign) 01(Depending on the operation direction)	00
Ad-04 Switching time of speed control to torque control	0 to 1000(ms)	100

- Operations settings of torque control.
  For more information, refer to the User's guide.

Torque bias setting

Code/Name	Range (unit)	Initial value
Ad-11 Torque bias input source selection	01 to 13 /15 Note:1	00
Ad-12 Torque bias value setting	-500.0 to 500.0(%)	0.0
Ad-13 Torque bias polarity	00(According to sign) 01(Depend on the operation direction)	00
Ad-14 Enable terminal [TBS]	00(Disable) 01(Enable)	

- For setting the torque bias.
  For more information, refer to the User's guide.

Speed limitation for torque control

Code/Name	Range (unit)	Initial value
Ad-40 Speed limit input source selection at torque control	01 to 13 Note:1	07
Ad-41 Speed limit at torque control (at Forward rotation)	0.00 to 590.00(Hz) Note:2	0.00
Ad-42 Speed limit at torque control (at Reverse rotation)		

- In middle of the torque control the speed limit can be set.
  For more information, refer to the User's guide.

Note: 1. 00(Disable)/01(Terminal [VRF])/02(Terminal [IRF])
03(Terminal [VF2])/04(Terminal [Ai4])/05(Terminal [Ai5])
06(Terminal [Ai6])/07(Parameter Setting)/08(RS485)
09(Option-1)/10(Option-2)/11(Option-3)/12(Pulse train input (internal))/13(Pulse train input (option))/14(Reserved)/15(PID)
2. The actual setting range depends on the maximum frequency setting ([Hb105/205] [Hd105/205]).

[AE-01] to [AE-13]

Position control

Code/Name	Range (unit)	Initial value
AE-01 Electronic gear setting point selection	00(Feedback side) 01(Reference side)	00
AE-02 Electronic gear ratio numerator	1 to 10000	1
AE-03 Electronic gear ratio denominator		
AE-04 Positioning completed range setting	0 to 10000(Pulse)	5
AE-05 Positioning completed delay time setting	0.00 to 10.00(s)	0.00
AE-06 Position feedforward gain setting	0 to 655.35	
AE-07 Position loop gain setting	0.00 to 100.00	0.50
AE-08 Position bias setting	-2048 to 2048(Pulse)	0

- Feedback signal is needed to perform the position control.
  For more information, refer to the User's guide.

Home search function setting

Code/Name	Range (unit)	Initial value
AE-10 Stop position selection of home search function	00(Parameter) 01(Option 1) 02(Option 2) 03(Option 3)	00
AE-11 Stop position of home search function	0 to 4096	0
AE-12 Speed reference of home search function	0.00 to 120.00(Hz) Note	5.00
AE-13 Direction of home search function	00(Forward) 01(Reverse)	00

- Adjust the Home search function of the position control.
  For more information, refer to the User's guide.

Note: If the maximum frequency setting ([Hb105/205] [Hd105/205]) is less than 120 Hz, the maximum value of [AE-12] will depend on it.

[AE-20] to [AE-62]

Absolute position control

Code/Name	Range (unit)	Initial value
AE-20 Position reference 0	When [AA121]≠10 or [AA121]≠03 -268435455 to +268435455 (pulse) Parameter setting other than above. -1073741823 to +1073741823 (pulse)	0
AE-22 Position reference 1		
AE-24 Position reference 2		
AE-26 Position reference 3		
AE-28 Position reference 4		
AE-30 Position reference 5		
AE-32 Position reference 6		
AE-34 Position reference 7		
AE-36 Position reference 8		
AE-38 Position reference 9		
AE-40 Position reference 10		
AE-42 Position reference 11		
AE-44 Position reference 12		
AE-46 Position reference 13		
AE-48 Position reference 14		
AE-50 Position reference 15		
AE-52 Position control range setting (forward)	When [AA121]≠10 or [AA123]≠03 0 to +268435455(pulse) Other than above. 0 to +1073741823(pulse)	Max
AE-54 Position control range setting (reverse)	When [AA121]≠10 or [AA123]≠03 -268435455 to 0 (pulse) Other than above. -1073741823 to 0 (pulse)	Min
AE-56 Position control mode selection	00(Limited) 01(Not limited)	00

- Sets the absolute position function.
  For more information, refer to the User's guide.

Teach-in function

Code/Name	Range (unit)	Initial value
AE-60 Teach-in function target selection	00 to 15(X00 to X15)	X00

- Set auto-learning position for the absolute position mode.
  For more information, refer to the User's guide.

Enable position saving when power is cut off

Code/Name	Range (unit)	Initial value
AE-61 Save current position at power off	00(Disable) 01(Enable)	00

- Saves the absolute position when the power supply is cut-off. For more information, refer to the User's guide.

Pre-set position

Code/Name	Range (unit)	Initial value
AE-62 Pre-set position data	When [AA121]≠10 or [AA121]≠03 -268435455 to +268435455(pulse) Other than above. -1073741823 to +107374182(pulse)	0

- In the absolute position mode sets the pre-set position.
  For more information, refer to the User's guide.

[AE-64] to [AE-73]

Positioning function adjustment

Code/Name	Range (unit)	Initial value
AE-64 Deceleration stop distance calculation gain	50.00 to 200.00(%)	100.00
AE-65 Deceleration stop distance calculation bias	0.00 to 655.35(%)	0.00
AE-66 Speed limit in APR control	0.00 to 100.00(%)	1.00
AE-67 APR start speed		0.20

- APR: Automatic Position Regulator
- Adjustment of control operation for positioning control. For more information, refer to the user's guide.

Homing (Return to reference position)

Code/Name	Range (unit)	Initial value
AE-70 Homing function selection	00(Low-speed) 01(High-Speed 1) 02(High-Speed 2)	00
AE-71 Direction of homing function	00(Forward) 01(Reverse)	
AE-72 Low-speed homing speed setting	0.00 to 10.00(Hz)	0.00
AE-73 High-speed homing speed setting	0.00 to 590.00(Hz) Note	

- Sets the Zero-return function for absolute position mode. For more information, refer to the user's guide.

Note: The actual setting range depends on the maximum frequency setting ([Hb105/205] [Hd105/205]).

[AF101] to [AF109]

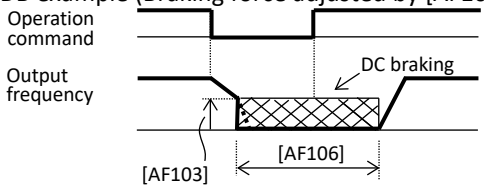
DC braking (DB) function

Code/Name	Range (unit)	Initial value
AF101 DC braking selection, 1st-motor	00(Disable) 01(Enable) 02(Frequency reference)	00
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 to 590.00(Hz)	0.50
AF104 DC braking delay time, 1st-motor	0.00 to 5.00(s)	0.00
AF105 DC braking force setting, 1st-motor	0 to 100(%) Note:2	0
AF106 DC braking active time at stop, 1st-motor	0.00 to 60.00(s)	0.00
AF107 DC braking operation method selection, 1st-motor	00(Edge) 01(Level)	01
AF108 DC braking force at start, 1st-motor	0 to 100(%) Note	0
AF109 DC braking active time at start, 1st-motor	0.00 to 60.00(s)	0.00

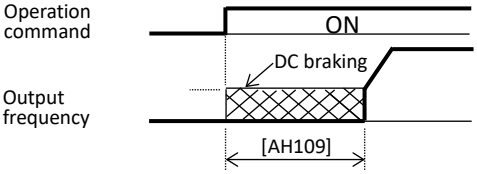
- DB function can be activated at start-up, at stop state or setting frequency ([AF101]=02) are selectable.
- DC braking can be used if Intelligent input terminal 030[DB] is ON.

Note: Depending on the setting of Load type selection ([Ub-03]) and inverter capacity, an internal limit is applied.

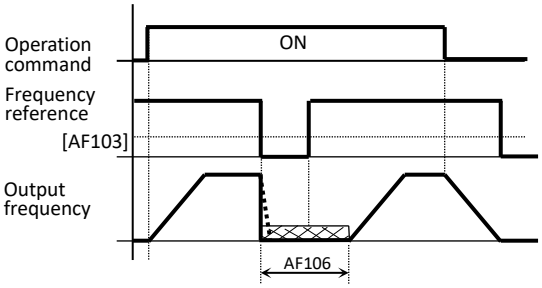
- Stop DB example (Braking force adjusted by [AF105])



- Start DB example (Braking force adjusted by [AF108])



- Frequency reference DB example (Braking force adjusted by [AF105])



- When the DC braking time is set as 0.00(s), DC braking is not operational.

[AF120] to [AF144] [AF150] to [AF254]

Brake control function

Code/Name	Range (unit)	Initial value
AF120 Contactor control enable, 1st-motor	00(Disable) 01(Enable: primary side) 02(Enable: secondary side)	00
AF121 Run delay time, 1st-motor	0.00 to 2.00(s)	0.20
AF122 Contactor off delay time, 1st-motor		0.10
AF123 Contactor response check time, 1st-motor	0.00 to 5.00(s)	0.10
AF130 Brake control enable, 1st-motor	00(Disable) 01(Brake control 1: Common) 02(Brake control 1: Separate) 03(Brake control 2)	00
AF131 Brake release wait time, 1st-motor(Forward)	0.00 to 5.00(s)	0.00
AF132 Brake wait time for accel., 1st-motor (Forward)		
AF133 Brake wait time for stopping, 1st-motor (Forward)		
AF134 Brake confirmation signal wait time, 1st-motor (Forward)		
AF135 Brake release frequency setting, 1st-motor (Forward)	0.00 to 590.00(Hz)	0.00
AF136 Brake release current setting, 1st-motor (Forward)	Inverter rated current ×(0.0 to 2.0)(A)	Note
AF137 Braking frequency, 1st-motor (Forward)	0.00 to 590.00(Hz)	0.00
AF138 Brake release wait time, 1st-motor (Reverse)	0.00 to 5.00(s)	0.00
AF139 Brake wait time for accel., 1st-motor (Reverse)		
AF140 Brake wait time for stopping, 1st-motor (Reverse)		
AF141 Brake confirmation signal wait time, 1st-motor (Reverse)		
AF142 Brake release frequency setting, 1st-motor (Reverse)	0.00 to 590.00(Hz)	0.00
AF143 Brake release current setting, 1st-motor(Reverse)	Inverter rated current ×(0.0 to 2.0)(A)	Note
AF144 Braking frequency, 1st-motor (Reverse)	0.00 to 590.00(Hz)	0.00

Note: Inverter rated current × 1.0(A)

Code/Name	Range (unit)	Initial value
AF150 Brake open delay time, 1st-motor	0.00 to 2.00(s)	0.20
AF151 Brake close delay time, 1st-motor		
AF152 Brake response check time, 1st-motor	0.00 to 5.00(s)	0.10
AF153 Servo lock/ DC injection time at start, 1st-motor	0.00 to 10.00(s)	0.60
AF154 Servo lock/ DC injection time at stop, 1st-motor		

- Operations settings of brake control.
  For more information, refer to the User's guide.

2nd motor When Intelligent Input terminal 024[SET] is enabled.

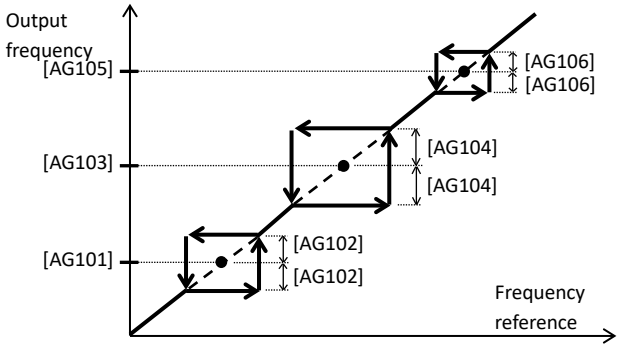
Code/Name	Range (unit) / Initial value
AF201 DC braking selection, 2nd-motor	Same as AF101
AF202 Braking type selection, 2nd-motor	Same as AF102
AF203 DC braking frequency, 2nd-motor	Same as AF103
AF204 DC braking delay time, 2nd-motor	Same as AF104
AF205 DC braking force setting, 2nd-motor	Same as AF105
AF206 DC braking active time at stop, 2nd-motor	Same as AF106
AF207 DC braking operation method selection,2nd-motor	Same as AF107
AF208 DC braking force at start, 2nd-motor	Same as AF108
AF209 DC braking active time at start, 2nd-motor	Same as AF109
AF220 Contactor control enable, 2nd-motor	Same as AF120
AF221 Run delay time, 2nd-motor	Same as AF121
AF222 Contactor off delay time, 2nd-motor	Same as AF122
AF223 Contactor response check time, 2nd-motor	Same as AF123
AF230 Brake control enable, 2nd-motor	Same as AF130
AF231 Brake release wait time, 2nd-motor(Forward)	Same as AF131
AF232 Brake wait time for accel., 2nd-motor(Forward)	Same as AF132
AF233 Brake wait time for stopping, 2nd-motor(Forward)	Same as AF133
AF234 Brake confirmation signal wait time, 2nd-motor(Forward)	Same as AF134
AF235 Brake release frequency setting, 2nd-motor(Forward)	Same as AF135
AF236 Brake release current setting, 2nd-motor (Forward)	Same as AF136
AF237 Braking frequency, 2nd-motor (Forward)	Same as AF137
AF238 Brake release wait time, 2nd-motor (Reverse)	Same as AF138
AF239 Brake wait time for accel., 2nd-motor (Reverse)	Same as AF139
AF240 Brake wait time for stopping, 2nd-motor(Reverse)	Same as AF140
AF241 Brake confirmation signal wait time, 2nd motor(Reverse)	Same as AF141
AF242 Brake release frequency setting, 2nd-motor(Reverse)	Same as AF142
AF243 Brake release current setting, 2nd-motor(Reverse)	Same as AF143
AF244 Braking frequency, 2nd-motor (Reverse side)	Same as AF144
AF250 Brake open delay time, 2nd-motor	Same as AF150
AF251 Brake close delay time, 2nd-motor	Same as AF151
AF252 Brake response check time, 2nd-motor	Same as AF152
AF253 Servo lock/DC injection time at start,2nd-motor	Same as AF153
AF254 Servo lock/DC injection time at stop, 2nd-motor	Same as AF154

[AG101] to [AG113]

Resonant frequency avoidance (Jump)

Code/Name	Range (unit)	Initial value
AG101 Jump frequency 1, 1st-motor	0.00 to 590.00(Hz)	0.00
AG102 Jump frequency width 1, 1st-motor		0.50
AG103 Jump frequency 2, 1st-motor		0.00
AG104 Jump frequency width 2, 1st-motor		0.50
AG105 Jump frequency 3, 1st-motor		0.00
AG106 Jump frequency width 3, 1st-motor		0.50

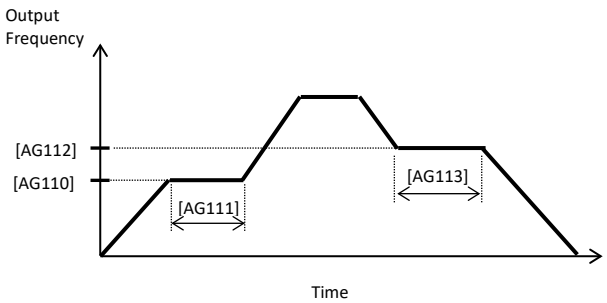
- Prevents the passing of the output frequency in a resonant point. Output frequency changes continuously.



Motor Accel/Decel dwell (Hold)

Code/Name	Range (unit)	Initial value
AG110 Acceleration stop frequency setting, 1st-motor	0.00 to 590.00(Hz)	0.00
AG111 Acceleration stop time setting, 1st-motor	0.0 to 60.0(s)	0.0
AG112 Deceleration stop frequency setting, 1st-motor	0.00 to 590.00(Hz)	0.00
AG113 Deceleration stop time setting, 1st-motor	0.0 to 60.0(s)	0.0

- This dwell function will allow the inverter to stop the acceleration during the acceleration stop time when the acceleration stop frequency is reached, which is useful when the load has a large inertia.
- If the Intelligent input terminal function 100[HLD] is in ON state, the acceleration and deceleration will be stopped (Hold activation).

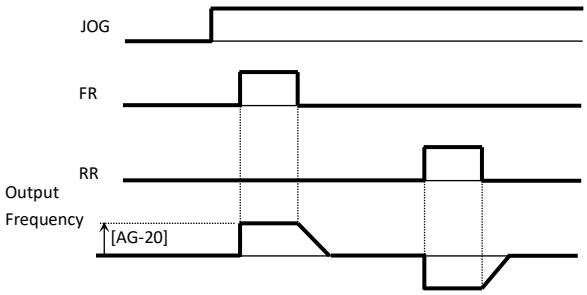


[AG-20] to [AG213]

Jogging function

Code/Name	Range (unit)	Initial value
AG-20 Jogging frequency	0.00 to 10.00(Hz)	5.00
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))	01

- When Input terminal [JOG] is active (ON), if the operation command is given the jogging frequency is outputted.
  The frequency and stop method can be set when performing jogging motion.



2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit) / Initial value
AG201 Jump frequency 1, 2nd-motor	Same as AG101
AG202 Jump frequency width 1, 2nd-motor	Same as AG102
AG203 Jump frequency 2, 2nd-motor	Same as AG103
AG204 Jump frequency width 2, 2nd-motor	Same as AG104
AG205 Jump frequency 3, 2nd-motor	Same as AG105
AG206 Jump frequency width 3, 2nd-motor	Same as AG106
AG210 Acceleration stop frequency setting, 2nd-motor	Same as AG110
AG211 Acceleration stop time setting 2nd-motor	Same as AG111
AG212 Deceleration stop frequency setting, 2nd-motor	Same as AG112
AG213 Deceleration stop time setting,, 2nd-motor	Same as AG113

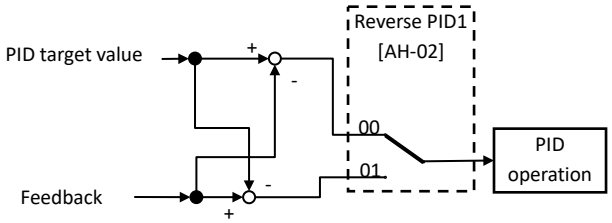
[AH-01] to [AH-06]

PID1 function

Code/Name	Range (unit)	Initial value
AH-01 PID1 enable	00(Disable) 01(Enable) 02(Enable (with inverted output)	00

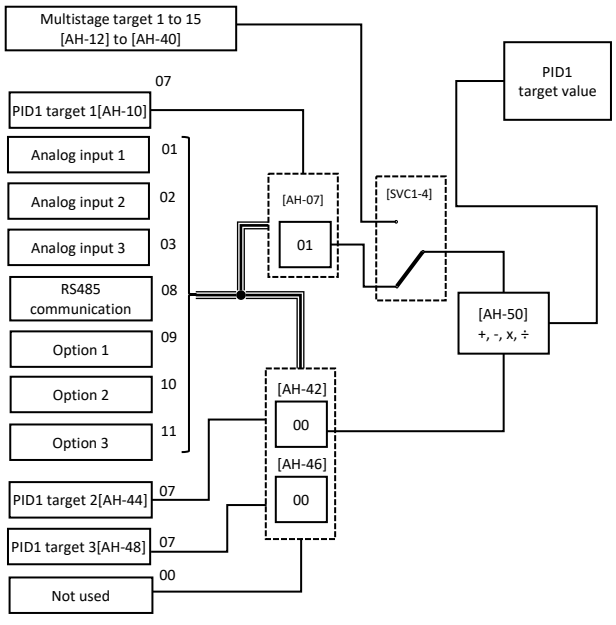
- Validates the PID1 operation.
- If [AH-01]=01 when the PID output reaches negative value, the PID output is limited to 0.
- If [AH-01]=02 when the PID output reaches negative value, the PID output lets out an inverted output.
- When the PID output is negative, the motor will rotate in the contrary direction.
- If [PID] terminal is ON, the PID control is disabled and the [PID] target value becomes the frequency reference.

Code/Name	Range (unit)	Initial value
AH-02 PID1 deviation inversion	00(Disable) 01(Enable)	00



Code/Name	Range (unit)	Initial value
AH-03 Unit selection for PID1	Please refer <unit table> of the end of this chapter.	01
AH-04 PID1 adjustment (0%)	-10000 to 10000	0
AH-05 PID1 adjustment (100%)		10000
AH-06 PID1 Adjustment (decimal point position)	0 to 4	2

- The unit and display data related to the output of the PID control can be changed.



[AH-07] to [AH-50]

Code/Name	Range (unit)	Initial value
AH-07 PID1 set-point 1 input source selection	00 to 13 Note:2	07
AH-10 PID1 set-point-1 setting	-100.00 to 100.00 (%) Note:1	0.00
AH-12 PID1 multistage set-point 1		
AH-14 PID1 multistage set-point 2		
AH-16 PID1 multistage set-point 3		
AH-18 PID1 multistage set-point 4		
AH-20 PID1 multistage set-point 5		
AH-22 PID1 multistage set-point 6		
AH-24 PID1 multistage set-point 7		
AH-26 PID1 multistage set-point 8		
AH-28 PID1 multistage set-point 9		
AH-30 PID1 multistage set-point 10		
AH-32 PID1 multistage set-point 11		
AH-34 PID1 multistage set-point 12		
AH-36 PID1 multistage set-point 13		
AH-38 PID1 multistage set-point 14		
AH-40 PID1 multistage set-point 15		
AH-42 PID1 set-point 2 input source selection	00 to 13 Note:2	00
AH-44 PID1 set-point 2 setting	-100.00 to 100.00(%)	0.00
AH-46 PID1 set-point 3 input source selection	00 to 13 Note:2	00
AH-48 PID1 set-point 3 setting	-100.00 to 100.00(%)	0.00
AH-50 PID1 set-point calculation symbol selection	01(Addition) 02(Subtraction) 03(Multiplication) 04(Division) 05(Minimum deviation) 06(Maximum deviation)	01

Note: 1. Display range can be set by [AH-04], [AH-05] and [AH-06].
2. 00(Not used)/01(Terminal [VRF])/02(Terminal [IRF])
03(Terminal [VF2])/04(Terminal [Ai4])/05(Terminal [Ai5])
06(Terminal [Ai6])/07(Parameter setting)/08(RS485)
09(Option-1)/10(Option-2)/11(Option-3)
12(Pulse train input (internal)/13(Pulse train input (option)

- For PID1 target value, two targets are selected, target value 1 and target value 2, the result of the operation carried out between these two targets constitutes the PID1 target value.
- If Input terminal function 051[SVC1] to 054[SVC4] are used, the PID target value can be changed for the Multistage.

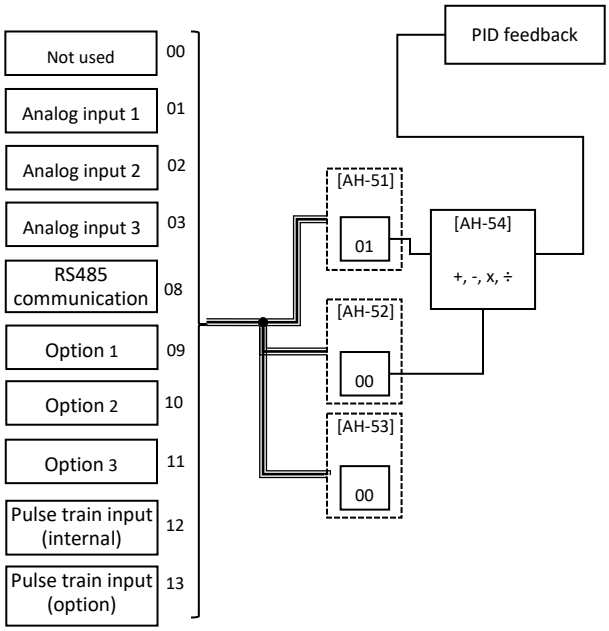
Multistage value	SVC4	SVC3	SVC2	SVC1
AH-10	OFF	OFF	OFF	OFF
AH-12	OFF	OFF	OFF	ON
AH-14	OFF	OFF	ON	OFF
AH-16	OFF	OFF	ON	ON
AH-18	OFF	ON	OFF	OFF
AH-20	OFF	ON	OFF	ON
AH-22	OFF	ON	ON	OFF
AH-24	OFF	ON	ON	ON
AH-26	ON	OFF	OFF	OFF
AH-28	ON	OFF	OFF	ON
AH-30	ON	OFF	ON	OFF
AH-32	ON	OFF	ON	ON
AH-34	ON	ON	OFF	OFF
AH-36	ON	ON	OFF	ON
AH-38	ON	ON	ON	OFF
AH-40	ON	ON	ON	ON

[AH-51] to [AH-54]

Code/Name	Range (unit)	Initial value
AH-51 PID1 feedback 1 input source selection	00 to 06/08 to 13 Note	01
AH-52 PID1 feedback 2 input source selection		00
AH-53 PID1 feedback 3 input source selection		
AH-54 PID1 feedback calculation symbol selection	01(Addition) 02(Subtraction) 03(Multiplication) 04(Division) 05(Square Root FB1) 06(Square Root FB2) 07(Square Root FB1-FB2) 08(Average of the three inputs) 09(Minimum of the three inputs) 10(Maximum of the three inputs)	01

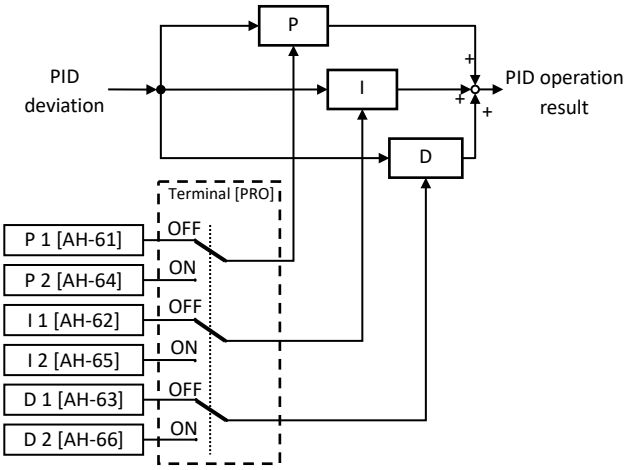
Note: 00(Not used)/01(Terminal [VRF)/02(Terminal [IRF])
03(Terminal [VF2])/04(Terminal [Ai4])/05(Terminal [Ai5])
06(Terminal [Ai6])/08(RS485)/ 09(Option-1)/10(Option-2)
11(Option-3)/12(Pulse train input (internal))
13(Pulse train input (option))

- For PID1 feedback two feedbacks are selected and the result of the operation carried out between these two constitutes the PID1 feedback value.



[AH-60] to [AH-70]

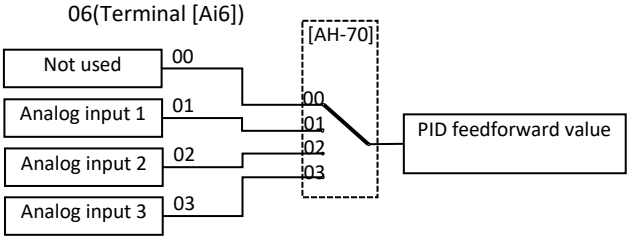
Code/Name		Range (unit)	Initial value
PID1	**AH-60** PID1 gain change method selection	00(Using gain-1 only) 01([PRO] terminal)	00
	AH-61 PID1 proportional gain 1	0.0 to 100.0	1.0
	AH-62 PID1 integral time constant 1	0.0 to 3600.0(s)	
	AH-63 PID1 derivative gain 1	0.00 to 100.00(s)	0.00
	AH-64 PID1 proportional gain 2	0.0 to 100.0	0.0
	AH-65 PID1 integral time constant 2	0.0 to 3600.0(s)	
	AH-66 PID1 derivative gain 2	0.00 to 100.00(s)	0.00
	AH-67 PID1 gain change time	0 to 10000(ms)	100



- If [PIDC] terminal is active (ON), the value of the integral constant is cleared. If done while operating, the operation can become instable/insecure.
- With [PRO] terminal, the gain can be changed. If the state is OFF, Gain 1 is used, if the state is ON, Gain 2 is used.

Code/Name	Range (unit)	Initial value
AH-70 PID1 feed-forward input source selection	00 to 06 Note	00

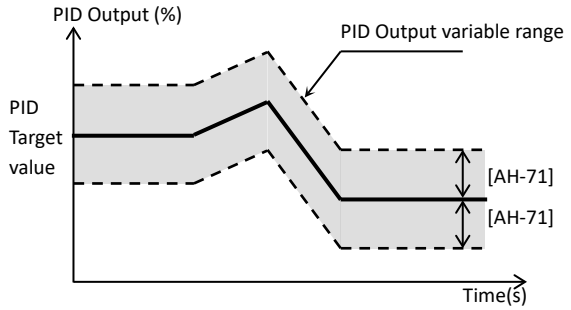
Note: 00(Not used)/01(Terminal [VRF])/02(Terminal [IRF])
03(Terminal [VF2])/ 04(Terminal [Ai4])/05(Terminal [Ai5])
06(Terminal [Ai6])



- To perform the PID feedforward control, an input is selected.

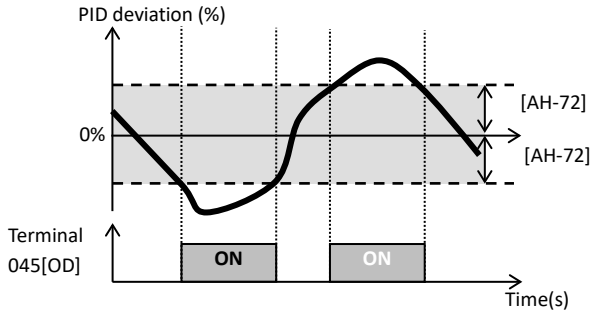
[AH-71] to [AH-74]

Code/Name	Range (unit)	Initial value
AH-71 PID1 output range	0.00 to 100.00(%)	0.00



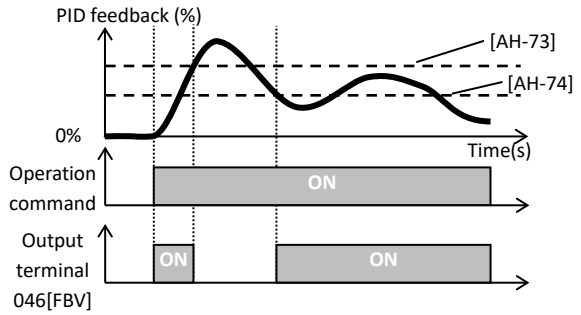
- Limits the output range of the PID. If [AH-71] = 0.00 the limit is disabled.

Code/Name	Range (unit)	Initial value
AH-72 PID1 over deviation level	0.00 to 100.00(%)	3.00



- When the PID deviation pass over the±[AH-72], the output terminal function 045[OD] is activated.

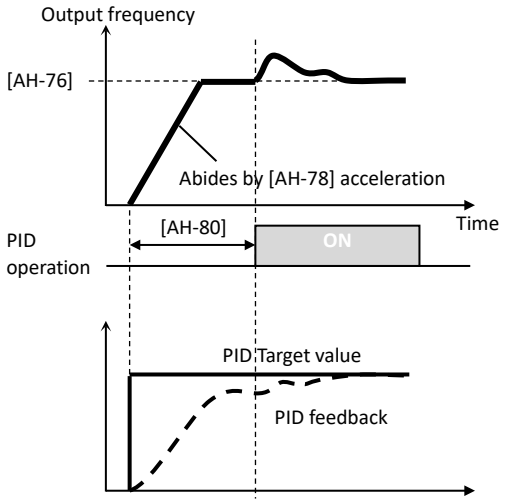
Code/Name	Range (unit)	Initial value
AH-73 Turn-off level for the PID1 feedback compare signal	0.00 to 100.00(%)	100.00
AH-74 Turn-on level for the PID1 feedback compare signal		0.00



- If the PID feedback cross over the [AH-73] level, the output terminal function 046[FBV] is deactivated (OFF). If it crosses under the [AH-74] level, is activated (ON).

[AH-75] to [AH-92]

Code/Name	Range (unit)	Initial value
AH-75 PID soft start function enable	00(Disable) 01(Enable)	00
AH-76 PID soft start target level	0.00 to 100.00(%)	100.00
AH-78 Acceleration time setting for PID soft start function	0.00 to 3600.00(s)	30.00
AH-80 PID soft start time	0.00 to 600.00(s)	0.00
AH-81 PID soft start error detection enable	00(Disable) 01(Enable: Error) 02(Enable: Warning)	00
AH-82 PID soft start error detection level	0.00 to 100.00(%)	0.00



- For a shock less operation, base frequency×[AH-76] is made the target value, with the [AH-80] output time.
- In the case of a soft start, the acceleration time can be set with [AH-78].

Code/Name	Range (unit)	Initial value
AH-85 PID sleep trigger selection	00(Disable) 01(Low output) 02([SLEP] terminal)	00
AH-86 PID sleep start level	0.00 to 590.00(Hz)	0.00
AH-87 PID sleep active time	0.00 to 100.00(s)	
AH-88 Enable set-point boost before PID sleep	00(Disable) 01(Enable)	00
AH-89 Set-point boost time before PID sleep	0.00 to 100.00(s)	0.00
AH-90 Set-point boost value before PID sleep	0.00 to 100.00(%)	
AH-91 Minimum RUN time before PID sleep	0.00 to 100.00(s)	
AH-92 Minimum active time of PID sleep		

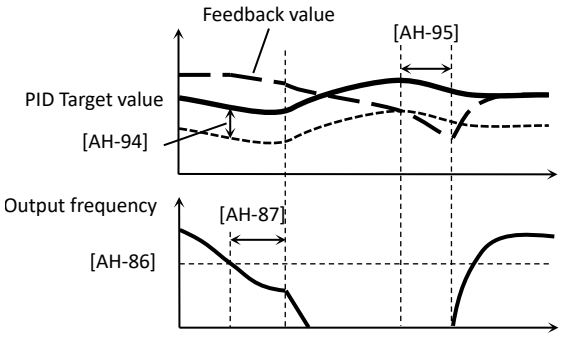
- The PID sleep function temporally reduces the PID output, achieving an energy saving state.
- If the set-point boost before the PID sleep is enabled it will add the boost value[AH-90] to the current set-point value during the boost time[AH-89] after the PID sleep trigger is activated.

[AH-93] to [AH-96]

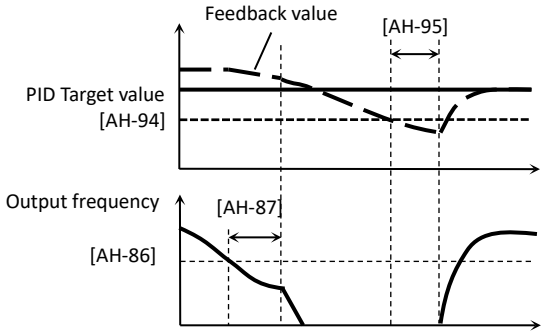
Code/Name	Range (unit)	Initial value
AH-93 PID wake trigger selection	01(Deviation) 02(Low feedback) 03([WAKE] terminal)	01
AH-94 PID wake start level	0.00 to 100.00(%)	0.00
AH-95 PID wake start time	0.00 to 100.00(s)	
AH-96 PID wake start deviation value	0.00 to 100.00(%)	

• Operation example of the sleep function.

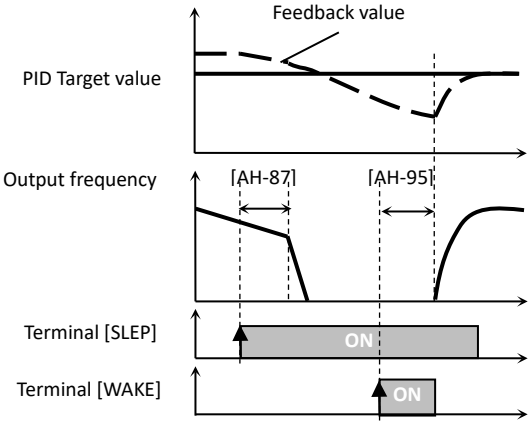
Example 1) [AH-85]=01(Low output)
[AH-93]=01(Error)



Example 2) [AH-85]=01(Low output)
[AH-93]=02(Low feedback)



Example 3) [AH-85]=02([SLEP] terminal)
[AH-93]=03([WAKE] terminal)



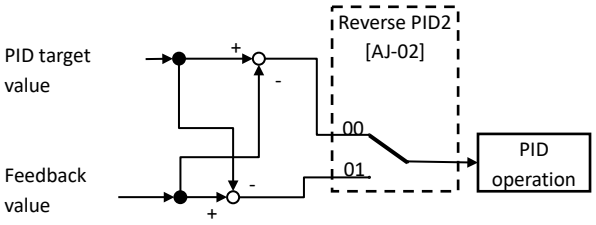
[AJ-01] to [AJ-12]

PID2 function

Code/Name	Range (unit)	Initial value
AJ-01 PID2 enable	00(Disable) 01(Enable) 02(Enable (with inverted output))	00

- Validates the PID2 operation.
- If [AJ-01]=01 when the PID output reaches a negative value, the PID output is limited to 0.
- If [AJ-01]=02 when the PID output reaches a negative value, the PID output lets out an inverted output.
- By activating the [PID2] terminal, the PID2 output becomes 0.

Code/Name	Range (unit)	Initial value
AJ-02 PID2 deviation inversion	00(Disable) 01(Enable)	00



- PID2 deviation can be reversed.

Code/Name	Range (unit)	Initial value
AJ-03 PID2 unit selection	Please refer <unit table> of the end of this chapter.	01
AJ-04 PID2 scale adjustment (0%)	-10000 to 10000	0
AJ-05 PID2 scale adjustment (100%)		10000
AJ-06 PID2 scale adjustment (decimal point position)	0 to 4	2

- The unit and display data related to the output of the PID control can be changed.

Code/Name	Range (unit)	Initial value
AJ-07 PID2 set-point input source selection	00 to 13, 15 Note:1	07
AJ-10 PID2 set-point setting	-100.00 to 100.00(%) Note:2	0.00

- When PID2 target value input is selected, if the selected is the parameter setting, [AJ-10] gets enabled.

Code/Name	Range (unit)	Initial value
AJ-12 PID2 feedback input source selection	00 to 06/08 to 13 Note:1	02

- Selects the PID2 feedback reference.

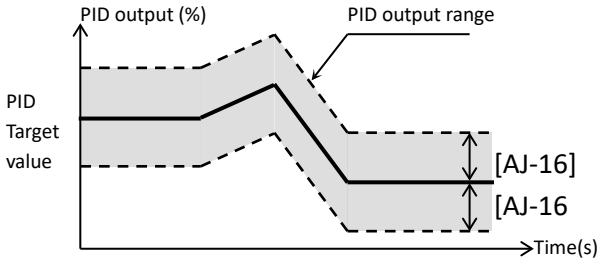
Note: 1. 00(Not used)/01(Terminal [VRF])/02(Terminal [IRF])
03(Terminal [VF2])/04(Terminal [Ai4])/05(Terminal [Ai5])
06(Terminal [Ai6])/07(Parameter setting)/08(RS485)
09(Option-1)/10(Option-2)/11(Option-3)
12(Pulse train input (internal)/13(Pulse train input (option)/15(PID1 output)
2. Adjustable with [AJ-04] [AJ-05] [AJ-06]

[AJ-13] to [AJ-19]

Code/Name	Range (unit)	Initial value
AJ-13 PID2 proportional gain	0.0 to 100.0	1.0
AJ-14 PID2 integral time constant	0.0 to 3600.0(s)	
AJ-15 PID2 derivative gain	0.0 to 100.0(s)	0.0

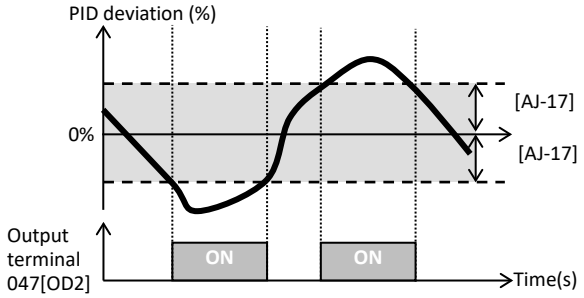
- Sets the PID2 gain.
- If [PIDC] terminal is active (ON), the value of the integral constant is purged. If done while operating, the operation can become instable/insecure.

Code/Name	Range (unit)	Initial value
AJ-16 PID2 output range	0.00 to 100.00(%)	0.00



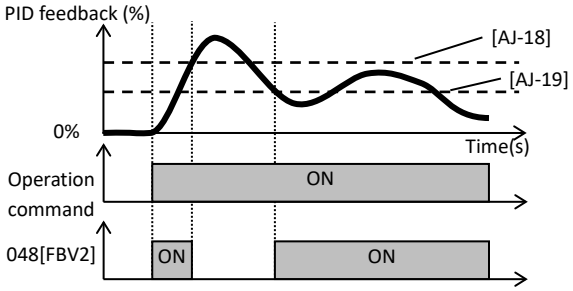
- Limits the output range of the PID. If [AJ-16] =0.00 the limit is disabled.

Code/Name	Range (unit)	Initial value
AJ-17 PID2 over deviation level	0.00 to 100.00(%)	3.00



- When the PID deviation pass over ±[AJ-17], the output terminal function 047[OD2] is activated.

Code/Name	Range (unit)	Initial value
AJ-18 Turn-off level for the PID2 feedback compare signal	0.00 to 100.00(%)	100.00
AJ-19 Turn-on level for the PID2 feedback compare signal		0.00



- When the PID feedback cross over the [AJ-18] level, the output terminal function 048[FBV2] is deactivated (OFF). If it crosses under the [AJ-19] level, is activated (ON).

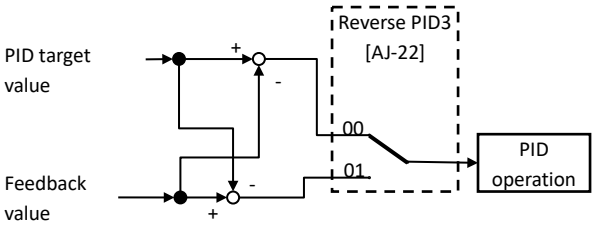
[AJ-21] to [AJ-32]

PID3 function

Code/Name	Range (unit)	Initial value
AJ-21 PID3 enable	00(Disable)/01(Enable) 02(Enable (with inverted output))	00

- Validates the PID3 operation.
- If [AJ-21]=01 when the PID output reaches a negative value, the PID output is limited to 0.
- If [AJ-21]=02 when the PID output reaches a negative value, the PID output lets out an inverted output.
- By activating the [PID3] terminal, the PID3 output becomes 0.

Code/Name	Range (unit)	Initial value
AJ-22 PID3 deviation inversion	00(Disable) 01(Enable)	00



- PID3 deviation can be reversed.

Code/Name	Range (unit)	Initial value
AJ-23 PID3 unit selection	Please refer <unit table> of the end of this chapter.	01
AJ-24 PID3 scale adjustment (0%)	-10000 to 10000	0
AJ-25 PID3 scale adjustment (100%)		10000
AJ-26 PID3 scale adjustment (decimal point position)	0 to 4	2

- You can switch the display data and the display unit involved in the output of the PID control by the calculation.

Code/Name	Range (unit)	Initial value
AJ-27 PID3 set-point input source selection	00 to 13 Note	07
AJ-30 PID3 set-point setting	-100.00 to 100.00(%)	0.00

- When PID3 target value input is selected, if the selected is the parameter setting, [AJ-30] gets enabled.

Code/Name	Range (unit)	Initial value
AJ-32 PID3 feedback input source selection	00 to 06/08 to 13 Note	01

- Selects the PID3 feedback reference.

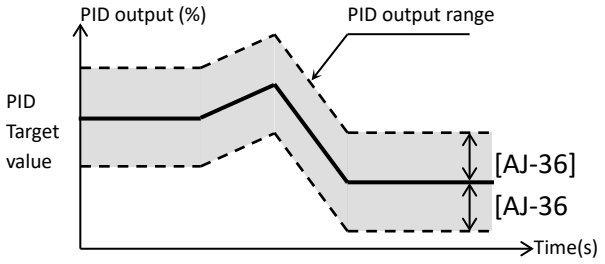
Note: 00(Not used)/01(Terminal [VRF])/02(Terminal [IRF])
03(Terminal [VF2])/04(Terminal [Ai4])/05(Terminal [Ai5])
06(Terminal [Ai6])/07(Parameter setting)/08(RS485)
09(Option-1)/10(Option-2)/11(Option-3)
12(Pulse train input (internal)/13(Pulse train input (option)

[AJ-33] to [AJ-39]

Code/Name	Range (unit)	Initial value
AJ-33 PID3 proportional gain	0.0 to 100.0	1.0
AJ-34 PID3 integral time constant	0.0 to 3600.0(s)	
AJ-35 PID3 derivative gain	0.00 to 100.00(s)	0.00

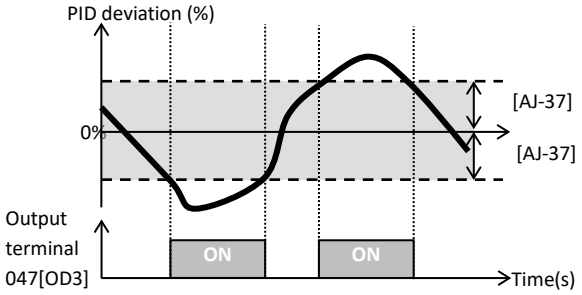
- Sets the PID3 gain.
- If [PIDC] terminal is active (ON), the value of the integral constant is purged. If done while operating, the operation can become instable/insecure.

Code/Name	Range (unit)	Initial value
AJ-36 PID3 output variable	0.00 to 100.00(%)	0.00



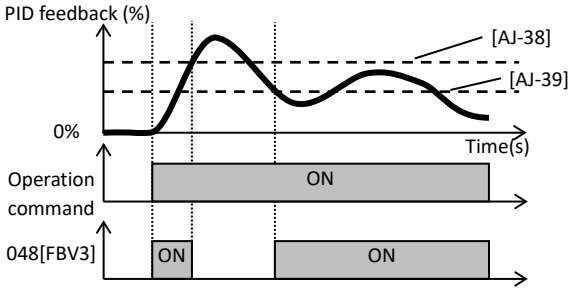
- Limits the output range of the PID. If [AJ-36] =0.00 the limit is disabled.

Code/Name	Range (unit)	Initial value
AJ-37 PID3 over deviation level	0.00 to 100.00(%)	3.00



- When the PID deviation pass over ±[AJ-37], the output terminal function 089[OD3] is activated.

Code/Name	Range (unit)	Initial value
AJ-38 Turn-off level for the PID3 feedback compare signal	0.00 to 100.00(%)	100.00
AJ-39 Turn-on level for the PID3 feedback compare signal		0.00



- When the PID feedback cross over the [AJ-18] level, the output terminal function 090[FBV3] is deactivated (OFF). If it crosses under the [AJ-39] level, is activated (ON).

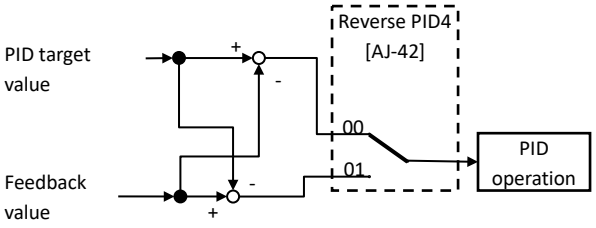
[AJ-41] to [AJ-52]

PID3 function

Code/Name	Range (unit)	Initial value
AJ-41 PID4 enable	00(Disable)/01(Enable) 02(Enable (with inverted output)	00

- Validates the PID4 operation.
- If [AJ-41]=01 when the PID output reaches a negative value, the PID output is limited to 0.
- If [AJ-41]=02 when the PID output reaches a negative value, the PID output lets out an inverted output.
- By activating the [PID4] terminal, the PID4 output becomes 0.

Code/Name	Range (unit)	Initial value
AJ-42 PID4 deviation inversion	00(Disable) 01(Enable)	00



- PID4 deviation can be reversed.

Code/Name	Range (unit)	Initial value
AJ-43 PID4 unit selection	Please refer <unit table> of the end of this chapter.	01
AJ-44 PID4 scale adjustment (0%)	-10000 to 10000	0
AJ-45 PID4 scale adjustment (100%)		10000
AJ-46 PID4 scale adjustment (decimal point position)	0 to 4	2

- You can switch the display data and the display unit involved in the output of the PID control by the calculation.

Code/Name	Range (unit)	Initial value
AJ-47 PID4 set-point input source selection	00 to 13 Note	07
AJ-50 PID4 set-point setting	-100.00 to 100.00(%)	0.00

- When PID4 target value input is selected, if the selected is the parameter setting, [AJ-50] gets enabled.

Code/Name	Range (unit)	Initial value
AJ-52 PID4 feedback input source selection	00 to 06/08 to 13 Note	01

- Selects the PID4 feedback reference.

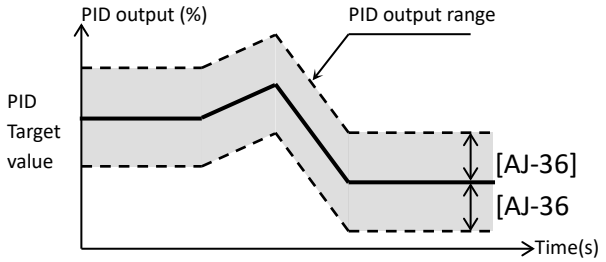
Note: 00(Not used)/01(Terminal[VRF])/02(Terminal[IRF])/03(Terminal[VF2])
04(Terminal[Ai4])/05(Terminal[Ai5])/06(Terminal[Ai6])/07(Parameter setting)/08(RS485)/09(Option-1)/10(Option-2)/11(Option-3)
12(Pulse train input (internal)/13(Pulse train input (option)

[AJ-53] to [AJ-59]

Code/Name	Range (unit)	Initial value
AJ-53 PID4 proportional gain	0.0 to 100.0	1.0
AJ-54 PID4 integral time constant	0.0 to 3600.0(s)	
AJ-55 PID4 derivative gain	0.00 to 100.00(s)	0.00

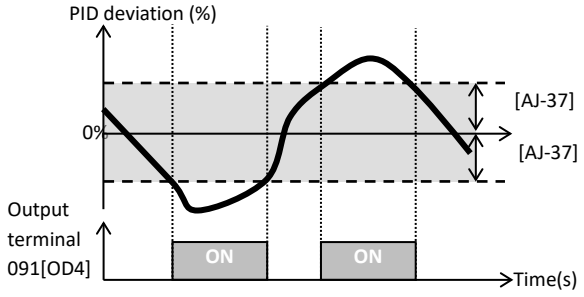
- Sets the PID4 gain.
- If [PIDC] terminal is active (ON), the value of the integral constant is purged. If done while operating, the operation can become instable/insecure.

Code/Name	Range (unit)	Initial value
AJ-56 PID4 output range	0.00 to 100.00(%)	0.00



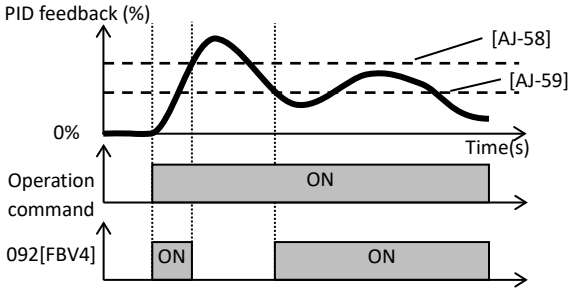
- Limits the output range of the PID. If [AJ-56] =0.00 the limit is disabled.

Code/Name	Range (unit)	Initial value
AJ-57 PID4 over deviation level	0.00 to 100.00(%)	3.00



- When the PID deviation pass over ±[AJ-57], the output terminal function 091[OD4] is activated.

Code/Name	Range (unit)	Initial value
AJ-58 Turn-off level for the PID4 feedback compare signal	0.00 to 100.00(%)	100.00
AJ-59 Turn-on level for the PID4 feedback compare signal		0.00



- When the PID feedback cross over the [AJ-58] level, the output terminal function 092[FBV4] is activated (ON). If it crosses under the [AJ-59] level, is deactivated (OFF).

[bA101] to [bA116]

■Parameter mode (B code：Fine Tuning Function)

Frequency limit

Code/Name	Range (unit)	Initial value
bA101 Upper frequency limit selection, 1st-motor	00(Disable) 01(Terminal[VRF]) 02(Terminal[IRF]) 03(Terminal[VF2]) 04(Terminal[Ai4]) 05(Terminal[Ai5]) 06(Terminal[Ai6]) 07(Parameter Setting) 08(RS485) 09(Option-1) 10(Option-2) 11(Option-3) 12(Pulse train input(internal)) 13(Pulse train input(option))	00
bA102 Upper frequency limit, 1st-motor	0.00 to 590.00(Hz)	0.00
bA103 Lower frequency limit , 1st-motor		

- Sets upper and lower limits of the frequency command.

Torque limit

Code/Name	Range (unit)	Initial value
bA110 Torque limit selection, 1st-motor	00(Disable) 01(Terminal[VRF]) 02(Terminal[IRF]) 03(Terminal[VF2]) 04(Terminal[Ai4]) 05(Terminal[Ai5]) 06(Terminal[Ai6]) 07(Parameter Setting) 08(RS485) 09(Option1) 10(Option2) 11(Option3)	07
bA111 Torque limiting parameters mode selection, 1st-motor	00(4 quadrants) 01([TRQ] terminal)	00
bA112 Torque limit 1 (Forward drive), 1st-motor	0.0 to 500.0(%)	200.0(%)
bA113 Torque limit 2 (Reverse regenerative), 1st-motor		
bA114 Torque limit 3 (Reverse drive), 1st-motor		
bA115 Torque limit 4 (Forward regenerative), 1st-motor		
bA116 Torque limit LADSTOP selection, 1st-motor	00(Disable) 01(Enable)	00

- In the case of vector control (With encoder, Sensor less, 0Hz range sensor less) the torque limit function can limit the motor output torque.

[bA120] to [bA128]

Overcurrent suppression function setting

Code/Name	Range (unit)	Initial value
bA120 Overcurrent suppression enable, 1st-motor	00(Disable) 01(Enable)	00
bA121 Overcurrent suppression level, 1st-motor	Inverter ND rated current×(0.0 to 2.5)(A)	Note

Note: Inverter ND rated current×2.0

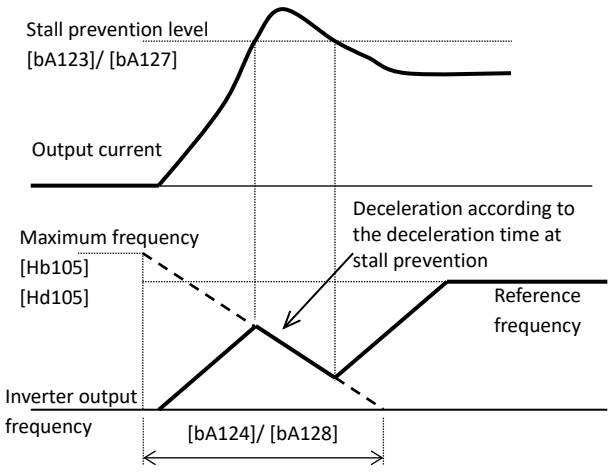
- Overcurrent can be suppressed, but in that case there is a possibility the motor become in a step-out state. Disable it in cases such as cranes.

Stall prevention function settings

Code/Name	Range (unit)	Initial value
bA122 Stall prevention 1 selection, 1st-motor	00(Disable) 01(Enable during accel. and constant speed) 02(Constant speed only) 03(Enable during accel. and constant speed (accel. during regeneration))	01
bA123 Stall prevention 1 level, 1st-motor	Inverter rated current ×(0.2 to 2.5)(A)	Note
bA124 Stall prevention 1 operation time, 1st-motor	0.10 to 3600.00(s)	1.00
bA126 Stall prevention 2 selection, 1st-motor	00(Disable) 01(Enable during accel. and constant speed) 02(Constant speed only) 03(Enable during accel. and constant speed (accel. during regeneration))	01
bA127 Stall prevention 2 level, 1st-motor	Inverter rated current ×(0.2 to 2.5)(A)	Note
bA128 Stall prevention 2 operation time, 1st-motor	0.10 to 3600.00(s)	1.00

Note: Inverter rated current × 1.7(A)

- When the current is increased, the stall prevention function reduces the current automatically by lowering the frequency.



- Using [OLR] function state, the stall prevention 1 (OFF) and stall prevention 2 (ON) can be used.

[bA-30] to [bA145]

Deceleration / stop at power loss (Non-stop)

Code/Name	Range (unit)	Initial value
bA-30 Instantaneous power failure non-stop function, mode selection	00(Disable) 01(Deceleration-stop) 02 (Voltage controlled decel-stop(without recovery)) 03 (Voltage controlled decel-stop (with recovery)	00
bA-31 Instantaneous power failure non-stop function, start voltage level	(200V class) 0.0 to 410.0(Vdc) (400V class) 0.0 to 820.0(Vdc)	(200V class) 220.0 (400V class) 440.0
bA-32 Instantaneous power failure non-stop function, target voltage level	(200V class) 0.0 to 410.0(Vdc) (400V class) 0.0 to 820.0(Vdc)	(200V class) 360.0 (400V class) 720.0
bA-34 Instantaneous power failure non-stop function, deceleration time	0.01 to 3600.00(s)	1.00
bA-36 Instantaneous power failure non-stop function, start frequency decrement	0.00 to 10.00(Hz))	0.00
bA-37 Instantaneous power failure non-stop function, DC bus voltage control P gain	0.00 to 5.00	0.20
bA-38 Instantaneous power failure non-stop function, DC bus voltage control I gain	0.00 to 150.00(s)	1.00

- If the DC voltage of the main circuit is lower than the level of [bA-31], the inverter decelerates to create a regenerative state.
- When [bA-30]=01, if the DC voltage drops under [bA-31], the current output frequency will be decreased by the amount set in the [bA-36] and then the inverter will decelerate according to the deceleration time [bA-34]. Once the DC voltage exceeds the [bA-32], the deceleration is temporally stopped.
- When [bA-30]=02/03, if the DC voltage drops below DC target level setting [bA-32], in order to maintain the DC voltage at [bA-32] target level, the output frequency is decelerated by the PI control to the regenerative state.

Overvoltage suppression - deceleration

Code/Name	Range (unit)	Initial value
bA140 Overvoltage suppression enable setting, 1st-motor	00(Disable) 01(Constant DC bus voltage control(deceleration stop)) 02(Enable acceleration) 03(Enable acceleration (at constant speed and deceleration))	00
bA141 Overvoltage suppression active level, 1st-motor	(200V class) 330.0 to 400.0(Vdc) (400V class) 660.0 to 800.0(Vdc)	(200V class) 380 (400V class) 760
bA142 Overvoltage suppression active time, 1st-motor	0.00 to 3600.00(s)	1.00
bA144 Constant DC bus voltage control P gain, 1st-motor	0.00 to 5.00	0.20
bA145 Constant DC bus voltage control I gain, 1st-motor	0.00 to 150.00(s)	1.00

- When [bA140]=01, the deceleration time is increased until stop so the DC voltage do not cross over the [bA141] level.
- When [bA140]=02/03, accelerates temporally so the DC voltage do not cross over [bA141] level.

[bA146] to [bA149]
[bA-60] to [bA-63]

Overvoltage suppression - Over-excitation

Code/Name	Range (unit)	Initial value
bA146 Over-excitation function selection, 1st-motor	00(Disable) 01(Always enable) 02(At deceleration only) 03(Operation at setting level) 04(Operation at setting level at deceleration only)	00
bA147 Over-excitation function output filter time constant, 1st-motor	0.00 to 1.00(s)	0.30
bA148 Over-excitation function voltage gain, 1st-motor	50 to 400(%)	100
bA149 Over-excitation suppression level setting, 1st-motor	(200V Class) 330.0 to 400.0(Vdc) (400V Class) 660.0 to 800.0(Vdc)	(200V Class) 360 (400V Class) 720

- This function disables the AVR function output voltage, works while in over-excitation.
- When [AA121]=00 to 02, 04 to 06, (V/f) is enabled.
- When [bA146]=03/04, it will be operative if DC voltage exceeds [bA-149] level.

Dynamic braking (DBTR) function

Code/Name	Range (unit)	Initial value
bA-60 Dynamic brake use ratio	0.0 to 10.0(%) Note	10.0
bA-61 Dynamic brake activation selection	00(Disable) 01(Only while running) 02(Enable during stop)	00
bA-62 Dynamic brake activation level	(200V class) 330.0 to 400.0(V) (400V class) 660.0 to 800.0(V)	(200V class) 360.0 (400V class) 720.0
bA-63 Dynamic brake resistor value	Inverter minimum resistor value to 600(Ω)	Minimum resistance

Note: The actual dynamic brake use ratio is [bA-60]×[bA-63] / (Inverter minimum resistor).

- This function operates the braking resistor of the built-in braking circuits models. To use the DBTR, setting [bA-60] and [bA-61] is required.
- Refer to the specification table of Chapter 7 for the minimum resistance value that can be connected.

[bA-70] to [bA-71]
[bA201] to [bA249]

Cooling-fan operation

Code/Name	Range (unit)	Initial value
bA-70 Cooling fan control method selection	00(Always ON) 01(While inverter operates) 02(Depends on temperature)	00
bA-71 Clear accumulated cooling fan run time monitor	00(Disable)/01(Clear)	

- The Inverter cooling fan can be stopped.
- If you change the cooling-fan, assigning [bA-71]=01 you will be able to clear the accumulated operation time.

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
bA201 Upper frequency limit selection, 2nd-motor	Same as bA101	
bA202 Upper Frequency limit, 2nd-motor	Same as bA102	
bA203 Lower Frequency limit , 2nd-motor	Same as bA103	
bA210 Torque limit selection, 2nd-motor	Same as bA110	
bA211 Torque limiting parameters mode selection, 2nd-motor	Same as bA111	
bA212 Torque limit 1 (Forward drive), 2nd-motor	Same as bA112	
bA213 Torque limit 2 (Reverse regenerative), 2nd-motor	Same as bA113	
bA214 Torque limit 3 (Reverse drive), 2nd-motor	Same as bA114	
bA215 Torque limit 4 (Forward regenerative), 2nd-motor	Same as bA115	
bA216 Torque limit LADSTOP selection, 2nd-motor	Same as bA116	
bA220 Overcurrent suppression enable, 2nd-motor	Same as bA120	
bA221 Overcurrent suppression level, 2nd-motor	Same as bA121	
bA222 Stall prevention 1 selection, 2nd-motor	Same as bA122	
bA223 Stall prevention 1 level, 2nd-motor	Same as bA123	
bA224 Stall prevention 1 operation time, 2nd-motor	Same as bA124	
bA226 Stall prevention 2 selection, 2nd-motor	Same as bA126	
bA227 Stall prevention 2 level, 2nd-motor	Same as bA127	
bA228 Stall prevention 2 operation time, 2nd-motor	Same as bA128	
bA240 Overvoltage suppression enable, 2nd-motor	Same as bA140	
bA241 Overvoltage suppression active level, 2nd-motor	Same as bA141	
bA242 Overvoltage suppression active time, 2nd-motor	Same as bA142	
bA244 Constant DC bus voltage control P gain, 2nd-motor	Same as bA144	
bA245 Constant DC bus voltage control I gain, 2nd-motor	Same as bA145	
bA246 Over-excitation function selection, 2nd_motor	Same as bA146	
bA247 Over-excitation function output filter time constant, 2nd-motor	Same as bA147	
bA248 Over-excitation function voltage gain, 2nd-motor	Same as bA148	
bA249 Over-excitation function level setting, 2nd-motor	Same as bA149	

[bb101] to [bb-23]

Carrier frequency

Code/Name	Range (unit)	Initial value
bb101 Carrier frequency setting, 1st-motor	0.5 to 16.0(kHz) ([Ub-03]=02(ND)) 0.5 to 12.0(kHz) ([Ub-03]=01(LD)) 0.5 to 10.0(kHz) ([Ub-03]=02(VLD))	2.0
bb102 Sprinkle carrier pattern selection, 1st-motor	00(Disable) 01(Enable: Patern-1) 02(Enable: Patern-2) 03(Enable: Patern-3)	00
bb103 Automatic carrier reduction selection, 1st-motor	00(Disable) 01(Enable: Current) 02(Enable: Temperature)	

- To decrease noise, [bb101] should be set small. To lower motor sound loudness, [bb101] has to be set bigger.
- By setting the duty specification selection [Ub-03], the carrier frequency is internally limited.
- For the sake of the inverter protection, the Automatic carrier reduction [bb103] decreases the carrier in certain cases.

Reset operation after error event

Code/Name	Range (unit)	Initial value
bb-10 Automatic error reset selection	00(Disable) 01(If RUN command is OFF) 02(After set time)	00
bb-11 Alarm signal selection at automatic error reset	00(Enable) 01(Disable)	
bb-12 Automatic error reset wait time	0 to 600(s)	2
bb-13 Automatic error reset number	0 to 10(count)	3

- Adjustment of the automatic reset that follows an error event. In the case that RUN command was on execution, after resetting, the motor re-operates according to the setting of [bb-41].

Retry/trip setting in error event

Code/Name	Range (unit)	Initial value
bb-20 Number of retries after instantaneous power failure	0 to 16/255	0
bb-21 Number of retries after under voltage		
bb-22 Number of retries after overcurrent	0 to 5	
bb-23 Number of retries after over voltage		

- Set the number of times to retry after each error.
- If 0 is set, as soon as an error occurs, it will trip.
- To retry, set to a value other than 0.

[bb-24] to [bb-42]

Code/Name	Range (unit)	Initial value
bb-24 Restart mode selection after instantaneous power failure/ under-voltage error	Note	01
bb-25 Instantaneous power failure allowed time	0.3 to 25.0(s)	1.0
bb-26 Retry wait time after instantaneous power failure/ under-voltage error	0.3 to 100.0(s)	
bb-27 Enable instantaneous power failure/ under-voltage trip while in stop status	00(Disable) 01(Enable) 02(Disable at Stop/Decel. stop)	00
bb-28 Restart mode selection after an overcurrent error	Note	01
bb-29 Retry wait time after an overcurrent error	0.3 to 100.0(s)	0.3
bb-30 Restart mode selection after an overvoltage error	Note	01
bb-31 Retry wait time after an overvoltage error	0.3 to 100.0(s)	0.3

Note: 00(Restart at 0Hz)/01(Restart with matching frequency)/02(Restart with active frequency matching)/03(Detect speed)/04(Decelerate and stop with matching frequency and then trip)

- Regarding the restart, after the waiting time is completed the selected restart method is carried out.

Restart mode after MBS/RST

Code/Name	Range (unit)	Initial value
bb-40 Restart mode after MBS release	00(Restart at 0Hz) 01(Restart with matching frequency) 02(Restart with active frequency matching) 03(Detect speed) Note	00
bb-41 Restart mode after RST release		

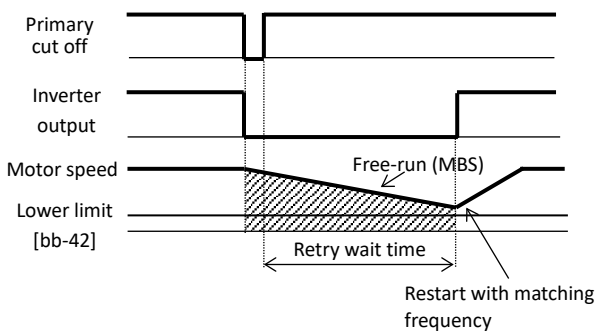
Note: Feedback input to input terminals DFH and DHH or feedback input to option cassette HF-FB is necessary.

- When using Intelligent input terminals [MBS] and [RST], restart mode can be selected.
- For [bb-40], select the operation after [MBS] input or after free-run-stop of stop command.
- For [bb-41], select the operation after reset a trip by power shutdown or after release reset for a trip.

Minimum level of frequency matching

Code/Name	Range (unit)	Initial value
bb-42 Frequency matching minimum restart frequency	0.00 to 590.00(Hz)	0.00

- The matching frequency function adopts the motor frequency for a shock less start-up.
- If at the restart the frequency is under the [bb-42] frequency, a 0Hz restart will be used instead.

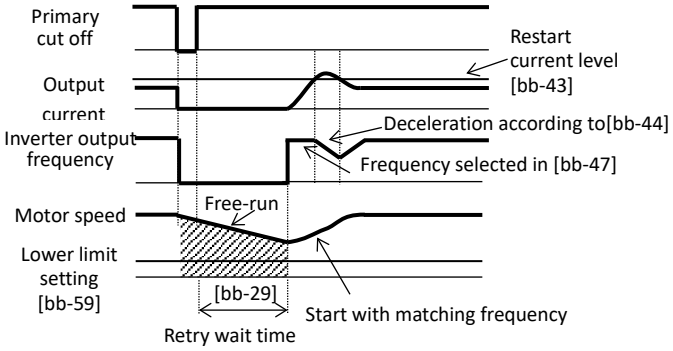


[bb-43] to [bb-62]

Frequency pull-in restart

Code/Name	Range (unit)	Initial value
bb-43 Level of frequency pull-in restart	Inverter rated current ×(0.2 to 2.5)(A)	Inverter rated current×1.0
bb-44 Constant (frequency) of frequency pull-in restart	0.10 to 30.00(s)	0.50
bb-45 Constant (voltage) of frequency pull-in restart		
bb-46 Overcurrent suppression level of frequency pull-in restart	Inverter rated current ×(0.0 to 2.5)(A)	Inverter rated current × 1.0(A)
bb-47 Start frequency selection of frequency pull-in restart	00(Output frequency at shut down) 01(Maximum frequency) 02(Setting frequency)	00
bb-50 Frequency matching filter gain	0 to 1000(%)	50

- The restart interval changes with the current set by [bb-46].
- Pull in at the frequency set in [bb-47] and start up.



Overcurrent level

Code/Name	Range (unit)	Initial value
bb160 Overcurrent detection level, 1st-motor	Depend on the inverter model	

- The motor protection level for overcurrent can be set.
- In the case of a permanent magnet motor is set lower than the motor demagnetizing level.

Overvoltage warning

Code/Name	Range (unit)	Initial value
bb-61 Power supply overvoltage selection	00(Warning) 01(Error)	00
bb-62 Power supply overvoltage level setting	(200V Class) 300.0 to 410.0(V) (400V Class) 600.0 to 820.0(V)	(200V Class) 390.0 (400V Class) 780.0

- When the input suffers an overvoltage and if the DC voltage is higher than the value in [bb-62], a warning is issued in accordance with [bb-61].

Selection of Ground fault detection

Code/Name	Range (unit)	Initial value
bb-64 Detect ground fault selection	00(Disable) 01(Enable)	01

- Ground fault detection enable/disable is selectable.

[bb-65] to [bb260]

Phase loss detection

Code/Name	Range (unit)	Initial value
bb-65 Input phase loss detection enable	00(Disable) 01(Enable)	00
bb-66 Output phase loss detection enable		
bb-67 Output phase loss detection sensitivity	1 to 100(%)	10

- Detects the disconnection of the supply RST input line and UVW output line.

Thermistor error detection

Code/Name	Range (unit)	Initial value
bb-70 Thermistor error level	0 to 10000(Ω)	3000
Cb-40 Thermistor type selection	00(Disable) 01(PTC)/02(NTC)	00

- In [TH] terminal must be attached the kind of thermistor specified in [Cb-40].
- If [Cb-40]=01 or 02, error level must be set in [bb-70].

Over-speed control

Code/Name	Range (unit)	Initial value
bb-80 Over-speed detection level	0.0 to 150.0(%)	135.0
bb-81 Over-speed detection time	0.0 to 5.0(s)	0.5

- In vector control, when speed surpass "maximum speed"×[bb-80] for more than the [bb-81] time, it will result in an error.

Abnormal deviation in speed control

Code/Name	Range (unit)	Initial value
bb-82 Speed deviation error mode selection	00(Warning) 01(Error)	00
bb-83 Speed deviation error detection level	0.0 to 100.0(%)	15.0
bb-84 Speed deviation error detection time	0.0 to 5.0(s)	0.5

- In vector control, when the speed deviation surpass "maximum speed"×[bb-83] for more than the [bb-84] time, it will result in an error.

Abnormal deviation in position control

Code/Name	Range (unit)	Initial value
bb-85 Position deviation error mode selection	00(Warning) 01(Error)	00
bb-86 Position deviation error detection level	0 to 65535 (×100pulse)	4096
bb-87 Position deviation error detection time	0.0 to 5.0(s)	0.5

- During position control, if the position deviation exceeds the [bb-86] for more than the [bb-87] time, it will result in an error.

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
bb201 Carrier frequency setting, 2nd-motor	Same as bb101	
bb202 Sprinkle carrier pattern selection, 2nd-motor	Same as bb102	
bb203 Automatic carrier reduction selection, 2nd-motor	Same as bb103	
bb260 Overcurrent detection level, 2nd-motor	Same as bb160	

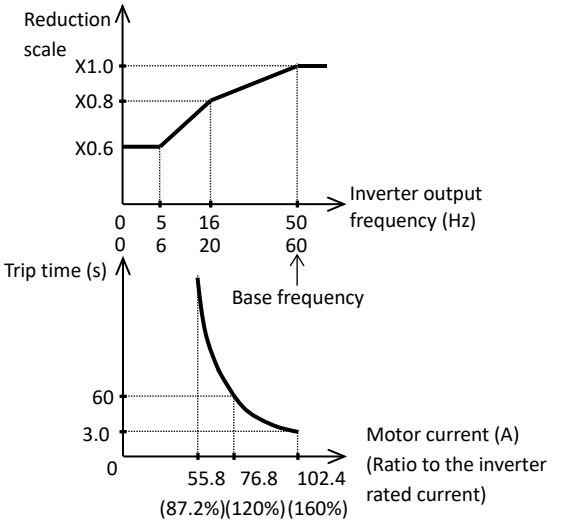
[bC110] to [bC125]

Electronic thermal protection

Code/Name	Range (unit)	Initial value
bC110 Electronic thermal level setting, 1st-motor	Inverter rated current × (0.0 to 3.0)(A)	Inverter rated current ×1.0(A)
bC111 Electronic thermal characteristic selection, 1st-motor	00(Reduced torque (VT)) 01(Constant torque (CT)) 02(Free setting)	00
bC112 Electronic thermal decrease function enable, 1st-motor	00(Disable) 01(Enable)	01
bC113 Electronic thermal decreasing time, 1st-motor	1 to 1000(s)	600
bC-14 Store electronic thermal counter at power-off	00(Disable) 01(Enable)	01
bC120 Free electronic thermal frequency-1, 1st-motor	0.00 to bC122(Hz)	0.00
bC121 Free electronic thermal current-1, 1st-motor	Inverter rated current × (0.0 to 3.0)(A)	0.0(A)
bC122 Free electronic thermal frequency-2, 1st-motor	bC120 to bC124(Hz)	0.00
bC123 Free electronic thermal current-2, 1st-motor	Inverter rated current × ×(0.0 to 3.0)(A)	0.0(A)
bC124 Free electronic thermal frequency-3, 1st-motor	bC122 to 590.00(Hz)	0.00
bC125 Free electronic thermal current-3, 1st-motor	Inverter rated current × (0.0 to 3.0)(A)	0.0(A)

- With [bC112], it is possible to subtract the thermal integral value of the motor.

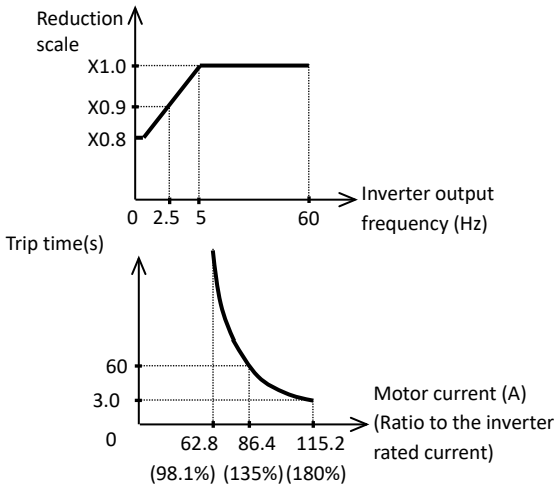
(Example) When [bC111]=00, Inverter rated current:64A, [bC110]=64(A), Base frequency [Hb104]=60Hz, Output frequency=20Hz



- In case of output frequency = 16Hz (base=50Hz) or 20Hz (base = 60hz), the reduction scale is ×0.8, then the inverter will trip when the output current of 120%(150%×0.8) flows continuously within 60s according to the curve.

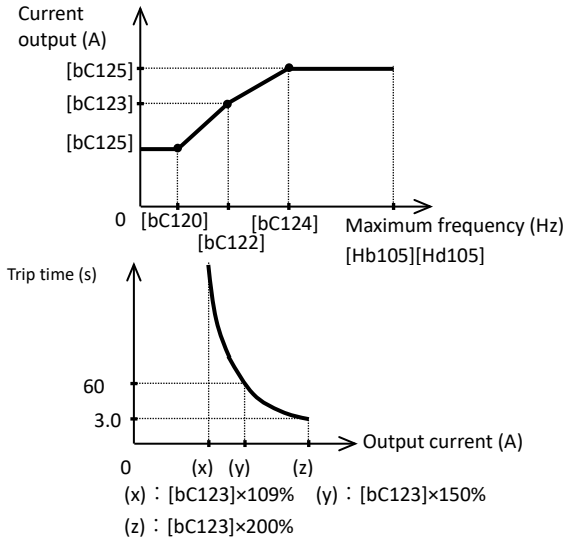
[bC210] to [bC225]

(Example) When [bC111]=01, Inverter rated current:64A, [bC110]=64(A), Base frequency[Hb103]=60Hz, Output frequency=2.5Hz



- In case of output frequency = 2.5Hz, the reduction scale is x0.9, then, the inverter will trip when the output current of 135%(=150%×0.9) flows continuously within 60s according to the curve.

(Example) When [bC111] = 02, and Output frequency [bC122]



(x)：[bC123]×109% (y)：[bC123]×150%
(z)：[bC123]×200%

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
bC210 Electronic thermal level setting, 2nd-motor	Same as bC110	
bC211 Electronic thermal characteristic selection, 2nd-motor	Same as bC111	
bC212 Electronic thermal decrease function selection, 2nd-motor	Same as bC112	
bC213 Electronic thermal decreasing time, 2nd-motor	Same as bC113	
bC220 Free electronic thermal frequency-1, 2nd-motor	Same as bC120	
bC221 Free electronic thermal current-1, 2nd-motor	Same as bC121	
bC222 Free electronic thermal frequency-2, 2nd-motor	Same as bC122	
bC223 Free electronic thermal current-2, 2nd-motor	Same as bC123	
bC224 Free electronic thermal frequency-3, 2nd-motor	Same as bC124	
bC225 Free electronic thermal current-3, 2nd-motor	Same as bC125	

[bd-01] to [bd-04]

Safety terminal

Code/Name	Range (unit)	Initial value
bd-01 STO input display selection	00(Warning(display)) 01(Warning(without display)) 02(Trip)	00
bd-02 STO input change time	0.00 to 60.00(s)	1.00
bd-03 Display selection during STO input change time	00(Warning(display)) 01(Warning(without display))	00
bd-04 Action selection after STO input change time	00(Maintain current status) 01(Disable) 02(Trip)	

• For more information, refer to the User's guide.

[CA-01] to [CA-31]

■Parameter mode (C code：I/O terminals, RS485)

Input terminal settings

Code/Name	Range (unit)	Initial value
CA-01 Input terminal [FR] function	Reference <Input terminal function list> 103 [PLA] Pulse train input DFH is restricted to [CA-10], 104 [PLB] Pulse train input DHH is restricted to [CA-11],	001
CA-02 Input terminal [RR] function		002
CA-03 Input terminal [DFL] function		003
CA-04 Input terminal [DFM] function		004
CA-05 Input terminal [AUT] function		015
CA-06 Input terminal [MBS] function		032
CA-07 Input terminal [JOG] function		029
CA-08 Input terminal [ES] function		033
CA-09 Input terminal [RST] function		028
CA-10 Input terminal [DFH] function		005
CA-11 Input terminal [DHH] function		006

- The functions for the input terminals are assigned in [CA-01] to [CA-09],[CA-10],[CA-11].

Input terminal NO/NC settings

Code/Name	Range (unit)	Initial value
CA-21 Input terminal [FR] active state	00(Normally Open: NO) 01(Normally Closed: NC)	00
CA-22 Input terminal [RR] active state		
CA-23 Input terminal [DFL] active state		
CA-24 Input terminal [DFM] active state		
CA-25 Input terminal [AUT] active state		
CA-26 Input terminal [MBS] active state		
CA-27 Input terminal [JOG] active state		
CA-28 Input terminal [ES] active state		
CA-29 Input terminal [RST] active state		
CA-30 Input terminal [DFH] active state		
CA-31 Input terminal [DHH] active state		

- NO/NC for the Intelligent input terminals FR to RST,DFH,DHH are assigned in [CA-21] to [CA-29], [CA-30],[CA-31].
- However, in the case of [RST] assignment the NO/NC will not apply, only NO will apply.

[CA-41] to [CA-55]

Output terminal chatter prevention

Code/Name	Range (unit)	Initial value
CA-41 Input terminal [FR] response time	0 to 400(ms)	2
CA-42 Input terminal [RR] response time		
CA-43 Input terminal [DFL] response time		
CA-44 Input terminal [DFM] response time		
CA-45 Input terminal [AUT] response time		
CA-46 Input terminal [MBS] response time		
CA-47 Input terminal [JOG] response time		
CA-48 Input terminal [ES] response time		
CA-49 Input terminal [RST] response time		
CA-50 Input terminal [DFH] response time		
CA-51 Input terminal [DHH] response time		

- Sets the time to wait after the input change has ended, and for the input to become stable and responsive.

Time allowed in simultaneous terminal change

Code/Name	Range (unit)	Initial value
CA-55 Multistage input determination time	0 to 2000(ms)	0

- Sets the dead time for multistage speed and position terminals change.

[Input terminal function list]

Function code	Symbol	Function name	Description
000	No	Not use	-
001	FR	Forward rotation	Activating (ON) only one of them will grant forward or reverse rotation command. ⇒ [AA111]
002	RR	Reverse rotation	
003	DFL	Multi-speed selection 1	Changing the states of these terminals, allow to set different motor speeds and change among them. ⇒[Ab110] to [Ab-25], [Ab210]
004	DFM	Multi-speed selection 2	
005	DFH	Multi-speed selection 3	
006	DHH	Multi-speed selection 4	
007	SF1	Multi-speed Bit-1	
008	SF2	Multi-speed Bit-2	
009	SF3	Multi-speed Bit-3	
010	SF4	Multi-speed Bit-4	
011	SF5	Multi-speed Bit-5	
012	SF6	Multi-speed Bit-6	
013	SF7	Multi-speed Bit-7	
014	ADD	Trigger for frequency addition	When is turned ON, adds the specified frequency value. ⇒[AA106]/[AA206]
015	AUT	Command change	Main speed(OFF)/Sub-speed (ON), to change between them use ⇒[AA105]/[AA205]
016	STA	3-wire start	If [STA] is ON, start the motor. If [STP] is ON stop the motor. Forward operation direction if [F/R] is (OFF), reverse operation direction if is (ON). ⇒[AA111]
017	STP	3-wire stop	
018	F/R	3-wire forward/reverse	
019	AHD	Analog command holding	When the Analog inputs Ai1, 2, 3 are in use, if AHD terminal is in ON state, holds the Analog terminal value. ⇒[AA101]
020	UP	Remote control speed-up function	If the frequency can be set ([AHD] ON included), [UP] ON accelerates, and [DWN] ON decelerates. [UDC] returns to the saved value. ⇒[CA-60] to [CA-66]
021	DWN	Remote control speed-DOWN function	
022	UDC	Remote control data clearing	
023	F-OP	Force operation	If ON, switch set parameters. ⇒[CA-70],[CA-71]
024	SET	2nd-motor control	Change between 1st-motor (OFF) and 2nd-motor (ON). ⇒By parameter
028	RST	Reset	Reset trip⇒[bb-41], [CA-72]
029	JOG	Jogging	Activates Jogging operation. ⇒[AG-20],[AG-21]
030	DB	External dynamic brake	Enables the DC braking operation⇒[AF101] to [AF109]
031	AD2	2-step acceleration/deceleration	If ON, changes the Accel/Decel time. ⇒[AC115]
032	MBS	Free run stop	If ON allows the motor to free run. ⇒[AA115],[bb-40]
033	ES	External fault	If ON error E012 occurs. ⇒Trip E012
034	USP	Unattended start protection	ON if at the start-up, the RUN command was issued right at the start up, E013 error. ⇒Tripping E013
035	CS	Commercial supply change	When changing to the commercial power supply, if it is ON, will cut the output.
036	SFT	Soft-Lock	If ON, disables parameter changes. ⇒[UA-16]
037	BOK	Brake confirmation signal	Here is inputted the brake confirmation signal for the brake control.

Function code	Symbol	Function name	Description
038	OLR	Stall prevention selection	Switches between stall prevention 1(OFF) and 2(ON). ⇒[bA122] to [bA128]
039	KHC	Clear accumulated input power monitor	If ON, clears the Accumulated input power monitor. ⇒[UA-14]
040	OKHC	Clear accumulated output power monitor	If ON, clears the Accumulated output power monitor. ⇒[UA-12]
041	PID	Disable PID1	If ON, disables PID1 and changes the PID target value for the frequency reference. ⇒[AH-01]
042	PIDC	PID1 integration reset	If ON, clears the integral value of the control. ⇒[AH-62],[AH-65]
043	PID2	Disable PID2	If ON, disables PID2 and changes the PID target value for the frequency reference. ⇒[AJ-01]
044	PIDC2	PID2 integration reset	If ON, clears the integral value of the control. ⇒[AJ-14]
045	PID3	Disable PID3	If ON, disables PID3 and changes the PID target value for the frequency reference. ⇒[AJ-21]
046	PIDC3	PID3 integration reset	If ON, clears the integral value of the control. ⇒[AJ-34]
047	PID4	Disable PID4	If ON, disables PID4 and changes the PID target value for the frequency reference. ⇒[AJ-41]
048	PIDC4	PID4 integration reset	If ON, clears the integral value of the control. ⇒[AJ-54]
051	SVC1	Multi set-point selection 1	The target value can be selected by changing the pattern of ON/OFF states. ⇒[AH-06]
052	SVC2	Multi set-point selection 2	
053	SVC3	Multi set-point selection 3	
054	SVC4	Multi set-point selection 4	
055	PRO	PID gain change	Switches between Gain 1(OFF) and Gain 2(ON).
056	PIO1	PID output switching 1	Switches PID Output 1 to 4 by (PIO1:PIO2). PID1 Enable(OFF:OFF) PID2 Enable(OFF:ON) PID3 Enable(ON:OFF) PID4 Enable(ON:ON)
057	PIO2	PID output switching 2	
058	SLEP	SLEEP condition activation	In case it is used in Sleep terminal functions, when ON, it activates. ⇒[AH-85]
059	WAKE	WAKE condition activation	In case it is used in Wake terminal functions, when ON, it activates. ⇒[AH-93]
060	TL	Torque limit enable Note	If ON, enables torque limit.
061	TRQ1	Torque limit selection bit 1 Note	The target value can be selected by changing the pattern of ON/OFF states.
062	TRQ2	Torque limit selection bit 2 Note	

Note: These functions are disabled when the Control mode selection (AA121/AA221) setting is 00 to 06 (V/f control mode).

[Input terminal function list]

Function code	Symbol	Function name	Description
063	PPI	P/PI control mode selection	For drooping control, switches between PI control (OFF) and P control (ON).
064	CAS	Control gain change	Changes between the PI gain 1 (OFF) and 2(ON) of the speed control system.
065	SON	Servo-on	If ON, executes the Servo-Lock operation.
066	FOC	Forcing	If ON, performs a forcible operation, will accelerate the rise of the torque.
067	ATR	Permission of torque control	If ON, enables the torque limit.
068	TBS	Torque bias enable	If ON, enables the torque bias.
069	ORT	Home search function	If ON, when in position control mode, stops by home search.
071	LAC	Acceleration Deceleration cancellation	If ON, forces Accel/Decel time to 0.00s.
072	PCLR	Clearance of position deviation	Clears the position deviation of position control mode.
073	STAT	Pulse train position command input enable	In the pulse train position control, if is ON, the input is enabled.
074	PUP	Position bias (ADD)	If in position control mode, Adds if [PUP] is ON. Subtracts if [PDN] is ON.
075	PDN	Position bias (SUB)	
076	CP1	Multistage position settings selection 1	The position reference can be selected by changing the pattern of ON/OFF states.
077	CP2	Multistage position settings selection 2	
078	CP3	Multistage position settings selection 3	
079	CP4	Multistage position settings selection 4	
080	ORL	Limit signal of homing function	Used by the Zero-Return position operations of the position control.
081	ORG	Start signal of homing function	
082	FOT	Forward over travel	Limits forward motion by forward limit torque.
083	ROT	Reverse over travel	Limits reverse motion by reverse limit torque.
084	SPD	Speed / Position switching	Switches position control (OFF) and speed control (ON).
085	PSET	Position data presetting	If ON, sets the actual position as the origin point.
086 to 096	-	-	Reserved

Function code	Symbol	Function name	Description
097	PCC	Pulse counter clearing	Clear the count for the pulse counter function.
098	ECOM	Starting up of EzCOM	Start for EzCOM
099	-	-	Reserved
100	HLD	Acceleration Deceleration disable	If ON, temporally stagnates Accel/Decel.
101	REN	RUN enable	If ON, operation is enable. If it is not assigned, it disables operation.
102	DISP	Display lock	If made ON, the keypad screen is lock. The RUN/STOP/RESET keys depend on [AA-13][AA111]
103	PLA	Pulse count A	For pulse train input use.
104	PLB	Pulse count B	For pulse train input use.
105	EMF	Emergency-force drive activation	Forces the set operation in emergency state.
107	COK	Contactor check signal	Regarding the braking control, check signal for the contactor.
108	DTR	Data trace start	If ON, starts data trace function.
109	PLZ	Pulse train input Z	Z phase pulse input of the external encoder. It is invalid when using HF-FB.
110	TCH	Teach-in signal	If ON, starts function.

[CA-60] to [CA-84]

[UP] / [DWN] operations

Code/Name	Range (unit)	Initial value
CA-60 UP/DWN overwrite target selection	00(Speed reference) 01(PID1 Set point)	00
CA-61 UP/DWN data save enable	00(No save) 01(Save)	
CA-62 UP/DWN UDC selection	00(0Hz) 01(Save data)	
CA-64 Acceleration time setting for UP/DWN function	0.00 to 3600.00(s)	30.00
CA-66 Deceleration time setting for UP/DWN function		

- [CA-60] sets as operation target the frequency reference or the PID target value for 020[UP]/021[DWN].
- [CA-61] sets if the modified values of [UP] / [DWN] should be saved or not in the storage memory.
- [CA-62] selects the frequency in which will change the frequency reference for when [UDC] terminal is ON.
- If [UP]/[DWN] is turn ON, in the case the frequency reference is changed you can set the acceleration and deceleration time [CA-64][CA-66].

[F-OP] Speed/Operation change

Code/Name	Range (unit)	Initial value
CA-70 Speed command selection when [F-OP] is active	01 to 16 Note:1	01
CA-71 RUN command source selection when [F-OP] is active	00 to 06 Note:2	00

- If Intelligent input terminal 023[F-OP] is ON the change is carried out.

Note: 1. 01(Terminal [VRF])/02(Terminal [IRF])/03(Terminal [VF2])
04(Terminal[Ai4])/05(Terminal[Ai5])/06(Terminal[Ai1])/07(Parameter Setting)/08(RS485)/09(Option-1)/10(Option-2)/11(Option-3)
12(Pulse train input (internal))/13(Pulse train input (option))
14(Program function)/15(PID calc.)/16(MOP VR)
2. 00([FR]/ [RR] terminal)/01(3-wire)/02(Keypad's RUN key)/03(RS485)
04(Option-1)/05(Option-2)/06(Option-3)

Reset terminal [RS]

Code/Name	Range (unit)	Initial value
CA-72 Reset mode selection	00(Always enabled (Trip release at turn-ON)) 01(Always enabled (Trip release at turn-OFF)) 02(Only enable in trip status (Trip release at turn-ON))/ 03(Only enable in trip status (Trip release at turn-OFF))	00

- Normally, Output is shut off when reset terminal is ON. It is also possible to enable only trip reset.

Main encoder input

Code/Name	Range (unit)	Initial value
CA-81 Encoder constant setting	32 to 65535(pulse)	1024
CA-82 Encoder phase sequence selection	00(A Phase lead) 01(B Phase lead)	00
CA-83 Motor gear ratio numerator	1 to 10000	1
CA-84 Motor gear ratio denominator		

- Sets the main encoder input and the motor gear ratio involved in the encoder feedback.

[CA-90] to [CA-99]

Pulse train input terminal

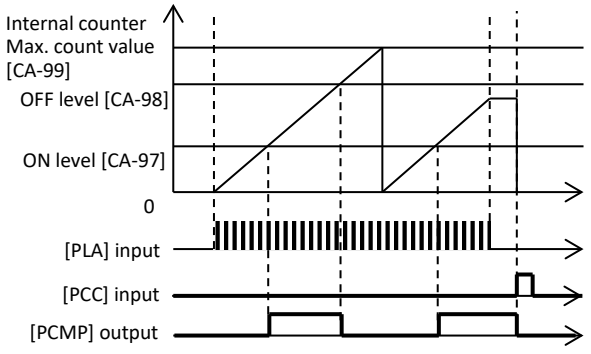
	Code/Name	Range (unit)	Initial value
Pulse train input	**CA-90** Pulse train input, target function selection	00(Disable) 01(Reference) 02(Speed feedback) 03(Pulse count)	00
	CA-91 Pulse train input mode selection	00(90 degrees shift pulse train) 01(Forward/Reverse pulse train and direction signal) 02(Forward pulse train and reverse pulse train)	00
Pulse train frequency	**CA-92** Pulse train frequency scale	0.05 to 32.00(kHz)	25.00
	CA-93 Pulse train frequency filter time constant	0.01 to 2.00(s)	0.10
	CA-94 Pulse train frequency bias value	-100.0 to 100.0(%)	0.0
	CA-95 Pulse train upper frequency detection level	0.0 to 100.0(%)	100.0
	CA-96 Pulse train lower frequency detection level		0.0

- If [CA-90] is 0, count input edges of terminal DFH(addition) and terminal DHH (subtraction).
- If [CA-90] is 01 to 03, DFH and DHH are 2-phase pulse train input and follow the [CA-91] setting.

Pulse train counter

Code/Name	Range (unit)	Initial value
CA-97 Pulse counter compare match output ON value	0 to 65535	0
CA-98 Pulse counter compare match output OFF value		
CA-99 Pulse counter maximum value		65535

- Set 091[PCMP] to output the compare results of the pulse train counters of functions 103[PLA]/104[PLB].
- Turning 097[PCC] terminal in ON state resets the counter.



[Cb-01] to [Cb-35]

Analog input acquisition

	Code/Name	Range (unit)	Initial value
[VRF] terminal	**Cb-01** [VRF] Filter time constant	1 to 500(ms)	500
	Cb-03 Frequency setting [VRF] Start value	0.00 to 100.00(%)	0.00
	Cb-04 Frequency setting [VRF] End value		100.00
	Cb-05 Analog input [VRF] Start rate	0.0 to [Cb-06](%)	0.0
	Cb-06 Analog input [VRF] End rate	[Cb-05] to 100.0(%)	100.0
	Cb-07 [VRF] Start value selection	00(Start value) 01(0%)	01
[IRF] terminal	**Cb-11** [IRF] Filter time constant	1 to 500(ms)	500
	Cb-13 Frequency setting [IRF] Start value	0.00 to 100.00(%)	0.00
	Cb-14 Frequency setting [IRF] End value		100.00
	Cb-15 Analog input [IRF] Start rate	0.0 to [Cb-16](%)	20.0
	Cb-16 Analog input [IRF] End rate	[Cb-15] to 100.0(%)	100.0
	Cb-17 [IRF] Start value selection	00(Start value) 01(0%)	01
[VF2] terminal	**Cb-21** [VF2] Filter time constant	1 to 500(ms)	500
	Cb-22 Terminal [VF2] selection	00(Single) 01(Added to VRF/IRF: Forward and Reverse) 02(Added to VRF/IRF: Forward only)	00
	Cb-23 Frequency setting [VF2] Start value	-100.00 to 100.00(%)	-100.00
	Cb-24 Frequency setting [VF2] End value		100.00
	Cb-25 Analog input [VF2] Start rate	-100.0 to [Cb-26]	-100.0
	Cb-26 Analog input [VF2] End rate	[Cb-25] to 100.0	100.0

- Regarding the adjustment method of the Analog input, please refer to the chapter 3 example of I/O terminals adjustment.

Analog input fine tuning

Code/Name	Range (unit)	Initial value
Cb-30 [VRF] Voltage/Current bias Adjustment	-100.00 to 100.00(%)	0.00
Cb-31 [VRF] Voltage/Current gain adjustment	0.00 to 200.00(%)	100.00
Cb-32 [IRF] Voltage/Current bias adjustment	-100.00 to100.00 (%)	0.00
Cb-33 [IRF] Voltage/Current gain adjustment	0.00 to 200.00(%)	100.00
Cb-34 [VF2] Voltage bias adjustment	-100.00 to 100.00(%)	0.00
Cb-35 [VF2] Voltage gain adjustment	0.00 to 200.00 (%)	100.00

- Regarding the adjustment method of the Analog input, please refer to the chapter 3 example of I/O terminals adjustment.
- The thermistor adjustment, when recognizes an increase in the adjustment value, reduces the resistor value.

[CA-40][Cb-41][Cb-51] to [Cb-57]
[CC-01] to [CC-07]

Thermistor error detection

Code/Name	Range (unit)	Initial value
Cb-40 Thermistor type selection	00(Disable) 01(PTC) 02(NTC)	00
Cb-41 Thermistor gain adjustment	0.0 to 1000.0	100.0

- Set [CA-40] according to the connected thermistor in TH input terminal.
- When [CA-40]=01 or 02, with [bb-70] the error level is set. Refer to [bb-70].
- [Cb-41] thermistor gain adjustment, when the adjustment value is raised the resistance value is lowered.

Code/Name	Range (unit)	Initial value
Cb-51 to 57	Reserved	-

Output terminal settings

Code/Name	Range (unit)	Initial value
CC-01 Output terminal [UPF] function	Reference Intelligent output terminal function list	002
CC-02 Output terminal [DRV] function		001
CC-03 Output terminal [X1] function		003
CC-04 Output terminal [X2] function		007
CC-05 Output terminal [X3] function		035
CC-06 Output terminal [RL] function		000 (no)
CC-07 Output terminal [FL] function		017

- The functions for the output terminals UPF to X3,RL,FL are assigned in [CC-01] to [CC-05],[CC-06],[CC-07].
- [RL] is RY/RC terminal, [FL] is FA/FB/FC terminal.

[CC-11] to [CC-33]

Output terminal NO/NC settings

Code/Name	Range (unit)	Initial value
CC-11 Output terminal [UPF] active state	00(Normally open: NO) 01(Normally closed: NC)	00
CC-12 Output terminal [DRV] active state		
CC-13 Output terminal [X1] active state		
CC-14 Output terminal [X2] active state		
CC-15 Output terminal [X3] active state		
CC-16 Output terminal [RL] active state		
CC-17 Output terminal [FL] active state		

- The NO/NC settings for the Intelligent output terminals UPF to X3,RL,FL are assigned in [CC-11] to [CC-15], [CC-16], [CC-17].

Output terminal response

Code/Name	Range (unit)	Initial value
CC-20 Output terminal [UPF] on-delay time	0.00 to 100.00(s)	0.00
CC-21 Output terminal [UPF] off-delay time		
CC-22 Output terminal [DRV] on-delay time		
CC-23 Output terminal [DRV] off-delay time		
CC-24 Output terminal [X1] on-delay time		
CC-25 Output terminal [X1] off-delay time		
CC-26 Output terminal [X2] on-delay time		
CC-27 Output terminal [X2] off-delay time		
CC-28 Output terminal [X3] on-delay time		
CC-29 Output terminal [X3] off-delay time		
CC-30 Output terminal [RL] on-delay time		
CC-31 Output terminal [RL] off-delay time		
CC-32 Output terminal [FL] on-delay time		
CC-33 Output terminal [FL] off-delay time		

- Sets the delay time since the output terminal changes, until it actually become responsive.

[Intelligent output terminal function list]

Function code	Symbol	Function name	Description
000	No	Not use	-
001	DRV	Running	While output is active
002	UPF1	Constant-speed reached	When constant speed reached, ON. [CE-10][CE-11]
003	UPF2	Set frequency overreached	Turns ON when the specified arrival frequency is reached or exceeded. [CE-10][CE-11]
004	UPF3	Set frequency reached	Turns ON only when the specified arrival frequency has been reached. [CE-12][CE-13]
005	UPF4	Set speed overreached 2	Turns ON when the specified arrival frequency is reached or exceeded. [CE-12][CE-13]
006	UPF5	Set speed reached	Turns ON only when the specified arrival frequency has been reached. [CE-12][CE-13]
007	IRDY	Inverter ready	ON when inverter is ready
008	FRR	Forward rotation	ON while in forward drive
009	RRR	Reverse rotation	ON while in reverse drive
010	FREF	Speed reference = Keypad is selected	ON if the frequency reference is from keypad
011	REF	Run command = Keypad is selected	ON if the motion operation is from operation keypad
012	SETM	2nd control is selected	ON if 2nd-motor selected
016	OPO	Option output	Controlled by the Option
017	AL	Alarm	ON when trip happens
018	MJA	Major failure	ON if major failure trips
019	OTQ	Over-torque Note	ON if torque is exceeded. [CE120] to [CE123]
020	IP	Instantaneous power failure	ON if control power drops
021	UV	Under-voltage	ON if main voltage drops
022	TRQ	Torque limited	ON if torque limit operates
023	IPS	IP-Nonstop function is active	ON if set in power loss
024	RNT	Accumulated operation time over	ON if set time [CE-36] is exceeded
025	ONT	Accumulated power-on time over	ON if set time [CE-36] is exceeded
026	THM	Electronic thermal alarm signal(MTR)	ON if motor thermal integral value exceeds set value [CE-30]
027	THC	Electronic thermal alarm signal(CTL)	ON if inverter thermal integral value exceeds set value [CE-31]
029	WAC	Capacitor life warning	ON by life warning
030	WAF	Cooling-fan speed drop	ON by life warning
031	FS	Starting contact signal	ON while in operation
032	OHF	Heat sink overheat warning	ON when the heatsink is overheated.
033	LOC	Low-current indication signal	ON if output current is less that the specified value [CE102]
034	LOC2	Low-current indication signal 2	ON if output current is less that the specified value [CE103]
035	OL	Overload notice advance signal (1)	ON if output current exceeds specified value [CE106]
036	OL2	Overload notice advance signal (2)	ON if output current exceeds specified value [CE107]
037	BRK	Brake release	ON when brake releases
038	BER	Brake error	ON if abnormality in sequence happens.
039	CON	Contactor control	ON if contactor releases

Note: This function disabled when the control mode selection (AA121/AA221) setting is 00 to 06 (V/f control mode).

[Output terminal function list]

Function code	Symbol	Function name	Description
040	ZS	Zero speed detection	ON if output frequency is less than set value [CE-33]
041	DSE	Speed deviation over	ON if speed deviation exceeds the set value.[bb-82] [bb-83] [bb-84]
042	PDD	Position deviation over	ON if position deviation exceeds the set value.[bb-85] [bb-86] [bb-87]
043	POK	Positioning completed	ON if positioning is completed
044	PCMP	Pulse count compare match output	ON when set value and pulse train comparator matches. [CA-97] to [CA-99]
045	OD	Deviation over for PID control	ON if PID control deviation exceeds the set value [AH-72]
046	FBV	PID1 feedback comparison	ON if PID feedback is within range. [AH-73] [AH-74]
047	OD2	OD: Deviation over for PID2 control	ON if PID control deviation exceeds the set value
048	FBV2	PID2 feedback comparison	ON if PID feedback is within range. [AJ-18] [AJ-19]
049	NDc	Communication line disconnection	ON if communication is lost with operation keypad
050	VRFDc	Analog [VRF] disconnection detection	ON if Analog input 1 is less than the set value [CE-50] [CE-51]
051	IRFDc	Analog [IRF] disconnection detection	ON if Analog input 2 is less than the set value [CE-52] [CE-53]
052	VF2Dc	Analog [VF2] disconnection detection	ON if Analog input 3 is less than the set value [CE-54] [CE-55]
053	Ai4Dc	Analog [Ai4] disconnection detection	ON if Analog input 4 is less than the set value [oE-44] [oE-45]
054	Ai5Dc	Analog [Ai5] disconnection detection	ON if Analog input 5 is less than the set value [oE-46] [oE-47]
055	Ai6Dc	Analog [Ai6] disconnection detection	ON if Analog input 6 is less than the set value [oE-48] [oE-49]
056	WCVRF	Window comparator VRF	ON if Analog input 1 is within range. [CE-40] to [CE-42]
057	WCIRF	Window comparator IRF	ON if Analog input 2 is within range. [CE-43] to [CE-45]
058	WCVF2	Window comparator VF2	ON if Analog input 3 is within range. [CE-46] to [CE-48]
059	WCAi4	Window comparator Ai4	ON if Analog input 4 is within range. [oE-35] to [oE-37]
060	WCAi5	Window comparator Ai5	ON if Analog input 5 is within range. [oE-38] to [oE-40]
061	WCAi6	Window comparator Ai6	ON if Analog input 6 is within range. [oE-41] to [oE-43]
062	LOG1	Logical operation result 1	Determined by the calculation results of two output terminals
063	LOG2	Logical operation result 2	
064	LOG3	Logical operation result 3	
065	LOG4	Logical operation result 4	
066	LOG5	Logical operation result 5	
067	LOG6	Logical operation result 6	
068	LOG7	Logical operation result 7	

Function code	Symbol	Function name	Description
069 to 075	-	Reserved	-
076	EMFC	Emergency force drive indicator	ON while in force operation
077	EMBP	Bypass mode indicator	ON while in bypass operation
078	WFT	Trace function waiting for trigger	ON while in waiting status
079	TRA	Trace function data logging	ON while in data sampling
080	LBK	Low-battery of keypad	ON while in low battery or when no contain battery on keypad
081	OVS	Overvoltage power Supply	ON when become overvoltage in stop status
084	AC0	Alarm code bit-0	ON if detects Alarm information is delivered as bit. Use the user's guide for more information.
085	AC1	Alarm code bit-1	
086	AC2	Alarm code bit-2	
087	AC3	Alarm code bit-3	
089	OD3	Deviation over for PID3 control	ON when PID deviation exceeds the value [AJ-37]
090	FBV3	PID3 feedback comparison	ON when PID feedback is between [AJ-38]/[AJ-39]
091	OD4	Deviation over for PID4 control	ON when PID deviation exceeds the value [AJ-57]
092	FBV4	PID4 feedback comparison	ON when PID feedback is between [AJ-58]/[AJ-59]
093	SSE	PID soft start error	ON when PID soft start became in warning status

[CC-40] to [CC-60]

Logic output terminals settings

Code/Name		Range (unit)	Initial value
Logical output signal	**CC-40** LOG1 operand-1 selection	<Intelligent output terminal function list> reference	00
	CC-41 LOG1 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-42 LOG1 logical calculation selection	00(AND)/01(OR) 02(XOR)	
	CC-43 LOG2 operand-1 selection	<Intelligent output terminal function list> reference	
	CC-44 LOG2 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-45 LOG2 logical calculation selection	00(AND)/01(OR) 02(XOR)	
	CC-46 LOG3 operand-1 selection	<Intelligent output terminal function list> reference	
	CC-47 LOG3 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-48 LOG3 logical calculation selection	00(AND)/01(OR) 02(XOR)	
	CC-49 LOG4 operand-1 selection	<Intelligent output terminal function list> reference	
	CC-50 LOG4 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-51 LOG4 logical calculation selection	00(AND)/01(OR) 02(XOR)	
	CC-52 LOG5 operand-1 selection	<Intelligent output terminal function list> reference	
	CC-53 LOG5 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-54 LOG5 logical calculation selection	00(AND)/01(OR) 02(XOR)	
	CC-55 LOG6 operand-1 selection	<Intelligent output terminal function list> reference	
	CC-56 LOG6 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-57 LOG6 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	
	CC-58 LOG7 operand-1 selection	<Intelligent output terminal function list> reference	
	CC-59 LOG7 operand-2 selection	<Intelligent output terminal function list> reference	
	CC-60 LOG7 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	

- The logical operation function is used to output the combinational result of two selected output terminals.

[Cd-01] to [Cd-35]

Analog output terminal adjustment

Code/Name	Range (unit)	Initial value
Cd-01 [FRQ] Output wave form selection	00(PWM) 01(Frequency)	00
Cd-02 [FRQ] Output base frequency (at frequency output)	0 to 3600(Hz)	2880
Cd-03 [FRQ] Output monitor selection	Set monitor code	dA-01
Cd-04 [AMV] Output monitor selection		
Cd-05 [AMI] Output monitor selection		
Cd-10 Analog monitor adjustment mode enable	00(Disable) 01(Enable)	00
Cd-11 [FRQ] Output filter time constant	1 to 500(ms)	100
Cd-12 [FRQ] Data type selection	00(Absolute value) 01(Signed value)	00
Cd-13 [FRQ] Bias adjustment	-100.0 to 100.0(%)	0.0
Cd-14 [FRQ] Gain adjustment	-1000.0 to 1000.0(%)	100.0
Cd-15 Adjustment mode [FRQ] output level	-100.0 to 100.0(%)	
Cd-21 [AMV] Output filter time constant	1 to 500(ms)	100
Cd-22 [AMV] Data type selection	00(Absolute value) 01(Signed value)	00
Cd-23 [AMV] Bias adjustment	-100.0 to 100.0(%)	0.0
Cd-24 [AMV] Gain adjustment	-1000.0 to 1000.0(%)	100.0
Cd-25 Adjustment mode [AMV] output level	-100.0 to 100.0(%)	
Cd-31 [AMI] Output filter time constant	1 to 500(ms)	100
Cd-32 [AMI] Data type se lection	00(Absolute value) 01(Signed value)	00
Cd-33 [AMI] Bias adjustment	-100.0 to 100.0(%)	20.0
Cd-34 [AMI] Gain adjustment	-1000.0 to 1000.0(%)	80.0
Cd-35 Adjustment mode [AMI] output level	-100.0 to 100.0(%)	100.0

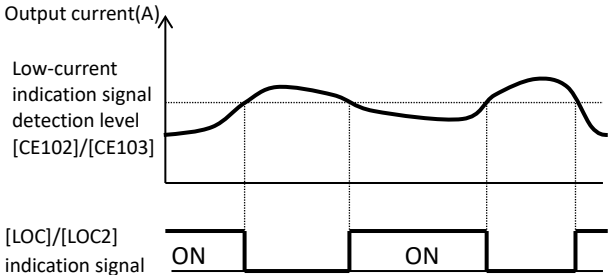
- Regarding the adjustment method of the Analog output, please refer to the chapter 3 example of I/O terminals adjustment.

[CE101] to [CE107]

Low-current detection signal

Code/Name	Range (unit)	Initial value
CE101 Low current signal output mode selection, 1st motor	00(During Accel/Decel and constant speed) 01(During constant speed only)	01
CE102 Low current detection level 1, 1st motor	Inverter rated current ×(0.00 to 2.00)(A)	Inverter rated current ×1.00(A)
CE103 Low current detection level 2, 1st motor		

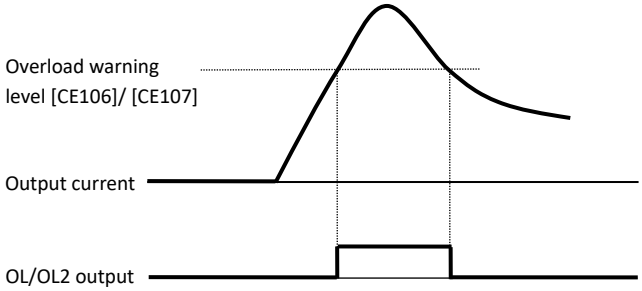
• In the case of low current, outputs a signal.



Overload detection signal

Code/Name	Range (unit)	Initial value
CE105 Overload signal output mode selection, 1st motor	00(During Accel/Decel and constant speed) 01(During constant speed only)	00
CE106 Overload warning level 1, 1st motor	Inverter rated current ×(0.00 to 2.00)(A)	Inverter rated current ×1.00(A)
CE107 Overload warning level 2, 1st motor		

• In the case of overload, outputs a signal.



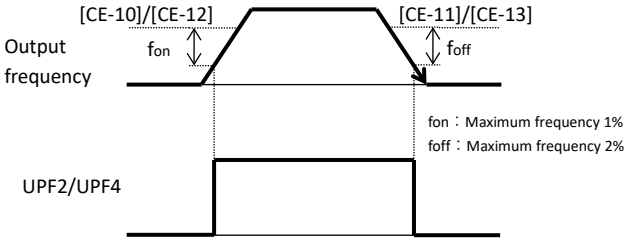
[CE-10] to [CE-31]

Frequency arrival signal

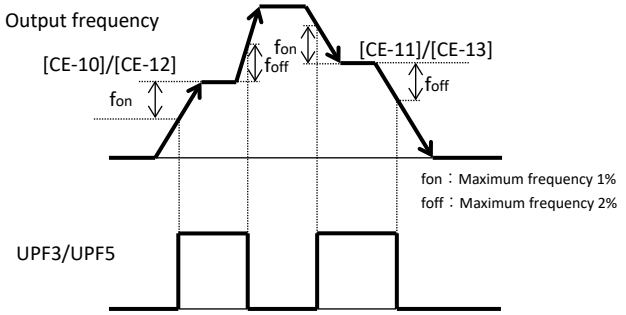
Code/Name	Range (unit)	Initial value
CE-10 Arrival frequency 1 value setting during acceleration	0.00 to 590.00(Hz)	0.00
CE-11 Arrival frequency 1 value setting during deceleration		
CE-12 Arrival frequency 2 value setting during acceleration		
CE-13 Arrival frequency 2 value setting during deceleration		

• Sets the operation of the frequency arrival signal.

(Example) In UPF2/UPF4 case:



(Example) In UPF3/UPF5 case:



Over-torque signal

Code/Name	Range (unit)	Initial value
CE120 Over-torque level (Forward drive), 1st motor	0.0 to 500.0(%)	100.0
CE121 Over-torque level (Reverse regenerative), 1st motor		
CE122 Over-torque level (Reverse drive), 1st motor		
CE123 Over-torque level (Forward regenerative), 1st motor		

• Sets the level to output the 019[OTQ] signal, when using vector control and the torque goes over the limit.

Electronic thermal warning

Code/Name	Range (unit)	Initial value
CE-30 Electronic thermal warning level (Motor)	0.00 to 100.00(%)	85.00
CE-31 Electronic thermal warning level (Inverter)		

• Sets the level to output the motor electronic thermal warning 026[THM].
• Sets the level to output the inverter electronic thermal warning 027[THC].

[CE-33] to [CE-55]

0Hz speed detection signal

Code/Name	Range (unit)	Initial value
CE-33 Zero speed detection level	0.00 to 100.00(Hz)	0.50

- Sets the level in which the Inverter outputs the 0Hz detection signal 040[ZS]

Cooling fan overheat warning signal

Code/Name	Range (unit)	Initial value
CE-34 Cooling fan overheat warning level	0 to 200(°C)	120

- Sets the level in which outputs the Heat sink overheat warning 032[OHF].

Signals for RUN/ON beyond time

Code/Name	Range (unit)	Initial value
CE-36 Accum. RUN time (RNT) Accum. Power-ON(ONT) time setting	0 to 100000(hour)	0

- Sets the level in which the inverter outputs the RUN exceeded time 024[RNT] and the Power-on exceeded time 025[ONT].

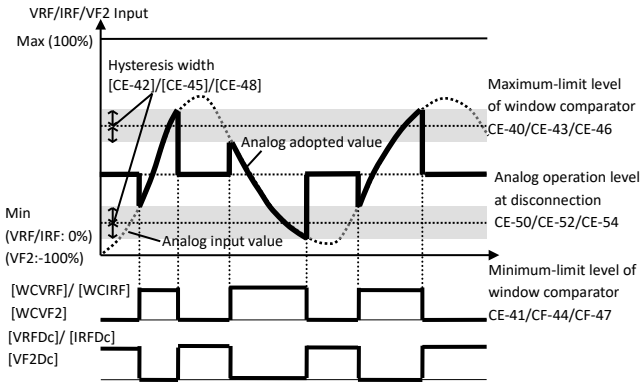
Window comparator (detection of terminal disconnection)

	Code/Name	Range (unit)	Initial value
Window comparator	**CE-40** [VRF] upper limit	0 to 100(%)	100
	CE-41 [VRF] lower limit		0
	CE-42 [VRF] hysteresis width	0 to 10(%)	0
	CE-43 [IRF] upper limit	0 to 100(%)	100
	CE-44 [IRF] lower limit		0
	CE-45 [IRF] hysteresis width	0 to 10(%)	0
	CE-46 [VF2] upper limit	-100 to 100(%)	100
	CE-47 [VF2] lower limit		-100
	CE-48 [VF2] hysteresis width	0 to 10(%)	0
Disconnection/Compare detection	**CE-50** [VRF] Operation set level at disconnection or compare event	0 to 100(%)	0
	CE-51 [VRF] Operation set level implement timing	00(Disable) 01(Enable) (at WC*active) 02(Enable) (at WC*de-active)	00
	CE-52 [IRF] Operation set level at disconnection or compare event	0 to 100(%)	0
	CE-53 [IRF] Operation set level implement timing	00(Disable) 01(Enable) (at WC*active) 02(Enable) (at WC*de-active)	00
	CE-54 [VF2] Operation set level at disconnection or compare event	-100 to 100(%)	0
	CE-55 [VF2] Operation set level implement timing	00(Disable) 01(Enable) (at WC*active) 02(Enable) (at WC*de-active)	00

- Outputs a signal whenever the Analog input value is within or out of range.
- As for disconnection detection, if is within or out of range, the operation frequency is limited the setting value.

[CE201] to [CE223]

If [CE-51] [CE-53] [CE-55] = 02



2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
CE201 Low current signal output mode selection, 2nd-motor	Same as CE101	
CE202 Low current detection level 1, 2nd-motor	Same as CE102	
CE203 Low current detection level 2, 2nd-motor	Same as CE103	
CE205 Overcurrent signal output mode selection, 2nd-motor	Same as CE105	
CE206 Overcurrent detection level 1, 2nd-motor	Same as CE106	
CE207 Overcurrent detection level 2, 2nd-motor	Same as CE107	
CE220 Over-torque level (Forward drive), 2nd-motor	Same as CE120	
CE221 Over-torque level (Reverse regenerative), 2nd-motor	Same as CE121	
CE222 Over-torque level (Reverse drive), 2nd-motor	Same as CE122	
CE223 Over-torque level (Forward regenerative), 2nd motor	Same as CE123	

[CF-01] to [CF-11]

Modbus communication

Code/Name	Range (unit)	Initial value
CF-01 RS485 communication baud rate selection	03(2400bps) 04(4800bps) 05(9600bps) 06(19.2kbps) 07(38.4kbps) 08(57.6kbps) 09(76.8kbps) 10(115.2kbps)	04
CF-02 RS485 communication node address	1 to 247	1
CF-03 RS485 communication parity selection	00(Absent) 01(Even parity) 02(Odd parity)	00
CF-04 RS485 communication stop bit selection	01(1bit)/02(2bit)	01
CF-05 RS485 communication error selection	00(Error) 01(Error output after Deceleration stop) 02(Ignore) 03(Free run stop) 04(Deceleration stop)	02
CF-06 RS485 communication timeout setting	0.00 to 100.00(s)	0.00
CF-07 RS485 communication wait time setting	0 to 1000(ms)	2
CF-08 RS485 communication mode selection	01(Modbus-RTU)	01
CF-11 Resister data A , V ⇔ % Transfer function	00(A , V) 01(%)	00

- Sets the Modbus communication function for its use.
- When using communication function between inverter EzCOM, set a value except 01 for [CF-08].

[CF-20] to [CF-50]

EzCOM peer to peer communication

Code/Name	Range (unit)	Initial value
CF-20 EzCOM start node No.	1 to 8	1
CF-21 EzCOM end node No.		
CF-22 EzCOM start method selection	00(Terminal [ECOM]) 01(Always)	00
CF-23 EzCOM data size	1 to 5	5
CF-24 EzCOM destination address 1	1 to 247	1
CF-25 EzCOM destination register 1	0000 to FFFF	0000
CF-26 EzCOM source register 1		
CF-27 EzCOM destination address 2	1 to 247	2
CF-28 EzCOM destination register 2	0000 to FFFF	0000
CF-29 EzCOM source register 2		
CF-30 EzCOM destination address 3	1 to 247	3
CF-31 EzCOM destination register 3	0000 to FFFF	0000
CF-32 EzCOM source register 3		
CF-33 EzCOM destination address 4	1 to 247	4
CF-34 EzCOM destination register 4	0000 to FFFF	0000
CF-35 EzCOM source register 4		
CF-36 EzCOM destination address 5	1 to 247	5
CF-37 EzCOM destination register 5	0000 to FFFF	0000
CF-38 EzCOM source register 5		

- Set for the use of EzCOM function.
- For more information, refer to the User's guide.

USB node code

Code/Name	Range (unit)	Initial value
CF-50 USB communication node address	1 to 247	1

- Sets the USB code in the case of multiple inverter connections with ProDriveNext(PC software), as is also required in the ProDriveNext side.

[HA-01] to [HA115]

■Parameter mode (H code：Motor Control)

Auto-tuning

Code/Name	Range (unit)	Initial value
HA-01 Auto-tuning selection	00(Disable) 01(No-rotation) 02(Rotation) 03(IVMS)	00
HA-02 Auto-tuning RUN command source selection	00(Keypad "RUN" key) 01(Setting by [AA111]/[AA211])	
HA-03 Online auto-tuning selection	00(Disable) 01(Enable)	

- After setting the motor basic parameters, by the auto-tuning operation the constant of the motor will be able to acquired.
- For no-rotation auto-tuning, the following variables are acquired, IM:[Hb110] to [Hb114], SM(PMM):[Hd110] to [Hd114].
- For rotation auto-tuning, the following variables are acquired, IM:[Hb110] to [Hb118]. Keep the operation conditions, as the motor can rotate.
- Auto-tuning start is done by the RUN-key ([HA-02] Initial value)

Motor stabilization (Hunting)

Code/Name	Range (unit)	Initial value
HA110 Stabilization constant, 1st-motor	0 to 1000(%)	100

- If hunting occurs while a pump or a fan is being operated, lower the stabilization constant for adjustment.
- In the case the load is relatively light and hunting occurs, then increase the stabilization constant.

Code/Name	Range (unit)	Initial value
HA112 Stability ramp function end ratio, 1st- motor	0 to 100(%)	30
HA113 Stability ramp function start ratio, 1st- motor		10

- These adjust the stabilization constant output frequency characteristic curve.

Control mode response adjustment

Code/Name	Range (unit)	Initial value
HA115 Speed response, 1st-motor	0 to 1000(%)	32

- The speed response in the operation control of the inverter will be adjusted.

⇒[AA121] control mode

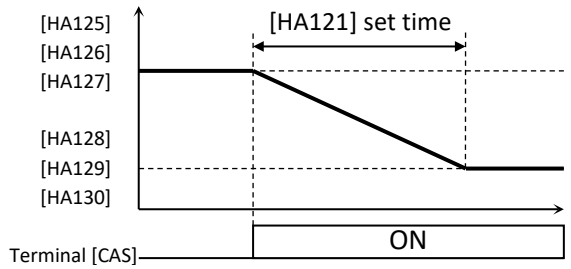
[HA120] to [HA134]

Control response gain

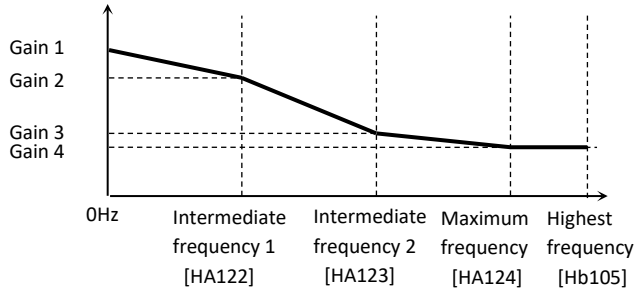
Code/Name	Range (unit)	Initial value
HA120 ASR gain switching mode selection, 1st-motor	00([CAS] terminal) 01(Parameter setting)	00
HA121 ASR gain switching time setting, 1st-motor	0 to 10000(ms)	100
HA122 ASR gain mapping intermediate speed 1, 1st-motor	0.00 to 590.00(Hz)	0.00
HA123 ASR gain mapping intermediate speed 2, 1st-motor		
HA124 ASR gain mapping maximum speed, 1st-motor		
HA125 ASR gain mapping P-gain 1, 1st-motor	0.0 to 1000.0(%)	100.0
HA126 ASR gain mapping I-gain 1, 1st-motor		
HA127 ASR gain mapping P control P-gain 1, 1st-motor		
HA128 ASR gain mapping P-gain 2, 1st-motor		
HA129 ASR gain mapping I-gain 2, 1st-motor		
HA130 ASR gain mapping P control P-gain 2, 1st-motor		
HA131 ASR gain mapping P-gain 3, 1st-motor		
HA132 ASR gain mapping I-gain 3, 1st-motor		
HA133 ASR gain mapping P-gain 4, 1st-motor		
HA134 ASR gain mapping I-gain 4, 1st-motor		

- ASR: Automatic Speed Regulator
- Current response of the motor control can be changed.
- In case of [CAS] terminal switching,

[HA120]=00



- In case of Control Gain Mapping, [HA120]=01



[HA210] to [HA234]

2nd motor When Intelligent Input terminal 024[SET] is enabled.

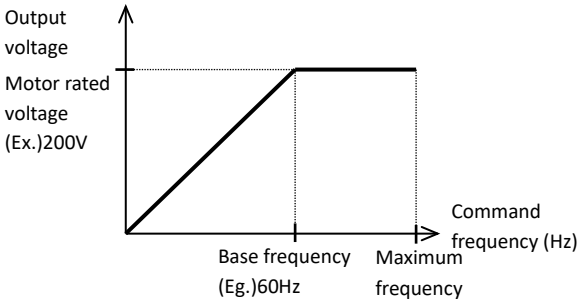
Code/Name	Range (unit)	Initial value
HA210 Stabilization constant, 2nd-motor	Same as HA110	
HA212 Stability ramp function end ratio, 2nd-motor	Same as HA112	
HA213 Stability ramp function start ratio, 2nd-motor	Same as HA113	
HA215 Speed response, 2nd-motor	Same as HA115	
HA220 ASR gain switching mode selection, 2nd-motor	Same as HA120	
HA221 ASR gain switching time setting, 2nd-motor	Same as HA121	
HA222 ASR gain mapping intermediate speed 1, 2nd-motor	Same as HA122	
HA223 ASR gain mapping intermediate speed 2, 2nd-motor	Same as HA123	
HA224 ASR gain mapping maximum speed, 2nd-motor	Same as HA124	
HA225 ASR gain mapping P-gain 1, 2nd-motor	Same as HA125	
HA226 ASR gain mapping I-gain 1, 2nd-motor	Same as HA126	
HA227 ASR gain mapping P control P-gain 1, 2nd-motor	Same as HA127	
HA228 ASR gain mapping P-gain 2, 2nd-motor	Same as HA128	
HA229 ASR gain mapping I-gain 2, 2nd-motor	Same as HA129	
HA230 ASR gain mapping P control P-gain 2, 2nd-motor	Same as HA130	
HA231 ASR gain mapping P-gain 3, 2nd-motor	Same as HA131	
HA232 ASR gain mapping I-gain 3, 2nd-motor	Same as HA132	
HA233 ASR gain mapping P-gain 4, 2nd-motor	Same as HA133	
HA234 ASR gain mapping I-gain 4, 2nd-motor	Same as HA134	

[Hb102] to [Hb108]

Basic parameters for Induction motor

	Code/Name	Range (unit)	Initial value
Induction motor (IM)	**Hb101** Motor type, 1st-motor	00：IE1 motor 01：AF motor 02：d2G4 motor 03：IE3 motor	03
	Hb102 Async. Motor capacity setting, 1st-motor	0.01 to 75.00 (kW)	Motor capacity setting
	Hb103 Async. Motor number of poles setting, 1st-motor	2 to 48 (Pole)	4
	Hb104 Async. Motor base frequency setting, 1st-motor	10.00 to [Hb105] (Hz)	60.00
	Hb105 Async. Motor maximum frequency setting, 1st-motor	[Hb104] to 590.00 (Hz)	
	Hb106 Async. Motor rated voltage, 1st-motor	1 to 1000 (V)	(200V Class) 200 (400V Class) 400
	Hb108 Async. Motor rated current, 1st-motor	0.01 to 10000.00 (A)	Motor capacity setting

- If the motor capacity [Hb102] and number of poles [Hb103] are changed, the motor characteristics are set according to the internal table values.
- The output is decided by setting the frequency and voltage. Below there is an example of V / f control.



- By setting the motor rated current, a reference current for the motor protection is set.

Motor typical data	Code	Range of values (Unit)
Capacity	[Hb102]	0.01 to 75.00 (kW)
Number of poles	[Hb103]	2 to 48 (poles)
Frequency	[Hb104]	10.00 to 590.00 (Hz)
	[Hb105]	
Voltage	[Hb106]	1 to 1000 (V)
Current	[Hb108]	0.01 to 10000.00 (A)

- Initial value depends on the inverter.

[Hb110] to [Hb131]

Induction motor constants

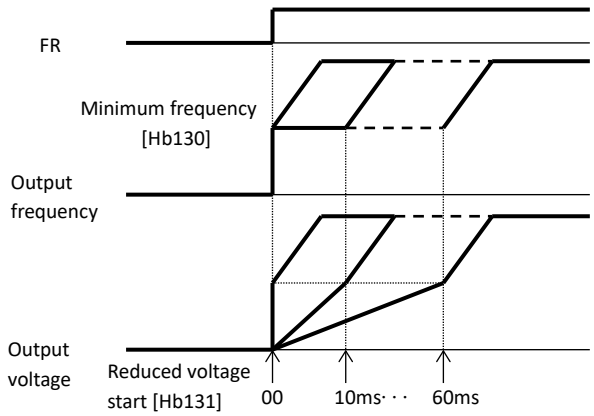
	Code/Name	Range (unit)	Initial value
Induction Motor (IM)	**Hb110** Async. Motor constant R1, 1st-motor	0.000001 to 1000.000000 (Ω)	Motor capacity setting
	Hb112 Async. Motor constant R2, 1st-motor		
	Hb114 Async. Motor constant L, 1st-motor	0.000001 to 1000.000000 (mH)	
	Hb116 Async. Motor constant Io, 1st-motor	0.01 to 10000.00 (A)	
	Hb118 Async. Motor constant J, 1st-motor	0.00001 to 10000.00000 (kgm^2)	

- If the motor capacity[Hb102] and number of poles [Hb103] are changed, the motor characteristics are set according to the internal table values.
- For no-rotation auto-tuning, the following variables are acquired:[Hb110] to [Hb114].
- For rotation auto-tuning, the following variables are acquired:[Hb110] to [Hb118]
- It is possible to input the data obtained from the motor manufacturer. However, it must also include the data of the wiring and the like.
- Io [Hb116] is converter into the base frequency setting [Hb104] when the motor setting [Hb101] and the motor capacity [Hb102], the number of poles setting [Hb103] is set up.

Minimum frequency setting

Code/Name	Range (unit)	Initial value
Hb130 Minimum frequency adjustment, 1st-motor	0.10 to 10.00(Hz)	0.50
Hb131 Reduced voltage start time setting, 1st-motor	0 to 2000(ms)	36

- If setting the lower limit of frequency reference, set bA130 instead of Hb130.
- If the torque is insufficient when starting, set a longer Hb130 (Initial setting 0.5Hz).
- if the trip occurs when raised the minimum frequency, set a longer "reduced voltage start time setting".



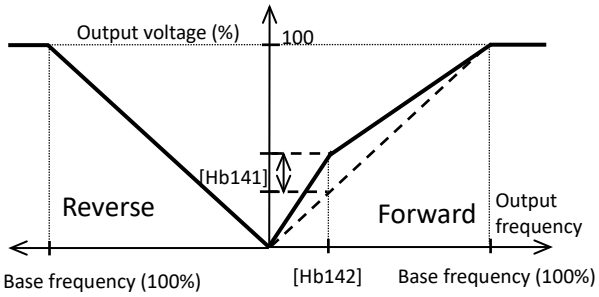
[Hb140] to [Hb146]

Manual torque boost adjustment

Code/Name	Range (unit)	Initial value
Hb140 Manual torque boost operation mode selection, 1st-motor	00(Disabled) 01(Always enable) 02(Enable at Forward rotation) 03(Enable at Reverse rotation)	01
Hb141 Manual torque boost value, 1st-motor	0.0 to 20.0(%)	1.0
Hb142 Manual torque boost peak speed, 1st-motor	0.0 to 50.0(%)	0.8

- The manual torque operation mode selection will allow to restrict the boost to forward only or reverse only operation.

- Example [Hb140]=02



Eco Drive function

Code/Name	Range (unit)	Initial value
Hb145 Eco drive enable, 1st-motor	00(Disable) 01(Enable)	00
Hb146 Eco drive response adjustment, 1st-motor	0 to 100	50

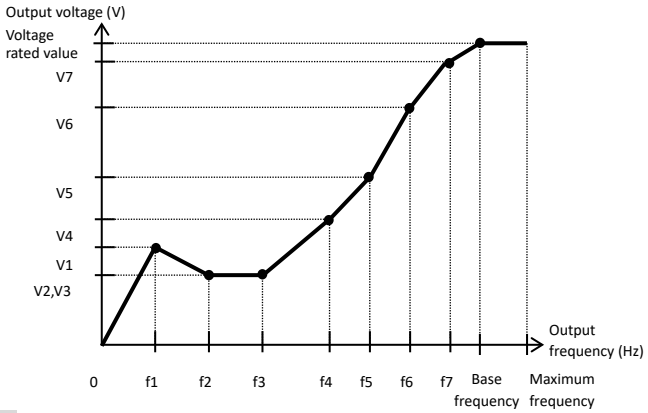
- In V/f control, if the energy saving operations is enabled, enters an energy saving control.

[Hb150] to [Hb171]

Free V/f setting

Code/Name	Range (unit)	Initial value
Hb150 Free-V/f frequency 1 setting, 1st-motor	0.00 to [Hb152](Hz)	0.00
Hb151 Free-V/f voltage 1 setting, 1st-motor	0.0 to 1000.0(V)	0.0
Hb152 Free-V/f frequency 2 setting, 1st-motor	[Hb150] to [Hb154](Hz)	0.00
Hb153 Free-V/f voltage 2 setting, 1st-motor	0.0 to 1000.0(V)	0.0
Hb154 Free-V/f frequency 3 setting, 1st-motor	[Hb152] to [Hb156](Hz)	0.00
Hb155 Free-V/f voltage 3 setting, 1st-motor	0.0 to 1000.0(V)	0.0
Hb156 Free-V/f frequency 4 setting, 1st-motor	[Hb154] to [Hb158](Hz)	0.00
Hb157 Free-V/f voltage 4 setting, 1st-motor	0.0 to 1000.0(V)	0.0
Hb158 Free-V/f frequency 5 setting, 1st-motor	[Hb156] to [Hb160](Hz)	0.00
Hb159 Free-V/f voltage 5 setting, 1st-motor	0.0 to 1000.0(V)	0.0
Hb160 Free-V/f frequency 6 setting, 1st-motor	[Hb158] to [Hb162](Hz)	0.00
Hb161 Free-V/f voltage 6 setting, 1st-motor	0.0 to 1000.0(V)	0.0
Hb162 Free-V/f frequency 7 setting, 1st-motor	[Hb160] to [Hb104](Hz)	0.00
Hb163 Free-V/f voltage 7 setting, 1st-motor	0.0 to 1000.0(V)	0.0

- Frequency 1(f1) to frequency (f7) and the corresponding voltage 1(V1) to voltage 7(V7) are set below the base frequency and rated voltage. In the case of a high-frequency motor, set the base/highest frequency the first.



V/f feedback control adjustment

Code/Name	Range (unit)	Initial value
Hb170 Slip compensation P-gain at V/f with encoder, 1st-motor	0 to 1000(%)	100
Hb171 Slip compensation I-gain at V/f with encoder, 1st-motor		100

- When [AA121] is set as feedback control, slip compensation is possible.

[Hb180] to [Hb280]

Output adjustment gain

Code/Name	Range (unit)	Initial value
Hb180 Output voltage gain, 1st-motor	0 to 255(%)	100

- When the motor is hunting, there is a possibility that the motor stabilizes by adjustment of the output voltage gain.

2nd motor When Intelligent Input terminal 024[SET] is enabled.

	Code/Name	Range (unit)	Initial value
Induction Motor (IM)	**Hb201** Motor setting, 2nd-motor	Same as Hb101	
	Hb202 Async. Motor capacity setting, 2nd-motor	Same as Hb102	
	Hb203 Async. Motor number of poles setting, 2nd-motor	Same as Hb103	
	Hb204 Async. Motor base frequency setting, 2nd-motor	Same as Hb104	
	Hb205 Async. Motor maximum frequency setting, 2nd-motor	Same as Hb105	
	Hb206 Async. Motor rated voltage, 2nd-motor	Same as Hb106	
	Hb208 Async. Motor rated current, 2nd-motor	Same as Hb108	
	Hb210 Async. Motor constant R1, 2nd-motor	Same as Hb110	
	Hb212 Async. Motor constant R2, 2nd-motor	Same as Hb112	
	Hb214 Async. Motor constant L, 2nd-motor	Same as Hb114	
	Hb216 Async. Motor constant Io, 2nd-motor	Same as Hb116	
	Hb218 Async. Motor constant J, 2nd-motor	Same as Hb118	

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
Hb230 Minimum frequency adjustment, 2nd-motor	Same as Hb130	
Hb231 Reduced voltage start time setting, 2nd-motor	Same as Hb131	
Hb240 Manual torque boost operation mode selection, 2nd-motor	Same as Hb140	
Hb241 Manual torque boost value, 2nd-motor	Same as Hb141	
Hb242 Manual torque boost Peak speed, 2nd-motor	Same as Hb142	
Hb245 Eco drive enable, 2nd-motor	Same as Hb145	
Hb246 Eco drive response adjustment, 2nd-motor	Same as Hb146	
Hb250 Free-V/f frequency 1 setting, 2nd-motor	Same as Hb150	
Hb251 Free-V/f voltage 1 setting, 2nd-motor	Same as Hb151	
Hb252 Free-V/f frequency 2 setting, 2nd-motor	Same as Hb152	
Hb253 Free-V/f voltage 2 setting, 2nd-motor	Same as Hb153	
Hb254 Free-V/f frequency 3 setting, 2nd-motor	Same as Hb154	
Hb255 Free-V/f voltage 3 setting, 2nd-motor	Same as Hb155	
Hb256 Free-V/f frequency 4 setting, 2nd-motor	Same as Hb156	
Hb257 Free-V/f voltage 4 setting, 2nd-motor	Same as Hb157	
Hb258 Free-V/f frequency 5 setting, 2nd-motor	Same as Hb158	
Hb259 Free-V/f voltage 5 setting, 2nd-motor	Same as Hb159	
Hb260 Free-V/f frequency 6 setting, 2nd-motor	Same as Hb160	
Hb261 Free-V/f voltage 6 setting, 2nd-motor	Same as Hb161	
Hb262 Free-V/f frequency 7 setting, 2nd-motor	Same as Hb162	
Hb263 Free-V/f voltage 7 setting, 2nd-motor	Same as Hb163	
Hb270 Slip compensation P-gain at V/f with encoder, 2nd-motor	Same as Hb170	
Hb271 Slip compensation I-gain at V/f with encoder, 2nd-motor	Same as Hb171	
Hb280 Output voltage gain, 2nd-motor	Same as Hb180	

[HC101] to [HC115]

Automatic torque boost adjustment

Code/Name	Range (unit)	Initial value
HC101 Automatic torque boost voltage compensation gain, 1st-motor	0 to 255(%)	100
HC102 Automatic torque boost slip compensation gain, 1st-motor		

- If is chosen the automatic torque boost control function in [AA121], adjustments can be made.
  For more information, refer to the user's guide.

Sensor less vector control start

Code/Name	Range (unit)	Initial value
HC110 Zero speed range limit, 1st-motor	0 to 100(%)	100
HC111 Boost value at start, 1st-motor (IM-SLV,IM-CLV)	0 to 50(%)	0
HC112 Boost value at start, 1st-motor (IM-0Hz-SLV)		50

- When [AA121] is sensor less vector control or 0Hz-range sensor less vector control, start boost is possible.

Secondary resistor compensation function

Code/Name	Range (unit)	Initial value
HC113 Secondary resistance (R2) correction, 1st-motor	00(Disable) 01(Enable)	00

- When the vector control (with encoder/ sensor less/0Hz) is being used and the temperature of the motor can be sensed, the inverter is capable of reducing the speed variations due to temperature changes.
- If use this function, use a thermistor PB-41E from Shibaura Electronics(Ltd.) with [Cb-40]=02(NTC).

Reverse run protection function

Code/Name	Range (unit)	Initial value
HC114 Direction reversal protection, 1st-motor	00(Disable) 01(Enable)	00

- This function is to prevent the change of direction of the output in a low frequency range for vector control such as (SLV/0Hz SLV/CLV).

Selection for the torque transformation

Code/Name	Range (unit)	Initial value
HC115 Selection for the torque transformation, 1st-motor	00(Torque) 01(Current)	01

[HC120] to [HC121]

Motor control adjustment gain

Code/Name	Range (unit)	Initial value
HC120 Torque current reference filter time constant, 1st-motor	0 to 100(ms)	2
HC121 Speed feedforward compensation gain, 1st-motor	0 to 1000(%)	0

- [HC120] can put into effect a filter for torque command of sensor less vector control, 0Hz sensor less vector control and vector control with encoder.
- [HC121] adjust the compensation of the feedforward for torque command of sensor less vector control, 0Hz sensor less vector control and vector control with encoder.

Code/Name	Range (unit)	Initial value
HC137 Flux setting level, 1st-motor	0.0 to 100.0(%)	80.0
HC140 Forcing level, 1st-motor	0 to 1000(%)	100
HC141 Modulation threshold 1, 1st-motor	0 to 133(%)	133
HC142 Modulation threshold 2, 1st-motor		

- [HC137] adjust the stabilization constant output frequency characteristics curve.
- [HC140] adjust the output current when the forcing function is active.
- [HC141] [HC142] adjust the upper limit of the output voltage.

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
HC201 Automatic torque boost voltage compensation gain, 2nd-motor	Same as HC101	
HC202 Automatic torque boost slip compensation gain, 2nd-motor	Same as HC102	
HC210 Zero speed range limit, 2nd-motor	Same as HC110	
HC211 Boost value at start, 2nd-motor (IM-SLV,IM-CLV)	Same as HC111	
HC212 Boost value at start, 2nd-motor (IM-0Hz-SLV)	Same as HC112	
HC213 Secondary resistor (R2) compensation enable 2nd-motor	Same as HC113	
HC214 Direction reversal protection, 2nd-motor	Same as HC114	
HC215 Torque current reference filter time constant 2nd-motor	Same as HC115	
HC220 Torque current reference filter time constant 2nd-motor	Same as HC120	
HC221 Speed feedforward compensation gain, 2nd-motor	Same as HC121	
HC237 Flux setting level, 2nd-motor	Same as HC137	
HC240 Forcing level, 2nd-motor	Same as HC140	
HC241 Modulation threshold 1, 2nd-motor	Same as HC141	
HC242 Modulation threshold 2, 2nd-motor	Same as HC142	

[Hd102] to [Hd118]

(SM/PMM) basic parameters

	Code/Name	Range (unit)	Initial value
Permanent Magnet Sync. Motor(SM/PMM)	**Hd102** Sync. Motor capacity setting, 1st-motor	0.01 to 75.00 (kW)	Factory setting
	Hd103 Sync. Motor number of poles setting, 1st-motor	2 to 48(Pole)	
	Hd104 Sync. Base frequency setting, 1st-motor	10.00 to [Hd105] (Hz)	60.00
	Hd105 Sync. Maximum frequency setting, 1st-motor	[Hd104] to 590.00 (Hz)	
	Hd106 Sync. Motor rated voltage, 1st-motor	1 to 1000(V)	(200V Class) 200 (400V Class) 400
	Hd108 Sync. Motor rated current, 1st-motor	0.01 to 10000.00 (A)	Factory setting

	Code/Name	Range (unit)	Initial value
Permanent Magnet Synchronous Motor (SM/PMM)	**Hd110** Sync. Motor constant R, 1st-motor	0.000001 to 1000.000000 (Ω)	Factory setting
	Hd112 Sync. Motor constant Ld, 1st-motor	0.000001 to 1000.000000 (mH)	
	Hd114 Sync. Motor constant Lq, 1st-motor		
	Hd116 Sync. Motor constant Ke, 1st-motor	0.1 to 100000.0 (mVs/rad)	
	Hd118 Sync. Motor constant J, 1st-motor	0.00001 to 10000.00000 (kgm^2)	

- The motor capacity and the number of poles will be set by internal table.
- For SM/PMM, frequency, voltage, and the motor characteristics are necessary.
- If the maximum current is decided, sets with a margin the overcurrent detection level [bb160].

Motor typical data	Code	Range of values (unit)
Capacity	[Hd102]	0.01 to 75.00 (kW)
Number of poles	[Hd103]	2 to 48 (Poles)
Frequency	[Hd104]	10.00 to 590.00 (Hz)
	[Hd105]	
Voltage	[Hd106]	1 to 1000 (V)
Current	[Hd108]	0.01 to 10000.00 (A)

- Initial value depends on the inverter.
- If motor capacity [Hd102], number of poles [Hd103] are changed, the motor characteristics are set according to the internal table values.
- The values of [Hd110] to [Hd114] can be acquired by no rotation auto-tuning.

[Hd130] to [Hd137][Hd-41] to [Hd-58]

Minimum frequency settings

Code/Name	Range (unit)	Initial value
Hd130 Minimum frequency adjustment for Sync.M, 1st-motor	0 to 50(%)	8
Hd131 No-Load current for Sync.M, 1st-motor	0 to 100(%)	10

- By base frequency[Hd104]×[Hd130], change from Sync drive to sensorless control drive.
- By [Hd131], the sensorless vector control no-load current is set.

Magnetic pole position estimation SM(PMM)

Code/Name	Range (unit)	Initial value
Hd132 Starting method for Sync.M, 1st-motor	00(Synchronous) 01(Initial motor position estimate (IMPE))	00
Hd133 IMPE 0V wait number for Sync.M, 1st-motor	0 to 255	10
Hd134 IMPE detect wait number for Sync.M, 1st-motor		
Hd135 IMPE detect number for Sync.M, 1st-motor		30
Hd136 IMPE voltage gain for Sync.M, 1st-motor	0 to 200(%)	100
Hd137 IMPE Mg-pole position offset, 1st-motor	0 to 359(°)	0

- For SM/PMM, if initial position estimate is enabled by [Hd132],drive after magnetic pole position estimation.
- Offset [Hd137] is added at the first start when doing reverse motion.

IVMS setting (Reserved)

Code/	Range(unit)	Initial Value
Hd-41 IVMS carrier frequency	0.5 to 16.0(kHz)	2.0
Hd-42 Filter gain of IVMS current detection	0 to 1000	100
Hd-43 Open-phase voltage detection gain	00(Gain 0)/01(Gain 1) 02(Gain 2)/03(Gain 3)	00
Hd-44 Open-phase switching threshold compensation	00(Disable) 01(Enable)	01
Hd-45 SM(PMM)-IVMS speed control P gain	0 to 1000	100
Hd-46 SM(PMM)-IVMS speed control I gain	0 to 10000	100
Hd-47 SM(PMM)-IVMS wait time for open-phase switching,	0 to 1000	15
Hd-48 SM(PMM)-IVMS restriction on the rotation-direction determination	00(Disable) 01(Enable)	01
Hd-49 SM(PMM)-IVMS open-phase voltage detection timing adjustment,	0 to 1000	10
Hd-50 SM(PMM)-IVMS minimum pulse width adjustment,	0 to 1000	100
Hd-51 IVMS threshold current limit	0 to 255(%)	100
Hd-52 IVMS threshold gain		
Hd-58 IVMS carrier-frequency switching start/finish point Note	0 to 50(%)	5

Note: Depends on the base frequency

- Above parameters are for adjustment in SM(PMM) driving with IVMS.

[Hd202] to [Hd237]

2nd motor When Intelligent Input terminal 024[SET] is enabled.

	Code/Name	Range (unit)	Initial value
Perm. Magnet Sync. Motor (SM/PMM)	**Hd202** Sync. Motor capacity setting, 2nd-motor	Same as Hd102	
	Hd203 Sync. Motor number of poles setting, 2nd-motor	Same as Hd103	
	Hd204 Sync. Base frequency setting, 2nd-motor	Same as Hd104	
	Hd205 Sync. Maximum frequency setting, 2nd-motor	Same as Hd105	
	Hd206 Sync. Motor rated voltage, 2nd-motor	Same as Hd106	
	Hd208 Sync. Motor rated current, 2nd-motor	Same as Hd108	
	Hd210 Sync. Motor constant R, 2nd-motor	Same as Hd110	
	Hd212 Sync. Motor constant Ld, 2nd-motor	Same as Hd112	
	Hd214 Sync. Motor constant Lq, 2nd-motor	Same as Hd114	
	Hd216 Sync. Motor constant Ke, 2nd-motor	Same as Hd116	
	Hd218 Sync. Motor constant J, 2nd-motor	Same as Hd118	

2nd motor When Intelligent Input terminal 024[SET] is enabled.

Code/Name	Range (unit)	Initial value
Hd230 Minimum frequency adjustment for Sync.M, 2nd-motor	Same as Hd130	
Hd231 No-Load current for Sync.M, 2nd-motor	Same as Hd131	
Hd232 Starting method for Sync.M, 2nd-motor	Same as Hd132	
Hd233 IMPE 0V wait number for Sync.M, 2nd-motor	Same as Hd133	
Hd234 IMPE detect wait number for Sync.M, 2nd-motor	Same as Hd134	
Hd235 IMPE detect number for Sync.M, 2nd-motor	Same as Hd135	
Hd236 IMPE voltage gain for Sync.M, 2nd-motor	Same as Hd136	
Hd237 IMPE Mg-pole position offset, 2nd-motor	Same as Hd137	

[oA-10] to [oA-33][ob-01] to [ob-04]

■Parameter mode (O code：Option Card)

- "o" parameters are displayed by the [UA-11] = 01. This configuration is not necessary except when option is used.
- The implementation of the following parameters might differ depending on the type of option being used. For more information, refer to the option User's guide and the HF-430NEO User's guide.

Optional board error operation

	Code/Name	Range (unit)	Initial value
Slot 1	**oA-10** Operation selection at an option error (SLOT-1)	00(Error) 01((Ignore error (keep running))	00
	oA-11 Communication Watch Dog Timer (SLOT-1)	0.00 to 100.00(s)	1.00
	oA-12 Action selection at a communication error (SLOT-1)	00(Error) 01(Trip after Deceleration stop)/02(Ignore) 03(Free run stop) 04(Deceleration stop)	01
	oA-13 RUN command selection at start up (SLOT-1)	00(Disable) 01(Enable)	00
Slot 2	**oA-20** Operation selection at an option error (SLOT-2)	00(Error) 01((Ignore error (keep running))	00
	oA-21 Communication Watch Dog Timer (SLOT-2)	0.00 to 100.00(s)	1.00
	oA-22 Action selection at a communication error (SLOT-2)	00(Error) 01(Trip after Deceleration stop)/02(Ignore) 03(Free run stop) 04(Deceleration stop)	01
	oA-23 RUN command selection at start up (SLOT-2)	00(Disable) 01(Enable)	00
Slot 3	**oA-30** Operation selection at an option error (SLOT-3)	00(Error) 01((Ignore error (keep running))	00
	oA-31 Communication Watch Dog Timer (SLOT-3)	0.00 to 100.00(s)	1.00
	oA-32 Action selection at a communication error (SLOT-3)	00(Error) 01(Trip after Deceleration stop)/02(Ignore) 03(Free run stop) 04(Deceleration stop)	01
	oA-33 RUN command selection at start up (SLOT-3)	00(Disable) 01(Enable)	00

HF-FB Optional board encoder input setting

Code/Name	Range (unit)	Initial value
ob-01 Encoder constant setting	32 to 65535(Pulse)	1024
ob-02 Encoder phase sequence selection	00(A Phase lead) 01(B Phase lead)	0
ob-03 Motor gear ratio numerator	1 to 10000	1
ob-04 Motor gear ratio denominator		

- Sets the encoder to be input into the optional board, and sets the motor gear ratio involved in the feedback of the encoder.

[ob-10] to [ob-16][oC-01] to [oC-28]

HF-FB Pulse train input terminal setting

Code/Name		Range (unit)	Initial value
Pulse train input (option)	**ob-10** Pulse train input, target function selection (option)	00(Frequency reference) 01(Pulse train position reference)	00
	ob-11 Pulse train input mode selection (option)	00(90° -phase-shift) 01(Forward/ Reverse pulse train and direction signal) 02(Forward pulse train and Reverse pulse train)	00
Pulse train frequency (option)	**ob-12** Pulse train frequency scale (option)	0.05 to 200.00(kHz)	25.00
	ob-13 Pulse train frequency filter time constant (option)	0.01 to 2.00(s)	0.10
	ob-14 Pulse train frequency bias value (option)	-100.0 to 100.0(%)	0.0
	ob-15 Pulse train upper frequency detection level(option)	0.0 to 100.0(%)	100.0
	ob-16 Pulse train lower frequency detection level (option)		0.0

- Set when using the option feedback.
- For more detail refer to optional board instruction.

Code/Name	Range(unit)	Initial value
oC-01 to oC-28 Reserved	-	-

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[oE-01] to [oE-33]

P1-AG Optional analog input setting

Code/Name		Range (unit)	Initial value
[Ai4] terminal	**oE-01** [Ai4] Filter time constant	1 to 500(ms)	16
	oE-03 [Ai4] Start value	0.00 to 100.00(%)	0.00
	oE-04 [Ai4] End value		100.00
	oE-05 [Ai4] Start rate	0.0 to [oE-06] (%)	0.0
	oE-06 [Ai4] End rate	[oE-05] to 100.0(%)	100.0
	oE-07 [Ai4] Start point selection	00(Start value[oE-03]) 01(0%)	01
[Ai5] terminal	**oE-11** [Ai5] Filter time constant	1 to 500(ms)	16
	oE-13 [Ai5] Start value	0.00 to 100.00(%)	0.00
	oE-14 [Ai5] End value		100.00
	oE-15 [Ai5] Start rate	0.0 to [oE-16] (%)	0.0
	oE-16 [Ai5] End rate	[oE-15] to 100.0(%)	100.0
	oE-17 [Ai5] Start point selection	00(Start value[oE-13]) 01(0%)	01
[Ai6] terminal	**oE-21** [Ai6] Filter time constant	1 to 500(ms)	16
	oE-23 [Ai6] Start value	-100.00 to 100.00(%)	-100.00
	oE-24 [Ai6] End value		100.00
	oE-25 [Ai6] Start rate	-100.0 to [oE-26] (%)	-100.0
	oE-26 [Ai6] End rate	[oE-25] to 100.0(%)	100.0

- Regarding the adjustment method of the analog input, please refer to the chapter 3 example of I/O terminals adjustment.

P1-AG Optional analog input adjustment

Code/Name	Range (unit)	Initial value
oE-28 [Ai4] Voltage/Current bias adjustment	-100.00 to 100.00(%)	0.00
oE-29 [Ai4] Voltage/Current gain adjustment	0.00 to 200.00(%)	100.00
oE-30 [Ai5] Voltage/Current bias adjustment	-100.00 to 100.00(%)	0.00
oE-31 [Ai5] Voltage/Current gain adjustment	0.00 to 200.00(%)	100.00
oE-32 [Ai6] Voltage bias adjustment	-100.00 to 100.00(%)	0.00
oE-33 [Ai6] Voltage gain adjustment	0.00 to 200.00(%)	100.00

- Regarding the adjustment method of the analog input, please refer to the chapter 3 example of I/O terminals adjustment.

[oE-35] to [oE-49]

P1-AG Window comparators output condition

	Code/Name	Range (unit)	Initial value
Window Comparator	**oE-35** [Ai4] Window comparator upper limit	0 to 100(%)	100
	oE-36 [Ai4] Window comparator lower limit		0
	oE-37 [Ai4] Window comparator hysteresis width	0 to 10(%)	0
	oE-38 [Ai5] Window comparator upper limit	0 to 100(%)	100
	oE-39 [Ai5] Window comparator lower limit		0
	oE-40 [Ai5] Window comparator hysteresis width	0 to 10(%)	0
	oE-41 [Ai6] Window comparator upper limit	-100 to 100(%)	100
	oE-42 [Ai6] Window comparator lower limit		-100
	oE-43 [Ai6] Window comparator hysteresis width	0 to 10(%)	0
Disconnection/Compare event	**oE-44** [Ai4] Temporal operation level set at disconnection or compare event	0 to 100(%)	0
	oE-45 [Ai4] Temporal operation level implementation timing	00(Disable) 01(Enable: At WC is active) 02(Enable: At WC is not active)	00
	oE-46 [Ai5] Temporal operation level set at disconnection or compare event	0 to 100(%)	0
	oE-47 [Ai5] Temporal operation level implementation timing	00(Disable) 01(Enable: At WC is active) 02(Enable: At WC is not active)	00
	oE-48 [Ai6] Temporal operation level set at disconnection or compare event	-100 to 100(%)	0
	oE-49 [Ai6] Temporal operation level implementation timing	00(Disable) 01(Enable: At WC is active) 02(Enable: At WC is not active)	00

- Outputs a signal whenever the analog input value is within or out of range.
- As for disconnection detection, if is within or out of range, the operation frequency is limited the setting value.

[oE-50] to [oE-70]

P1-AG Optional analog output adjustment

Code/Name	Range (unit)	Initial value
oE-50 [Ao3] Output monitor selection	Set monitor code	dA-01
oE-51 [Ao4] Output monitor selection		dA-01
oE-52 [Ao5] Output monitor selection		dA-01
oE-56 [Ao3] Output filter time constant	1 to 500(ms)	100
oE-57 [Ao3] Data type selection	00(Absolute value) 01(Signed value)	00
oE-58 [Ao3] Bias adjustment	-100.0 to 100.0(%)	0.0
oE-59 [Ao3] Gain adjustment	-1000.0 to 1000.0 (%)	100.0
oE-60 Adjustment mode [Ao3] output level	-100.0 to 100.0(%)	100.0
oE-61 [Ao4] Output filter time constant	1 to 500(ms)	100
oE-62 [Ao4] Data type selection	00(Absolute value) 01(Signed value)	00
oE-63 [Ao4] Bias adjustment	-100.0 to 100.0(%)	0.0
oE-64 [Ao4] Gain adjustment	-1000.0 to 1000.0 (%)	100.0
oE-65 Adjustment mode [Ao4] output level	-100.0 to 100.0(%)	100.0
oE-66 [Ao5] Output filter time constant	1 to 500(ms)	100
oE-67 [Ao5] Data type selection	00(Absolute value) 01(Signed value)	00
oE-68 [Ao5] Bias adjustment	-100.0 to 100.0(%)	0.0
oE-69 [Ao5] Gain adjustment	-1000.0 to 1000.0 (%)	100.0
oE-70 Adjustment mode [Ao5] output level	-100.0 to 100.0(%)	100.0

- Regarding the adjustment mode of the analog output, please refer to the chapter 3 example of I/O terminals adjustment.

[oH-01] to [oH-34]

P1-EN Optional Ethernet setting

Code/Name	Range (unit)	Initial value
oH-01 IP-address selection	00(Group 1) 01(Group 2)	00
oH-02 Communication speed (port-1)	00(Auto-negotiation) 01(100M:full duplex) 02(100M:half duplex) 03(10M:full duplex) 04(10M:half duplex)	00
oH-03 Communication speed (port-2)		
oH-04 Ethernet communication timeout	1 to 65535(×10ms)	3000
oH-05 Modbus TCP Port No.(IPv4)	502, 1024 to 65535	502
oH-06 Modbus TCP Port No.(IPv6)		

• For more information, refer to the user's guide.

P1-PB Optional PROFIBUS setting

Code/Name	Range (unit)	Initial value
oH-20 PROFIBUS Node address	0 to 125	0
oH-24 PROFIBUS Telegram group selection	00(Gr.A) 01(Gr.B) 02(Gr.C)	00

• Refer to option User's Guide for more details.

P1-PN Optional PROFINET setting

Code/Name	Range (unit)	Initial value
oH-34 PROFINET Telegram group selection	00(Gr.A) 01(Gr.B) 02(Gr.C)	00

• Refer to option User's Guide for more details.

[oJ-01] to [oJ-40]

Optional Interface

Group A option I/F flexible command

Code/Name		Range (unit)	Initial value
Group A option I/F flexible command registers	**oJ-01** Writing register 1, Gr.A	0000 to FFFF	0000
	oJ-02 Writing register 2, Gr.A		
	oJ-03 Writing register 3, Gr.A		
	oJ-04 Writing register 4, Gr.A		
	oJ-05 Writing register 5, Gr.A		
	oJ-06 Writing register 6, Gr.A		
	oJ-07 Writing register 7, Gr.A		
	oJ-08 Writing register 8, Gr.A		
	oJ-09 Writing register 9, Gr.A		
	oJ-10 Writing register 10, Gr.A		
	oJ-11 Reading register 1 Gr.A		
	oJ-12 Reading register 2 Gr.A		
	oJ-13 Reading register 3 Gr.A		
	oJ-14 Reading register 4 Gr.A		
	oJ-15 Reading register 5 Gr.A		
	oJ-16 Reading register 6 Gr.A		
	oJ-17 Reading register 7 Gr.A		
	oJ-18 Reading register 8 Gr.A		
	oJ-19 Reading register 9 Gr.A		
	oJ-20 Reading register 10 Gr.A		

Group B option I/F flexible command

Code/Name		Range (unit)	Initial value
Group B option I/F flexible command registers	**oJ-21** Writing register 1, Gr.B	0000 to FFFF	0000
	oJ-22 Writing register 2, Gr.B		
	oJ-23 Writing register 3, Gr.B		
	oJ-24 Writing register 4, Gr.B		
	oJ-25 Writing register 5, Gr.B		
	oJ-26 Writing register 6, Gr.B		
	oJ-27 Writing register 7, Gr.B		
	oJ-28 Writing register 8, Gr.B		
	oJ-29 Writing register 9, Gr.B		
	oJ-30 Writing register 10, Gr.B		
	oJ-31 Reading register 1 Gr.B		
	oJ-32 Reading register 2 Gr.B		
	oJ-33 Reading register 3 Gr.B		
	oJ-34 Reading register 4 Gr.B		
	oJ-35 Reading register 5 Gr.B		
	oJ-36 Reading register 6 Gr.B		
	oJ-37 Reading register 7 Gr.B		
	oJ-38 Reading register 8 Gr.B		
	oJ-39 Reading register 9 Gr.B		
	oJ-40 Reading register 10 Gr.B		

[oJ-41] to [oJ-60]

Group C option I/F flexible command

Code/Name		Range (unit)	Initial value
Group C option I/F flexible command registers	**oJ-41** Writing register 1, Gr.C	0000 to FFFF	0000
	oJ-42 Writing register 2, Gr.C		
	oJ-43 Writing register 3, Gr.C		
	oJ-44 Writing register 4, Gr.C		
	oJ-45 Writing register 5, Gr.C		
	oJ-46 Writing register 6, Gr.C		
	oJ-47 Writing register 7, Gr.C		
	oJ-48 Writing register 8, Gr.C		
	oJ-49 Writing register 9, Gr.C		
	oJ-50 Writing register 10, Gr.C		
	oJ-51 Reading register 1 Gr.C		
	oJ-52 Reading register 2 Gr.C		
	oJ-53 Reading register 3 Gr.C		
	oJ-54 Reading register 4 Gr.C		
	oJ-55 Reading register 5 Gr.C		
	oJ-56 Reading register 6 Gr.C		
	oJ-57 Reading register 7 Gr.C		
	oJ-58 Reading register 8 Gr.C		
	oJ-59 Reading register 9 Gr.C		
	oJ-60 Reading register 10 Gr.C		

• For more information, refer to the user's guide of the corresponding option.

[oL-01] to [oL-36]

Code/Name		Range (unit)	Initial value
Group 1 IPv4	**oL-01** IPv4 IP address (1) Gr.1	0 to 255	192
	oL-02 IPv4 IP address (2) Gr.1		168
	oL-03 IPv4 IP address (3) Gr.1		0
	oL-04 IPv4 IP address (4) Gr.1		2
	oL-05 IPv4 subnet mask (1) Gr.1		255
	oL-06 IPv4 subnet mask (2) Gr.1		255
	oL-07 IPv4 subnet mask (3) Gr.1		255
	oL-08 IPv4 subnet mask (4) Gr.1		0
	oL-09 IPv4 default gateway (1) Gr.1		192
	oL-10 IPv4 default gateway (2) Gr.1		168
	oL-11 IPv4 default gateway (3) Gr.1		0
	oL-12 IPv4 default gateway (4) Gr.1		1
Group 1 IPv6	**oL-20** IPv6 IP address (1) Gr.1	0000 to FFFF	0000
	oL-21 IPv6 IP address (2) Gr.1		
	oL-22 IPv6 IP address (3) Gr.1		
	oL-23 IPv6 IP address (4) Gr.1		
	oL-24 IPv6 IP address (5) Gr.1		
	oL-25 IPv6 IP address (6) Gr.1		
	oL-26 IPv6 IP address (7) Gr.1		
	oL-27 IPv6 IP address (8) Gr.1		
	oL-28 IPv6 Prefix of subnet, Gr.1	0 to 127	64
	oL-29 IPv6 default gateway (1) Gr.1	0000 to FFFF	0000
	oL-30 IPv6 default gateway (2) Gr.1		
	oL-31 IPv6 default gateway (3) Gr.1		
	oL-32 IPv6 default gateway (4) Gr.1		
	oL-33 IPv6 default gateway (5) Gr.1		
	oL-34 IPv6 default gateway (6) Gr.1		
	oL-35 IPv6 default gateway (7) Gr.1		
	oL-36 IPv6 default gateway (8) Gr.1		

• For more information, refer to the user's guide of the corresponding option.

[oL-40] to [oL-76]

	Code/Name	Range (unit)	Initial value
Group 2 IPv4	**oL-40** IPv4 IP-address (1) Gr.2	0 to 255	192
	oL-41 IPv4 IP-address (2) Gr.2		168
	oL-42 IPv4 IP-address (3) Gr.2		0
	oL-43 IPv4 IP-address (4) Gr.2		2
	oL-44 IPv4 subnet mask (1) Gr.2		255
	oL-45 IPv4 subnet mask (2) Gr.2		255
	oL-46 IPv4 subnet mask (3) Gr.2		255
	oL-47 IPv4 subnet mask (4) Gr.2		0
	oL-48 IPv4 default gateway (1) Gr.2		192
	oL-49 IPv4 default gateway (2) Gr.2		168
	oL-50 IPv4 default gateway (3) Gr.2		0
	oL-51 IPv4 default gateway (4) Gr.2		1
Group 2 IPv6	**oL-60** IPv6 IP address (1) Gr.2	0000 to FFFF	0000
	oL-61 IPv6 IP address (2) Gr.2		
	oL-62 IPv6 IP address (3) Gr.2		
	oL-63 IPv6 IP address (4) Gr.2		
	oL-64 IPv6 IP address (5) Gr.2		
	oL-65 IPv6 IP address (6) Gr.2		
	oL-66 IPv6 IP address (7) Gr.2		
	oL-67 IPv6 IP address (8) Gr.2		
	oL-68 IPv6 Prefix of subnet, Gr.2	0 to 127	64
	oL-69 IPv6 default gateway (1) Gr.2	0000 to FFFF	0000
	oL-70 IPv6 default gateway (2) Gr.2		
	oL-71 IPv6 default gateway (3) Gr.2		
	oL-72 IPv6 default gateway (4) Gr.2		
	oL-73 IPv6 default gateway (5) Gr.2		
	oL-74 IPv6 default gateway (6) Gr.2		
	oL-75 IPv6 default gateway (7) Gr.2		
	oL-76 IPv6 default gateway (8) Gr.2		

- For more information, refer to the user's guide of the corresponding option.

[PA-01] to [PA-05]

■Parameter mode (P code：Special Function)

Em-force mode settings

	Code/Name	Range (unit)	Initial value
Em-force mode	**PA-01** Enable Emergency-force drive mode	00(Disable) 01(Enable)	00
	PA-02 Emergency-force drive frequency reference	0.00 to 590.00(Hz) Note	0.00
	PA-03 Emergency-force drive direction command	00(Forward) 01(Reverse)	00
Bypass	**PA-04** Commercial power supply bypass function selection	00(Disable) 01(Enable)	00
	PA-05 Bypass function delay time	0.0 to 1000.0(s)	5.0

Note: The actual setting range depends on the maximum frequency setting ([Hb105/205] [Hd105/205])

• Settings for EM-force mode in case of abnormality.
For more information, refer to the user's guide.

[PA-20] to [PA-31]

Simulation mode settings

Code/Name	Range (unit)	Initial value
PA-20 Simulation mode enable	00(Disable) 01(Enable)	00
PA-21 Error code selection for alarm test	0 to 255	0
PA-22 Simulation mode: Optional output selection for the output current monitor	00(Disable) 01(Parameter[PA-23]) 02(Setting by terminal [VRF]) 03(Setting by terminal [IRF]) 04(Setting by terminal [VF2]) 05(Setting by terminal [Ai4]) 06(Setting by terminal [Ai5]) 07(Setting by terminal [Ai6])	01
PA-23 Optional output value setting for the output current monitor	0.0 to Rated current × 3.0(A)	0.0
PA-24 Simulation mode: Optional output selection for the DC bus voltage monitor	00(Disable) 01(Parameter[PA-25]) 02(Setting by terminal [VRF]) 03(Setting by terminal [IRF]) 04(Setting by terminal [VF2]) 05(Setting by terminal [Ai4]) 06(Setting by terminal [Ai5]) 07(Setting by terminal [Ai6])	01
PA-25 Optional output value setting for the DC bus voltage monitor	200V Class : 0.0 to 450.0(Vdc) 400V Class : 0.0 to 900.0(Vdc)	200V: 270.0 400V: 540.0
PA-26 Simulation mode: Optional output selection for the output voltage monitor	00(Disable) 01(Parameter[PA-27]) 02(Setting by terminal [VRF]) 03(Setting by terminal [IRF]) 04(Setting by terminal [VF2]) 05(Setting by terminal [Ai4]) 06(Setting by terminal [Ai5]) 07(Setting by terminal [Ai6])	01
PA-27 Optional output value setting for the output voltage monitor	200V Class : 0.0 to 300.0(V) 400V Class : 0.0 to 600.0(V)	0.0
PA-28 Simulation mode: Optional output selection for the output torque monitor	00(Disable) 01(Parameter[PA-29]) 02(Setting by terminal [VRF]) 03(Setting by terminal [IRF]) 04(Setting by terminal [VF2]) 05(Setting by terminal [Ai4]) 06(Setting by terminal [Ai5]) 07(Setting by terminal [Ai6])	01
PA-29 Optional output value setting for the output torque monitor	-500.0 to 500.0(%)	0.0
PA-30 Simulation mode: Optional frequency matching start enable setting	00(Disable) 01(Parameter[PA-31]) 02(Setting by terminal [VRF]) 03(Setting by terminal [IRF]) 04(Setting by terminal [VF2]) 05(Setting by terminal [Ai4]) 06(Setting by terminal [Ai5]) 07(Setting by terminal [Ai6])	01
PA-31 Optional frequency matching start setting value	0.0 to 590.0(Hz)	0.0

• Settings for the simulation mode functions.
For more information, refer to the user's guide.

[UA-01] to [UA-19]

■Parameter mode (U code：Set-up, PDN)

Password setting

Code/Name	Range (unit)	Initial value
UA-01 Password for display	0000 to FFFF	0000
UA-02 Password for soft lock		

- When using the password, display and parameter settings are locked.
- The inverter will be locked by password when setting any value other than 0000. The password can be cancelled by entering the set password. Please note that, the restrictions will not be cancelled if you forget the password.

Display mode of keypad

Code/Name	Range (unit)	Initial value
UA-10 Display restriction selection	00(Full display) 01(Function-specific display) 02(User setting) 03(Data comparison display) 04(Monitor only)	00

- Limit the displayed contents of the keypad.
- For more information, refer to the User's guide.

Accumulated power display adjustment/clear

Code/Name	Range (unit)	Initial value
UA-12 Accumulated input power monitor clear	00(Disable) 01(Clear)	00
UA-13 Display gain for the accumulated input power monitor	1 to 1000	1
UA-14 Accumulated output power monitor clear	00(Disable) 01(Clear)	00
UA-15 Display gain for the accumulated output power monitor	1 to 1000	1

- If [KHC] terminal is ON, the accumulated input power can be clear.
- If [OKHC] terminal is ON, the accumulated output power can be clear.

Software lock operation settings

Code/Name	Range (unit)	Initial value
UA-16 Soft-Lock selection	00([SFT] terminal) 01(Always enable)	00
UA-17 Soft-Lock target selection	00(All data) 01(All, except speed related values)	

- Sets the software lock operation.

Keypad copy function restriction

Code/Name	Range (unit)	Initial value
UA-18 Data R/W selection	00(Enable R/W by operator) 01(Disable R/W by operator)	00

- Restricts the copy function(Read/Write).

Keypad low battery warning

Code/Name	Range (unit)	Initial value
UA-19 Low battery warning enable	00(Disable) 01(Warning)/02(Error)	00

- Sets the behaviour when the battery in the keypad is low.

[UA-20] to [UA-62]

Keypad communication lost operation

Code/Name	Range (unit)	Initial value
UA-20 Action selection at keypad disconnection	00(Error) 01(Error after deceleration stop) 02(Ignore)/03(Free run stop) 04(Deceleration stop)	02

Keypad display mode

Code/Name	Range (unit)	Initial value
UA-21 2nd-motor parameter display selection	00(Hidden) 01(Display)	00
UA-22 Option parameter display selection		

- If options and 2nd-motor related parameters are not required to be displayed, it is recommended to hide them. For more information, refer to the User's guide.

User-parameter setting function

Code/Name	Range (unit)	Initial value
UA-30 User-parameter auto setting function enable	00(Disable) 01(Enable)	00
UA-31 User-parameter 1 selection	no (parameter)	no
UA-32 User-parameter 2 selection		
UA-33 User-parameter 3 selection		
UA-34 User-parameter 4 selection		
UA-35 User-parameter 5 selection		
UA-36 User-parameter 6 selection		
UA-37 User-parameter 7 selection		
UA-38 User-parameter 8 selection		
UA-39 User-parameter 9 selection		
UA-40 User-parameter 10 selection		
UA-41 User-parameter 11 selection		
UA-42 User-parameter 12 selection		
UA-43 User-parameter 13 selection		
UA-44 User-parameter 14 selection		
UA-45 User-parameter 15 selection		
UA-46 User-parameter 16 selection		
UA-47 User-parameter 17 selection		
UA-48 User-parameter 18 selection		
UA-49 User-parameter 19 selection		
UA-50 User-parameter 20 selection		
UA-51 User-parameter 21 selection		
UA-52 User-parameter 22 selection		
UA-53 User-parameter 23 selection		
UA-54 User-parameter 24 selection		
UA-55 User-parameter 25 selection		
UA-56 User-parameter 26 selection		
UA-57 User-parameter 27 selection		
UA-58 User-parameter 28 selection		
UA-59 User-parameter 29 selection		
UA-60 User-parameter 30 selection		
UA-61 User-parameter 31 selection		
UA-62 User-parameter 32 selection		

- Sets the data displayed when [UA-10]=02.

[UA-90] to [UA-94] [Ub-01] to [Ub-05] [UC-01]

Code/Name	Range (unit)	Initial value
UA-90 to 94	Reserved	-

Initialize

Code/Name	Range (unit)	Initial value
Ub-01 Initialize mode selection	00(Disable) 01(Error history clear) 02(Data initialize) 03(Error history clear & Data initialize) 04(Reserved) 05(All data except terminal configuration) 06(All data except communication configuration) 07(All data except terminal & communication configuration) 08(Reserved)	00
Ub-02 Initialize data selection	00(Mode 0): JPN 01(Mode 1): EU, ASIA 02(Mode 2): USA 03(Mode 3): CHN	00
Ub-03 Load type selection	00(Very Low Duty) 01(Low Duty) 02(Normal Duty)	02
Ub-05 Enable initialization	00(Disable) 01(Execute initialization)	00

- How to initialize; at first select the initial mode at [Ub-01], next, when [Ub-05] is set to1, initialize process is start.
- Once setting the load type selection [Ub-03],will change instantaneously the inverter load rating.

Factory settings

Code/Name	Range (unit)	Initial value
UC-01 (-)	(Do not change)	(00)

[Ud-01] to [Ud-37]

Trace function

Code/Name	Range (unit)	Initial value
Ud-01 Trace function enable	00(Disable) 01(Enable)	00
Ud-02 Trace start	00(Stop) 01(Start)	
Ud-03 Number of trace data setting	0 to 8	1
Ud-04 Number of trace signals setting		
Ud-10 Trace data 0 selection	All the parameters of the monitor mode	dA-01
Ud-11 Trace data 1 selection		
Ud-12 Trace data 2 selection		
Ud-13 Trace data 3 selection		
Ud-14 Trace data 4 selection		
Ud-15 Trace data 5 selection		
Ud-16 Trace data 6 selection		
Ud-17 Trace data 7 selection		
Ud-20 Trace signal 0 input/output selection	00(Input:[Ud-21]) 01(Output:[Ud-22])	00
Ud-21 Trace signal 0 input terminal selection	Same as [CA-01]	001
Ud-22 Trace signal 0 output terminal selection	Same as [CC-01]	
Ud-23 Trace signal 1 input/output selection	00(Input:[Ud-24]) 01(Output:[Ud-25])	00
Ud-24 Trace signal 1 input terminal selection	Same as [CA-01]	001
Ud-25 Trace signal 1 output terminal selection	Same as [CC-01]	
Ud-26 Trace signal 2 input/output selection	00(Input:[Ud-27]) 01(Output:[Ud-28])	00
Ud-27 Trace signal 2 input terminal selection	Same as [CA-01]	001
Ud-28 Trace signal 2 output terminal selection	Same as [CC-01]	
Ud-29 Trace signal 3 input/output selection	00(Input:[Ud-30]) 01(Output:[Ud-31])	00
Ud-30 Trace signal 3 input terminal selection	Same as [CA-01]	001
Ud-31 Trace signal 3 output terminal selection	Same as [CC-01]	
Ud-32 Trace signal 4 input/output selection	00(Input:[Ud-33]) 01(Output:[Ud-34])	00
Ud-33 Trace signal 4 input terminal selection	Same as [CA-01]	001
Ud-34 Trace signal 4 output terminal selection	Same as [CC-01]	
Ud-35 Trace signal 5 input/output selection	00(Input:[Ud-36]) 01(Output:[Ud-37])	00
Ud-36 Trace signal 5 input terminal selection	Same as [CA-01]	001
Ud-37 Trace signal 5 output terminal selection	Same as [CC-01]	

[Ud-38] to [Ud-60]

Code/Name	Range (unit)	Initial value
Ud-38 Trace signal 6 input/output selection	00 (Input: [Ud-39]) 01 (Output: [Ud-40])	00
Ud-39 Trace signal 6 input terminal selection	Similar to [CA-01]	001
Ud-40 Trace signal 6 output terminal selection	Similar to [CC-01]	
Ud-41 Trace signal 7 input/output selection	00 (Input: [Ud-42]) 01 (Output: [Ud-43])	00
Ud-42 Trace signal 7 input terminal selection	Similar to [CA-01]	001
Ud-43 Trace signal 7 output terminal selection	Similar to [CC-01]	
Ud-50 Trace trigger 1 selection	Note	00
Ud-51 Trigger 1 activation selection at trace data trigger	00(Action at rising above the trigger level) 01(Action at falling below the trigger level)	00
Ud-52 Trigger 1 level setting at trace data trigger	0 to 100(%)	0
Ud-53 Trigger 1 activation selection at trace signal trigger	00(Action by signal on) 01(Action by signal off)	00
Ud-54 Trace trigger 2 selection	Note	00
Ud-55 Trigger 2 activation selection at trace data trigger	00(Action at rising above the trigger level) 01(Action at falling below the trigger level)	00
Ud-56 Trigger 2 level setting at trace data trigger	0 to 100(%)	0
Ud-57 Trigger 2 activation selection at trace signal trigger	00(Action by signal on) 01(Action by signal off)	00
Ud-58 Trigger condition selection	00(At trace trigger 1 activation) 01(At trace trigger 2 activation) 02(Trigger-1 OR trigger-2 activation) 03(Trigger-1 AND trigger-2 activation)	00
Ud-59 Trigger point setting	0 to 100(%)	0
Ud-60 Sampling time setting	01(0.2ms) 02(0.5ms) 03(1ms) 04(2ms) 05(5ms) 06(10ms) 07(50ms) 08(100ms) 09(500ms) 10(1000ms)	03

Note: 00(Trip)/01(Data 0)/02(Data 1)/03(Data 2)/04(Data 3)
05(Data 4)/06(Data 5)/07(Data 6)/08(Data 7)
09(Signal 0)/10(Signal 1)/11(Signal 2)/12(Signal 3)
13(Signal 4)/14(Signal 5)/15(Signal 6)/16(Signal 7)

- Trace function settings.
  For more information, refer to the User's guide.

[Unit table]

Number	Unit
00	Non
01	%
02	A
03	Hz
04	V
05	kW
06	W
07	hr
08	S
09	kHz
10	ohm
11	mA
12	ms
13	P
14	kgm^2
15	pls
16	mH
17	Vdc
18	°C
19	kWh
20	mF
21	mVs/rad
22	Nm
23	min-1
24	m/s
25	m/min
26	m/h
27	ft/s
28	ft/min
29	ft/h
30	m

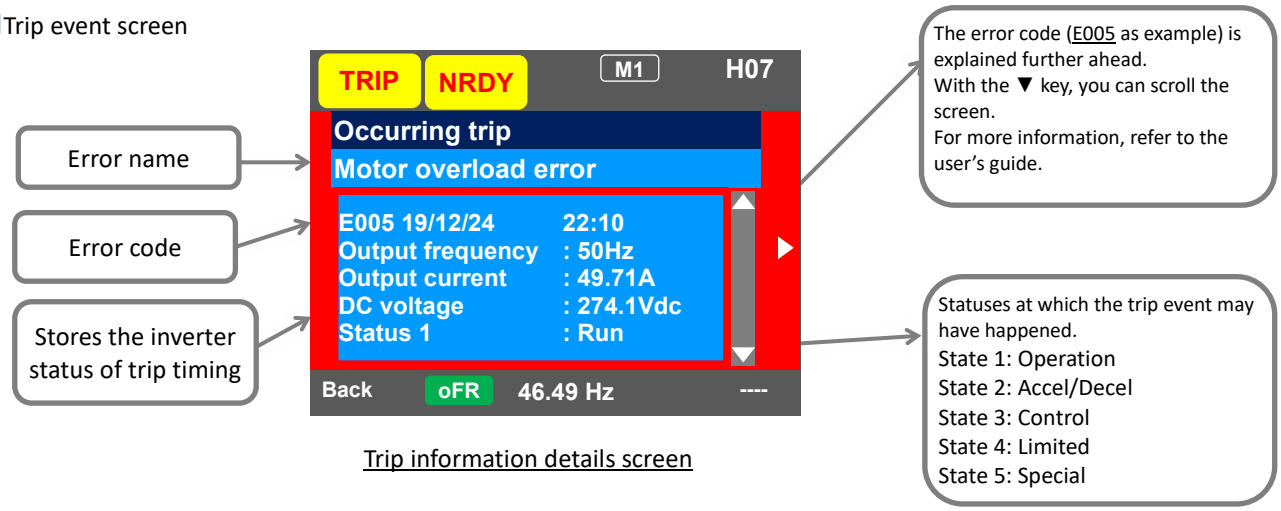
Number	Unit
31	cm
32	°F
33	l/s
34	l/min
35	l/h
36	m^3/s
37	m^3/min
38	m^3/h
39	kg/s
40	kg/min
41	kg/h
42	t/min
43	t/h
44	gal/s
45	gal/min
46	gal/h
47	ft^3/s
48	ft_3/min
49	ft^3/h
50	lb/s
51	lb/min
52	lb/h
53	mbar
54	bar
55	Pa
56	kPa
57	PSI
58	mm

Chapter 5 Troubleshooting

5.1 Error events

Next are the descriptions of the basic errors that may occur. For more information, refer to the user's guide.

■Trip event screen



Trip information details screen

■Error events

Code	Error Name	Details	Corrective actions	Related parameter
E001	Overcurrent error	By the load and the operating conditions, overcurrent has occurred.	If the acceleration is fast, increase the acceleration time.	[AC120]
			Use the overcurrent suppression function.	[bA120]
			Use the overload restriction function.	[bA122]
			Use the overcurrent retry function.	[bb-22]
			In order to stabilize the control, Try auto-tuning.	[HA-01]
E005 E039	Motor overload Error (E005) Inverter overload Error (E039)	By the load and the operating conditions, current has increased.	If the acceleration is fast, increase the acceleration time.	[AC120]
			Use the overload restriction function.	[bA122]
			If the motor sound is abnormal, in order to stabilize the control, adjust the constant by trying auto-tuning.	[HA-01]
E006	Braking resistor overload error	Braking resistor use is limited.	If the deceleration is fast, increase the deceleration time.	[AC122]
			Reselection of the braking resistor is necessary.	[bA-60]
E007	Overvoltage error	Internal voltage has Increased insufficient capacity of the inverter.	If the deceleration is fast, increase the deceleration time.	[AC122]
			Use the overvoltage suppression functions.	[bA140] [bA146]
			Use the overvoltage retry function.	[bb-23]
			Use the regenerative braking option.	-
E008 E011	Memory error CPU error	Main CPU abnormality	Carry out counter measures for the inverter noise.	
			If it occurs consecutively, there is a possibility of inverter failure.	
E009	Under voltage error	Main circuit supply has drop.	To disable the under-voltage error, change setting.	[bb-27]
			Use the under-voltage retry function.	[bb-21]
E010	Current detector error	Current detector abnormality	Carry out counter measures for the inverter noise.	-
			If it occurs consecutively, there is a possibility of inverter failure, and parts replacement might be required.	
E012	External trip error	[ES] input terminal is ON.	Check the signal status of the input terminal	[dA-51]
			Check if there are no operations by communication.	-
E013	USP error	While the [USP]terminal was ON and the operation command is input state, the main power supply was turned ON.	Make sure that an operation command is not introduced at the time of turning ON the inverter.	[dA-51]

Code	Error Name	Details	Corrective actions	Related parameter
E014	Ground fault error	Ground fault is detected at main power supply turned ON.	Check for ground fault of the motor, wiring, etc.	-
E015	Incoming overvoltage error	The main power supply voltage has been continuously above the limit.	Review the power circumstances, such as the power supply capacity.	[dA-40]
E016	Instantaneous power failure error	The control circuit power source was off due to instantaneous power failure.	If avoiding this trip is required, use the power loss retry function.	[bb-20]
E019	Temperature detector error	Abnormality in temperature detector circuit.	Carry out counter measures for the inverter noise.	-
			If it occurs consecutively, there is a possibility of the inverter failure.	
E020	Cooling fan rotation speed reduction temperature error	Because of cooling-fan life span, internal temperature has raised.	Changing the cooling-fan is necessary.	
			Lower the carrier frequency.	[bb101]
E021	Temperature error	Internal temperature has increased.	Requires a review of the installation circumstances.	-
			Lower the carrier frequency.	[bb101]
E024	Input open phase error	Disconnection of the wiring in the supply side has occurred.	Check the fastening of the input wiring with screws.	-
			Check that the 3 phases are correctly inserted.	
E030	IGBT error	Sudden increase of current	Verify if a ground fault or a cable disconnection/rupture has occurred at the output wiring. (Possible short circuit)	
			Check that the motor is not locked.	
E034	Output open phase error	Disconnection of the wiring in the motor side has occurred.	Check the output wiring disconnection, motor insulation failure, …etc.	
			Check that the 3 phases are correctly connected.	
E035	Thermistor error	Abnormal motor temperature	Improve the motor cooling circumstances.	
			Use the overload restriction function.	[bA122]
		Thermistor abnormality	Check if the thermistor is damaged.	-
			Check the thermistor settings.	[Cb-40]
E036	Brake error	Brake abnormality	Check if the brake is damaged and if the wiring for the [BOK] signal is disconnected.	[dA-51]
			Check the brake waiting time.	[AF134] [AF141]
E038	Low speed range overload error	Increase of current during slow speed operation	If torque is needed during slow speed, a review of the inverter capacity is necessary.	-
E040	Operation keypad disconnection error	There is an error in connection for the keypad and the inverter	Check for the disconnection of the keypad from the inverter.	[UA-20]
			Noise countermeasures are necessary	-
E041	RS485 communication error	There is an error in RS485 communication.	Noise countermeasures are necessary	
			Check the communication setting	[CF-01]
E042	RTC error	Built in data for the keypad has returned to initial data.	Battery replacement for the panel is necessary.	-
E060 to E089	Option error	There is an error in the option.	For more information, please refer to each option in user's guide.	

Note: E043 to E059 and E090 to E097 reserved parameters.
For other errors not shown above, refer to the user's guide.

■Warning events

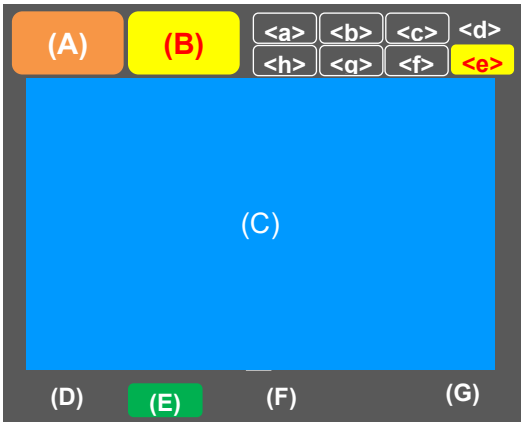
Regarding the warnings, please refer to the user's guide.
Fixing the parameter details shown in the panel screen may cancel the warning.

5.2 Confirming the status

■Frequently asked questions – FAQ (simplified edition)

(A) Main operation status

Details of display



Display	Description
RUN,FR	While in forward operation
RUN,RR	While in reverse operation
RUN,0Hz	While output operation is 0Hz. Even for DB, FOC and SON functions.
TRIP	Displays the trip status.
WARN	When a conflict in the setting happens.
STOP (red)	This sign is indicated when run- command is given to the forced to stop due to the other functions. ・In an operation that is not controlled from the panel, but is stopped with the panel. ・In a non-stop operation. ・An operation is stopped with a terminal function.
STOP (white)	While stopped, in absence of RUN command or if frequency reference is 0Hz.

・If STOP(in red),

⇒ Displayed in (F): if the reference frequency it is 0.00Hz, make sure that the frequency reference has been inputted.

⇒ For example; if it is being driven by the [FR] terminal, and then stopped with the stop key, inverter will not start again the operation unless the [FR] terminal turns off and on again (re-arm).

⇒ When [RST, [MBS] or STO terminals are in ON state it won't operate.

(B) Warning status

No.	Display	Description
1	LIM	While: ・Overload restriction ・Overcurrent suppression ・Overvoltage suppression ・Jump frequency limited ・minimum frequency limited ・Upper or lower frequency limited ・Torque limiting **Details can be confirmed in [dC-37].**
2	ALT	If displays the following functions: ・Overload warning ・Inverter thermal warning ・Motor heat warning ・Motor thermal warning **Details can be confirmed in [dC-38].**
3	RETRY	While waiting for retry or restart functions. **Details can be confirmed in [dC-39].**
4	NRDY	While inverter is in a state unfit to operate, even if a RUN command is issued. ・Main power under voltage ・Operating only with 24V supply ・Resetting ・[REN] terminal is enabled and OFF. **Details can be confirmed in [dC-40].**
5	FAN	Cooling-fan life warning is issued.
6	C	Capacitor life warning is issued.
7	F/C	When both Capacitor and Cooling-fan life warnings are issued.
8	(None)	Different statuses from those shown above.

・LIM and ALT are indicated when current and internal voltage has risen. Review things such as the load if this error happens too often.

・Above icons are indicated when cooling-fan and smoothing capacitor lifespan has reached to the end.

(E) Panel's RUN key function

No.	Display	Description
1	oFR	Forward operation from panel's RUN key.
2	oRR	Reverse operation from panel's RUN key.
3	>FR	Forced forward operation.
4	>RR	Forced reverse operation.
5	(None)	Different operation (other than RUN).

・Displayed if the panel RUN key is activated.

・Review AA111 if is not displayed and want to use the panel for RUN operation.

<a> Power supply status

Number	Display	Description
1	(None)	Main and control power is supplied.
2	CTRL	Control supply is connected.
3	24V	Only P+/P- 24V supply is connected.

・Displays the status of the supply.
If CTRL or 24V is displayed means that is in a state where there is not a main power source plugged and cannot operate. Check the supply.

<b> SET function status

Number	Display	Description
1	M1	When [SET] terminal is not assigned or is assigned but in OFF state (1st-motor is enabled).
2	M2	[SET] terminal is assigned and in ON state (2nd-motor is enabled).

・When the [SET] terminal is not being used, M1 is displayed. If the centre character of the parameter is "-"([AC-01]) or "1"([AA111]) it becomes enabled, if it is "2" (such as [AA211]), it will be ignored.

<c> Parameter display

Number	Display	Description
1	(None)	Display all modes
2	UTL	Individual function display mode
3	USR	User's settings display mode
4	CMP	Data comparator display mode
5	MON	Only monitor display mode

・Is displayed if it operating under a display limiting function. Change the setting of [UA-10] in the case that the parameters are not being displayed.

<d> Monitor screen number

・Each screen displayed has a number. When contacting to us, make reference to the screens with its number.

(e) Functional safety

・If there is a display, will be shut off. For functional safety display, refers to safety instruction.

<f> Control mode

Number	Display	Description
1	(None)	Speed control mode.
2	TRQ	Torque control mode.
3	POS	Position control mode.

・Displays the operation control mode.

<g> Reserved

<h> Special functions

・In the case it is displayed, means that the inverter entered in a special state. For more information, refer to the user's guide.

5.3 Possible errors and solutions

If the corrective action does not solve the problem, refer to the user's guide where there are more detailed descriptions.

Event ►	Estimated cause ►	Corrective action
Screen is not displayed even when POWER Led is illuminated.	・Keypad in idle mode	・Press a key of the Keypad and the screen will be displayed.
	・Keypad has been detached.	・Recover and reinsert the keypad.
After issuing a RUN command, the motor does not start.	・Trip has occurred.	・If an error causes a trip, the cause of the trip will have to be removed before resetting.
	・A warning came up.	・In a warning event is necessary to resolve any data inconsistency.
	・Command function not introduced	・Check that the RUN command [AA111] and the reference (terminal, keypad, etc.) are correct.
	・Speed source not introduced.	・Check that the main speed source [AA101] and the reference (terminal, panel, etc.) are correct.
	・Activate a stop function.	・Check if functional safety terminals and [RST]/[MBS] terminals are not enabled through the terminal status [dA-51].
	・Motor is restricted/locked.	・Check if there is a braking operation or something inhibiting the motor (Like something clogged).
	・Wiring is disconnected.	・Check that there are not disconnected cables in the output to the motor and in the internal side.
Cannot change settings.	・Inverter is in running.	・There are parameters that cannot be modified while running, please refer to the parameter list.
Motor rotates in reverse.	・Wrong wiring order of the motor phases	・Rotation is reversed by replacing two phases of the motor.
Motor/machinery sound is loud.	・Carrier frequency setting is low.	・Set higher carrier frequency [bb101], however, that may increase the generated noise or leakage current, so output current derating is required for some models.

Event ►	Estimated cause ►	Corrective action
Motor speed does not increase.	・Overload restriction function is in operation.	・If output current is high, the overload restriction function [bA122] lowers the frequency. To increase the acceleration time [AC120], it is necessary to suppress the current increase.
	・Frequency is being limited.	・The upper limit [bA102] setting may be low, and it should be increased. The frequency limiting does not make use of the maximum frequency, but the upper limit function.
	・Frequency command value is low.	・Increase the frequency command or cancel any other high priority frequency command such as jogging or multi-speed.
	・Acceleration time is long.	・Acceleration time [AC120] setting is long, so will accelerate really slowly. Shorten gradually the acceleration time.
Output frequency is unstable.	・Several parameters are not adequately set.	・Check for the motor basic parameters.
	・Big variation in the load	・Review the power capacity of both the inverter and motor.
	・Supply voltage fluctuates.	・To keep to a minimum the supply fluctuations, by using an optional AC reactor, DC choke or and input filter, improvement is possible.
Low torque or Torque stall	・V/f control is selected.	・Can switch in [AA121] to torque boost, sensor less vector control, … etc.
	・It is being used for lift down application.	・If the torque in the regenerative operation is not enough, Use a braking resistor or regenerative braking unit.
	・Very heavy load	・Review the capacity of both the inverter and motor.
In operation the circuit breaker gets activated.	・Large leakage current	・Lower the carrier frequency [bb101]. ・Increase the sensitivity current of the earth leakage breaker or replace it with a high sensitivity current.
Noise interferes with the TVs and radios nearby the inverter.	・Irradiated noise from the inverter	・If possible, separate the wiring from the TV and radio. ・Put a zero-phase reactor either in the main supply input or in the output of the inverter.

Chapter 6 Inspection and Maintenance

⚠ Read this before performing any inspection or maintenance!

There is risk of electric shock!

・Before an inspection the supply power must to be cut off, and then wait at least 10 minutes (Note:1) or 15 minutes (Note:2) before proceeding.

(Make sure that the charge lamp in the inverter is off. Furthermore, measure the voltage between the P and N terminals and make sure that the voltage is less than 45V)

Note: 1. For models HF4322-5A5 to HF4322-022 and HF4324-5A5 to HF4324-022
2. For models HF4322-030 to HF4322-055 and HF4324-030 to HF4324-055

6.1 Inspection and maintenance notes

6.1.1 Daily inspection

Check and confirm for the following abnormalities while the inverter is operating:

No.	Details	✓
1	Motor operates as per settings	□
2	No abnormalities in the environment	□
3	Cooling-system running normally	□
4	Abnormal vibration or noise	□
5	Discolouration and superheating	□
6	Unusual odour	□

While operating, check the inverter input voltage using a multi-meter or a similar tool to confirm:

No.	Details	✓
1	Voltage supply fluctuation	□
2	Line-to-line voltage balance	□

6.1.2 Regarding the functional safety

The contents related to the functional safety are listed in the attachment [Functional safety guide].

・Other than the designated person, do not perform any maintenance, inspection or component replacement.
(Before starting to operate, remove any wristwatch or metal accessories, and use always isolated tools.)

6.1.3 Cleaning

Keep the inverter in a clean condition.

No.	Details	✓
1	When cleaning the inverter, use a soft cloth soaked in neutral detergent to gently wipe up the dirtied parts.	□
2	Do not use solvents like acetone, benzene, toluene or alcohol to clean the inverter, as it can melt its surface or peel off the coating.	□
3	For the display of the panel do not use detergent or alcohol to clean it.	□

6.1.4 Periodic inspection

Check the parts that are only accessible while the inverter is stopped.
The periodic inspection is a vital point that has to be carried out, for any periodic inspection.

No.	Details	✓
1	Check for abnormalities in cooling system. ・Heat sink cleaning, etc.	□
2	Check the fastening and tighten. ・By the effects of oscillations, thermal expansion, etc., the screws and bolts may become loose, proceed to tighten after confirming.	□
3	Check that there is no damage or corrosion to the conductors and insulators.	□
4	Measurement of the dielectric breakdown voltage of insulators	□
5	Check and replacement of cooling-fan, smoothing capacitator and relay in main circuit.	□

6.2 Daily and periodic inspections

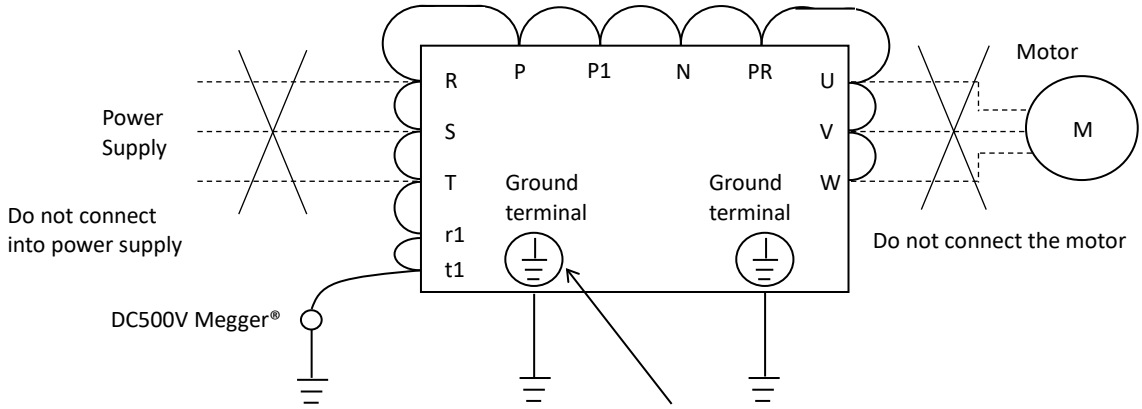
Inspected part	Inspection entry	Details of inspection	Inspection cycle			Inspection method	Criterion	Tester device
			Daily	Every 1 year	Every 2 years			
General	Surrounding environment	Check the ambient temperature, level of humidity, dust, … etc.	○			Refer to the installation guide.	Ambient temperature, level of humidity are withing the range. No frozen part. No condensation.	Thermometer Hygrometer Data logger
	Whole inverter	Check abnormal vibrations or noises.	○			Check visually and auditorily.	Without abnormalities	-
	Power supply voltage	Check that the main circuit voltage is normal.	○			Measure the line-to-line voltage of the inverter main circuit terminals R,S and T.	Within the AC voltage permissible variation.	Digital multimeter
Main circuit	General check	(1)Check the resistance between the main circuit and the ground terminals.		○		Remove the inverter main circuit terminals input/output wiring and the control terminal board, and remove the jumper for the internal filter, after that, shortcircuit the terminals R,S,T,U,V,W,P,P1,N,PR,r1,t1, and measure between this shortcircuit and the ground.	Resistance no less than 5MΩ	DC 500V class Ohmmeter (megger®)
		(2)Check looseness in fastened parts.		○		Confirm tighten of fasteners.	Without abnormalities	-
		(3)Check for overheating traces.		○		Check visually.		
	Conductor and cables	(1)Check for straining in conductors.		○				
		(2)Check for cable coating damage.		○				
	Terminal block	Check for any damage.		○				
	Inverter and converter circuits (Including resistors)	Check the resistance between all the terminals.			○	Remove the inverter main circuit terminal wiring, and measure the following: - Resistance between terminals RST and PN. - Resistance between terminals UVW and PN	Refer the "6.5 Method of checking the inverter/converter circuits". The inverter, capacitor and thyristor lifespan before replacing the componentes is of 10^6 start/stop cycles. Note:3	Analog multimeter
	Smoothing capacitor	(1)Check for capacitor fluid leakage.	○			Check visually.	That there are no abnormalities Estimated number life span before exchanging component: 10 years. Note:1,3,4	Capacitance meter
		(2)Check that the relief valve does not swells or protudes.	○					
	Relay	(1)No chatter sound while operating.		○		Check auditorily.	That there are no abnormalities.	-
		(2)Check contacts for damage.		○		Check visually.		
Control and protection circuits	Operation check	(1) While performing a unit operation of the inverter, check the balance of the output voltage among the individual phases.		○		Measure the voltage between the U,V,W terminals of the inverter main circuit.	Phase-to-phase voltage balance 200V class: within 4V 400V class: within 8V	Digital multimeter Voltmeter Ammeter
		(2)Carry out a sequential protection test, and check the protective and display circuits for any abnormality.		○		Simulate a shortcircuit or open of the inverter output protection circuit.	An error must be detected according to the sequence.	
Cooling system	Cooling-fan	(1) Check for abnormal vibrations or noises.	○			Turn by hand while electricity is not being supplied.	Smooth operation without abnomalities. Replace every: 10 years. Note:2,3,5	-
		(2)Check for loose joints.		○		Check visually.		
	Heat sink	Check for obstructions/clogging.		○		Check visually.	That there are not obstructions.	
Display	Display	(1) Check if the charge lamp LED and the Keypad's LEDs and LCD light up.	○			Check visually.	Confirm they light up.	-
		(2)Display cleaning		○		With cleaning rag	-	-
	Meter	Check that Indicated values are normal.	○			Check the meter readings on the panel.	Regulation and control value are satisfactory.	Voltmeter Ammeter Etc.
Motor	General	(1)Check abnormal vibrations or noises.	○			Check visually,auditorily, and by touch.	Without abnorma-lities	-
		(2)Check that there is no odour.	○			Check for abnormal superheating, damages an so on.		
	Insulation resistance	Check the resistance between the main circuit and the ground terminals.	Follow the installed motor instructions			Detach the U,V,W terminals from the inverter main circuit, and shortcircuit the motor wiring, mesure with the Megger® between the motor wiring and ground terminal.	No less than 5MΩ	DC 500V class Ohmmeter (megger®)

Note:
1. The life span of the smoothing capacitor is influenced by the ambient temperature. Refer to [Smoothing capacitor life span curve] for replacing measures.
2. The life span of the cooling-fan is influenced by the ambient temperature, the dirt and the change in its environmental conditions. Check these circumstances on the usual inspection.
3. The estimated time before replacement (Number of years/cycle) and the [Smoothing capacitor life span curve] are based on the design lifespan, not guaranteed.
4. In the case that the inverter is used after that the storage period of 2 years has expired, before the first use please refer to the aging process under the following conditions:
   - First, apply for 1 hour the 80% of the capacitor rated voltage at ambient temperature
   - Then, raise the voltage to 90%, and keep it for 1 more hour.
   - Finally, apply for 5 hours the rated voltage at ambient temperature
5. In the case that the cooling-fan if affected by dust, obstructing it; remove the dust, after that may take 5 to 10 seconds to start again.

6.3 Insulation resistance test

- When testing an external circuit with a megger, disconnect all the external circuit cables from the inverter to prevent it from being exposed to the test voltage.
- In the control circuit carry out a conduction test, use a multi-meter (with high resistance range), do not use a megger® or buzzer /continuity tester.
- The insulation resistance test of the inverter itself is carried out only at the main circuit, do not perform an insulation resistance test in the control circuit.
- It is recommended the use of a DC500V megger® for the insulation resistance test.

- Before the main circuit test with a megger, remove the jumper for switching the inverter's internal filter function, and then connect terminals R, S, T, U, V, W, P, P1, N, PR, r1, and t1 by wires as shown in the figure below. Subsequently, carry out the test.
- After the test using the megger, remove the wires from terminals R, S, T, U, V, W, P, P1, N, PR, r1, and t1, and connect the jumper for switching the inverter's internal filter function at the original position.
- Furthermore, depending on the model, the PR terminal may not be present.
  Please confirm in “Chapter 7 Specifications”.



Make sure to disable the EMC filter or remove the filter jumper before testing.

6.4 Dielectric withstand test

Do not carry out a withstand voltage test for the inverter.
The test may damage its internal parts, deteriorating the inverter.

6.5 Checking method for Inverter/Converter

・Using the multi-meter, you can check if the inverter or converter unit are defective or non-defective.

(Preparation)

(1) Remove the supply (R,S,T) and motor wiring (U,V,W), and also the regenerative braking resistor(P,PR).

(2) Prepare the multi-meter. (Application measurement range is 1Ω)

(Checking method)

・Measure and check the current conduction at each of the inverter main circuit terminals R, S, T, U, V, W, PR, P, N, by changing the polarity of the multi-meter alternately.

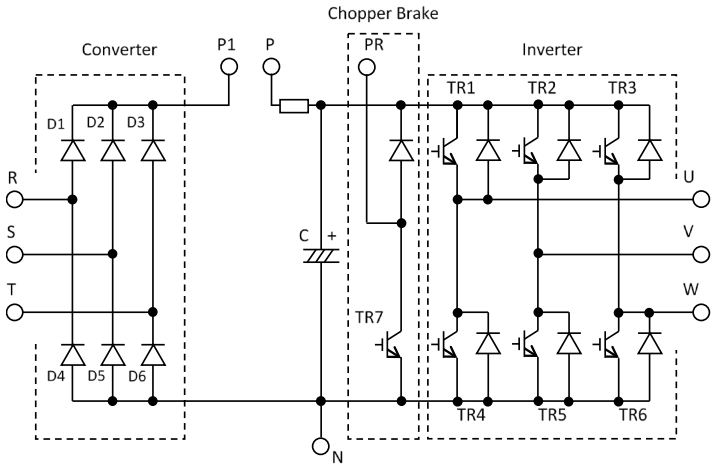
(1) Before checking the circuits, measure the voltage across terminals P and N with the multi-meter in DC voltage range mode to confirm that the smoothing capacitor has been fully discharged.

(2) When not conducting, it shows an infinite value. Due to the influence of the smoothing capacitor, it may show momentarily any other value other than infinite. When the measured terminal is conductive, the tester reading is several ohms to several tens of ohms. The measurements with different multi-meters may not match exactly, but as long the values are close between them, it is acceptable.

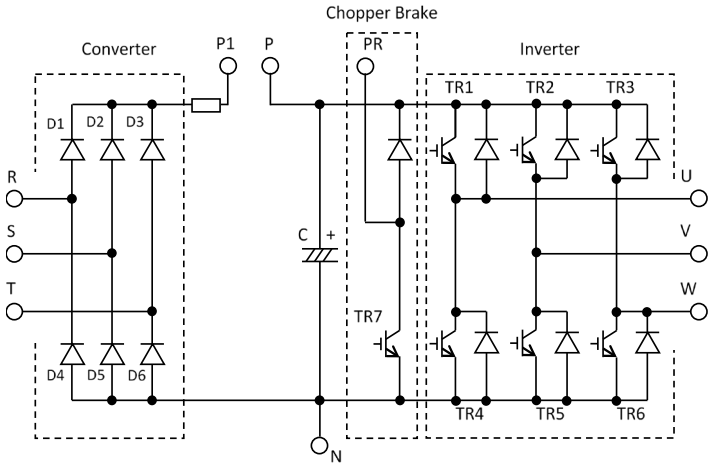
(3) The chopper braking circuit is built-in in the models below:
HF4322-5A5 to HF4322-022
HF4324-5A5 to HF4324-037

		Multi-meter polarity ⊕ (Red)	Multi-meter polarity ⊖ (Black)	Measured result
Converter circuit	D1	R	P1	No conduction
		P1	R	Conduction
	D2	S	P1	No conduction
		P1	S	Conduction
	D3	T	P1	No conduction
		P1	T	Conduction
	D4	R	N	Conduction
		N	R	No conduction
	D5	S	N	Conduction
		N	S	No conduction
	D6	T	N	Conduction
		N	T	No conduction
Inverter circuit	TR1	U	P	No conduction
		P	U	Conduction
	TR2	V	P	No conduction
		P	V	Conduction
	TR3	W	P	No conduction
		P	W	Conduction
	TR4	U	N	Conduction
		N	U	No conduction
	TR5	V	N	Conduction
		N	V	No conduction
	TR6	W	N	Conduction
		N	W	No conduction
BRD part	TR7	PR	P	No conduction
		P	PR	Conduction
		PR	N	No conduction
		N	PR	No conduction

Model
200V class : HF4322-5A5 to HF4322-011 (5.5 to 11kW)
400V class : HF4324-5A5 to HF4324-011 (5.5 to 11kW)

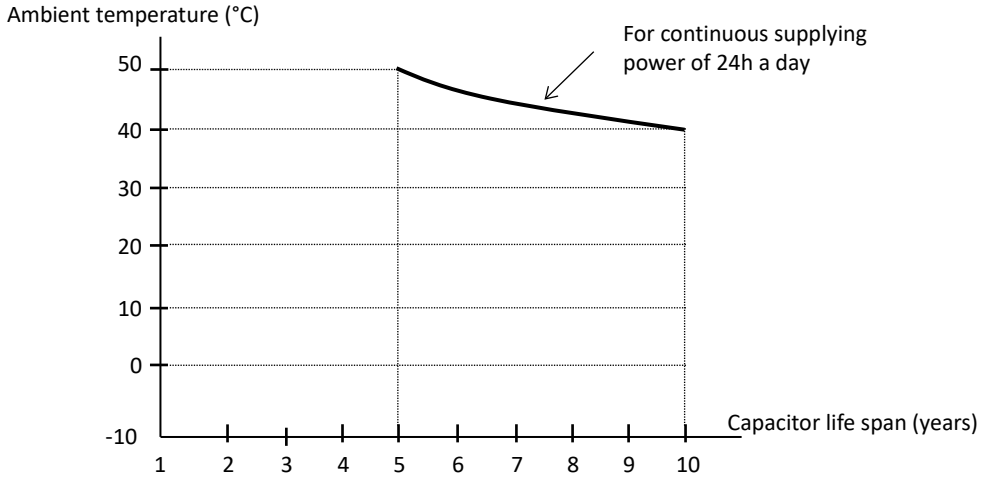


Model
200V class : HF4322-015 to HF4322-055 (15 to 55kW)
400V class : HF4324-015 to HF4324-055 (15 to 55kW)



6.6 Smoothing capacitor life span curve

・80% of the ND rated current value for continuous drive.



(1) The ambient temperature is considered to be measured around 5 cm of the bottom centre of the inverter (Atmosphere temperature). If the inverter is in an enclosure, it will be the temperature inside the case.

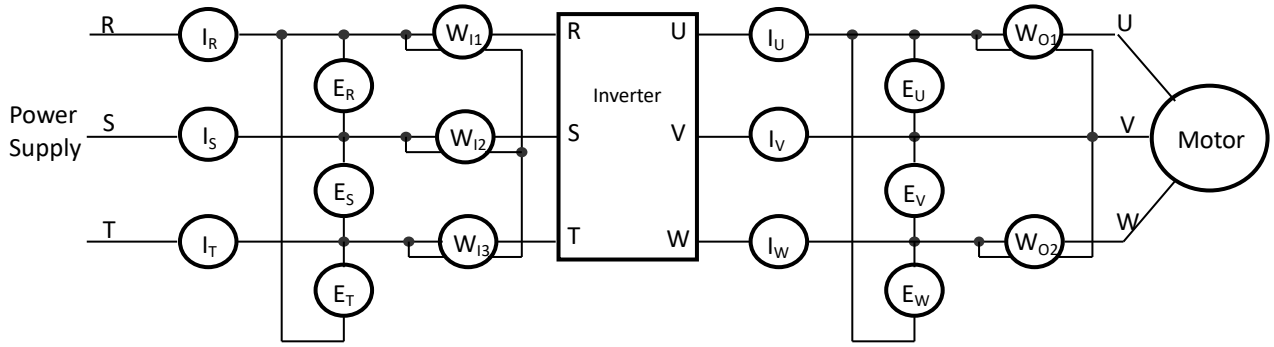
(2) The smoothing capacitor has a limited life because of the chemical reactions occurring inside the capacitor while operating. The capacitor should be replaced after 10 years of use, as a reference standard (10 years is not the guaranteed lifespan, but rather, the design lifespan). Note that the smoothing capacitor lifespan will be shortened if the inverter is used at a high ambient temperature or with a heavy load that requires a current beyond the rated current.

6.7 Lifespan alarm output

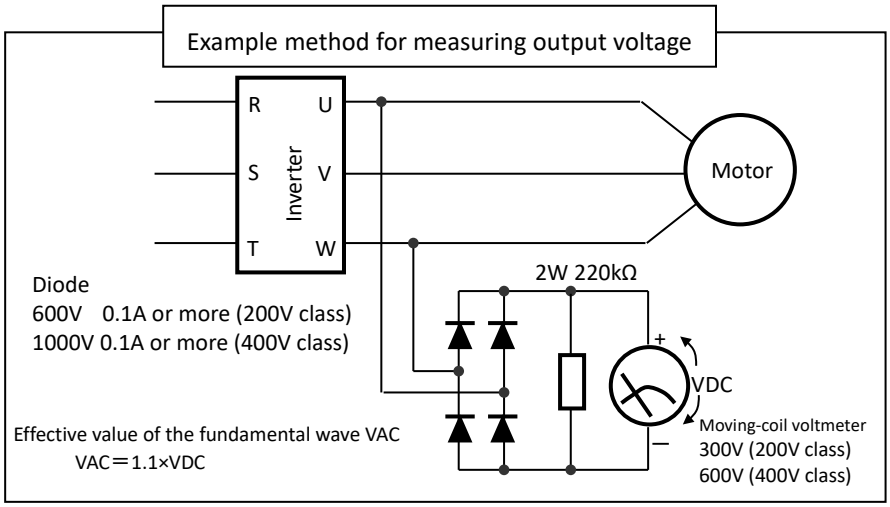
・By the self-diagnostic, it is possible to output an alarm in regards of the inverter own internal components lifespan when the lifespan is nearing to its end (Including the circuit board smoothing capacitor and cooling-fan, and excluding the main circuit smoothing capacitor). Use this to get a reference for when the components should be replaced. Particularly, consult the lifespan diagnosis monitor [dC-16] and the output terminal function selection [CC-01] to [CC-07].
It should be noted that the warning itself is based on the design lifespan, and thus, is not a guaranteed measurement. Depending on the environment, the operation conditions, etc. problems may arise, to avoid that, is recommended an early maintenance.

6.8 Input/output voltage, current and power measurement methods

Standard equipment for measuring input/output voltage, current, and power measurement.



Measured data	Measuring point	Measuring instrument	Remarks	Standard reference values
Input voltage E_{IN}	R-S, S-T, T-R (E_R), (E_S), (E_T)	Moving-iron voltmeter or Rectifier-type voltmeter	Effective value of full waves	200V class:200 to 240V 50/60Hz 400V class:380 to 500V 50/60Hz
Input current I_{IN}	R, S, T current (I_R), (I_S), (I_T)	Moving-iron ammeter		If there is unbalance in the input supply $I\ IN=(I_R+I_S+I_T)/3$
Input power W_{IN}	R-S, S-T, T-R (W_{I1})+(W_{I2})+(W_{I3})	Electrodynamometer-type wattmeter		Three-wattmeter method
Input power factor Pf_{IN}	Is calculated from the measured values of the input voltage (E_{IN}), input current (I_{IN}) and supply power (W_{IN}). $Pf_{IN}=\frac{W_{IN}}{\sqrt{3}\times F_{IN}\times I_{IN}}\times 100$			-
Output voltage E_{OUT}	U-V, V-W, W-U (E_U), (E_V), (E_W)	Moving-iron voltmeter or Rectifier-type voltmeter	Effective value of fundamental wave	
Output current I_{OUT}	U, V, W current (I_U), (I_V), (I_W)	Moving-iron ammeter	Effective value of full waves	
Output power W_{OUT}	U-V, V-W (W_{O1})+(W_{O2})	Electrodynamometer-type wattmeter		Two-wattmeter method (Otherwise the three-wattmeter method)
Output power factor Pf_{OUT}	Is calculated from the measured values of the output voltage (E_{OUT}), output current (I_{OUT}) and output power (W_{OUT}). $Pf_{OUT}=\frac{W_{OUT}}{\sqrt{3}\times F_{OUT}\times I_{OUT}}\times 100$			-



When measuring…

1. To measure the output voltage, use an instrument that reads the effective value of the fundamental wave.
   To measure the current or the power, use an instrument that reads the effective value of full waves.

2. Since the inverter output waveform is controlled by PWM, it has a large margin of error, especially at low frequencies. In many cases, general testers may be defective for the measurement, because of the adverse effects of the noise.

Chapter 7 Specifications

7.1 200V class specifications

Model name			HF4322-								
			5A5	7A5	011	015	022	030	037	045	055
Applicable motor (4 poles) (kW)		VLD	7.5	11	15	18.5	30	37	45	55	75
		LD									
		ND	**5.5**	**7.5**	**11**	**15**	**22**	**30**	**37**	**45**	**55**
Output	Rated output current (A)	VLD	33.0	46.0	60.0	80.0	124	153	185	229	295
		LD	30.0	40.0	56.0	73.0	113	140	169	210	270
		ND	**24.0**	**32.0**	**46.0**	**64.0**	**95.0**	**121**	**145**	**182**	**220**
	Overload current rating	VLD	110% 60sec / 120% 3sec								
		LD	120% 60sec / 150% 3sec								
		ND	**150% 60sec / 200% 3sec**								
	Rated output voltage		Three-phase(3 wire)200 to 240V (Corresponding to the incoming voltage)								
	Rated capacity (kVA) 200V	VLD	11.4	15.9	20.8	27.7	43.0	53.0	64.1	79.3	102.2
		LD	10.4	13.9	19.4	25.3	39.1	48.5	58.5	72.7	93.5
		ND	**8.3**	**11.1**	**15.9**	**22.2**	**32.9**	**41.9**	**50.2**	**63.0**	**76.2**
	Rated capacity (kVA) 240V	VLD	13.7	19.1	24.9	33.3	51.5	63.6	76.9	95.2	122.6
		LD	12.5	16.6	23.3	30.3	47.0	58.2	70.3	87.3	112.2
		ND	**9.9**	**13.3**	**19.1**	**26.6**	**39.4**	**50.2**	**60.2**	**75.6**	**91.4**
Input	Rated input current(A) Note:1	VLD	39.3	54.8	71.4	95.2	147.6	182.1	220.2	272.6	351.2
		LD	35.7	47.6	66.7	86.9	134.5	166.7	201.2	250.0	321.4
		ND	**29.8**	**38.1**	**54.8**	**76.2**	**113.1**	**145.2**	**173.8**	**216.7**	**261.9**
	Rated input AC voltage Note:2		Control power supply: Single-phase 200 to 240V Permissible AC voltage 170 to 264 , 50Hz/60Hz(±5%)								
			Three-phase(3 wire) 200 to 240V , Permissible AC voltage 170 to 264 , 50Hz/60Hz(±5%)								
	Power supply capacity (kVA) Note:3	VLD	15.0	20.9	27.2	36.3	56.3	69.4	83.9	103.9	133.8
		LD	13.6	18.1	25.4	33.1	51.3	63.5	76.7	95.3	122.5
		ND	**11.3**	**14.5**	**20.9**	**29.0**	**43.1**	**55.3**	**66.2**	**82.6**	**99.8**
Carrier frequency variation Note:4		VLD	0.5 to 10.0kHz								
		LD	0.5 to 12.0kHz								
		ND	**0.5 to 16.0kHz**								
Starting torque Note:5			150% or more								
Regenerative brake			Internal BRD circuit (external discharge resistor value)					External regenerative braking unit			
Minimum resistance value(Ω)			16	10		7.5	5	-			
Dimensions Note:6	H(height)(mm)		260			390		540	550		700
	W(width)(mm)		210			245		300	390		480
	D(Depth)(mm)		170			190		195	250		250
Protective structure			IP20 – UL Open Type								
Aprox. weight (kg)			6			10		22	33		47

Note:
1. The rated input current is the value when the drive is operated in the rated output current.
   The value of the impedance at the supply side changes due to the wiring, breaker, input reactor, etc.
2. Following are for Low Voltage Directive (LVD) compliant.
   - Pollution degree 2
   - Overvoltage category 3
3. The power supply capacity is the value of the rated output current at 220V. The value of the impedance at the supply side changes due to the wiring, breaker, input reactor, etc.
4. It is necessary to set the carrier frequency settings [bb101]/ [bb201] equal or greater than the (maximum output frequency x 10) Hz. For induction motor IM, set the carrier frequency to 2 kHz or more except V/f control. For synchronous motor (SM), permanent magnet motor (PMM) set the carrier frequency to 8 kHz or more.
5. The value is specified for the standard motor controlled by the sensor less vector control when ND rating.
   Torque characteristics may vary by the control system and the use of the motor.
6. The key height of keypad are exclued from dimensions. When an option is connected, the depth is increased. Refer to the each optional instruction.

7.2 400V class specifications

Model name			HF4324-								
			5A5	7A5	011	015	022	030	037	045	055
Applicable motor (4 poles) (kW)		VLD	7.5	11	15	18.5	30	37	45	55	75
		LD									
		ND	**5.5**	**7.5**	**11**	**15**	**22**	**30**	**37**	**45**	**55**
Output	Rated output current(A)	VLD	17.5	25.0	31.0	40.0	62.0	77.0	93.0	116	147
		LD	16.0	22.0	29.0	37.0	57.0	70.0	85.0	105	135
		ND	**14.8**	**19.0**	**25.0**	**32.0**	**48.0**	**61.0**	**75.0**	**91.0**	**112**
	Overload current rating	VLD	110% 60sec / 120% 3sec								
		LD	120% 60sec / 150% 3sec								
		ND	**150% 60sec / 200% 3sec**								
	Rated output voltage		Three-phase(3 wire)380 to 500V (Corresponding to the incoming voltage)								
	Rated capacity (kVA) 400V	VLD	12.1	17.3	21.5	27.7	43.0	53.3	64.4	80.4	101.8
		LD	11.1	15.2	20.1	25.6	39.5	48.5	58.9	72.7	93.5
		ND	**9.7**	**13.1**	**15.9**	**22.2**	**33.3**	**40.2**	**52.0**	**62.1**	**76.2**
	Rated capacity (kVA) 500V	VLD	15.2	21.7	26.8	34.6	53.7	66.7	80.5	100.5	127.3
		LD	13.9	19.1	25.1	32.0	49.4	60.6	73.6	90.9	116.9
		ND	**10.4**	**13.9**	**19.9**	**27.7**	**41.6**	**50.2**	**65.0**	**77.9**	**96.3**
Input	Rated input current(A) Note:1	VLD	20.8	29.8	36.9	47.6	73.8	91.7	110.7	138.1	175.0
		LD	19.0	26.2	34.5	44.0	67.9	83.3	101.2	125.0	160.7
		ND	**17.6**	**22.6**	**29.8**	**38.1**	**57.1**	**72.6**	**89.3**	**108.3**	**133.3**
	Rated input AC voltage Note:2		Control power supply : Single-phase 380 to 500V Permissible AC voltage 323 to 550V , 50Hz/60Hz(±5%)								
			Three-phase(3 wire) 380 to 500V , Permissible AC voltage 323 to 550 , 50Hz/60Hz(±5%)								
	Power supply capacity (kVA) Note:3	VLD	15.9	22.7	28.1	36.3	56.3	69.9	84.4	105.2	133.4
		LD	14.5	20.0	26.3	33.6	51.7	63.5	77.1	95.3	122.5
		ND	**13.4**	**17.2**	**22.7**	**29.0**	**43.5**	**55.3**	**68.0**	**82.6**	**101.6**
Carrier frequency variation Note:4		VLD	0.5 to 10.0kHz								
		LD	0.5 to 12.0kHz								
		ND	**0.5 to 16.0kHz**								
Starting torque Note:5			150% or more								
Regenerative brake			Internal BRD circuit (external discharge resistor value)								External regenerative braking unit
Minimum resistance value(Ω)			70	35		24	20	15			10
Dimensions Note:6	H(height)(mm)		260			390		540	550		
	W(width)(mm)		210			245		300	390		
	D(Depth)(mm)		170			190		195	250		
Protective structure			IP20 – UL Open Type								
Aprox. weight (kg)			6			8.5		22	31		

Note:
1. The rated input current is the value when the drive is operated in the rated output current. The value of the impedance at the supply side changes due to the wiring, breaker, input reactor, etc.
2. Make sure the following for Low Voltage Directive (LVD) compliant.
   - Pollution degree 2
   - Overvoltage category 3 (for 380 to 460Vac Input supply)
   - Overvoltage category 2 (for over 460Vac Input supply)
3. The power supply capacity is the value of the rated output current at 440V. The value of the impedance at the supply side changes due to the wiring, breaker, input reactor, etc.
4. It is necessary to set the carrier frequency settings [bb101]/[bb201] equal or greater than the (maximum output frequency x 10)Hz. For induction motor IM, set the carrier frequency to 2 kHz or more except V/f control. For synchronous motor (SM), permanent magnet motor (PMM) set the carrier frequency to 8 kHz or more.
5. The value is specified for the standard motor controlled by the sensor less vector control when ND rating.
   Torque characteristics may vary by the control system and the use of the motor.
6. The key height of keypad are excluded from dimensions. When an option is connected, the depth is increased. Refer to the each optional instruction.

7.3 Common specifications

PWM system			Sine-wave PWM system	
Output frequency range Note:1			0.00 to 590.00Hz	
Frequency accuracy			For the highest frequency, digital±0.01%, analog±0.2% (25±10℃)	
Frequency resolution			Digital: 0.01Hz ： Analog: Max. frequency/4000 (VRF terminal/IRF terminal:12bit/0 to +10V or 0 to +20mA, VF2 terminal 12bit/-10 to +10V)	
Control system Note:2			IM	V/f control (constant torque/reduced torque/ free / automatic boost control) V/f with encoder(constant torque/reduced torque/ free / automatic boost control) Cascade type sensorless vector control, 0Hz sensorless vector control, Vector control with encoder
			SM/PMM	synchronous startup for smart sensorless vector control , IVMS start type sensor less vector control
Speed fluctuation Note:3			±0.5%(sensorless vector control)	
Acceleration/deceleration time			0.00 to 3600.00s (Linear, S-curve, U-curve, Inverted-U-curve, EL-S-curve)	
Display			Output frequency, Output current, Output torque, trip history, input/output terminal status, input/output terminal function input/output power, PN voltage, etc, the rest is described in the chapter 4.	
Start functions			DC braking after the start, matching frequency after the start, active frequency matching start, Low-voltage start, retry restart	
Stop functions			After free run stop, deceleration stop, DC braking or external DC braking operation (Braking force, time, adjustment of operation speed)	
Stall prevention function			Overload limit function, overcurrent supression, overvoltage suppresion function	
Protection functions Note:4			Overcurrent error, overload error, brake resistor overload, overvoltage error, memory error, undervoltage error, current detector error, CPU error, external trip error, USP error, ground error, supply overvoltage error, power loss error, temperature detector error, Cooling-fan rotation speed decrease, temperature error, phase input error, IGBT error, phase output error, thermistor error brake error, low-speed range overload error, inverter overload, RS485communication error, RTC error, the rest is described in the chapter 5.	
Other functions			V/f free setting (7 points), upper and lower speed limit, speed jump, curve acceleration and deceleration, manual torque boost energy-saven operation, analog output adjustment, minimun speed, carrier frequency adjustment, motor electronic thermal function(free is possible), inverter thermal function, external start-end(speed and rate), frequency input selection, trip retry, restart stop, various signal output, inilization setting, PID control, auto-decel at shut-off, brake control function, commercial switching function, auto-tuning (on/offline), etc. the rest is described in the chapter 4.	
Input	Frequency reference	Panel	UP, DOWN keys according to the set parameter.	
		External signal Note:5	VRF/IRF terminal (for voltage input)	0 to 10Vdc set by the voltage input (Input impedance:10kΩ)
			VRF/IRF terminal (for current input)	0 to 20mA set by the current input (Input impedance:100Ω)
			VF2 terminal	-10 to +10Vdc set by the voltage input (Input impedance:10kΩ)
			Multi-speed terminal	16multi-speed(With the use of the intelligent input terminal)
			Pulse train-input	Maximum 32kHz×2
		Communication port	RS485 serial communication (Protocol: Modbus-RTU)	
	RUN Stop Forward/ Reverse	Keypad	By RUN/Stop key (With the set parameter, forward/reverse can be switched)	
		External signal	Forward (FR)/Reverse(RR)(When input terminal functions are allocated) 3-wire input allowed(When input terminal functions are allocated)	
		Communication Port	Set by RS485 communication (Maximum: 115.2kbps)	
	Input terminals		11 terminals (A or B terminal accept a pulse train)	
			FR(Forward rotation)/RR(Reverse rotation), DFL/DFM/DFH/DHH(Multi-speed 1 to 4), SF1 to 7(Multi-speed bit 1 to 7), ADD(Trigger for frequency addition), AUT(Command change), STA(3-wire start)/STP(3-wire stop)/ F/R(Forward/reverse by 3-wire), AHD(Analog command holding, UP(Remote control up)/DWN(Remote control down), UDC(Remote data clearance), F-OP(Forcible operation), SET(2nd-motor), RST(Reset), JOG(Jogging), DB(External DC braking), AD2(2-stage accel/decel), MBS(Free-run stop), ES(External trip) USP(Unattended start protection), CS(Commercial power supply switching), SFT(Software lock), BOK(Braking confirmation) OLR(Overload restriction selection), KHC(Accumulated input power clear), OKHC(Accumulated input), PID(PID1 disable), PIDC(PID1 integration reset), PID2(PID2 disable), PIDC2(PID2 integration reset), PID3(PID3 disable), PIDC3(PID3 integration reset), PID4(PID4 disable), PIDC4(PID4 integration reset), SVC1 to 4(PID1 multistage target value 1 to 4), PRO(PID gain change), PIO1(PID output change 1), PIO2(PID output change 2), SLEP(SLEEP trigger)/WAKE(WAKE trigger), TL(Enable torque limit), TRQ1/2(Torque limit 1/2), PPI(P/PI switching), CAS(Control gain switching), SON(Servo-ON), FOC(Forcing), ATR(Enable torque command input), TBS(Enable torque bias), ORT(Home search function), LAC(LAD cancellation), PCLR(Position deviation clearance), STAT(Enable 90°-shift phase) PUP(Position bias addition), PDN(Position bias subtraction), CP1 to 4(Multistage position 1 to 4), ORL(Zero-return limit function) ORG(Zero-return trigger function), FOT(Forward drive stop), ROT(Reverse drive stop), SPD(Speed/position change), PSET(Position data pre-set), PCC(Pulse counter clearance), HLD(accel/decel stop), REN(Motion enable signal), DISP(Display lock), PLA(Pulse train input A), PLB(Pulse train input B), EMF(Emergency-force drive activation), COK(Contactor check signal), DTR(Data trace start signal) PLZ(Pulse train input Z), TCH(Teach-in signal)	
	Backup supply terminal		P+/P-: DC24V input(Input allowable voltage: 24V±10%)	
	Functional safety STO input terminal		2 terminals (Simultaneous input)	
	Thermistor input terminal		1 terminal (PTC/NTC resistor allowed)	

7.3 Common specifications (continue)

Output	Output terminals	Transistor output terminal 5, 1a contact relay 1 point, 1c contact relay 1 point	
	Relay/Alarm relay (1a, 1c) function	DRV(While in run), UPF1 to 5(Reached frequency signal), IRDY(Inverter ready), FRR(Forward rotation), RRR(Reverse rotation), FREF(panel frequency reference), REF(panel motion operation), SETM(2nd-motor selected), OPO(Option-Output), AL(Alarm signal), MJA(Major failure signal), OTQ(Over-torque), IP(Power loss), UV(Undervoltage), TRQ(Torque limited), IPS(Decel. Power loss), RNT(RUN time exceeded), ONT(ON time exceeded), THM(Motor electronic thermal warning), THC(Electronic thermal warning), WAC(Capacitor life warning), WAF(Cooling-fan life warning), FS(Operation signal), OHF(heat sink overheat warning), LOC/LOC2(Low-current indication signal), OL/OL2(Overload warning signal 1/2), BRK(Brake release)/BER(Brake error)/CON(Contactor control), ZS(0Hz detection signal) DSE(Maximum speed deviation), PDD(Maximum position deviation), POK(Positioning completed), PCMP(Pulse counter compare output) OD/OD2/OD3/OD4(Output deviation for PID control), FBV/FBV2/FBV3/FBV4(PID feedback comparison), NDc(Communication disconnection), VRFDc/IRFDc/VF2Dc(Analog VRF/IRF/VF2 disconnection), Ai4Dc/Ai5Dc/Ai6Dc(Option analog Ai4/Ai5/Ai6 disconnection) WCVRF/WCIRF/WCVF2(Window comparator VRF/IRF/VF2), WCAi4/WCAi5/WCAi6(Window comparator Ai4/Ai5/Ai6),LOG1 to 7(logical operation result 1 to 7),EMFC(Emergency force drive indicator),EMBP(Bypass mode indicator), WFT(Trace waiting signal), TRA(Trace running signal), LBK(Low battery of panel), OVS(Overvoltage power Supply), AC0-3(Alarm code bit-0 to 4), SSE(PID soft start error)	
	EDM output terminal	Functional safety diagnostic output	
	Output terminal monitor Note:6	The data of the monitor can be selected by the parameter of the output.	
EMC filter Note:7		EMC filter can be enable (The filter exchange method can alter depending on the model)	
PC external access		USB Micro-B	
Operating environment	Ambient temperature	ND	-10 to 50°C
		LD	-10 to 45°C
		VLD	-10 to 40°C
	Storage temperature Note:8	-20 to 65°	
	Level of humidity	20 to 90%RH(No condensation allowed)	
	Vibration tolerance Note:9	Model: up to HF4322-022 and up to HF4324-022	5.9m/s^2 (0.6G), 10 to 55Hz
		Model: more than HF4322-030 and more than HF4324-030	2.94m/s^2 (0.3G), 10 to 55Hz
	Installation place Note:10	A maximum altitude of 1000m, without gases or dust.	
Components life span		The life span of the main circuit smoothing capacitors is 10 years.	
		The life span of the cooling-fan is 10 years.	
Conformity standars Note:11		UL, cUL, CE marking, RCM Functional safety (STO function/ IEC61800-5-2,IEC62061,IEC61508: SIL3/ EN ISO13849-1: Cat.4 PLe)	
Coating color		Black	
Optional slots		3 ports	
Optional boards	Input/ouput option	Analog input/output option(available soon)	
	Communication option Note:12	CC-Link, PROFIBUS, PROFINET, Ethernet (Modbus-TCP)	
	Feedback option	Line driver input (RS422)	
	Functional safety option	Functional safety option(STO/SS1/SBC/SLS/SDI/SSM function / IEC61800-5-2,IEC62061,IEC61508: SIL3/ EN ISO13849-1: Cat.4 PLe)	
Other optional components		Braking resistor, AC reactor, DC reactor, Noise filter,Radio noise filter, Zero phase reactor,operator cable, regenerative braking unit, PC software	

Note: 1. Output frequency range will depend on the motor control method and the motor used. Consult the motor manufacturer for the maximum allowable frequency of the motor when operating beyond 60Hz.
2. In case of the control mode is changed and the motor constant is not set appropriately, the desired starting torque cannot be obtained and also exists the possibility of tripping.
3. Regarding the speed range regulation of motor, the variable range depends on the client system and the environment in which the motor is used.
4. If the IGBT error [E030] occurs by the protective function, it may have happened by the short-circuit protection, but also can occur if the IGBT is damaged. Depending on the operation status of the inverter, instead of the IGBT error, the overcurrent error [E001] may also occur.
5. At factory setting, the maximum output frequency for analogue input signal VRF/IRF is adjusted to 9.8V for voltage input and 19.6mA for current input. In order to adjust the specification use analogue start/end function.
6. The analogue voltage and analogue current monitor are estimated outputs of the analogue meter connection. Maximum output value might deviate slightly from 10V or 20mA by variation of the analogue output circuit. If you want to change the characteristics, adjust the Ao1 and Ao2 adjustment functions.
   There are some monitor data that cannot be output.
7. In order to enable the EMC filter, connect to the neutral grounding supply. Otherwise, the leakage current may increase.
8. Storage temperature is the temperature during transport.
9. In accordance with the test methods of JIS C 60068-2-6:2010(IEC 60068-2-6:2007).
10. In case of utilization at an altitude of 1000m or more, take into account that the atmospheric pressure is reduced by 1% for every 100m up. Apply 1% derating from the rated current by increasing every 100m, and conduct an evaluation test.
    When using above 2500m ambient, please contact Hitachi Inverter distributer.
11. Insulation distance is in accordance with the UL and CE standards.
12. Modbus is a registered trademark of Schneider Automation Inc.
    PROFIBUS® and PROFINET® is registered trademark of PROFIBUS Nutzerorganisation e.V. (PNO).

7.4 Current derating

For using with carrier frequency over 2.1 kHz, or when changing load ratings to LD/VLD, refer to HF-430NEO user's guide section "20.4 Current derating table".

List of Parameters

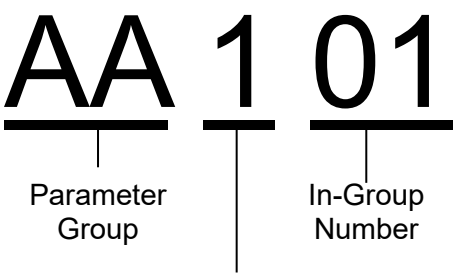
A1.1 What This Chapter Explains

This chapter describes lists of monitors and parameters as well as setting range of each parameter and their initial values.

A1.2 How to View Parameters and Lists

■Structure of parameter number

- A parameter consists of a parameter group, switch recognition number assigned by the 024[SET] terminal function, and an in-group number.
- If the switch recognition number assigned by 024[SET] terminal function is “-”, it is enabled in both first setting and second setting.
- If the 024[SET] function is not set to the input terminal functions [CA-01] to [CA-11], the first setting is valid.



-: Always enabled in both the first setting and second setting
1: Enabled in the first setting when the [SET] terminal function is OFF
2: Enabled in the second setting when the [SET] terminal function is ON

■About monitor mode

Code	Name	Data range	Page
XX-01	Monitor name	Data Range	Reference page

■About parameter mode

Code	Name	Data range	Initial value	Note	Page
YY101	Parameter name	Data range	ZZ	Write down the setting value	Reference page
YY-02 Note	Parameter name	(200V class) data range (400V class) data range	(200V class) VV (400V class) WW		

Note: Codes that can be changed during operation are underlined.

- The voltage class is shown by 200V/400V.
- See "Chapter 20 Specifications" for the product model.
  The description applies to all models unless otherwise specified.
- Parameters other than those changeable during operation can be changed only when the device is stopped.
  The user can change the parameter that cannot be changed during operation after the device decelerates and stops and output is stopped. However, it cannot be changed if the soft-lock function is activated.
- The text includes notes with a symbol “*”.

■Notes on setting parameters

Do

- When setting parameters, we expect you to fully understand various points to be noted.
- Make sure to check and set the following parameters to protect the motor.
  - [Hb102]-[Hb108] (for IM)
  - [Hd102]-[Hd108] (for SM/PMM)
  - [bC110] (electronic thermal level)
    → for motor overload protection current
  - [bb160] (overcurrent level)

Note: When setting the thermal subtraction characteristics, set a value in accordance with the characteristics of motor. Otherwise, the motor may be burned.

After configuring settings for motor protection, choose the frequency command destination and operation command destination to run the device.

- With [AA101], choose a frequency command destination.
- With [AA111], choose an operation command destination.
- With [FA-01], check that the frequency command is received.

Note: To run the inverter, a frequency command and operation command are required. If commands are sent using V/f control, there is no output if the frequency command is 0Hz.

A1.3 List of Monitor Modes

■Monitors related to output（D code：Monitor）

Code	Name	Data range	Page
dA-01	Output frequency monitor	0.00 to 590.00 (Hz)	4-15
dA-02	Output current monitor	0.0 to 655.35 (A)	
dA-03	Operation direction monitor	F (Normal rotation in process)/r (Reverse rotation in process) d (0Hz output)/ o (Stopped)	
dA-04	Frequency command	-590.00 to 590.00 (Hz)	
dA-06	Output frequency conversion monitor	0.00 to 590.00 (Hz)	
dA-08	Speed detection value monitor	-590.00 to 590.00 (Hz)	
dA-12	Output frequency monitor (with sign)		
dA-14	Frequency upper limit monitor	0.00 to 590.00 (Hz)	
dA-15	Torque command monitor (after calculation)	-1000.0 to 1000.0 (%)	
dA-16	Torque limit monitor	0.0 to 500.0 (%)	
dA-17	Output torque monitor Note	-1000.0 to 1000.0 (%)	
dA-18	Output voltage monitor	0.0 to 800.0 (V)	
dA-20	Current position monitor	When [AA121]≠10 or [AA123]≠03 -268435455 to +268435455(pls) When [AA121]=10 and [AA123]=03 -1073741823 to +1073741823	
dA-26	Pulse string position deviation monitor	-2147483647 to +2147483647 (pls)	
dA-28	Pulse counter monitor	0 to 2147483647 (pls)	
dA-30	Input power monitor	0.00 to 75.00 (kW)	
dA-32	Integrated input power monitor	0.0 to 1000000.0 (kW)	
dA-34	Output power monitor	0.00 to 75.00 (kW)	
dA-36	Integrated output power monitor	0.0 to 1000000.0 (kW)	
dA-38	Motor temperature monitor	-20.0 to 200.0 (°C)	
dA-40	DC voltage monitor	0.0 to 1000.0 (V)	
dA-41	Braking resistor circuit (DBTR) duty ratio monitor	0.00 to 100.00 (%)	
dA-42	Electronic thermal duty ratio monitor (motor)		
dA-43	Electronic thermal duty ratio monitor (inverter)		

Note: Output torque monitor is disabled at AA121/221=0 to 6 (V/f control).

■Monitors related to control circuit

Code	Name	Data range	Page
dA-45	STO monitor	00 (no input)/ 01 (P-1A)/ 02 (P-2A)/ 03 (P-1b) 04 (P-2b)/05 (P-1C)/06 (P-2C)/ 07 (STO)	4-15
dA-46,47	Reserved	-	
dA-50	Terminal block option mounted	00 (P1-TM: standard terminal block) 02 (P1-TM2: terminal block with round screws)/15 (not connected)	
dA-51	Input terminal monitor	LLLLLLLLLL to HHHHHHHHHH [L:OFF/H:ON] [Left side] (terminal DHH) (terminal DFH) (terminal RST) - (terminal FR) [Right side]	
dA-54	Output terminal monitor	LLLLLLL-HHHHHHH [L:OFF/H:ON] [Left side] (terminal FL) (terminal RL) (terminal X3) - (terminal UPF) [Right side]	
dA-60	Analog I/O selection monitor	AAAAAAAA- VVVVVVVV [A: current/V: voltage] [Left side] (terminal Ao4 (Io4/Vo4)) (terminal Ao3 (Io3/Vo3)) (terminal (Ai5(Ii5/Vi5))) (terminal (Ai4(Ii4/Vi4))) (terminal AMI) (terminal AMV) (terminal IRF) (terminal VRF) [Right side]	
dA-61	Analog input [VRF] monitor	0.00 to 100.00 (%)	
dA-62	Analog input [IRF] monitor		
dA-63	Analog input [VF2] monitor	-100.00 to 100.00 (%)	
dA-64	Extended analog input [Ai4] monitor	0.00 to 100.00 (%)	
dA-65	Extended analog input [Ai5] monitor		
dA-66	Extended analog input [Ai6] monitor	-100.00 to 100.00 (%)	
dA-70	Pulse string input monitor (main body)		
dA-71	Pulse string input monitor (HF-FB)		

■Option slot monitor

Code	Name	Data range	Page
dA-81	Option slot 1 mounted	00: (none) /01: (P1-EN) /03: (P1-PN) / 06: (P1-PB) 07: (P1-CCL) /18: (P1-AG) <hereafter only da-82 is indicated>33: (HF-FB)	4-15
dA-82	Option slot 2 mounted		
dA-83	Option slot 3 mounted		

■ Monitors related to PID function

Code	Name	Data range	Page
db-01 to 23	Reserved	-	-
db-30	PID1 feedback data 1 monitor	0.00 to 100.00 (%) (adjustable in [AH-04][AH-05][AH-06])	4-16
db-32	PID1 feedback data 2 monitor		
db-34	PID1 feedback data 3 monitor		
db-36	PID2 feedback data monitor	0.00 to 100.00 (%) (adjustable in [AJ-04][AJ-05][AJ-06])	
db-38	PID3 feedback data monitor	0.00 to 100.00 (%) (adjustable in [AJ-24][AJ-25][AJ-26])	
db-40	PID4 feedback data monitor	0.00 to 100.00 (%) (adjustable in [AJ-44][AJ-45][AJ-46])	
db-42	PID1 target value monitor	0.00 to 100.00 (%) (adjustable in [AH-04][AH-05][AH-06])	
db-44	PID1 feedback data monitor		
db-50	PID1 output monitor	-100.00 to 100.00 (%)	
db-51	PID1 deviation monitor		
db-52	PID1 deviation 1 monitor		
db-53	PID1 deviation 2 monitor		
db-54	PID1 deviation 3 monitor		
db-55	PID2 output monitor		
db-56	PID2 deviation monitor		
db-57	PID3 output monitor		
db-58	PID3 deviation monitor		
db-59	PID4 output monitor		
db-60	PID4 deviation monitor		
db-61	PID current P gain monitor	0 to 100.00 (%)	
db-62	PID current I gain monitor	0.0 to 3600.0 (s)	
db-63	PID current D gain monitor	0.00 to 100.00 (s)	
db-64	PID feed-forward monitor		

■ Monitors for checking internal condition

Code	Name	Data range	Page
dC-01	Monitor for checking selection of inverter duty spec	00 (very low duty) 01 (low duty/02 (normal duty)	4-16
dC-02	Rated current monitor	0.0 to 6553.5 (A)	
dC-07	Main speed command destination monitor	00 (disabled)/01 (VRF)/02 (IRF)/03 (VF2)/04 (Ai4)/05 (Ai5)/06 (Ai6) 07 (Multistage speed 0)/08 (auxiliary speed)/09 (Multistage speed 1) 10 (Multistage speed 2)/11 (Multistage speed 3)/12 (Multistage speed 4) 13 (Multistage speed 5)/14 (Multistage speed 6)/15 (Multistage speed 7) 16 (Multistage speed 8)/17 (Multistage speed 9)/18 (Multistage speed 10) 19 (Multistage speed 11)/20 (Multistage speed 12)/21 (Multistage speed 13) 22 (Multistage speed 14)/23 (Multistage speed 15)/24 (JOG)/25 (RS485) 26 (Option 1)/27 (Option 2)/28 (Option 3)/29 (Pulse array (main unit)) 30 (Pulse array (HF-FB))/31 (Reserved)/32 (PID)/33 (Reserved) 34 (AHD retention speed)	
dC-08	Auxiliary speed command destination monitor		
dC-10	Operation command destination monitor	00 ([FR]/[RR] terminal)/01 (3 wire)/02 (RUN key on operator keypad) 03 (RS485 setting)/04 (Option 1)/05 (Option 2)/06 (Option 3)	
dC-15	Cooling fin temperature monitor	-20.0 to 200.0 (°C)	
dC-16	Life diagnostic monitor	LL - HH [L: normal/H: reduction of life] [Left side] (FAN life) (lives of the capacitors on the circuit board) [Right side]	
dC-20	Total start-up count	1 to 65535 (Counts)	
dC-21	Power-on count		
dC-22	Cumulative operating hours monitor during RUN	1 to 1000000 (hr)	
dC-24	Cumulative power-on time		
dC-26	Cumulative operating time of cooling fan		
dC-37	Detailed monitor for icon 2LIM	00 (Condition other than below)/01 (Overcurrent suppression in process) 02 (Overload being limited)/03 (Overvoltage suppression in process) 04 (Torque being limited) 05 (Upper/lower limit and jump frequency setting being limited) 06 (Setting of minimum frequency being limited)	
dC-38	Detailed monitor for icon 2ALT	00 (Condition other than below)/01 (Overload advance notice) 02 (Motor thermal advance notice)/03 (Controller thermal advance notice) 04 (Motor overheat advance notice)	
dC-39	Detailed monitor for icon 2RETRY	00 (Condition other than below)/01 (Retry standby)/02 (Restart standby	
dC-40	Detailed monitor for icon 2NRDY	00 (Preparation completed condition other than below IRDY=OFF) 01 (Trip occurred)/02 (Power supply abnormality)/03 (Resetting)/04 (STO) 05 (Standby)/06 (Data inconsistency Others (including no FB, consistency of settings of A and B phases, etc.)) 07 (Sequence abnormality)/08 (Free run)/09 (Forced stop)	
dC-45	IM/SM (PMM) monitor	00 (Induction motor IM being selected) 01 (Synchronous motor SM (permanent magnet motor PMM) being selected)	
dC-50	Firmware version monitor	0.000 to 99.255	
dC-53	Firmware grade monitor	00 (Standard)	
dE-50	Warning monitor	See the right section	

■Monitors（F code：Reference Monitor / setting）

Code	Name	Data range	Note	Page
FA-01	Main speed command monitor	0.00 to 590.00 (Hz)		4-17
FA-02	Auxiliary speed command monitor	-590.00 to 590.00 (Hz) (for monitoring)/0.00 to 590.00 (Hz) (for setting)		
FA-10	Acceleration time monitor	0.00 to 3600.00 (s)		
FA-12	Deceleration time monitor			
FA-15	Torque command monitor	-500.0 to 500.0 (%)		
FA-16	Torque bias command monitor			
FA-20	Position command monitor	When [AA121]≠10 or [AA123]≠03 -268435455 to +268435455 (pls) When [AA121]=10 and [AA123]=03 -1073741823 to +1073741823 (pls)		
FA-30	PID1 target value 1	0.00 to 100.00 (%) (adjustable in [AH-04][AH-05][AH-06])		
FA-32	PID1 target value 2			
FA-34	PID1 target value 3			
FA-36	PID2 target value	0.00 to 100.00 (%) (adjustable in [AJ-04][AJ-05][AJ-06])		
FA-38	PID3 target value	0.00 to 100.00 (%) (adjustable in [AJ-24][AJ-25][AJ-26])		
FA-40	PID4 target value	0.00 to 100.00 (%) (adjustable in [AJ-44][AJ-45][AJ-46])		

• FA parameter indicates the current command value, and automatically displays data of the command destination that is being adopted.

Example 1：If the command destination is the operator keypad, it can be changed using the arrow keys.

Example 2：If the command destination is the analog input VRF, it can be changed by changing input to the terminal [VRF].

A1.4 List of Parameter Modes

■Parameter mode (A code：Standard Function)

Code	Name	Data range	Initial value	Note	Page
AA101	First main speed command selection	01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input) 05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1) 10 (Option 2)/11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/14 (Reserved) 15 (PID calculation)/16 (Reserved)	07		4-18
AA102	First auxiliary speed command selection	00 (Disabled)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input) 05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1) 10 (Option 2)/11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/14 (Reserved) 15 (PID calculation)/16 (Reserved)	00		
AA104	First auxiliary speed setting	0.00 to 590.00 (Hz)	0.00		
AA105	First operator selection	00 (Disabled)/01 (Addition)/02 (Subtraction) 03(Multiplication)	00		
AA106	First additional frequency setting	-590.00 to 590.00 (Hz)	0.00		
AA111	First operation command selection	00 ([FR]/[RR] terminal)/01 (3 wire) 02 (RUN key on operator keypad)/03 (RS485)/04 (Option 1) 05 (Option 2)/06 (Option 3)	02		4-19
AA-12	RUN key operation direction selection	00 (Normal rotation)/01 (Reverse rotation)	00		
AA-13	STOP key selection	00 (Disabled)/01 (Enabled)/02 (Only reset is enabled)	01		
AA114	First operation direction limit selection	00 (No limitation)/01 (Only normal rotation) 02 (Only reverse rotation)	00		
AA115	First stop mode selection	00 (Deceleration stop)/01 (Free run stop)	00		
AA121	First control mode	00 ([V/f] Constant torque characteristics (IM)) 01 ([V/f] Reducing torque characteristics (IM)) 02 ([V/f] Free V/f (IM))/03 ([V/f] Auto torque boost (IM)) 04 ([V/f with sensor] Fixed torque characteristics (IM) 05 ([V/f with sensor] Reduced torque characteristics (IM) 06 ([V/f with sensor] Free V/f (IM) 07 ([V/f with sensor] Auto torque boost (IM) 08 (Sensorless vector control (IM)) 09 (Zero-Hz range sensorless vector control (IM)) Note:1 10 (Vector control with sensor (IM)) Note:1 11 (Synchronous start type sensorless vector control (SM/PMM)) 12 (IVMS start type sensorless vector control (SM/PMM)) Note:2	00		
AA123	First vector control mode selection	00 (Speed/torque control mode) 01 (Pulse string position control mode) 02 (Absolute position control mode) 03 (High-resolution absolute position control mode)	00		

Note: 1. Cannot be selected if [Ub-03] duty spec selection is 01 (LD) or 02 (VLD).
2. Cannot be selected if [Ub-03] duty spec selection is 02 (VLD) or 02 (VLD).

Code	Name	Data range	Initial value	Note	Page
AA201	Second main speed command selection	Same as AA101	07		4-19
AA202	Second auxiliary speed command selection	Same as AA102	00		
AA204	Second auxiliary speed setting	Same as AA104	0.00		
AA205	Second operator selection	Same as AA105	00		
AA206	Second additional frequency setting	Same as AA106	0.00		
AA211	Second operation command selection	Same as AA111	02		
AA214	Second operation direction limit selection	Same as AA114	00		
AA215	Second stop mode selection	Same as AA115			
AA221	Second control mode	Same as AA121			
AA223	Second vector control mode selection	Same as AA123			

Code	Name	Data range	Initial value	Note	Page
Ab-01	Frequency conversion coefficient	0.01 to 100.00	1.00		4-20
Ab-03	Multistep speed selection	00 (16th speed: binary (DFL to DHH)) 01 (8th speed: bit (SF1-SF7))	00		
Ab110	0th speed of the 1st multi-step speed	0.00 to 590.00 (Hz)	10.00		
Ab-11	1st speed of the multi-step speed		20.00		
Ab-12	2nd speed of the multi-step speed		30.00		
Ab-13	3rd speed of the multi-step speed		40.00		
Ab-14	4th speed of the multi-step speed		0.00		
Ab-15	5th speed of the multi-step speed				
Ab-16	6th speed of the multi-step speed				
Ab-17	7th speed of the multi-step speed				
Ab-18	8th speed of the multi-step speed				
Ab-19	9th speed of the multi-step speed				
Ab-20	10th speed of the multi-step speed				
Ab-21	11th speed of the multi-step speed				
Ab-22	12th speed of the multi-step speed				
Ab-23	13th speed of the multi-step speed				
Ab-24	14th speed of the multi-step speed				
Ab-25	15th speed of the multi-step speed				
Ab210	0th speed of the 2nd multi-step speed		10.00		

Code	Name	Data range	Initial value	Note	Page
AC-01	Acceleration or deceleration time input type selection	00 (Parameter setting)/01 (Option 1) 02 (Option 2)/03 (Option 3)/04 (Reserved)	00		4-20
AC-02	Multi-stage acceleration or deceleration selection	00 (Common) 01 (Multi-stage acceleration/deceleration)	00		
AC-03	Acceleration pattern selection	00 (Linear)/01 (S-shaped)/02 (U-shaped) 03 (Reverse U-shaped)/04 (Elevator S-shaped)	00		4-21
AC-04	Deceleration pattern selection				
AC-05	Acceleration curve constant (S-shaped, U-shaped, reverse U-shaped)	1 to 10	2		
AC-06	Deceleration curve constant (S-shaped, U-shaped, reverse U-shaped)				
AC-08	Curvature 1 for EL-S-shaped acceleration	0 to 100	25		
AC-09	Curvature 2 for EL-S-shaped acceleration				
AC-10	Curvature 1 for EL-S-shaped deceleration				
AC-11	Curvature 2 for EL-S-shaped deceleration				
AC115	First 2-stage acceleration or deceleration selection	00 ([AD2] terminal)/01 (Parameter setting) 02 (Switching normal/reverse rotation)	00		
AC116	First 2-stage acceleration frequency	0.00 to 590.00 (Hz)	0.00		
AC117	First 2-stage deceleration frequency				
AC120	First acceleration time 1	0.00 to 3600.00 (s)	30.00		
AC122	First deceleration time 1				
AC124	First acceleration time 2				
AC126	First deceleration time 2				

Code	Name	Data range	Initial value	Note	Page
AC-30	Acceleration time for multi-speed 1st speed	0.00 to 3600.00 (s)	0.00		4-22
AC-32	Deceleration time for multi-speed 1st speed				
AC-34	Acceleration time for multi-speed 2nd speed				
AC-36	Deceleration time for multi-speed 2nd speed				
AC-38	Acceleration time for multi-speed 3rd speed				
AC-40	Deceleration time for multi-speed 3rd speed				
AC-42	Acceleration time for multi-speed 4th speed				
AC-44	Deceleration time for multi-speed 4th speed				
AC-46	Acceleration time for multi-speed 5th speed				
AC-48	Deceleration time for multi-speed 5th speed				
AC-50	Acceleration time for multi-speed 6th speed				
AC-52	Deceleration time for multi-speed 6th speed				
AC-54	Acceleration time for multi-speed 7th speed				
AC-56	Deceleration time for multi-speed 7th speed				
AC-58	Acceleration time for multi-speed 8th speed				
AC-60	Deceleration time for multi-speed 8th speed				
AC-62	Acceleration time for multi-speed 9th speed				
AC-64	Deceleration time for multi-speed 9th speed				
AC-66	Acceleration time for multi-speed 10th speed				
AC-68	Deceleration time for multi-speed 10th speed				
AC-70	Acceleration time for multi-speed 11th speed				
AC-72	Deceleration time for multi-speed 11th speed				
AC-74	Acceleration time for multi-speed 12th speed				
AC-76	Deceleration time for multi-speed 12th speed				
AC-78	Acceleration time for multi-speed 13th speed				
AC-80	Deceleration time for multi-speed 13th speed				
AC-82	Acceleration time for multi-speed 14th speed				
AC-84	Deceleration time for multi-speed 14th speed				
AC-86	Acceleration time for multi-speed 15th speed				
AC-88	Deceleration time for multi-speed 15th speed				
AC215	Second 2-stage acceleration or deceleration selection	00 ([AD2] terminal)/01 (Parameter setting) 02 (Switching normal/reverse rotation)	00		
AC216	Second 2-stage acceleration frequency	0.00 to 590.00 (Hz)	0.00		
AC217	Second 2-stage deceleration frequency				
AC220	Second acceleration time 1	0.00 to 3600.00 (s)	30.00		
AC222	Second deceleration time 1				
AC224	Second acceleration time 2				
AC226	Second deceleration time 2				

Code	Name	Data range	Initial value	Note	Page
Ad-01	Torque command input selection	00 (Disabled)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting) 08 (RS 485)/09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/15 (PID calculation)	01		4-22
Ad-02	Torque command setting	-500.0 to 500.0 (%) (Limited at a torque equivalent to 200% of inverter ND rating)	0.0		
Ad-03	Torque command polarity selection	00 (As per the sign)/01 (Follow the revolution direction)	00		
Ad-04	Speed/torque control switch time	0 to 1000 (ms)	100		
Ad-11	Torque bias input selection	Same as Ad-01	00		
Ad-12	Torque bias setting	-500.0 to 500.0 (%) (Limited at a torque equivalent to 200% of inverter ND rating)	0.0		
Ad-13	Torque bias polarity selection	00 (As per the sign)/01 (Follow the revolution direction)	00		
Ad-14	Torque bias enable terminal [TBS] selection	00 (Disabled) 01 (Enabled)	00		
Ad-40	Torque control speed limit value input selection	01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input) 05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1) 10 (Option 2)/11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)	07		
Ad-41	Torque control frequency limit value (for normal rotation)	0.00 to 590.00 (Hz)	0.00		
Ad-42	Torque control frequency limit value (for reverse rotation)				

Code	Name	Data range	Initial value	Note	Page
AE-01	Electronic gear installation position selection	00 (Feedback side)/01 (Command side)	00		
AE-02	Electronic gear ratio numerator	1 to 10000	1		
AE-03	Electronic gear ratio denominator				
AE-04	Positioning completion range setting	0 to 1000 (ms)	5		
AE-05	Positioning completion delay time setting	0.00 to 10.00 (s)	0.00		
AE-06	Position control feed forward	0.00 to 655.35	0.00		
AE-07	Position loop gain	0.00 to 100.00	0.50		
AE-08	Position bias amount	-2048 to 2048	0		
AE-10	Orientation stop position input destination selection	00 (Parameter setting)/01 (Option 1) 02 (Option 2)/03 (Option 3)	00		
AE-11	Orientation stop position	0 to 4095	0		
AE-12	Orientation speed setting	0.00 to 120.00	5.00		
AE-13	Orientation direction setting	00 (Normal rotation) 01 (Reverse rotation)	00		
AE-20	Position command 0	When [AA121]≠10 or [AA123]≠03 -268435455 to +268435455 (pls) When [AA121]=10 and [AA123]=03 -1073741823 to +1073741823 (pls)	0		4-23
AE-22	Position command 1				
AE-24	Position command 2				
AE-26	Position command 3				
AE-28	Position command 4				
AE-30	Position command 5				
AE-32	Position command 6				
AE-34	Position command 7				
AE-36	Position command 8				
AE-38	Position command 9				
AE-40	Position command 10				
AE-42	Position command 11				
AE-44	Position command 12				
AE-46	Position command 13				
AE-48	Position command 14				
AE-50	Position command 15				
AE-52	Position range designation (forward rotation side)	When [AA121]≠10 or [AA123]≠03 0 to +268435455 (pls) When [AA121]=10 and [AA123]=03 0 to +1073741823 (pls)	268435455		
AE-54	Position range designation (reverse rotation side)	When [AA121]≠10 or [AA123]≠03 –268435455 to 0 (pls) When [AA121]=10 and [AA123]=03 -1073741823 to 0 (pls)	-268435455		
AE-56	Positioning mode selection	00 (With limit)/01 (Without limit)	00		
AE-60	Teaching selection	00 (X00) to 15 (X15)	00		
AE-61	Memorization of current position at power-off	00 (Disabled)/01 (Enabled)	00		
AE-62	Preset position data	When [AA121]≠10 or [AA123]≠03 0 to +268435455 When [AA121]=10 and [AA123]=03 0 to +1073741823	0		
AE-64	Gain for calculating the deceleration stop distance	50.00 to 200.00	100.00		4-24
AE-65	Bias for calculating the deceleration stop distance	0.00 to 655.35	0.00		
AE-66	APR control speed limit	0.00 to 100.00	1.00		
AE-67	APR start speed		0.20		
AE-70	Zero return mode selection	00 (Low speed zero return) 01 (High speed zero return) 02 (High speed zero return 2)	00		
AE-71	Zero return direction selection	00 (Normal rotation) 01 (Reverse rotation)	00		
AE-72	Low speed zero return speed	0.00 to 10.00 (Hz)	0.00		
AE-73	High speed zero return speed	0.00 to 590.00 (Hz)	0.00		
AF101	First DC braking selection	00 (Disabled)/01 (Enabled) 02 (Frequency command)	00		
AF102	First braking mode selection	00 (DC braking)/01 (Speed servo lock) 02 (Position servo lock)	00		
AF103	First DC braking frequency setting	0.00 to 590.00 (Hz)	0.50		
AF104	First DC braking delay time	0.00 to 5.00 (s)	0.00		
AF105	First DC braking force at the time of the stop	0 to 100 (%) (with internal limitation)	0		
AF106	First DC braking time at the time of the stop	0.00 to 60.00 (s)	0.00		
AF107	First DC braking trigger selection	00 (Edge mode)/01 (Level mode)	01		
AF108	First DC braking force at the start	0 to 100 (%) (with internal limitation)	0		
AF109	First DC braking time at the start	0.00 to 60.00 (s)	0.00		
AF120	First contactor control selection	00 (Disabled)/01 (Enabled: primary side) 02 (Enabled: secondary side)	00		4-25
AF121	First start waiting time	0.00 to 2.00 (s)	0.20		
AF122	First contactor release delay time		0.10		
AF123	First contactor check time	0.00 to 5.00 (s)			

Code	Name	Data range	Initial value	Note	Page
AF130	First brake control selection	00 (Disabled) 01 (Brake control 1 common forward/reverse rotation) 02 (Brake control 1 forward/reverse set individually) 03 (Brake control 2)	00		4-25
AF131	First brake release establishment waiting time (normal rotation)	0.00 to 5.00 (s)	0.00		
AF132	First acceleration waiting time (normal rotation)				
AF133	First stop waiting time (normal rotation)				
AF134	First brake confirmation waiting time (normal rotation)				
AF135	First brake release frequency (normal rotation)	0.00 to 590.00 (Hz)	0.00		
AF136	First brake release current (normal rotation)	(0.00 to 2.00) × Inverter rated current (A)	1.00 × Inverter rated current		
AF137	First brake apply frequency (normal rotation)	0.00 to 590.00 (Hz)	0.00		
AF138	First brake release establishment waiting time (reverse rotation)	0.00 to 5.00 (s)	0.00		
AF139	First acceleration waiting time (reverse rotation)				
AF140	First stop waiting time (reverse rotation)				
AF141	First brake confirmation waiting time (reverse rotation)				
AF142	First brake release frequency (reverse rotation)	0.00 to 590.00 (Hz)	0.00		
AF143	First brake release current (reverse rotation)	(0.00 to 2.00) × Inverter rated current (A)	1.00 × Inverter rated current		
AF144	First brake apply frequency (reverse rotation)	0.00 to 590.00 (Hz)	0.00		
AF150	First brake release delay time	0.00 to 2.00 (s)	0.20		
AF151	First brake apply delay time				
AF152	First brake check time	0.00 to 5.00 (s)	0.10		
AF153	First servo lock time at start	0.00 to 10.00 (s)	0.60		
AF154	First servo lock time at stop				
AF201	Second DC braking selection	Same as AF101	00		
AF202	Second braking mode selection	Same as AF102			
AF203	Second DC braking frequency setting	Same as AF103	0.50		
AF204	Second DC braking delay time	Same as AF104	0.00		
AF205	Second DC braking force at the time of the stop	Same as AF105	0		
AF206	Second DC braking time at the time of the stop	Same as AF106	0.00		
AF207	Second DC braking trigger selection	Same as AF104	01		
AF208	Second DC braking force at the start	Same as AF108	0		
AF209	Second DC braking time at the start	Same as AF109	0.00		
AF220	Second contactor control selection	Same as AF120	00		
AF221	Second start waiting time	Same as AF121	0.20		
AF222	Second contactor release delay time	Same as AF122	0.10		
AF223	Second contactor check time	Same as AF123			
AF230	Second brake control selection	Same as AF130	00		
AF231	Second brake release establishment waiting time (normal rotation)	Same as AF131	0.00		
AF232	Second acceleration waiting time (normal rotation)	Same as AF132			
AF233	Second stop waiting time (normal rotation)	Same as AF133			
AF234	Second brake confirmation waiting time (normal rotation)	Same as AF134			
AF235	Second brake release frequency (normal rotation)	Same as AF135	0.00		
AF236	Second brake release current (normal rotation)	Same as AF136	1.00 × Inverter rated current		
AF237	Second brake apply frequency (normal rotation)	Same as AF137	0.00		

Code	Name	Data range	Initial value	Note	Page
AF238	Second brake release establishment waiting time (normal rotation)	Same as AF138	0.00		4-25
AF239	Second acceleration waiting time (normal rotation)	Same as AF139			
AF240	Second stop waiting time (normal rotation)	Same as AF140			
AF241	Second brake confirmation waiting time (reverse rotation)	Same as AF141			
AF242	Second brake release frequency (reverse rotation)	Same as AF142			
AF243	Second brake release current (reverse rotation)	Same as AF143	1.00 × Inverter rated current		
AF244	Second brake apply frequency (reverse rotation)	Same as AF144	0.00		
AF250	Second brake release delay time	Same as AF150	0.20		
AF251	Second brake apply delay time	Same as AF151			
AF252	Second brake check time	Same as AF152	0.10		
AF253	Second servo lock time at start	Same as AF153	0.60		
AF254	Second servo lock time at stop	Same as AF154			
AG101	First jump frequency 1	0.00 to 590.00 (Hz)	0.00		4-26
AG102	First jump frequency width 1	0.00 to 10.00 (Hz)	0.50		
AG103	First jump frequency 2	0.00 to 590.00 (Hz)	0.00		
AG104	First jump frequency width 2	0.00 to 10.00 (Hz)	0.50		
AG105	First jump frequency 3	0.00 to 590.00 (Hz)	0.00		
AG106	First jump frequency width 3	0.00 to 10.00 (Hz)	0.50		
AG110	First acceleration-stop frequency	0.00 to 590.00 (Hz)	0.00		
AG111	First acceleration-stop time	0.0 to 60.0 (s)	0.0		
AG112	First deceleration-stop frequency	0.00 to 590.00 (Hz)	0.00		
AG113	First deceleration-stop time	0.0 to 60.0 (s)	0.0		
AG-20	Jogging frequency	0.00 to 10.00 (Hz)	5.00		
AG-21	Selecting the jogging stop	00 (Disabled during MBS operation at stop) 01 (Disabled during deceleration stop operation) 02 (Disabled during DB operation at stop) 03 (Enabled during MBS operation at stop) 04 (Enabled during deceleration stop operation) 05 (Enabled during DB operation at stop)	01		
AG201	Second jump frequency 1	Same as AF101	0.00		
AG202	Second jump frequency width 1	Same as AF102			
AG203	Second jump frequency 2	Same as AF103			
AG204	Second jump frequency width 2	Same as AF104			
AG205	Second jump frequency 3	Same as AF105			
AG206	Second jump frequency width 3	Same as AF106			
AG210	Second acceleration-stop frequency	Same as AF110			
AG211	Second acceleration-stop time	Same as AF111	0.0		
AG212	Second deceleration-stop frequency	Same as AF112	0.00		
AG213	Second deceleration-stop time	Same as AF113	0.0		
AH-01	PID1 selection	00 (Disabled) 01 (Enabled without reverse output) 02 (Enabled with reverse output)	00		4-27
AH-02	PID1 deviation negative	00 (Disabled)/01 (Enabled)	00		
AH-03	PID1 unit selection	See <Unit options> at the end of Appendix-1	01		
AH-04	PID1 scale adjustment (0%)	-10000 to 10000	0		
AH-05	PID1 scale adjustment (100%)		10000		
AH-06	PID1 scale adjustment (decimal point)	0 to 4	2		
AH-07	PID1 target value 1 input destination selection	00 (None)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting) 08 (RS 485)/09 (Option 1)/10 (Option 2) 11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)	07		
AH-10	PID1 target value 1 set value	-100.00 to 100.00 Note	0.00		
AH-12	PID1 multistage target value 1				
AH-14	PID1 multistage target value 2				
AH-16	PID1 multistage target value 3				
AH-18	PID1 multistage target value 4				
AH-20	PID1 multistage target value 5				
AH-22	PID1 multistage target value 6				
AH-24	PID1 multistage target value 7				
AH-26	PID1 multistage target value 8				
AH-28	PID1 multistage target value 9				
AH-30	PID1 multistage target value 10				

Note: Data range differs depending on [AH-04] - [AH-06].

Code	Name	Data range	Initial value	Note	Page
AH-32	PID1 multistage target value 11	-100.00 to 100.00 Note	0.00		4-27
AH-34	PID1 multistage target value 12				
AH-36	PID1 multistage target value 13				
AH-38	PID1 multistage target value 14				
AH-40	PID1 multistage target value 15				
AH-42	PID1 target value 2 input destination selection	Same as AH-07	00		
AH-44	PID1 target value 2 set value	-100.00 to 100.00 (%) Note	0.00		
AH-46	PID1 target value 3 input destination selection	Same as AH-07	00		
AH-48	PID1 target value 3 set value	-100.00 to 100.00 (%) Note	0.00		
AH-50	PID1 target value 1 operator selection	01 (Addition)/02 (Subtraction) 03(Multiplication)/04 (Division)	01		
AH-51	PID1 feedback Data 1 Input destination selection	Same as AH-07	01		4-28
AH-52	PID1 feedback Data 2 Input destination selection		00		
AH-53	PID1 feedback Data 3 Input destination selection		00		
AH-54	PID1 feedback Data operator selection	01 (Addition)/02 (Subtraction) 03 (Multiplication)/04 (Division)	01		
AH-60	PID1 gain switch method selection	00 (Only gain 1)/01 ([PRO] terminal switch)	00		
AH-61	PID1 proportional gain 1	0.0 to 100.0	1.0		
AH-62	PID1 integral gain 1	0.0 to 3600.0 (s)	1.0		
AH-63	PID1 differential gain 1	0.00 to 100.00 (s)	0.00		
AH-64	PID1 proportional gain 2	0.0 to 100.0	0.0		
AH-65	PID1 integral gain 2	0.00 to 3600.0 (s)	0.0		
AH-66	PID1 differential gain 2	0.00 to 100.00 (s)	0.00		
AH-67	PID1 gain switch time	0 to 10000 (ms)	100		
AH-70	PID feed-forward selection	00 (Disabled)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)	00		
AH-71	PID1 changeable range	0.00 to 100.00 (%)	0.00		4-29
AH-72	PID1 deviation excessive level		3.00		
AH-73	PID1 feedback comparison signal OFF level		100.00		
AH-74	PID1 feedback comparison signal ON level		0.00		
AH-75	PID soft-start function selection	00 (Disabled)/01 (Enabled)	00		
AH-76	PID soft-start target level	0.00 to 100.00 (%)	100.00		
AH-78	Acceleration time for PID soft-start	0.00 to 3600.00 (s)	30.00		
AH-80	PID soft-start time	0.00 to 100.00 (s)	0.00		
AH-81	PID start abnormal judgment implement selection	00 (Disabled)/01 (Enabled: error output) 02 (Enabled: warning)	00		
AH-82	PID start abnormality judgment level	0.00 to 100.00 (%)	0.00		
AH-85	PID sleep condition selection	00 (Disabled)/01 (Low output) 02 ([SLEP] terminal)	00		
AH-86	PID sleep start level	0.00 to 590.00 (Hz)	0.00		
AH-87	PID sleep operation time	0.00 to 100.00 (s)	0.00		
AH-88	Boost selection prior to PID sleep	00 (Disabled)/01 (Enabled)	00		
AH-89	Boost time prior to PID sleep	0.00 to 100.00 (s)	0.00		
AH-90	Boost amount prior to PID sleep	0.00 to 100.00 (%)	0.00		
AH-91	Minimum operation time prior to PID sleep	0.00 to 100.00 (s)	0.00		
AH-92	PID sleep status minimum retaining time				
AH-93	PID wake condition selection	01 (Deviation amount)/02 (Low feedback) 03 ([WAKE] terminal)	01		4-30
AH-94	PID wake start level	0.00 to 100.00 (%)	0.00		
AH-95	PID wake operation time				
AH-96	PID wake start deviation amount				

Note: Data range differs depending on [AH-04] - [AH-06].

Code	Name	Data range	Initial value	Note	Page
AJ-01	PID2 selection	00 (Disabled)/01 (Enabled without reverse output) 02 (Enabled with reverse output)	00		4-30
AJ-02	PID2 deviation negative	00 (Disabled)/01 (Enabled)	00		
AJ-03	PID2 unit selection	See <Unit options> at the end of Appendix-1	01		
AJ-04	PID2 scale adjustment (0%)	-10000 to 10000	0		
AJ-05	PID2 scale adjustment (100%)		10000		
AJ-06	PID2 scale adjustment (decimal point)	0 to 4	2		
AJ-07	PID2 target value input destination selection	00 (None)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting) 08 (RS 485)/09 (Option 1)/10 (Option 2) 11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/15 (PID1 output)	07		
AJ-10	PID2 target value set value	-100.00 to 100.00 (%) Note:1	0.00		
AJ-12	PID2 feedback data input destination selection	00 (None)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting) 08 (RS 485)/09 (Option 1)/10 (Option 2) 11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)	02		
AJ-13	PID2 proportional gain	0.0 to 100.0	1.0		4-31
AJ-14	PID2 integral gain	0.0 to 3600.0 (s)	1.0		
AJ-15	PID2 differential gain	0.00 to 100.00 (s)	0.00		
AJ-16	PID2 changeable range	0.00 to 100.00 (%)	0.00		
AJ-17	PID2 deviation excessive level		3.00		
AJ-18	PID2 feedback comparison signal OFF level		100.00		
AJ-19	PID2 feedback comparison signal ON level		0.00		
AJ-21	PID3 selection	00 (Disabled)/01 (Enabled without reverse output) 02 (Enabled with reverse output)	00		
AJ-22	PID3 deviation negative	00 (Disabled)/01 (Enabled)	00		
AJ-23	PID3 unit selection	See <Unit options> at the end of Appendix-1	01		
AJ-24	PID3 scale adjustment (0%)	-10000 to 10000	0		
AJ-25	PID3 scale adjustment (100%)		10000		
AJ-26	PID3 scale adjustment (decimal point)	0 to 4	2		
AJ-27	PID3 target value input destination selection	Same as AJ-12	07		
AJ-30	PID3 target value set value	-100.00 to 100.00 (%) Note:2	0.00		
AJ-32	PID3 feedback data input destination selection	Same as AJ-12	02		
AJ-33	PID3 proportional gain	0.0 to 100.0	1.0		4-32
AJ-34	PID3 integral gain	0.00 to 3600.0 (s)			
AJ-35	PID3 differential gain	0.0 to 100.00 (s)	0.00		
AJ-36	PID3 changeable range	0.00 to 100.00 (%)	0.00		
AJ-37	PID3 deviation excessive level		3.00		
AJ-38	PID3 feedback comparison signal OFF level		100.00		
AJ-39	PID3 feedback comparison signal ON level		0.00		
AJ-41	PID4 selection	00 (Disabled)/01 (Enabled without reverse output) 02 (Enabled with reverse output)	00		
AJ-42	PID4 deviation negative	00 (Disabled)/01 (Enabled)	00		
AJ-43	PID4 unit selection	See <Unit options> at the end of Appendix-1	01		
AJ-44	PID4 scale adjustment (0%)	-10000 to 10000	0		
AJ-45	PID4 scale adjustment (100%)		10000		
AJ-46	PID4 scale adjustment (decimal point)	0 to 4	2		
AJ-47	PID4 target value input destination 1 selection	Same as AJ-12	07		
AJ-50	PID4 target value set value 2	-100.00 to 100.00 (%) Note:3	0.00		
AJ-52	PID4 feedback data input destination selection	Same as AJ-12	02		
AJ-53	PID4 proportional gain	0.0 to 100.0	1.0		4-33
AJ-54	PID4 integral gain	0.00 to 3600.0 (s)	1.0		
AJ-55	PID4 differential gain	0.0 to 100.00 (s)	0.00		
AJ-56	PID4 changeable range	0.00 to 100.00 (%)	0.00		
AJ-57	PID4 deviation excessive level		3.00		
AJ-58	PID4 feedback comparison signal OFF level		100.00		
AJ-59	PID4 feedback comparison signal ON level		0.00		

Note: 1. Data range differs depending on [AJ-04] - [AJ-06].
2. Data range differs depending on [AJ-24] - [AJ-26].
3. Data range differs depending on [AJ-44] - [AJ-46].

■Parameter mode (B code：Fine Tuning Function)

Code	Name	Data range	Initial value	Note	Page
bA101	First frequency upper limit selection	00 (Disable)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting) 08 (RS485)/09 (Option 1)/10 (Option 2) 11 (Option 3)/12 (Pulse string input (main body)) 13 (Pulse string input HF-FB)	00		4-33
bA102	First frequency upper limiter	0.00 to 590.00 (Hz)	0.00		
bA103	First frequency lower limiter				
bA110	First torque limit selection	00 (Disable)/01 (VRF terminal input) 02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting) 08 (RS 485)/09 (Option 1)/10 (Option 2) 11 (Option 3)	07		
bA111	First torque limit parameter mode selection	00 (Four quadrant specific) 01 ([TRQ] terminal switch)	00		
bA112	First torque limit 1 (Four quadrant normal powered)	0.0 to 500.0 (%) (Limited at a torque equivalent to 200% of inverter ND rating)	200.0		
bA113	First torque limit 2 (Four quadrant reverse rotation regeneration)				
bA114	First torque limit 3 (Four quadrant reverse powered)				
bA115	First torque limit 4 (Four quadrant normal rotation regeneration)				
bA116	First torque LAD stop selection	00 (Disabled)/01 (Enabled)	00		
bA120	First overcurrent suppression selection	00 (Disabled)/01 (Enabled)	00		4-34
bA121	First overcurrent suppression level	(0.00 to 2.50) × Inverter rated current (A)	Note:1		
bA122	First stall prevention 1 selection	00 (Disabled)/01 (Accelerate at constant speed) 02 (Only constant speed) 03 (Accelerate at constant speed/Increase speed at regeneration)	01		
bA123	First stall prevention level 1	(0.20 to 2.50) × Inverter rated current (A)	Note:2		
bA124	First stall prevention 1 operation time	0.10 to 3600.00 (s)	1.00		
bA126	First stall prevention 2 selection	Same as bA122	01		
bA127	First stall prevention level 2	Same as bA123	Note:2		
bA128	First stall prevention 2 operation time	Same as bA124	1.00		
bA-30	Instantaneous power failure non-stop selection	00 (Disabled)/01 (Enabled: deceleration stop) 02 (Enabled: no recovery) 03 (Enabled: with recovery)	00		
bA-31	Instantaneous power failure non-stop function starting voltage	(200V class) 0.0 to 410.0 (V) (400V class) 0.0 to 820.0 (V)	220.0 440.0		
bA-32	Instantaneous power failure non-stop target level		360.0 720.0		
bA-34	Instantaneous power failure non-stop deceleration time	0.01 to 3600.00 (s)	1.00		
bA-36	Instantaneous power failure non-stop deceleration starting range	0.00 to 10.00 (Hz)	0.00		
bA-37	Instantaneous power failure non-stop constant DC voltage control P gain	0.00 to 5.00	0.20		
bA-38	Instantaneous power failure non-stop constant DC voltage control I gain	0.00 to 150.00 (s)	1.00		
bA140	First overvoltage suppression function	00 (Disabled) 01 (DC voltage constant deceleration) 02 (Acceleration only at deceleration) 03 (Acceleration at constant speed/deceleration)	00		
bA141	First overvoltage suppression level setting	(200V class) 330.0 to 400.0 (V) (400V class) 660.0 to 800.0 (V)	380.0 760.0		
bA142	First overvoltage suppression operating time	0.00 to 3600.00 (s)	1.00		
bA144	First DC voltage control P gain	0.00 to 5.00	0.20		
bA145	First DC voltage control I gain	0.00 to 150.00 (s)	1.00		
bA146	First over-excitation function selection	00 (Disabled)/01 (Regular operation) 02 (Operation only at deceleration) 03 (Level mode) 04 (Level mode only at deceleration)	00		4-35
bA147	First over-excitation filter time constant	0.00 to 1.00(s)	0.30		
bA148	First over-excitation voltage gain	50 to 400 (%)	100		
bA149	First over-excitation suppression level setting	(200V class) 330.0 - 400.0 (V) (400V class) 660.0 - 800.0 (V)	360.0 720.0		

Note: 1. 2.00 × Inverter rated current (A)
2. 1.70 × Inverter rated current (A)

Code	Name	Data range	Initial value	Note	Page
bA-60	Braking resistor operation circuit (DBTR) use rate	0.0 to 10.0×([bA-63]/minimum resistance)^2 (%) Note:3	10.0		4-35
bA-61	Braking resistor circuit (DBTR) selection	00 (Disabled)/01 (Enabled: disabled at stop) 02 (Enabled: enabled at stop)	00		
bA-62	Braking resistor circuit (DBTR) ON level	(200V class) 330.0 to 400.0 (V) (400V class) 660.0 to 800.0 (V)	360.0 720.0		
bA-63	Braking resistor circuit (DBTR) resistance	Minimum resistance（R） - 600 (Ω)	Min.R Note:3		
bA-70	Selection of the cooling fan operation	00 (Always ON)/01 (ON during operation) 02 (Temperature dependent)	00		
bA-71	Clear cumulative operating time of cooling fan	00 (Disabled)/01 (Clear)	00		
bA201	Second frequency upper limit selection	Same as bA101	00		
bA202	Second frequency upper limiter	Same as bA102	0.00		
bA203	Second frequency lower limiter	Same as bA103			
bA210	Second torque limit selection	Same as bA110	07		
bA211	Second torque limit parameter mode selection	Same as bA111	00		
bA212	Second torque limit 1 (Four quadrant normal powering)	Same as bA112	200.0		
bA213	Second torque limit 2 (Four quadrant reverse rotation regeneration)	Same as bA113			
bA214	Second torque limit 3 (Four quadrant reverse powering)	Same as bA114			
bA215	Second torque limit 4 (Four quadrant normal rotation regeneration)	Same as bA115			
bA216	Second torque LAD stop selection	Same as bA116	00		
bA220	Second overcurrent suppression selection	Same as bA120			
bA221	Second overcurrent suppression level	Same as bA121	Note:1		
bA222	Second stall prevention 1 selection	Same as bA122	01		
bA223	Second stall prevention level 1	Same as bA123	Note:2		
bA224	Second stall prevention 1 operation time	Same as bA124	1.00		
bA226	Second stall prevention 2 selection	Same as bA126	00		
bA227	Second stall prevention level 2	Same as bA127	Note:2		
bA228	Second stall prevention 2 operation time	Same as bA128	1.00		
bA240	Second overvoltage suppression function	Same as bA140	00		
bA241	Second overvoltage suppression level setting	(200V class) 330.0 to 400.0 (V) (400V class) 660.0 to 800.0 (V)	380.0 760.0		
bA242	Second overvoltage suppression operating time	Same as bA142	1.00		
bA244	Second DC voltage control P gain	Same as bA144	0.20		
bA245	Second DC voltage control I gain	Same as bA145	1.00		
bA246	Second over-excitation function selection	Same as bA146	02		
bA247	Second over-excitation filter time constant	Same as bA147	0.30		
bA248	Second over-excitation voltage gain	Same as bA148	100		
bA249	Second over-excitation control level setting	(200V class) 330.0 to 400.0 (V) (400V class) 660.0 to 800.0 (V)	360.0 720.0		
bb101	Carrier frequency	[Ub-03]=02: Normal duty：0.5 to 16.0 (kHz) [Ub-03]=01: Low duty：0.5 to 12.0 (kHz) [Ub-03]=00: Very low duty：0.5 to 10.0 (kHz)	2.0		4-36
bb102	Sprinkle carrier pattern selection	00 (Disabled)/01 (Pattern 1 enabled) 02 (Pattern 2 enabled)/03 (Pattern 3 enabled)	00		
bb103	Automatic carrier frequency reduction selection	00 (Disabled)/01 (Enabled: current) 02 (Enabled: temperature)			
bb-10	Auto-reset selection	00 (Disabled) 01 (Enabled with operation command OFF) 02 (Enable after the setting time)			
bb-11	Auto-reset alarm selection	00 (Output)/01 (Not output)			
bb-12	Auto-reset waiting time	0 to 600 (s)	2		
bb-13	Auto-reset count	0 to 10	3		
bb-20	Instantaneous power failure retry count	0 to 16/255	0		
bb-21	Undervoltage retry count				
bb-22	Overcurrent retry count	0 to 5			
bb-23	Overvoltage retry count				
bb-24	Selection of instantaneous power failure/undervoltage retry	00 (0Hz)/01 (Frequency matching) 02 (Frequency entrainment)/03 (Detection speed) 04 (Trip after frequency matching deceleration stop)	01		
bb-25	Allowable instantaneous power failure time	0.3 to 25.0 (s)	1.0		

Note: 1. 2.00 × Inverter rated current (A)
2. 1.70 × Inverter rated current (A)
3. The minimum resistance varies depending on inverter models.

Code	Name	Data range	Initial value	Note	Page
bb-26	Retry wait time after instantaneous power failure/undervoltage	0.3 to 100.0 (s)	0.3		4-36
bb-27	Instantaneous power failure undervoltage tripping selection during stop	00 (Disabled)/01 (Enabled at stop) 02 (Disabled at stop and deceleration stop)	00		
bb-28	Overcurrent trip/retry selection	00 (0Hz)/01 (Frequency matching) 02 (Frequency entrainment)/03 (Detection speed) 04 (Trip after frequency matching deceleration stop)	01		
bb-29	Retry wait time after overcurrent	0.3 to 100.0 (s)	0.3		
bb-30	Overvotage tripping retry selection	00 (0Hz)/01 (Frequency matching) 02 (Frequency entrainment)/03 (Detection speed) 04 (Trip after frequency matching deceleration stop)	01		
bb-31	Overvoltage retry standby time	0.3 to 100.0 (s)	0.3		
bb-40	Restart mode after MBS release	00 (0Hz)/01 (Frequency matching) 02 (Frequency entrainment)/03 (Detection speed) Note	00		
bb-41	Restart mode after RST release	00 (0Hz)/01 (Frequency matching) 02 (Frequency entrainment)/03 (Detection speed) Note			
bb-42	Frequency matching lower limit setting	0.00 to 590.00 (Hz)	0.00		
bb-43	Level of frequency pull-in restart	(0.00 to 2.50) × Inverter rated current (A)	1.00× Inverter rated current		4-37
bb-44	Constant (frequency) of frequency pull-in restart	0.10 to 30.00 (s)	0.50		
bb-45	Constant (voltage) of frequency pull-in restart				
bb-46	Overcurrent suppression level of frequency pull-in restart	(0.20 to 2.50) × Inverter rated current (A)	1.00× Inverter rated current		
bb-47	Start frequency selection of frequency pull-in restart	00 (Cutoff frequency)/01 (Maximum frequency) 02 (Setting frequency)	00		
bb-50	Frequency matching filter gain	0 to 1000(%)	50		
bb160	First overcurrent detection level	Depend on the inverter model			
bb-61	Excessive voltage of accepted power	00 (Warning)/01 (Error)	00		
bb-62	Incoming overvoltage level selection	(200V class) 300.0 to 410.0 (V) (400V class) 600.0 to 820.0 (V)	390.0 780.0		
bb-64	Ground fault detection selection	00 (Disabled)/01 (Enabled)	01		
bb-65	Input phase loss selection		00		
bb-66	Output phase loss selection				
bb-67	Output phase loss detection sensitivity	1 to 100 (%)	10		
bb-70	Thermistor error level	0 to 10000 (Ω)	3000		
bb-80	Over-speed error detection level setting	0.0 to 150.0 (%)	135.0		
bb-81	Over-speed error detection time	0.0 to 5.0 (s)	0.5		
bb-82	Operation for speed deviation error	00 (Warning)/01 (Error)	00		
bb-83	Speed deviation error detection level setting	0.0 to 100.0 (%)	15.0		
bb-84	Speed deviation error detection time	0.0 to 5.0 (s)	0.5		
bb-85	Behavior when the position deviation is abnormal	00 (Warning)/01 (Error)	00		
bb-86	Abnormal position deviation detection level	0.0 to 65535 (×100pls)	4096		
bb-87	Abnormal position deviation time	0.0 to 5.0 (s)	0.5		
bb201	Second carrier frequency	Same as bb101	2.0		
bb202	Second sprinkle carrier pattern selection	Same as bb102	00		
bb203	Second automatic carrier frequency reduction selection	Same as bb103			
bb260	Second overcurrent detection level	Same as bb160			

Note: Feedback input to input terminals DFH and DHH or feedback input to option cassette HF-FB is necessary.

Code	Name	Data range	Initial value	Note	Page
bC110	First electronic thermal level	(0.00 to 3.00)× Inverter rated current	1.00× Inverter rated current		4-38
bC111	First electronic thermal characteristics selection	00 (Reduction characteristics) 01 (Constant torque characteristics) 02 (Arbitrary setting)	00		
bC112	First electronic thermal subtraction function selection	00 (Disabled)/01 (Enabled)	01		
bC113	First electronic thermal subtraction time	1 to 1000 (s)	600		
bC-14	Electronic thermal counter memory at power-off	00 (Disabled)/01 (Enabled)	01		
bC120	First free electronic thermal frequency 1	0.00 to [bC122] (Hz)	0.00		
bC121	First free electronic thermal current 1	(0.00 to 3.00)× Inverter rated current	0.00		
bC122	First free electronic thermal frequency 2	[bC120] to [bC124] (Hz)	0.00		
bC123	First free electronic thermal current 2	(0.00 to 3.00)× Inverter rated current	0.00		
bC124	First free electronic thermal frequency 3	[bC122] to 590.00 (Hz)	0.00		
bC125	First free electronic thermal current 3	(0.00 to 3.00)× Inverter rated current	0.00		
bC210	Second electronic thermal level	Same as bC110	1.00× Inverter rated current		
bC211	Second electronic thermal characteristics selection	Same as bC111	00		
bC212	Second electronic thermal subtraction function selection	Same as bC112	01		
bC213	Second electronic thermal subtraction time	Same as bC113	600		
bC220	Second free electronic thermal frequency 1	Same as bC120	0.00		
bC221	Second free electronic thermal current 1	Same as bC121			
bC222	Second free electronic thermal frequency 2	Same as bC122			
bC223	Second free electronic thermal current 2	Same as bC123			
bC224	Second free electronic thermal frequency 3	Same as bC124			
bC225	Second free electronic thermal current 3	Same as bC125			
bd-01	STO input indication selection	00 (With indication) 01 (Without indication)/02 (Trip)	00		4-39
bd-02	STO allowable input switch time	0.00 to 60.00 (s)	1.00		
bd-03	STO indication selection within allowable input time	00 (With indication) 01 (Without indication)	00		
bd-04	STOoperation selection after allowable input time	00 (Retain only the condition) 01 (Disabled)/02 (Trip)			

■Parameter mode (C code：I/O terminals, RS485)

Code	Name	Data range	Initial value	Note	Page
CA-01	Input terminal function [FR] selection	See <List of input terminal functions>	001		4-40
CA-02	Input terminal function [RR] selection		002		
CA-03	Input terminal function [DFL] selection		003		
CA-04	Input terminal function [DFM] selection		004		
CA-05	Input terminal function [AUT] selection		015		
CA-06	Input terminal function [MBS] selection		032		
CA-07	Input terminal function [JOG] selection		029		
CA-08	Input terminal function [ES] selection		033		
CA-09	Input terminal function [RST] selection		028		
CA-10	Input terminal function [DFH] selection		005		
CA-11	Input terminal function [DHH] selection		006		
CA-21	Selection of Input terminal [FR] a/b (NO/NC)	00 (Normally open) 01 (Normally closed)	00		
CA-22	Selection of Input terminal [RR] a/b (NO/NC)				
CA-23	Selection of Input terminal [DFL] a/b (NO/NC)				
CA-24	Selection of Input terminal [DFH] a/b (NO/NC)				
CA-25	Selection of Input terminal [AUT] a/b (NO/NC)				
CA-26	Selection of Input terminal [MBS] a/b (NO/NC)				
CA-27	Selection of Input terminal [JOG] a/b (NO/NC)				
CA-28	Selection of Input terminal [ES] a/b (NO/NC)				
CA-29	Selection of Input terminal [RST] a/b (NO/NC)				
CA-30	Selection of Input terminal [DFH] a/b (NO/NC)				
CA-31	Selection of Input terminal [DHH] a/b (NO/NC)				
CA-41	Input terminal [FR] response time	0 to 400 (ms)	2		
CA-42	Input terminal [RR] response time				
CA-43	Input terminal [DFL] response time				
CA-44	Input terminal [DFM] response time				
CA-45	Input terminal [AUT] response time				
CA-46	Input terminal [MBS] response time				
CA-47	Input terminal [JOG] response time				
CA-48	Input terminal [ES] response time				
CA-49	Input terminal [RST] response time				
CA-50	Input terminal [DFH] response time				
CA-51	Input terminal [DHH] response time				
CA-55	Multi-step input determination time	0 to 2000 (ms)	0		

Code	Name	Data range	Initial value	Note	Page
CA-60	UP/DWN target selection	00 (Frequency command)/01 (PID1)	00		4-43
CA-61	UP/DWN memory selection	00 (Not save)/01 (Save)			
CA-62	UP/DWN UDC mode selection	00 (0Hz)/01 (saved data)			
CA-64	Acceleration time for UP/DWN functions	0.00 to 3600.00 (s)	30.00		
CA-66	Deceleration time for UP/DWN functions				
CA-70	[F-OP] frequency command	01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input) 05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485) 09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB) 14 (Program function)/15 (PID calculation) 16 (Reserved)	01		
CA-71	[F-OP] Operation command	00 ([FR]/[RR] terminal)/01 (3 wire) 02 (RUN key on operator keypad)/03 (RS485) 04 (Option 1)/05 (Option 2)/06 (Option 3)	00		
CA-72	Reset selection	00 (On to Release Trip)/01 (Off to Release Trip) 02 (On to Release at Trip) 03 (Of to Release at Trip)	00		
CA-81	Encoder constant set-up	32 to 65535 (pls)	1024		
CA-82	Encoder phase sequence selection	00 (Phase-A is leading)/01 (Phase-B is leading)	00		
CA-83	Motor gear ratio's numerator	1 to 10000	1		
CA-84	Motor gear ratio's denominator				
CA-90	Pulse string input (main body) detection target selection	00 (Pulse count)/01 (Frequency command) 02 (Speed feedback)/03 (Pulse count)	00		
CA-91	Pulse string input (main body) mode selection	00 (90° phase difference) 01 (forward/reverse rotation command and rotation direction) 02 (forward/reverse rotation pulse string)	00		
CA-92	Pulse string frequency (main body) scale	0.05 to 32.00 (kHz)	25.00		
CA-93	Pulse string frequency (main body) filter time constant	0.01 to 2.00 (s)	0.10		
CA-94	Pulse string frequency (main body) bias size	-100.0 to 100.0 (%)	0.0		
CA-95	Pulse string frequency (main body) upper detection limit	0.0 to 100.0 (%)	100.0		
CA-96	Pulse string frequency (main body) lower detection limit		0.0		
CA-97	Pulse count compare-match output ON level	0 to 65535	0		
CA-98	Pulse count compare-match output OFF level		0		
CA-99	Maximum value for pulse count compare-match output		65535		

Code	Name	Data range	Initial value	Note	Page
Cb-01	[VRF] terminal input filter time constant	1 to 500 (ms)	500		4-44
Cb-03	[VRF] terminal frequency setting start amount	0.00 to 100.00 (%)	0.00		
Cb-04	[VRF] terminal frequency setting end amount		100.00		
Cb-05	[VRF] terminal analog input start ratio	0.0 to [Cb-06] (%)	0.0		
Cb-06	[VRF] terminal analog input end ratio	[Cb-05] to 100.0 (%)	100.0		
Cb-07	[VRF] terminal start selection	00 (Start amount)/01 (0%)	01		
Cb-11	[IRF] terminal input filter time constant	1 to 500 (ms)	500		
Cb-13	[IRF] terminal frequency setting start amount	0.00 to 100.00 (%)	0.00		
Cb-14	[IRF] terminal frequency setting end amount		100.00		
Cb-15	[IRF] terminal analog input start ratio	0.0 to [Cb-16] (%)	20.0		
Cb-16	[IRF] terminal analog input end ratio	[Cb-15] to 100.0 (%)	100.0		
Cb-17	[IRF] terminal start selection	00 (Start amount)/01 (0%)	01		
Cb-21	[VF2] terminal input filter time constant	1 to 500 (ms)	500		
Cb-22	[VF2] terminal selection	00 (Single)/01 (Added to VRF/IRF: with reversibility) 02 (Added to VRF/IRF: without reversibility)	00		
Cb-23	[VF2] terminal frequency setting start amount	-100.00 to 100.00 (%)	-100.00		
Cb-24	[VF2] terminal frequency setting end amount		100.00		
Cb-25	[VF2] terminal analog input start ratio	-100.0 to [Cb-26]	-100.0		
Cb-26	[VF2] terminal analog input end ratio	[Cb-25] to 100.0	100.0		
Cb-30	[VRF] voltage/current bias adjustment	-100.00 to 100.00	0.00		
Cb-31	[VRF] voltage/current adjustment gain	0 to 200.00	100.00		
Cb-32	[IRF] voltage/current bias adjustment	-100.00 to 100.00	0.00		
Cb-33	[IRF] voltage/current adjustment gain	0 to 200.00	100.00		
Cb-34	[VF2] voltage bias adjustment	-100.00 to 100.00	0.00		
Cb-35	[VF2] voltage adjustment gain	0 to 200.00	100.00		

Code	Name	Data range	Initial value	Note	Page
Cb-40	Thermistor selection	00 (Disabled) 01 (PTC resistance value enabled) 02 (NTC resistance value enabled)	00		4-44
Cb-41	Thermistor [TH+/TH-] adjustment	0.0 to 1000.0	100.0		
Cb-51 to Cb-57	Reserved	-	-		
CC-01	Selection of output terminal function [UPF]	See <List of output terminal functions>	002		
CC-02	Selection of output terminal function [DRV]		001		
CC-03	Selection of output terminal function [X1]		003		
CC-04	Selection of output terminal function [X2]		007		
CC-05	Selection of output terminal function [X3]		035		
CC-06	Selection of output terminal function [RL]		000		
CC-07	Selection of output terminal function [FL]		017		
CC-11	Selection of output terminal [UPF] a/b (NO/NC)	00 (Normally open) 01 (Normally closed)	00		4-45
CC-12	Selection of output terminal [DRV] a/b (NO/NC)				
CC-13	Selection of output terminal [X1] a/b (NO/NC)				
CC-14	Selection of output terminal [X2] a/b (NO/NC)				
CC-15	Selection of output terminal [X3] a/b (NO/NC)				
CC-16	Selection of output terminal [RL] a/b (NO/NC)				
CC-17	Selection of output terminal [FL] a/b (NO/NC)		01		
CC-20	Output terminal [UPF] on-delay time	0.00 to 100.00 (s)	0.00		
CC-21	Output terminal [UPF off-delay time				
CC-22	Output terminal [DRV] on-delay time				
CC-23	Output terminal [DRV] off-delay time				
CC-24	Output terminal [X1] on-delay time				
CC-25	Output terminal [X1] off-delay time				
CC-26	Output terminal [X2] on-delay time				
CC-27	Output terminal [X2] off-delay time				
CC-28	Output terminal [X3] on-delay time				
CC-29	Output terminal [X3] off-delay time				
CC-30	Output terminal [RL] on-delay time				
CC-31	Output terminal [RL] off-delay time				
CC-32	Output terminal [FL] on-delay time				
CC-33	Output terminal [FL] off-delay time				
CC-40	Logical calculation output signal LOG1 selection 1	See <List of output terminal functions>	000		4-47
CC-41	Logical calculation output signal LOG1 selection 2				
CC-42	Logical calculation output signal LOG1 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		
CC-43	Logical calculation output signal LOG2 selection 1	See <List of output terminal functions>	000		
CC-44	Logical calculation output signal LOG2 selection 2				
CC-45	Logical calculation output signal LOG2 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		
CC-46	Logical calculation output signal LOG3 selection 1	See <List of output terminal functions>	000		
CC-47	Logical calculation output signal LOG3 selection 2				
CC-48	Logical calculation output signal LOG3 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		
CC-49	Logical calculation output signal LOG4 selection 1	See <List of output terminal functions>	000		
CC-50	Logical calculation output signal LOG4 selection 2				
CC-51	Logical calculation output signal LOG4 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		
CC-52	Logical calculation output signal LOG5 selection 1	See <List of output terminal functions>	000		
CC-53	Logical calculation output signal LOG5 selection 2				
CC-54	Logical calculation output signal LOG5 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		
CC-55	Logical calculation output signal LOG6 selection 1	See <List of output terminal functions>	000		
CC-56	Logical calculation output signal LOG6 selection 2				
CC-57	Logical calculation output signal LOG6 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		
CC-58	Logical calculation output signal LOG7 selection 1	See <List of output terminal functions>	000		
CC-59	Logical calculation output signal LOG7 selection 2				
CC-60	Logical calculation output signal LOG7 operator selection	00 (AND)/01 (OR)/02 (XOR)	00		

Code	Name	Data range	Initial value	Note	Page
Cd-01	[FRQ] terminal output form selection	00 (PWM)/01 (frequency)	00		4-47
Cd-02	[FRQ] terminal standard frequency (for PWM output)	0 to 3600 (kHz)	2880		
Cd-03	[FRQ] terminal output selection	See the List of output monitor functions	[dA-01]		
Cd-04	[AMV] terminal output selection				
Cd-05	[AMI] terminal output selection				
Cd-10	Analog monitor adjustment mode selection	00 (Disabled)/01 (Enabled)	00		
Cd-11	[FRQ] output filter time constant	1 to 500 (ms)	100		
Cd-12	[FRQ] output data type selection	00 (absolute value)/01 (with sign)	00		
Cd-13	[FRQ] bias adjustment	-100.0 to 100.0 (%)	0.0		
Cd-14	[FRQ] gain adjustment	-1000.0 to 1000.0 (%)	100.0		
Cd-15	[FRQ] output level in the adjustment mode	-100.0 to 100.0 (%)			
Cd-21	[AMV] output filter time constant	1 to 500 (ms)	100		
Cd-22	[AMV] output data type selection	00 (absolute value)/01 (with sign)	00		
Cd-23	[AMV] bias adjustment	-100.0 to 100.0 (%)	0.0		
Cd-24	[AMV] gain adjustment	-1000.0 to 1000.0 (%)	100.0		
Cd-25	[AMV] output level in the adjustment mode	-100.0 to 100.0 (%)			
Cd-31	[AMI] output filter time constant	1 to 500 (ms)	100		
Cd-32	[AMI] output data type selection	00 (absolute value)/01 (with sign)	00		
Cd-33	[AMI] bias adjustment	-100.0 to 100.0 (%)	20.0		
Cd-34	[AMI] gain adjustment	-1000.0 to 1000.0 (%)	80.0		
Cd-35	[AMI] output level in the adjustment mode	-100.0 to 100.0 (%)	100.0		

Code	Name	Data range	Initial value	Note	Page
CE101	First low current signal output mode selection	00 (During acceleration/deceleration, at constant speed) 01 (Only at constant speed)	01		4-48
CE102	First low current detection level 1	(0.00 to 2.00) × Inverter rated current	1.00 × Inverter rated current		
CE103	First low current detection level 2				
CE105	First overload prewarning signal output mode selection	00 (During acceleration/deceleration, at constant speed) 01 (Only at constant speed)	01		
CE106	First overload prewarning level 1	(0.00 to 2.00) × Inverter rated current	1.00 × Inverter rated current		
CE107	First overload prewarning level 2				
CE-10	Acceleration reaching frequency 1	0.00 to 590.00 (Hz)	0.00		
CE-11	Deceleration reaching frequency 1				
CE-12	Acceleration reaching frequency 2				
CE-13	Deceleration reaching frequency 2				
CE120	First over torque level (normal powered)	0.0 to 500.0 (%)	100.0		
CE121	First over torque level (reverse regenerative)				
CE122	First over torque level (reverse powered)				
CE123	First over torque level (normal regenerative)				
CE-30	Electronic thermal warning level (Motor)	0.00 to 100.00 (%)	85.00		
CE-31	Electronic thermal warning level (Inverter)				
CE-33	0-Hz detection value level		0.50		4-49
CE-34	Cooling fin heating prewarning level	0 to 200 (°C)	120		
CE-36	RUN time/power-on time level	0 to 100000 (hr)	0		
CE-40	Window comparator [VRF] upper limit level	0 to 100 (%)	100		
CE-41	Window comparator [VRF] lower limit level		0		
CE-42	Window comparator [VRF] hysteresis range	0 to 10 (%)	0		
CE-43	Window comparator [IRF] upper limit level	0 to 100 (%)	100		
CE-44	Window comparator [IRF] lower limit level		0		
CE-45	Window comparator [IRF] hysteresis range	0 to 10 (%)	0		
CE-46	Window comparator [VF2] lower limit level	-100 to 100 (%)	100		
CE-47	Window comparator [VF2] lower limit level		-100		
CE-48	Window comparator [VF2] hysteresis range	0 to 10 (%)	0		
CE-50	[VRF] operation level at disconnection	0 to 100 (%)	0		
CE-51	[VRF] operation level selection at disconnection	00 (Disabled)/01 (Enabled: out of range) 02 (Enabled: within the range)	00		
CE-52	[IRF] operation level at disconnection	0 to 100(%)	0		
CE-53	[IRF] operation level selection at disconnection	00 (Disabled)/01 (Enabled: out of range) 02 (Enabled: within the range)	00		
CE-54	[VF2] operation level at disconnection	-100 to 100(%)	0		
CE-55	[VF2] operation level selection at disconnection	00 (Disabled)/01 (Enabled: out of range) 02 (Enabled: within the range)	00		

Code	Name	Data range	Initial value	Note	Page
CE201	Second low current signal output mode selection	00 (During acceleration/deceleration, at constant speed) 01 (Only at constant speed)	01		4-49
CE202	Second low current detection level 1	(0.00 to 2.00) × Inverter rated current	1.00 × Inverter rated current		
CE203	Second low current detection level 2				
CE205	Second overload prewarning signal output mode selection	00 (During acceleration/deceleration, at constant speed) 01 (Only at constant speed)	01		
CE206	Second overload prewarning level 1	(0.00 to 2.00) × Inverter rated current	1.00 × Inverter rated current		
CE207	Second overload prewarning level 2				
CE220	Second over torque level (normal powered)	0.0 to 500.0 (%)	100.0		
CE221	Second over torque level (reverse regenerative)				
CE222	Second over torque level (reverse powered)				
CE223	Second over torque level (normal regenerative)				

Code	Name	Data range	Initial value	Note	Page
CF-01	Communication transmission speed selection (baudrate selection)	03 (2400bps)/04 (4800bps)/05 (9600bps) 06 (19.2kbps)/07 (38.4kbps)/08 (57.6kbps) 09 (76.8kbps)/10 (115.2kbps)	04		4-50
CF-02	Communication station number selection	1 to 247	1		
CF-03	Communication parity selection	00 (Without parity)/01 (Even number parity) 02 (Odd number parity)	00		
CF-04	Communication stop bit selection	01 (1bit)/02 (2bit)	01		
CF-05	Communication error selection	00 (Error)/01 (Trip after deceleration stop) 02 (Ignore)/03 (Free run)/04 (Deceleration stop)	02		
CF-06	Communication timeout time	0.00 to 100.00 (s)	0.00		
CF-07	Communication waiting time	0 to 1000 (ms)	2		
CF-08	Communication method selection	01 (Modbus-RTU)/02 (EzCOM) 03 (EzCOM management)	01		
CF-11	Resister dataA,V⇔% conversion function	00 (A, V)/01 (%)	00		
CF-20	EzCOM start INV station number	01 to 08	01		
CF-21	EzCOM stop INV station number				
CF-22	EzCOM start selection	00 (ECOM) terminal)/01 (Modbus spec)	00		
CF-23	Numer of EzCOM data sets	01 to 05	05		
CF-24	EzCOM transmission destination station number 1	1 to 247	1		
CF-25	EzCOM transmission destination register 1	0000 to FFFF	0000		
CF-26	EzCOM transmission source register 1				
CF-27	EzCOM transmission destination station number 2	1 to 247	2		
CF-28	EzCOM transmission destination register 2	0000 to FFFF	0000		
CF-29	EzCOM transmission source register 2				
CF-30	EzCOM transmission destination station number 3	1 to 247	3		
CF-31	EzCOM transmission destination register 3	0000 to FFFF	0000		
CF-32	EzCOM transmission source register 3				
CF-33	EzCOM transmission destination station number 4	1 to 247	4		
CF-34	EzCOM transmission destination register 4	0000 to FFFF	0000		
CF-35	EzCOM transmission source register 4				
CF-36	EzCOM transmission destination station number 5	1 to 247	5		
CF-37	EzCOM transmission destination register 5	0000 to FFFF	0000		
CF-38	EzCOM transmission source register 5				
CF-50	USB station number selection	1 to 247	1		

■Parameter mode (H code：Motor Control)

Code	Name	Data range	Initial value	Note	Page
HA-01	Auto-tuning selection	00 (Disabled)/01 (Non-rotation)/02 (Rotation) 03 (IVMS)	00		4-51
HA-02	Operation command for auto-tuning	00 (RUN key on the operator keypad) 01 ([AA111]/[AA211])			
HA-03	Online tuning selection	00 (Disabled)/01 (Enabled)			
HA110	First stability constant	0 to 1000 (%)	100		
HA112	First stabilization ramp function end ratio	0 to 100 (%)	30		
HA113	First stabilization ramp function start ratio		10		
HA115	First speed response	0 to 1000 (%)	32		
HA120	First gain switch selection	00 ([CAS] terminal)/01 (setting switch)	00		
HA121	First gain switch time	0 to 10000 (ms)	100		
HA122	First gain switch intermediate frequency 1	0.00 to 590.00 (Hz)	0.00		
HA123	First gain switch intermediate frequency 2				
HA124	First gain mapping maximum frequency				
HA125	First gain mapping P gain 1	0.0 to 1000.0 (%)	100.0		
HA126	First gain mapping I gain 1				
HA127	First gain mapping P control P gain 1				
HA128	First gain mapping P gain 2				
HA129	First gain mapping I gain 2				
HA130	First gain mapping P control P gain 2				
HA131	First gain mapping P gain 3				
HA132	First gain mapping I gain 3				
HA133	First gain mapping P gain 4				
HA134	First gain mapping I gain 4				
HA210	Second stability constant	0 to 1000 (%)	100		4-52
HA212	Second stabilization ramp function end ratio	0 to 100 (%)	30		
HA213	Second stabilization ramp function start ratio		10		
HA215	Second speed response	0 to 1000 (%)	32		
HA220	Second gain switch selection	00 ([CAS] terminal)/01 (setting switch)	00		
HA221	Second gain switch time	0 to 10000 (ms)	100		
HA222	Second gain switch intermediate frequency 1	0.00 to 590.00 (Hz)	00		
HA223	Second gain switch intermediate frequency 2		100		
HA224	Second gain mapping maximum frequency		0.00		
HA225	Second gain mapping P gain 2	0.0 to 1000.0 (%)	100.0		
HA226	Second gain mapping I gain 2				
HA227	Second gain mapping P control P gain 2				
HA228	Second gain mapping P gain 2				
HA229	Second gain mapping I gain 2				
HA230	Second gain mapping P control P gain 2				
HA231	Second gain mapping P gain 3				
HA232	Second gain mapping I gain 3				
HA233	Second gain mapping P gain 4				
HA234	Second gain mapping I gain 4				

Code	Name	Data range	Initial value	Note	Page
Hb101	Motor type, 1st-motor	00：IE1 motor/01：AF motor 02：d2G4 motor/03：IE3 motor	03		4-52
Hb102	First IM motor capacity selection	0.01 to 75.00 (kW)	Note		
Hb103	Selection of number of first IM motor poles	2 to 48 (poles)	4		
Hb104	First IM base frequency	10.00 to 590.00 (Hz)	60.00		
Hb105	First IM maximum frequency				
Hb106	First IM motor's rated voltage	1 to 1000 (V)	200 V class : 200 400 V class : 400		
Hb108	First IM motor's rated current	0.01 to 10000.00 (A)	Note		4-53
Hb110	First IM motor constant R1	0.000001 to 1000.000000 (Ω)			
Hb112	First IM motor constant R2				
Hb114	First motor constant L	0.000001 to 1000.000000 (mH)			
Hb116	First IM motor constant Io	0.01 to 10000.00 (A)			
Hb118	First IM motor constant J	0.00001 to 10000.00000 (kgm^2)			
Hb130	First minimum frequency	0.10 to 10.00 (Hz)	0.50		
Hb131	First reduced voltage start time	0 to 2000 (ms)	36		

Note: Varies depending on inverter models and settings of duty rating.

Code	Name	Data range	Initial value	Note	Page
Hb140	First manual torque boost operation mode selection	00 (Disabled)/01 (Always enabled) 02 (Enabled only for forward revolution) 03 (Enabled only for reverse revolution)	01		4-53
Hb141	First amount of manual torque boost	0.0 to 20.0 (%)	1.0		
Hb142	First manual torque boost break point	0.0 to 50.0 (%)	0.8		
Hb145	First energy-saving operation selection	00 (Disabled)/01 (Enabled)	00		
Hb146	First energy-saving response/accuracy adjustment	0.0 to 100.0(%)	50.0		
Hb150	First free V/f frequency 1	0.00 to [Hb152] (Hz)	0.00		4-54
Hb151	First free V/f voltage 1	0.0 to 1000.0 (V)	0.0		
Hb152	First free V/f frequency 2	[Hb150] to [Hb154] (Hz)	0.00		
Hb153	First free V/f voltage 2	0.0 to 1000.0 (V)	0.0		
Hb154	First free V/f frequency 3	[Hb152] to [Hb156] (Hz)	0.00		
Hb155	First free V/f voltage 3	0.0 to 1000.0 (V)	0.0		
Hb156	First free V/f frequency 4	[Hb154] to [Hb158] (Hz)	0.00		
Hb157	First free V/f voltage 4	0.0 to 1000.0 (V)	0.0		
Hb158	First free V/f frequency 5	[Hb156] to [Hb160] (Hz)	0.00		
Hb159	First free V/f voltage 5	0.0 to 1000.0 (V)	0.0		
Hb160	First free V/f frequency 6	[Hb158] to [Hb162] (Hz)	0.00		
Hb161	First free V/f voltage 6	0.0 to 1000.0 (V)	0.0		
Hb162	First free V/f frequency 7	[Hb160] to [Hb104] (Hz)	0.00		
Hb163	First free V/f voltage 7	0.0 to 1000.0 (V)	0.0		
Hb170	First slip compensation P gain with sensor (V/f with sensor)	0 to 1000 (%)	100		
Hb171	First slip compensation I gain with sensor (V/f with sensor)				
Hb180	First output voltage gain	0 to 255 (%)			
Hb201	Second motor setting	00：IE1 motor/01：AF motor 02：d2G4 motor/03：IE3 motor	03		
Hb202	Second IM motor capacity selection	0.01 to 75.00 (kW)	Note		
Hb203	Selection of number of second IM motor poles	2 to 48 (poles)	4		
Hb204	Second IM base frequency	10.00 to 590.00 (Hz)	60.00		
Hb205	Second IM maximum frequency				
Hb206	Second IM motor's rated voltage	1 to 1000 (V)	200 V class : 200 400 V class : 400		
Hb208	Second IM motor's rated current	0.01 to 10000.00 (A)	Note		
Hb210	Second IM motor constant R1	0.000001 to 1000.000000 (Ω)			
Hb212	Second IM motor constant R2				
Hb214	Second IM motor constant L	0.000001 to 1000.000000 (mH)			
Hb216	Second IM motor constant Io	0.01 to 10000.00 (A)			
Hb218	Second IM motor constant J	0.00001 to 10000.00000 (kgm^2)			
Hb230	Second minimum frequency	0.10 to 10.00 (Hz)	0.50		
Hb231	Second reduced voltage start time	0 to 2000 (ms)	36		
Hb240	Second manual torque boost operation mode selection	00 (Disabled)/01 (Always enabled) 02 (Enabled only for forward revolution) 03 (Enabled only for reverse revolution)	01		
Hb241	Second amount of manual torque boost	0.0 to 20.0 (%)	0.0		
Hb242	Second manual torque boost break point	0.0 to 50.0 (%)			
Hb245	Second energy-saving operation selection	00 (Disabled)/01 (Enabled)	00		
Hb246	Second energy-saving response/accuracy adjustment	0.0 to 100.0 (%)	50.0		
Hb250	Second free V/f frequency 1	0.00 to [Hb252] (Hz)	0		
Hb251	Second free V/f voltage 1	0.0 to 1000.0 (V)	0.0		
Hb252	Second free V/f frequency 2	[Hb250] to [Hb254] (Hz)	0.00		
Hb253	Second free V/f voltage 2	0.0 to 1000.0 (V)	0.0		
Hb254	Second free V/f frequency 3	[Hb252] to [Hb256] (Hz)	0.00		
Hb255	Second free V/f voltage 3	0.0 to 1000.0 (V)	0.0		
Hb256	Second free V/f frequency 4	[Hb254] to [Hb258] (Hz)	0.00		
Hb257	Second free V/f voltage 4	0.0 to 1000.0 (V)	0.0		
Hb258	Second free V/f frequency 5	[Hb256] to [Hb260] (Hz)	0.00		
Hb259	Second free V/f voltage 5	0.0 to 1000.0 (V)	0.0		
Hb260	Second free V/f frequency 6	[Hb258] to [Hb262] (Hz)	0.00		
Hb261	Second free V/f voltage 6	0.0 to 1000.0 (V)	0.0		
Hb262	Second free V/f frequency 7	[Hb260] to [Hb204] (Hz)	0.00		
Hb263	Second free V/f voltage 7	0.0 to 1000.0 (V)	0.0		
Hb270	Second slip compensation I gain with sensor (V/f with sensor)	0 to 1000 (%)	100		
Hb271	Second slip compensation I gain with sensor (V/f with sensor)				
Hb280	Second output voltage gain	0 to 255 (%)			

Note: Varies depending on inverter models and settings of duty rating.

Code	Name	Data range	Initial value	Note	Page
HC101	First automatic torque boost voltage compensation gain	0 to 255 (%)	100		4-55
HC102	First automatic torque boost slip compensation gain				
HC110	First zero-speed range limiter (IM-0Hz)	0 to 100 (%)			
HC111	First amount of boost at the start (IM-SLV)	0 to 50 (%)	0		
HC112	First amount of boost at the start (IM-oHz)		10		
HC113	First selection of secondary-resistance correction that is conducted or not.	00 (Disabled)/01 (Enabled)	00		
HC114	First selection of reversal prevention				
HC115	First selection for the torque transformation	00 (Torque)/01 (Current)	01		
HC120	First time constant for torque current command filter	0 to 100 (ms)	2		
HC121	First speed feed forward gain	0 to 1000	0		
HC137	First flux setting level	0.0 to 100.0 (%)	80.0		
HC140	First forcing level	0 to 1000 (%)	100		
HC141	First modulation threshold 1	0 to 133 (%)	133		
HC142	First modulation threshold 2				
HC201	Second automatic torque boost voltage compensation gain	0 to 255 (%)	100		
HC202	Second automatic torque boost slip compensation gain				
HC210	Second zero-speed range limiter (IM-0Hz)	0 to 100 (%)	80		
HC211	Second amount of boost at the start (IM-SLV)	0 to 50 (%)	0		
HC212	Second amount of boost at the start (IM-oHz)		10		
HC213	Second selection of whether a secondary-resistance correction is to be conducted.	00 (Disabled)/01 (Enabled)	00		
HC214	Second selection of reversal prevention				
HC215	Second selection for the torque transformation	Same as HC115	01		
HC220	Second time constant for torque current command filter	0 to 100 (ms)	2		
HC221	Second speed feed forward gain	0 to 1000	0		
HC237	Second flux setting level	Same as HC137	80.0		
HC240	Second forcing level	Same as HC140	100		
HC241	Second modulation threshold 1	Same as HC141	133		
HC242	Second modulation threshold 2	Same as HC142			
Hd102	First SM (PMM) motor capacity selection	0.01 to 75.00 (kW)	Note:1		4-56
Hd103	First selection of number of SM (PMM) motor poles	2 to 48 (poles)			
Hd104	First SM (PMM) base frequency	10.00 to 590.00 (Hz)			
Hd105	First SM (PMM) maximum frequency				
Hd106	First SM (PMM) motor's rated voltage	1 to 1000 (V)			
Hd108	First SM (PMM) motor's rated current	0.01 to 10000.00 (A)			
Hd110	First SM (PMM) motor's constant R	0.000001 to 1000.000000 (Ω)			
Hd112	First SM (PMM) motor's constant Ld	0.000001 to 1000.000000 (mH)			
Hd114	First SM (PMM) motor's constant Lq				
Hd116	First SM (PMM) motor's constant Ke	0.1 to 100000.0 (mVs/rad)			
Hd118	First SM (PMM) motor's constant J	0.00001 to 10000.00000 (kgm^2)			
Hd130	First SM (PMM) minimum frequency	0 to 50 (%)	8		
Hd131	First SM (PMM) no-load current	0 to 100 (%)	10		
Hd132	First SM (PMM) start method selection	00 (Position estimation disabled) 01 (Position estimation enabled)	00		
Hd133	First SM (PMM) initial position estimation zero-V stand-by times	0 to 255	10		
Hd134	First SM (PMM) initial position estimation detection stand-by times				
Hd135	First SM (PMM) initial position estimation detection times		30		
Hd136	First SM (PMM) initial position estimation voltage gain	0 to 200 (%)	100		
Hd137	First initial position estimation magnetic-pole position offset	0 to 359 (deg)	0		
Hd-41	IVMS carrier frequency Note:2	0.5 to 16.0 (kHz)	2.0		
Hd-42	Filter gain of IVMS detection current Note:2	0 to 1000	100		
Hd-43	Open-phase voltage detection gain selection. Note:2	00 (Gain 0)/01 (Gain 1) 02 (Gain 2)/03 (Gain 3)	00		
Hd-44	Selection of open-phase switch threshold correction. Note:2	00 (Disabled)/01 (Enabled)	01		
Hd-45	Speed control P gain Note:2	0 to 1000	100		
Hd-46	Speed control I gain Note:2	0 to 10000			
Hd-47	Waiting time for open-phase switching Note:2	0 to 1000	15		
Hd-48	Restriction on the rotation-direction determination Note:2	00 (Disabled)/01 (Enabled)	01		
Hd-49	Adjustment of the timing for detecting the open-phase voltage Note:2	0 to 1000	10		
Hd-50	Minimum pulse-width adjustment Note:2		100		
Hd-51	Current limit of IVMS threshold Note:2	0 to 255	100		
Hd-52	IVMS threshold gain Note:2				
Hd-58	IVMS carrier-frequency switching start/finish point Note:2	0 to 50 (%)	5		

Note: 1. Varies depending on inverter models and settings of duty rating.
2. Hd-41 to 58 are reserved parameters.

Code	Name	Data range	Initial value	Note	Page
Hd202	Second SM (PMM) motor capacity selection	Same as Hd-102	Note		4-57
Hd203	Second selection of number of SM (PMM) motor poles	Same as Hd-103			
Hd204	Second SM (PMM) base frequency	Same as Hd-104			
Hd205	Second SM (PMM) maximum frequency	Same as Hd-105			
Hd206	Second SM (PMM) motor's rated voltage	Same as Hd-106			
Hd208	Second SM (PMM) motor's rated current	Same as Hd-108			
Hd210	Second SM (PMM) motor's constant R	Same as Hd-110			
Hd212	Second SM (PMM) motor's constant Ld	Same as Hd-112			
Hd214	Second SM (PMM) motor's constant Lq	Same as Hd-114			
Hd216	Second SM (PMM) motor's constant Ke	Same as Hd-116			
Hd218	Second SM (PMM) motor's constant J	Same as Hd-118			
Hd230	Second SM (PMM) minimum frequency	Same as Hd-130	8		
Hd231	Second SM (PMM) no-load current	Same as Hd-131	10		
Hd232	Second SM (PMM) start method selection	Same as Hd-132	00		
Hd233	Second SM (PMM) initial position estimation zero-V stand-by times	Same as Hd-133	10		
Hd234	Second SM (PMM) initial position estimation detection stand-by times	Same as Hd-134			
Hd235	Second SM (PMM) initial position estimation detection times	Same as Hd-135	30		
Hd236	Second SM (PMM) initial position estimation voltage gain	Same as Hd-136	100		
Hd237	Second initial position estimation magnetic-pole position offset	Same as Hd-137	0		

Note: Varies depending on inverter models and settings of duty rating.

■Parameter mode (O code：Option Card)

Code	Name	Data range	Initial value	Note	Page
oA-10	Operation selection when option error occurs (slot 1)	00 (Error)/01 (Continue operation)	00		4-57
oA-11	Communication monitoring timer setting (slot1)	0.00 to 100.00 (s)	1.00		
oA-12	Operation setting at the time of communication error (slot1)	00 (Error)/01 (Trip after deceleration stop) 02 (Ignore)/03 (Free run) 04 (Deceleration stop)	01		
oA-13	Selection of operation command behavior at start (slot 1)	00 (Operation command disabled) 01 (Operation command enabled)			
oA-20	Operation selection when option error occurs (slot 2)	00 (Error)/01 (Continue operation)	00		
oA-21	Communication monitoring timer setting (slot 2)	0.00 to 100.00 (s)	1.00		
oA-22	Operation setting at the time of communication error (slot 2)	00 (Error)/01 (Trip after deceleration stop) 02 (Ignore)/03 (Free run) 04 (Deceleration stop)	01		
oA-23	Selection of operation command behavior at start (slot 2)	00 (Operation command disabled) 01 (Operation command enabled)	00		
oA-30	Operation selection when option error occurs (slot 3)	00 (Error)/01 (Continue operation)			
oA-31	Communication monitoring timer setting (slot 3)	0.00 to 100.00 (s)	1.00		
oA-32	Operation setting at the time of communication error (slot 3)	00 (Error)/01 (Trip after deceleration stop) 02 (Ignore)/03 (Free run) 04 (Deceleration stop)	01		
oA-33	Selection of operation command behavior at start (slot 3)	00 (Operation command disabled) 01 (Operation command enabled)	00		
ob-01	Encoder constant set-up (option)	32 to 65535 (pls)	1024		
ob-02	Encoder phase sequence selection (option)	00 (Phase-A is leading) 01 (Phase-B is leading)	00		
ob-03	Motor gear ratio's numerator (option)	1 to 10000	1		
ob-04	Motor gear ratio's denominator (option)				
ob-10	Pulse train input SA/SB (option) detection target selection	00 (Command) 01 (Pulse string position command)	00		4-58
ob-11	Pulse train input (option) mode selection	00 (90° phase difference) 01 (forward/reverse rotation command and rotation direction) 02 (forward/reverse rotation pulse string)	01		
ob-12	Pulse train input (option) scale	0.05 to 200.0 (kHz)	25.00		
ob-13	Pulse train input (option) filter time constant	0.01 to 2.00 (s)	0.10		
ob-14	Pulse train input (option) bias size	-100.0 to 100.0 (%)	0.0		
ob-15	Pulse train input (option) upper detection limit	0.0 to 100.0 (%)	100.0		
ob-16	Pulse train input (option) lower detection limit		0.0		

• For details, refer to the instruction manual provided together with the each optional cassette.

Code	Name	Data range	Initial value	Note	Page
oC-01 to oC-28	Reserved	-	-	-	
oE-01	[Ai4] terminal input filter time constant	1 to 500 (ms)	16		
oE-03	[Ai4] terminal start amount	0.00 to 100.00 (%)	0.00		
oE-04	[Ai4] terminal end amount		100.00		
oE-05	[Ai4] terminal start ratio	0.0 to [oE-06] (%)	0.0		
oE-06	[Ai4] terminal end ratio	[oE-05] to 100.0 (%)	100.0		
oE-07	[Ai4] terminal start selection	00 (Start amount [oE-03])/01 (0%)	01		
oE-11	[Ai5] terminal input filter time constant	1 to 500 (ms)	16		
oE-13	[Ai5] terminal start amount	0.00 to 100.00 (%)	0.00		
oE-14	[Ai5] terminal end amount		100.00		
oE-15	[Ai5] terminal start ratio	0.0 to [oE-16] (%)	0.0		
oE-16	[Ai5] terminal end ratio	[oE-15] to 100.0 (%)	100.0		
oE-17	[Ai5] terminal start selection	00 (Start amount [oE-13])/01 (0%)	01		4-58
oE-21	[Ai6] terminal input filter time constant	1 to 500 (ms)	16		
oE-23	[Ai6] terminal start amount	-100.00 to 100.00 (%)	-100.00		
oE-24	[Ai6] terminal end amount		100.00		
oE-25	[Ai6] terminal start ratio	-100.0 to [oE-26] (%)	-100.0		
oE-26	[Ai6] terminal end ratio	[oE-25] to 100.0 (%)	100.0		
oE-28	[Ai4] voltage/current bias adjustment	-100.00 to 100.00 (%)	0.00		
oE-29	[Ai4] voltage adjustment gain	0.00 to 200.00 (%)	100.00		
oE-30	[Ai5] voltage/current bias adjustment	-100.00 to 100.00 (%)	0.00		
oE-31	[Ai5] voltage adjustment gain	0.00 to 200.00 (%)	100.00		
oE-32	[Ai6] voltage bias adjustment	-100.00 to 100.00 (%)	0.00		
oE-33	[Ai6] voltage adjustment gain	0.00 to 200.00 (%)	100.00		
oE-35	Window comparator [Ai4] upper limit level	0 to 100 (%)	100		
oE-36	Window comparator [Ai4] lower limit level		0		
oE-37	Window comparator [Ai4] hysteresis range	0 to 10 (%)	0		
oE-38	Window comparator [Ai5] upper limit level	0 to 100 (%)	100		
oE-39	Window comparator [Ai5] lower limit level		0		
oE-40	Window comparator [Ai5] hysteresis range	0 to 10 (%)	0		
oE-41	Window comparator [Ai6] upper limit level	-100 to 100 (%)	100		
oE-42	Window comparator [Ai6] lower limit level		-100		
oE-43	Window comparator [Ai6] hysteresis range	0 to 10 (%)	0		
oE-44	[Ai4] operation level at disconnection	-100 to 100 (%)	0		
oE-45	[Ai4] operation level selection at disconnection	00 (Disabled)/01 (Enabled: out of range)	00		
oE-46	[Ai5] operation level at disconnection	0 to 100 (%)	0		
oE-47	[Ai5] operation level selection at disconnection	00 (Disabled)/01 (Enabled: out of range)	00		
oE-48	[Ai6] operation level at disconnection	0 to 100 (%)	0		
oE-49	[Ai6] operation level selection at disconnection	00 (Disabled)/01 (Enabled: out of range)	00		
oE-50	[Ao3] terminal output selection	See the List of output monitor functions	dA-01		4-59
oE-51	[Ao4] terminal output selection				
oE-52	[Ao5] terminal output selection				
oE-56	[Ao3] output filter time constant	1 to 500 (ms)	100		
oE-57	[Ao3] output data type selection	00 (absolute value)/01 (with sign)	00		
oE-58	[Ao3] bias adjustment (voltage/current)	-100.0 to 100.0 (%)	0.0		
oE-59	[Ao3] gain adjustment (voltage/current)	-1000.0 to 1000.0 (%)	100.0		
oE-60	[Ao3] output level in the adjustment mode	-100.0 to 100.0 (%)			
oE-61	[Ao4] output filter time constant	1 to 500 (ms)	100		
oE-62	[Ao4] output data type selection	00 (absolute value)/01 (with sign)	00		
oE-63	[Ao4] bias adjustment (voltage/current)	-100.0 to 100.0 (%)	0.0		
oE-64	[Ao4] gain adjustment (voltage/current)	-1000.0 to 1000.0 (%)	100.0		
oE-65	[Ao4] output level in the adjustment mode	-100.0 to 100.0 (%)			
oE-66	[Ao5] output filter time constant	1 to 500(ms)	100		
oE-67	[Ao5] output data type selection	00 (absolute value)/01 (with sign)	00		
oE-68	[Ao5] bias adjustment (voltage)	-100.0 to 100.0 (%)	0.0		
oE-69	[Ao5] gain adjustment (voltage)	-1000.0 to 1000.0 (%)	100.0		
oE-70	[Ao5] output level in the adjustment mode	-100.0 to 100.0 (%)			

• For details, refer to the instruction manual provided together with the each optional cassette.

Code	Name	Data range	Initial value	Note	Page
oH-01	IP address selection (P1-EN)	00 (Gr.1)/01 (Gr.2)	00		4-60
oH-02	Transmission speed (port 1) (P1-EN)	00 (Auto negotiation)/01 (100M: full duplex) 02 (100M: half duplex)/03 (10M: full duplex) 04 (10M: half duplex)			
oH-03	Transmission speed (port 2) (P1-EN)				
oH-04	Ethernet communication timeout (P1-EN)	1 to 65535 (×10ms)	3000		
oH-05	Modbus TCP port number (IPv4)	502, 1024 to 65535	502		
oH-06	Modbus TCP port number (IPv6)				
oH-20	Profibus Nobe address	0 to 125	0		
oH-21	Profibus Clear Mode selection	00 (Clear)/01 (Value retained the last time)	00		
oH-22	Profibus Map selection	00 (PPO)/01 (Comvertional)/02 (FlexibleMode)			
oH-23	Selection of setting from the Profibus master	00 (Allowed)/01 (Not allowed)			
oH-24	Selection of setpoint telegram/Actual value telegram Gr	00 (Gr.A)/01 (Gr.B)/02 (Gr.C)			
oH-30	IP address selection (P1-PN)	00 (Gr.1)/01 (Gr.2)			
oH-31	Transmission speed (port 1) (P1-PN)	00 (Auto negotiation)/01 (100M: full duplex) 02 (100M: half duplex)/03 (10M: full duplex) 04 (10M: half duplex)			
oH-32	Transmission speed (port 2) (P1-PN)				
oH-33	Ethernet communication timeout (P1-PN)	1 to 65535 (×10ms)	3000		
oH-34	Selection of setpoint telegram/Actual value telegram Gr	00 (Gr.A)/01 (Gr.B)/02 (Gr.C)	502		

Code	Name	Data range	Initial value	Note	Page
oJ-01	Gr.A flexible command registration writing register 1	0000 to FFFF	0000		4-60
oJ-02	Gr.A flexible command registration writing register 2				
oJ-03	Gr.A flexible command registration writing register 3				
oJ-04	Gr.A flexible command registration writing register 4				
oJ-05	Gr.A flexible command registration writing register 5				
oJ-06	Gr.A flexible command registration writing register 6				
oJ-07	Gr.A flexible command registration writing register 7				
oJ-08	Gr.A flexible command registration writing register 8				
oJ-09	Gr.A flexible command registration writing register 9				
oJ-10	Gr.A flexible command registration writing register 10				
oJ-11	Gr.A flexible command registration reading register 1				
oJ-12	Gr.A flexible command registration reading register 2				
oJ-13	Gr.A flexible command registration reading register 3				
oJ-14	Gr.A flexible command registration reading register 4				
oJ-15	Gr.A flexible command registration reading register 5				
oJ-16	Gr.A flexible command registration reading register 6				
oJ-17	Gr.A flexible command registration reading register 7				
oJ-18	Gr.A flexible command registration reading register 8				
oJ-19	Gr.A flexible command registration reading register 9				
oJ-20	Gr.A flexible command registration reading register 10				
oJ-21	Gr.B flexible command registration writing register 1				
oJ-22	Gr.B flexible command registration writing register 2				
oJ-23	Gr.B flexible command registration writing register 3				
oJ-24	Gr.B flexible command registration writing register 4				
oJ-25	Gr.B flexible command registration writing register 5				
oJ-26	Gr.B flexible command registration writing register 6				
oJ-27	Gr.B flexible command registration writing register 7				
oJ-28	Gr.B flexible command registration writing register 8				
oJ-29	Gr.B flexible command registration writing register 9				
oJ-30	Gr.B flexible command registration writing register 10				
oJ-31	Gr.B flexible command registration reading register 1				
oJ-32	Gr.B flexible command registration reading register 2				
oJ-33	Gr.B flexible command registration reading register 3				
oJ-34	Gr.B flexible command registration reading register 4				
oJ-35	Gr.B flexible command registration reading register 5				
oJ-36	Gr.B flexible command registration reading register 6				
oJ-37	Gr.B flexible command registration reading register 7				
oJ-38	Gr.B flexible command registration reading register 8				
oJ-39	Gr.B flexible command registration reading register 9				
oJ-40	Gr.B flexible command registration reading register 10				
oJ-41	Gr.C flexible command registration writing register 1				4-61
oJ-42	Gr.C flexible command registration writing register 2				
oJ-43	Gr.C flexible command registration writing register 3				
oJ-44	Gr.C flexible command registration writing register 4				
oJ-45	Gr.C flexible command registration writing register 5				
oJ-46	Gr.C flexible command registration writing register 6				
oJ-47	Gr.C flexible command registration writing register 7				
oJ-48	Gr.C flexible command registration writing register 8				
oJ-49	Gr.C flexible command registration writing register 9				

Code	Name	Data range	Initial value	Note	Page
oJ-50	Gr.C flexible command registration writing register 10	0000 to FFFF	0000		4-61
oJ-51	Gr.C flexible command registration reading register 1				
oJ-52	Gr.C flexible command registration reading register 2				
oJ-53	Gr.C flexible command registration reading register 3				
oJ-54	Gr.C flexible command registration reading register 4				
oJ-55	Gr.C flexible command registration reading register 5				
oJ-56	Gr.C flexible command registration reading register 6				
oJ-57	Gr.C flexible command registration reading register 7				
oJ-58	Gr.C flexible command registration reading register 8				
oJ-59	Gr.C flexible command registration reading register 9				
oJ-60	Gr.C flexible command registration reading register 10				
oL-01	Gr.1 IPv4 IP address (1)	0 to 255	192		
oL-02	Gr.1 IPv4 IP address (2)		168		
oL-03	Gr.1 IPv4 IP address (3)		0		
oL-04	Gr.1 IPv4 IP address (4)		2		
oL-05	Gr.1 IPv4 subnet mask (1)		255		
oL-06	Gr.1 IPv4 subnet mask (2)		255		
oL-07	Gr.1 IPv4 subnet mask (3)		255		
oL-08	Gr.1 IPv4 subnet mask (4)		0		
oL-09	Gr.1 IPv4 default gateway (1)		192		
oL-10	Gr.1 IPv4 default gateway (2)		168		
oL-11	Gr.1 IPv4 default gateway (3)		0		
oL-12	Gr.1 IPv4 default gateway (4)		1		
oL-20	Gr.1 IPv6 IP address (1)	0000 to FFFF	0000		
oL-21	Gr.1 IPv6 IP address (2)				
oL-22	Gr.1 IPv6 IP address (3)				
oL-23	Gr.1 IPv6 IP address (4)				
oL-24	Gr.1 IPv6 IP address (5)				
oL-25	Gr.1 IPv6 IP address (6)				
oL-26	Gr.1 IPv6 IP address (7)				
oL-27	Gr.1 IPv6 IP address (8)				
oL-28	Gr.1 IPv6 subnet prefix	0 to 127	64		
oL-29	Gr.1 IPv6 default gateway (1)	0000 to FFFF	0000		
oL-30	Gr.1 IPv6 default gateway (2)				
oL-31	Gr.1 IPv6 default gateway (3)				
oL-32	Gr.1 IPv6 default gateway (4)				
oL-33	Gr.1 IPv6 default gateway (5)				
oL-34	Gr.1 IPv6 default gateway (6)				
oL-35	Gr.1 IPv6 default gateway (7)				
oL-36	Gr.1 IPv6 default gateway (8)				
oL-40	Gr.2 IPv4 IP address (1)	0 to 255	192		4-62
oL-41	Gr.2 IPv4 IP address (2)		168		
oL-42	Gr.2 IPv4 IP address (3)		0		
oL-43	Gr.2 IPv4 IP address (4)		2		
oL-44	Gr.2 IPv4 subnet mask (1)		255		
oL-45	Gr.2 IPv4 subnet mask (2)		255		
oL-46	Gr.2 IPv4 subnet mask (3)		255		
oL-47	Gr.2 IPv4 subnet mask (4)		0		
oL-48	Gr.2 IPv4 default gateway (1)		192		
oL-49	Gr.2 IPv4 default gateway (2)		168		
oL-50	Gr.2 IPv4 default gateway (3)		0		
oL-51	Gr.2 IPv4 default gateway (4)		1		
oL-60	Gr.2 IPv6 IP address (1)	0000 to FFFF	0000		
oL-61	Gr.2 IPv6 IP address (2)				
oL-62	Gr.2 IPv6 IP address (3)				
oL-63	Gr.2 IPv6 IP address (4)				
oL-64	Gr.2 IPv6 IP address (5)				
oL-65	Gr.2 IPv6 IP address (6)				
oL-66	Gr.2 IPv6 IP address (7)				
oL-67	Gr.2 IPv6 IP address (8)				
oL-68	Gr.2 IPv6 subnet prefix	0 to 127	64		
oL-69	Gr.2 IPv6 default gateway (1)	0000 to FFFF	0000		
oL-70	Gr.2 IPv6 default gateway (2)				
oL-71	Gr.2 IPv6 default gateway (3)				
oL-72	Gr.2 IPv6 default gateway (4)				
oL-73	Gr.2 IPv6 default gateway (5)				
oL-74	Gr.2 IPv6 default gateway (6)				
oL-75	Gr.2 IPv6 default gateway (7)				
oL-76	Gr.2 IPv6 default gateway (8)				

• For details, refer to the instruction manual provided together with the each optional cassette.

■Parameter mode (P code：Special Function)

Code	Name	Data range	Initial value	Note	Page
PA-01	Forced operation mode selection	00 (Disabled)/01 (Enabled)	00		4-63
PA-02	Forced operation frequency setting	0.00 to 590.00 (Hz)	0.00		
PA-03	Forced operation rotation direction command	00 (Normal rotation)/01 (Reverse rotation)	00		
PA-04	Commercial power supply bypass function selection	00 (Disabled)/01 (Enabled)	00		
PA-05	Bypass function delay time	0.0 to 1000.0 (s)	5.0		
PA-20	Simulation mode selection	00 (Disabled)/01 (Enabled)	00		
PA-21	Selection of error code for alarm test	000 to 255	000		
PA-22	Output current monitor optional output selection	00 (Disabled) 01 (Enabled: parameter setting [PA-23]) 02 (Enabled: set from [VRF]) 03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2]) 05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5]) 07 (Enabled: set from [Ai6])	01		
PA-23	Output current monitor optional setting value	0.0 to 3.0 × Inverter rated current (A)	0.0		
PA-24	P-N voltage monitor optional output selection	00 (Disabled) 01 (Enabled: parameter setting [PA-25]) 02 (Enabled: set from [VRF]) 03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2]) 05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5]) 07 (Enabled: set from [Ai6])	01		
PA-25	P-N voltage monitor optional setting value	200V class: 0.0 to 450.0 (Vdc) 400V class: 0.0 to 900.0 (Vdc)	270.0 540.0		
PA-26	Output voltage monitor optional output selection	00 (Disabled) 01 (Enabled: parameter setting [PA-27]) 02 (Enabled: set from [VRF]) 03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2]) 05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5]) 07 (Enabled: set from [Ai6])	01		
PA-27	Output voltage monitor optional setting value	200V class: 0.0-300.0 (V) 400V class: 0.0-600.0 (V)	0.0		
PA-28	Output torque monitor optional output selection	00 (Disabled) 01 (Enabled: parameter setting [PA-29]) 02 (Enabled: set from [VRF]) 03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2]) 05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5]) 07 (Enabled: set from [Ai6])	01		
PA-29	Output torque monitor optional setting value	-500.0 to +500.0 (%)	0.0		
PA-30	Frequency adjustment optional output selection	00 (Disabled) 01 (Enabled: parameter setting [PA-31]) 02 (Enabled: set from [VRF]) 03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2]) 05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5]) 07 (Enabled: set from [Ai6])	01		
PA-31	Frequency matching optional setting value	0.0 to 590.00 (Hz)	0.00		

■Parameter mode (U code：¥Set-up, PDN)

Code	Name	Data range	Initial value	Note	Page
UA-01	Password input for display selection	0000 to FFFF	0000		4-64
UA-02	Soft-lock password input				
UA-10	Display selection	00 (Full display)/01 (By function)/02 (User setting) 03 (Conveyor display)/04 (Only monitor display)	00		
UA-12	Clearing of integrated input power	00 (Disabled)/01 (Clear)	00		
UA-13	Integrated input power display gain	1 to 1000	1		
UA-14	Clearing of integrated output power	00 (Disabled)/01 (Clear)	00		
UA-15	Integrated output power display gain	1 to 1000	1		
UA-16	Soft-lock selection	00 ([SFT] terminal)/01 (Always enabled)	00		
UA-17	Soft-lock target selection	00 (All data cannot be changed) 01 (Data other than set frequency cannot be changed)	00		
UA-18	Data R/W selection	00 (R/W enabled)/01 (R/W disabled)	00		
UA-19	Battery level warning selection	00 (Disabled)/01 (Warning)/02 (Error)	00		
UA-20	Operation at disconnection of operator keypad	00 (Error)/01 (Error after deceleration stop) 02 (Ignore)/03 (Free run)/04 (Deceleration stop)	02		
UA-21	Selection of second setting parameter display	00 (Not display)/01 (Display)	00		
UA-22	Selection of option parameter display				
UA-30	Selection of user parameter automatic setting	00 (Disabled)/01 (Enabled)			
UA-31	User parameter 1 selection	no/***** (select a parameter)	no		
UA-32	User parameter 2 selection				
UA-33	User parameter 3 selection				
UA-34	User parameter 4 selection				
UA-35	User parameter 5 selection				
UA-36	User parameter 6 selection				
UA-37	User parameter 7 selection				
UA-38	User parameter 8 selection				
UA-39	User parameter 9 selection				
UA-40	User parameter 10 selection				
UA-41	User parameter 11 selection				
UA-42	User parameter 12 selection				
UA-43	User parameter 13 selection				
UA-44	User parameter 14 selection				
UA-45	User parameter 15 selection				
UA-46	User parameter 16 selection				
UA-47	User parameter 17 selection				
UA-48	User parameter 18 selection				
UA-49	User parameter 19 selection				
UA-50	User parameter 20 selection				
UA-51	User parameter 21 selection				
UA-52	User parameter 22 selection				
UA-53	User parameter 23 selection				
UA-54	User parameter 24 selection				
UA-55	User parameter 25 selection				
UA-56	User parameter 26 selection				
UA-57	User parameter 27 selection				
UA-58	User parameter 28 selection				
UA-59	User parameter 29 selection				
UA-60	User parameter 30 selection				
UA-61	User parameter 31 selection				
UA-62	User parameter 32 selection				
UA-90 to UA-94	Reserved	-	-		4-65
Ub-01	Selection of factory default initialization	00 (Disabled)/01 (Trip history) 02 (Parameter initialization) 03 (Trip history + parameters)/04 (Reserved) 05 (Other than terminal function) 06 (Other than communication function) 07 (Other than terminal&communication functions) 08 (Reserved)	00		
Ub-02	Selection of initial values	00(Mode 0): JPN / 01(Mode 1): EU, ASIA 02(Mode 2): USA /03(Mode 3): CHN	00		
Ub-03	Duty type selection	00 (VLD)/01 (LD)/02 (ND)	02		
Ub-05	Initialization start selection	00 (Disabled)/01 (Start initialization)	00		
UC-01	Debug mode selection	(do not change)	00		

Code	Name	Data range	Initial value	Note	Page
Ud-01	Trace function selection	00 (Disabled)/01 (Enabled)	00		4-65
Ud-02	Trace start	00 (Stop)/01 (Start)			
Ud-03	Selection of the number of trace data sets	0 to 8	1		
Ud-04	Selection of the number of trace signals				
Ud-10	Selection of trace data 0	See Appendix 1-30 <List of output monitor functions>.	dA-01		
Ud-11	Selection of trace data 1				
Ud-12	Selection of trace data 2				
Ud-13	Selection of trace data 3				
Ud-14	Selection of trace data 4				
Ud-15	Selection of trace data 5				
Ud-16	Selection of trace data 6				
Ud-17	Selection of trace data 7				
Ud-20	Trace signal 0 I/O selection	00 (Input: [Ud-21])/01 (Output: [Ud-22])	00		
Ud-21	Trace signal 0 input terminal selection	Note:1	001		
Ud-22	Trace signal 0 output terminal selection	Note:2			
Ud-23	Trace signal 1 I/O selection	00 (Input: [Ud-24])/01 (Output: [Ud-25])	00		
Ud-24	Trace signal 1 input terminal selection	Note:1	001		
Ud-25	Trace signal 1 output terminal selection	Note:2			
Ud-26	Trace signal 2 I/O selection	00 (Input: [Ud-27]/01 (Output: [Ud-28])	00		
Ud-27	Trace signal 2 input terminal selection	Note:1	001		
Ud-28	Trace signal 2 output terminal selection	Note:2			
Ud-29	Trace signal 3 I/O selection	00 (Input: [Ud-30])/01 (Output: [Ud-31])	00		
Ud-30	Trace signal 3 input terminal selection	Note:1	001		
Ud-31	Trace signal 3 output terminal selection	Note:2			
Ud-32	Trace signal 4 I/O selection	00 (Input: [Ud-33])/01 (Output: [Ud-34])	00		
Ud-33	Trace signal 4 input terminal selection	Note:1	001		
Ud-34	Trace signal 4 output terminal selection	Note:2			
Ud-35	Trace signal 5 I/O selection	00 (Input: [Ud-36])/01 (Output: [Ud-37])	00		
Ud-36	Trace signal 5 input terminal selection	Note:1	001		
Ud-37	Trace signal 5 output terminal selection	Note:2			
Ud-38	Trace signal 6 I/O selection	00 (Input: [Ud-39])/01 (Output: [Ud-40])	00		4-66
Ud-39	Trace signal 6 input terminal selection	Note:1	001		
Ud-40	Trace signal 6 output terminal selection	Note:2			
Ud-41	Trace signal 7 I/O selection	00 (Input: [Ud-42])/01 (Output: [Ud-43])	00		
Ud-42	Trace signal 7 input terminal selection	Note:1	001		
Ud-43	Trace signal 7 output terminal selection	Note:2			
Ud-50	Selection of trace trigger 1	00 (Trip)/01 (Trace data 0)/02 (Trace data 1) 03 (Trace data 2)/04 (Trace data 3)/05 (Trade data 4) 06 (Trace data 5)/07 (Trace data 6)/08 (Trace data 7) 09 (Trace signal 0)/10 (Trace signal 1) 11 (Trace signal 2)/12 (Trace signal 3) 13 (Trace signal 4)/14 (Trace signal 5) 15 (Trace signal 6)/16 (Trace signal 7)	00		
Ud-51	Selection of trigger 1 operation at trace data trigger	00 (Operate when it is above the trigger level) 01 (Operate when it is below the trigger level)	00		
Ud-52	Trigger 1 level at trace data trigger	0 to 100 (%)	0		
Ud-53	Selection of trigger 1 operation at trace signal trigger	00 (Operate when the signal is ON) 01 (Operate when the signal is OFF)	00		
Ud-54	Selection of trace trigger 2	Same as Ud-50	00		
Ud-55	Selection of trigger 2 operation at trace data trigger	00 (Rising edge) 01 (Falling edge)	00		
Ud-56	Trigger 2 level at trace data trigger	0 to 100 (%)	0		
Ud-57	Selection of trigger 2 operation at trace signal trigger	00 (Operate when the signal is ON) 01 (Operate when the signal is OFF)	00		
Ud-58	Trigger condition selection	00 (When trigger 1 is satisfied) 01 (When trigger 2 is satisfied) 02 (When trigger 1 or 2 is satisfied) 03 (When trigger 1 and 2 are satisfied)	00		
Ud-59	Trigger point setting	0 to 100 (%)	0		
Ud-60	Sampling time setting	01 (0.2ms)/02 (0.5ms)/03 (1ms)/04 (2ms)/05 (5ms) 06 (10ms)/07 (50ms)/08 (100ms)/09 (500ms) 10 (1000ms)	03		

Note: 1. See Appendix 1-31 <List of input terminal functions>.
2. See Appendix 1-32 <List of output terminal functions>.

<List of output monitor functions>

Monitor No.	Function
dA-01	Output frequency monitor
dA-02	Output current monitor
dA-03	Position command monitor
dA-04	Frequency command after calculation
dA-06	Position command monitor
dA-08	Speed detection value monitor
dA-12	Output frequency monitor (with sign)
dA-14	Frequency upper limit monitor
dA-15	Torque command monitor after calculation
dA-16	Torque limit monitor
dA-17	Output torque monitor Note
dA-18	Output voltage monitor
dA-20	Current position monitor
dA-26	Pulse string position deviation monitor
dA-28	Pulse counter monitor
dA-30	Input power monitor
dA-34	Output power monitor
dA-38	Motor temperature monitor
dA-40	DC voltage monitor
dA-41	DBTR load factor monitor
dA-42	Electronic thermal duty ratio monitor MTR
dA-43	Electronic thermal duty ratio monitor CTL
dA-61	Analog input [VRF] monitor
dA-62	Analog input [IRF] monitor
dA-63	Analog input [VF2] monitor
dA-64	Analog input [Ai4] monitor
dA-65	Analog input [Ai5] monitor
dA-66	Analog input [Ai6] monitor
dA-70	Pulse string input monitor main body
dA-71	Pulse string input monitor option
db-01 to db-23	Reserved
db-30	PID1 feedback data 1 monitor
db-32	PID1 feedback data 2 monitor

Monitor No.	Function
db-34	PID1 feedback data 3 monitor
db-36	PID2 feedback data monitor
db-38	PID3 feedback data monitor
db-40	PID4 feedback data monitor
db-42	PID1 target value monitor after calculation
db-44	PID1 feedback data
db-50	PID1 output monitor
db-51	PID1 deviation monitor
db-52	PID1 deviation 1 monitor
db-53	PID1 deviation 2 monitor
db-54	PID1 deviation 3 monitor
db-55	PID2 output monitor
db-56	PID2 deviation monitor
db-57	PID3 output monitor
db-58	PID3 deviation monitor
db-59	PID4 output monitor
db-60	PID4 deviation monitor
db-61	PID current P gain monitor
db-62	PID current I gain monitor
db-63	PID current D gain monitor
db-64	PID feed-forward monitor
dC-15	Cooling fin temperature monitor
FA-01	Main speed command
FA-02	Auxiliary speed command
FA-15	Torque command monitor
FA-16	Torque bias monitor
FA-20	Position command monitor
FA-30	PID1 target value 1
FA-32	PID1 target value 2
FA-34	PID1 target value 3
FA-36	PID2 target value
FA-38	PID3 target value
FA-40	PID4 target value

Note: Output torque monitor is disabled at AA121/221=0 to 6 (V/f control).

<Unit options>

No.	Unit
00	non
01	%
02	A
03	Hz
04	V
05	kW
06	W
07	hr
08	s
09	kHz
10	ohm
11	mA
12	ms
13	P
14	kgm^2
15	pls
16	mH
17	Vdc
18	°C
19	kWh
20	mF
21	mVs/rad
22	Nm
23	min^{-1}
24	m/s
25	m/min
26	m/h
27	ft/s
28	ft/min
29	ft/h

No.	Unit
30	m
31	cm
32	°F
33	l/s
34	l/min
35	l/h
36	m^3/s
37	m^3/min
38	m^3/h
39	kg/s
40	kg/min
41	kg/h
42	t/min
43	t/h
44	gal/s
45	gal/min
46	gal/h
47	ft^3/s
48	ft^3/min
49	ft^3/h
50	lb/s
51	lb/min
52	lb/h
53	mbar
54	bar
55	Pa
56	kPa
57	PSI
58	mm

<List of input terminal functions>

Function No.	Abbreviation	Function name	Page
000	no	Without allocation	4-36
001	FR	Normal rotation	
002	RR	Reverse rotation	
003	DFL	Multistage speed 1	
004	DFM	Multistage speed 2	
005	DFH	Multistage speed 3	
006	DHH	Multistage speed 4	
007	SF1	Multistage speed bit 1	
008	SF2	Multistage speed bit 2	
009	SF3	Multistage speed bit 3	
010	SF4	Multistage speed bit 4	
011	SF5	Multistage speed bit 5	
012	SF6	Multistage speed bit 6	
013	SF7	Multistage speed bit 7	
014	ADD	Addition of frequency	
015	AUT	Switching of command	
016	STA	3-wire starting up	
017	STP	3-wire stopping	
018	FS	3-wire normal and reverse	
019	AHD	Retention of analog command	
020	UP	Acceleration through remote operation	
021	DWN	Deceleration through remote operation	
022	UDC	Clearing of remote operation data	
023	F-OP	Forced switching of command	
024	SET	Second control	
028	RST	Reset	
029	JOG	Jogging	
030	DB	Braking with external direct current	
031	AD2	2-step acceleration/deceleration	
032	MBS	Free-run stop	
033	ES	External abnormality	
034	USP	Prevention of power restoration restarting	
035	CS	Commercial switch	
036	SFT	Soft-lock	
037	BOK	Brake check	
038	OLR	Switching of stall prevention	
039	KHC	Clearing of integrated input power	
040	OKHC	Clearing of integrated output power	
041	PID	PID1 disabled	
042	PIDC	Resetting of PID1 integration	
043	PID2	PID2 disabled	
044	PIDC2	Resetting of PID2 integration	
045	PID3	PID3 disabled	
046	PIDC3	Resetting of PID3 integration	
047	PID4	PID4 disabled	
048	PIDC4	Resetting of PID4 integration	
051	SVC1	PID1 multistage target value 1	
052	SVC2	PID1 multistage target value 2	4-36
053	SVC3	PID1 multistage target value 3	
054	SVC4	PID1 multistage target value 4	
055	PRO	Switching of PID gain	
056	PIO	Switching of PID output	
058	SLEP	Satisfaction of SLEEP condition	
059	WAKE	Satisfaction of WAKE condition	
060	TL	Validation of torque limit Note	
061	TRQ1	Torque limit switchover 1 Note	
062	TRQ2	Torque limit switchover 2 Note	
063	PPI	PPI control switch	4-37
064	CAS	Control gain switch	
066	FOC	Auxiliary excitation	
067	ATR	Validation of torque control	
068	TBS	Validation of torque bias	
069	ORT	Orientation	
071	LAC	Cancellation of LAD	
072	PCLR	Clearing of positional deviation	
073	STAT	Permission to inputting of Pulse string position command	
074	PUP	Addition of positional bias	
075	PDN	Subtraction of positional bias	
076	CP1	Positional command selection 1	
077	CP2	Positional command selection 2	
078	CP3	Positional command selection 3	
079	CP4	Positional command selection 4	
080	ORL	Origin limit signal	
081	ORG	Return-to-origin start up signal	
082	FOT	Stopping of normal rotation driving	
083	ROT	Stopping of reverse rotation driving	
084	SPD	Switching of speed position	
085	PSET	Presetting of positional data	
086 to 096	-	Reserved	
097	PCC	Clearing of pulse counter	
098	ECOM	Starting up of EzCOM	
099	-	Reserved	
100	HLD	Stopping of acceleration/deceleration	
101	REN	Operation permission signal	
102	DISP	Fixation of display	
103	PLA	Pulse string input A	
104	PLB	Pulse string input B	
105	EMF	Emergency forced operation	
107	COK	Contactor check signal	
108	DTR	Data trace starting signal	
109	PLZ	Pulse string input Z	
110	TCH	Teaching signal	

Note: Output torque monitor is disabled at AA121/221=0 to 6 (V/f control).

<List of output terminal functions>

Function No.	Abbreviation	Function name	Page
000	no	Without allocation	4-40
001	DRV	During operation	
002	UPF1	When the constant speed is attained	
003	UPF2	Equal to or above the set frequency	
004	UPF3	Set frequency only	
005	UPF4	Equal to or above the set frequency 2	
006	UPF5	Set frequency only 2	
007	IRDY	Operation ready completion	
008	FRR	During normal rotation operation	
009	RRR	During reverse rotation operation	
010	FREF	Frequency command panel	
011	REF	Operation command panel	
012	SETM	Second control under selection	
016	OPO	Optional output	
017	AL	Alarm signal	
018	MJA	Severe failure signal	
019	OTQ	Excessive torque Note	
020	IP	During instantaneous power failure	
021	UV	Under insufficient voltage	
022	TRQ	During torque limitation Note	
023	IPS	During power failure deceleration	
024	RNT	RUN time elapsed	
025	ONT	Power ON time elapsed	
026	THM	Electronic thermal warning	
027	THC	Electronic thermal warning	
029	WAC	Capacitor life advance notice	
030	WAF	Fan life advance notice	4-41
031	FS	Operation command signal	
032	OHF	Cooling fin heating advance notice	
033	LOC	Low current signal	
034	LOC2	Low current signal 2	
035	OL	Overload advance notice	
036	OL2	Overload advance notice 2	
037	BRK	Brake release	
038	BER	Brake abnormality	
039	CON	Contactor control	
040	ZS	0 Hz detection signal	
041	DSE	Excessive speed deviation	
042	PDD	Excessive positional deviation	
043	POK	Positioning completed	
044	PCMP	Pulse count compare-match output	
045	OD	PID excessive deviation	
046	FBV	PID feedback comparison	
047	OD2	PID2 excessive deviation	
048	FBV2	PID2 feedback comparison	
049	NDc	Communication disconnection	
050	VRFDc	Analog disconnection VRF	
051	IRFDc	Analog disconnection IRF	
052	VF2Dc	Analog disconnection VF2	
053	Ai4Dc	Analog disconnection Ai4	
054	Ai5Dc	Analog disconnection Ai5	
055	Ai6Dc	Analog disconnection Ai6	
056	WCVRF	Window comparator VRF	
057	WCIRF	Window comparator IRF	
058	WCVF2	Window comparator VF2	
059	WCAi4	Window comparator Ai4	
060	WCAi5	Window comparator Ai5	
061	WCAi6	Window comparator Ai6	
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	

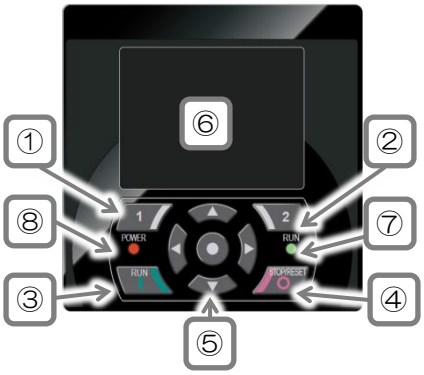
Function No.	Abbreviation	Function name	Page
068	LOG7	Result of logical operation 7	4-41
069 to 075	-	Reserved	
076	EMFC	Forced operation in process signal	
077	EMBP	During-bypass-mode signal	
078	WFT	Trace trigger stand-by signal	
079	TRA	During-tracing signal	
080	LBK	Operation panel battery insufficient	
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	

Note: Output torque monitor is disabled at AA121/221=0 to 6 (V/f control).

Quick Start

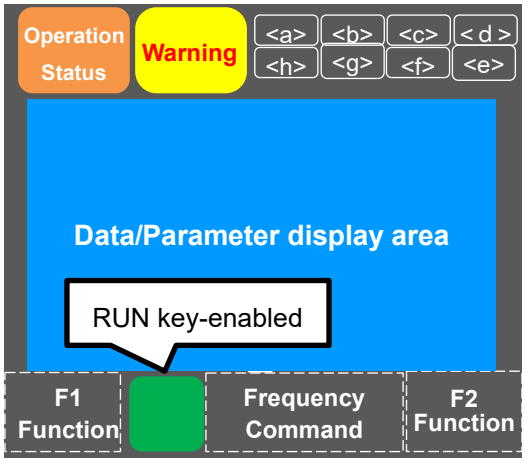
DANGER Thoroughly read “Chapter 1 Safety Instructions” and “Chapter 2 Installation and Wiring” in the Instruction Manual for installation and wiring of the inverter.

How to use the keypad



No.	Description
(1)	F1 key Displays the functions in the lower left corner of the screen (e.g. Return to the top page and Cancel).
(2)	F2 key Displays the functions in the lower right corner of the screen (e.g. Data memory).
(3)	RUN key Runs when the key is enabled.
(4)	STOP/RESET key Selects Deceleration stop and Trip reset.
(5)	Selects data on the screen by using the right/left and the up/down arrow keys and confirms the selection by using the O key at the center.
(6)	Display screen
(7)	RUN LED. Turns on when incoming command for operation.
(8)	POWER LED. Turns on when the power is supplied to keypad.

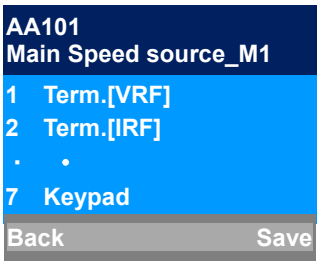
How to read the display screen (6)



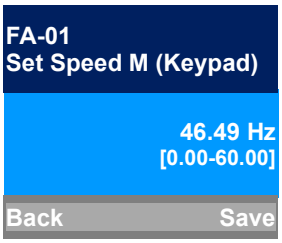
<a>24V supply state, <b> SET function, <c> Parameter display restrictions, <d> Display screen No., <e> Functional safety operation, <f> Command control mode, <h> Special status indication

・Part of the keypad screen is shown in below.

Frequency setting from keypad

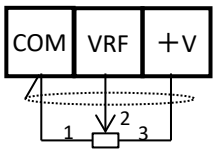


In case of AA101 = 7 set the frequency from Setting.



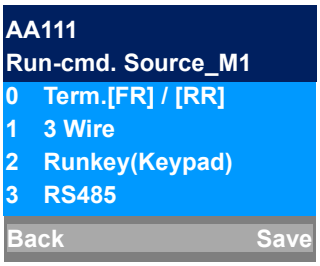
In case of AA101 = 1 set the frequency from the VRF terminal.

Analog input/output

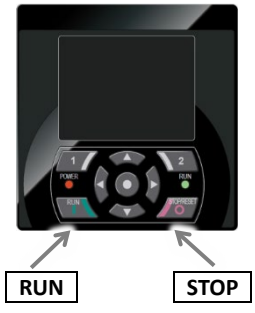


Potentiometer for frequency source (1kΩ, 1W or more is recommended)

Operation setting from keypad

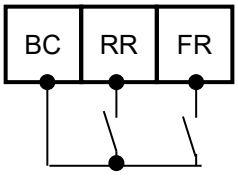


In case of AA111 = 2 set run/stop from the operator keypad.



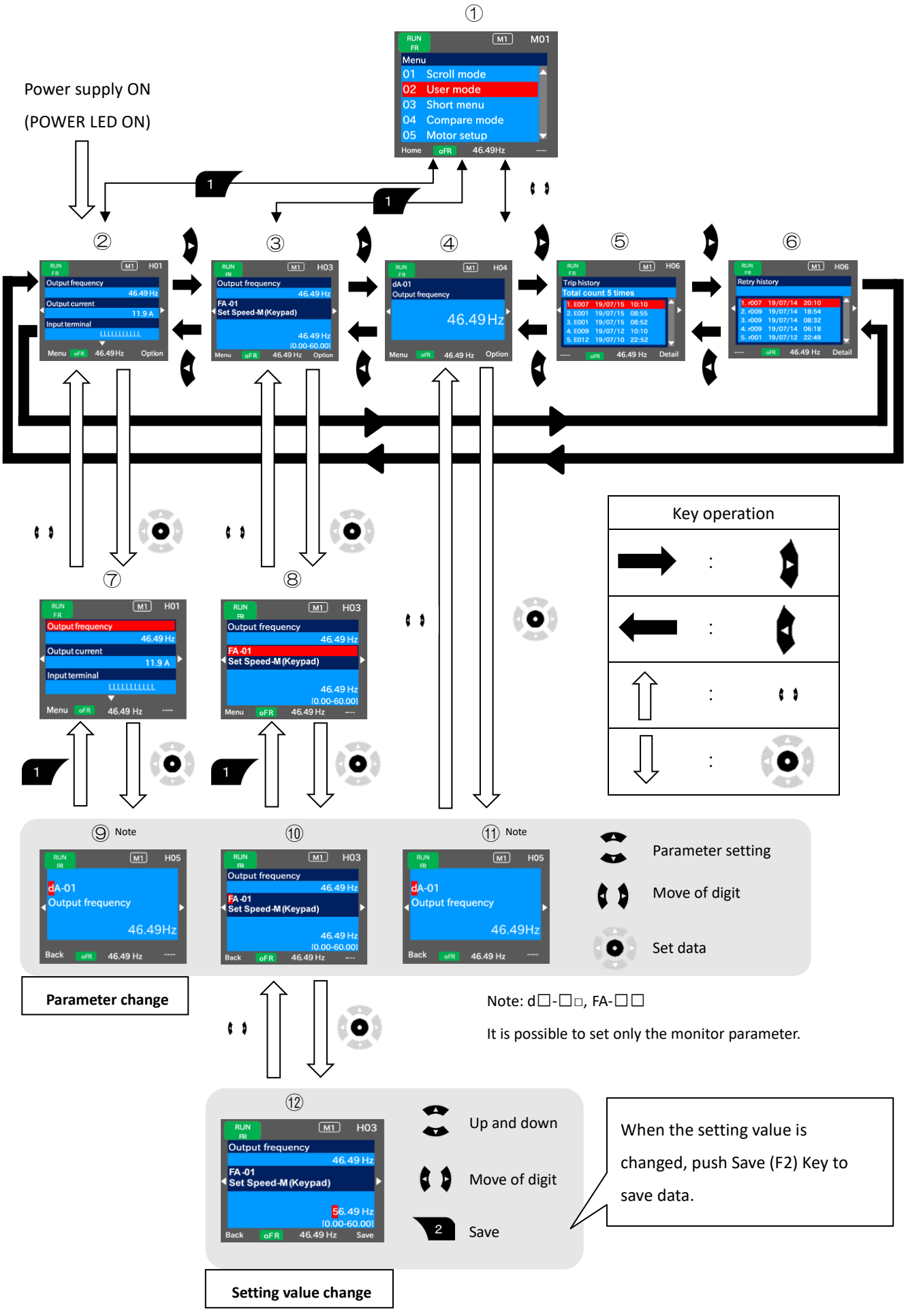
In case of AA111 = 0 set run/stop from the FR/RR terminal.

Input



Although there are many functions on the inverter, you do not need to use all the functions. If you need to set functions in more detail, refer to this Instruction Manual and User’s Guide (You can download from Sumitomo Heavy Industries, Ltd.’ Website).

Transition of Display



Adjustment for Analog Output Signal

1. Selection of Monitor Parameters

Typical monitor parameters using AMV and AMI terminal are showed below table.
(See the HF-430NEO user's guide p.12-25-6.)
Set the monitor parameter at [Cd-04] in the case of using AMV terminal and at [Cd-0] in the case of using AMI terminal.

Typical Monitor Parameter		Range for Output Scale
dA-01	Output frequency monitor	0.00 to Max. frequency [Hz]
dA-02	Output current monitor	(0.00 to 2.00) × Inverter rated current[A]
dA-17	Output torque monitor	0 to Standard torque 500% [Nm]
dA-18	Output voltage monitor	0 to Rated voltage × 133% [V]
dA-30	Input power monitor	0.00 to nverter capacity 200% [kW]

Parameters of adjustment for the analog output (0 to 10V or 4 to 20mA) are showed below table.

Terminal	Analog output	Output selection setting	Bias adjustment	Gain adjustment
AMV	0-10V (Initial setting)	Cd-04	Cd-23 (Initial setting: 0%)	Cd-24 (Initial setting: 100%)
	4-20mA			
AMI	4-20mA (Initial setting)	Cd-05	Cd-33 (Initial setting: 20%)	Cd-34 (Initial setting: 80%)
	0-10V			

Note: Voltage/Current output is selectable using dip switch 3 and 4.

2. Monitor for Output Frequency [dA-01]

In the case of the meter indication for 60Hz (10V F.S.) at 10V using AMV terminal for HF4324-022.
(1) Set the parameter [dA-01] at [Cd-04]. (Initial setting: dA-01)
(2) Max. analog output is value of max. frequency [Hb105: Initial setting 60Hz].

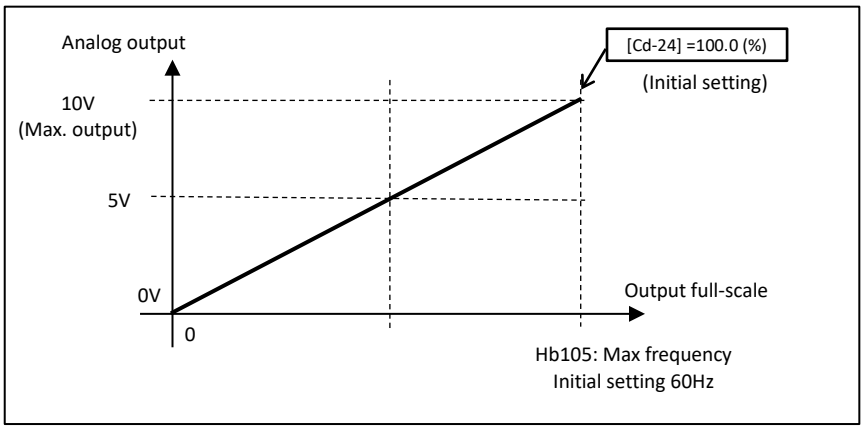


Fig. A2-1 Relation between Analog output and output full-scale

3. Parameter Adjustment for Output Current Monitor [dA-02]
   In the case of the meter indication for 100A (10V F.S.) at 10V using AMV terminal for HF4324-022.
   (1) Set the parameter [Cd-04] at [dA-02].
   (2) Input the value inside the frame for below equation.
   (See chapter 7 of HF-430NEO instruction manual about the inverter rated current.)

$$[Cd\text{-}24] = \frac{\text{Inverter rated current: } 48\ [A] \times 200\%}{\text{Indication for the current meter at 10V: } 100\ [A]} \times (100 - \underbrace{0\ [\%]}_{\text{Cd-23 Initial setting}})$$

$$= 96.0\ [\%] \quad \text{Cd-24 Setting value}$$

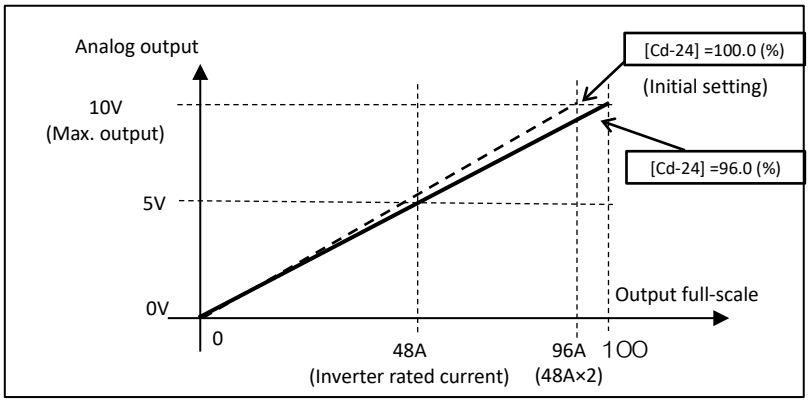


Fig. A2-2 Relation between Analog output and output full-scale

In the case of the meter indication for 100A (10V F.S.) at 20mV using AMI terminal for HF4324-030.
(1) Set the parameter [dA-02] at [Cd-05].
(2) Input the value inside the frame for below equation.

$$[Cd\text{-}34] = \frac{\text{Inverter rated current: } 58\ [A] \times 200\%}{\text{Indication of Current meter at 20mA: } 100\ [A]} \times (100 - \underbrace{20\ [\%]}_{\text{Cd-33 Initial setting}})$$

$$= 92.8\ [\%] \quad \text{Cd-34 Setting value}$$

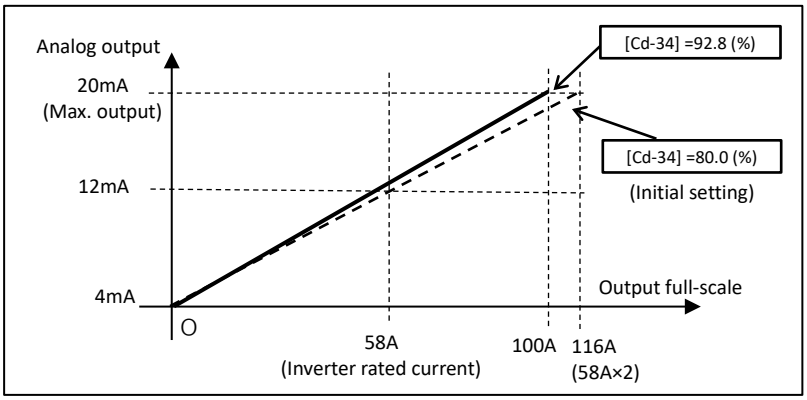


Fig. A2-3 Relation between Analog output and output full-scale

4. Parameter Adjustment for Output Torque Monitor [dA-17]
In the case of the meter indication (10V F.S.) for +200% at 10V and -200% at 0V using AMV terminal for HF4324-5A5.
100% (rated) torque : 79.58 × 5.5(kW) × 4(P) / 60(Hz) ≒ 29.2 Nm
Note: In the case of 00 (V/f control mode) at the control mode selection (AA121/AA221), Output torque cannot monitor.

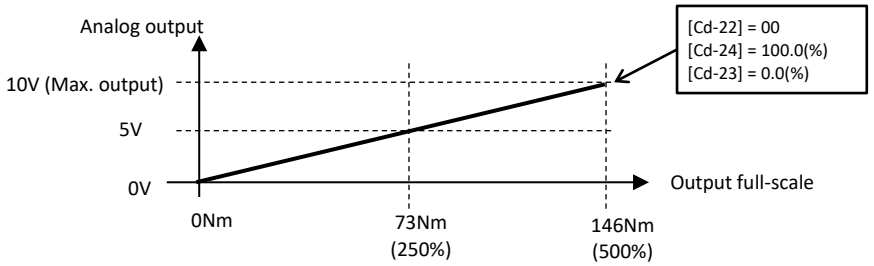
100% (rated) torque

$$[\text{Cd-24}] = \frac{29.2\ [\text{Nm}] \times 500\%}{29.2 \times 400\%\ [\text{Nm}]} \times (100 - 0\ [\%])$$

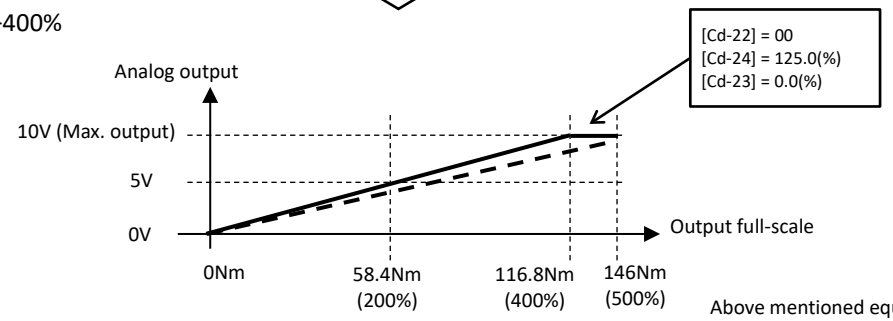
Absolute value for monitor range at 0-10V

Cd-23 Initial setting

(1) Indication of 0% to +500% (Initial setting)



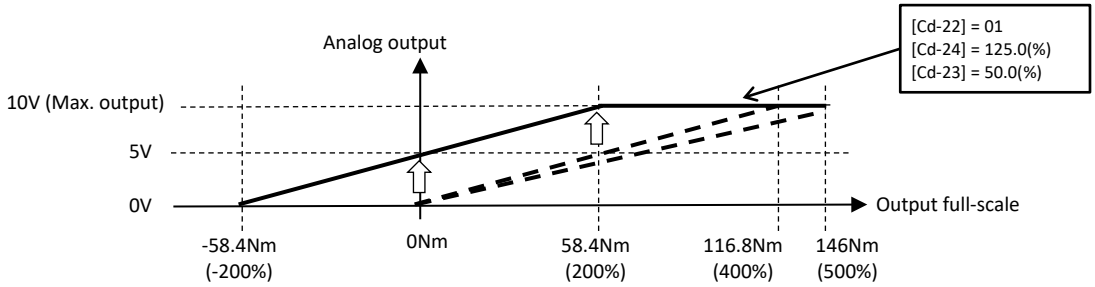
(2) Indication of 0% to +400%



Above mentioned equation

$$[\text{Cd-24}] = \frac{146\ [\text{Nm}]}{116.8\ [\text{Nm}]} \times (100-0) = 125.0\%$$

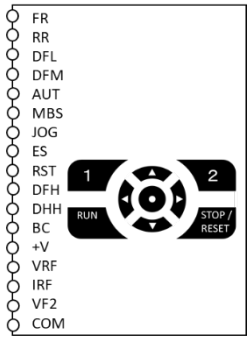
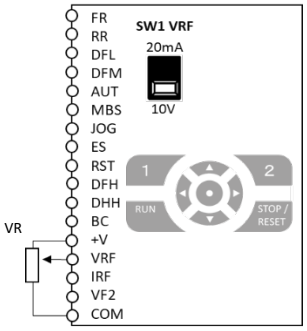
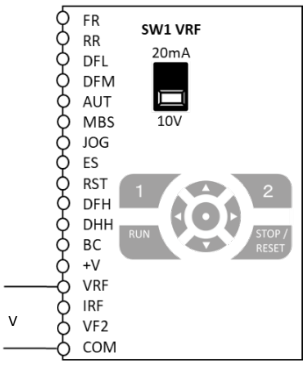
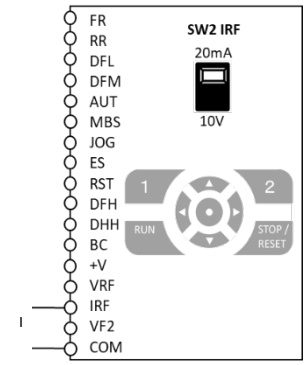
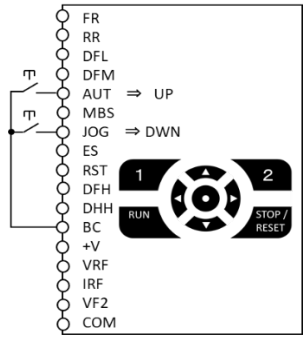
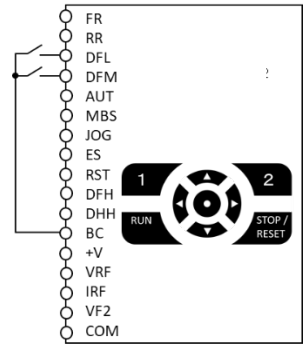
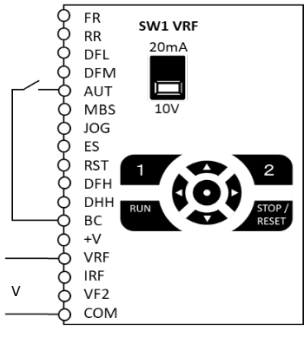
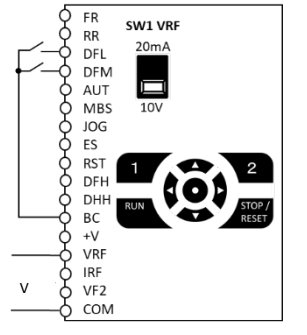
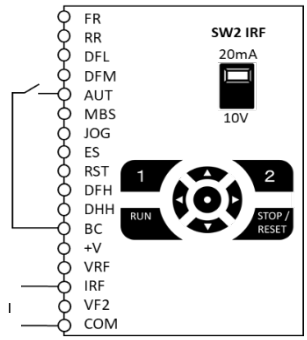
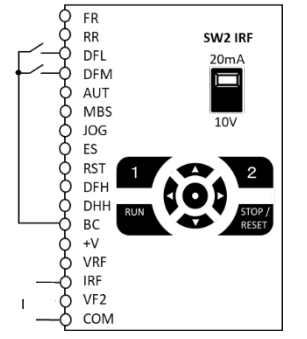
(3) Indication of -200% to +200%

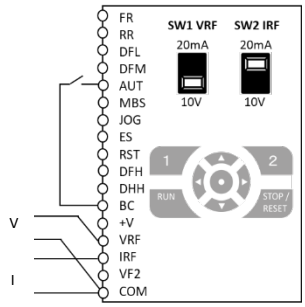
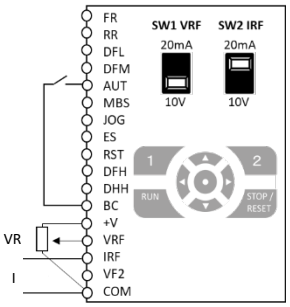


Cd-22: Selection of data type (00: absolute 01: signed)

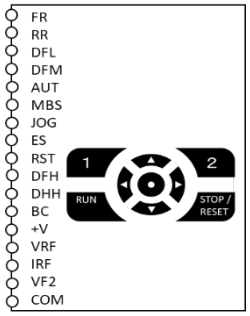
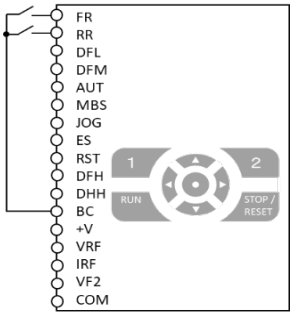
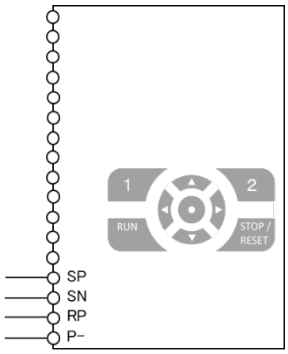
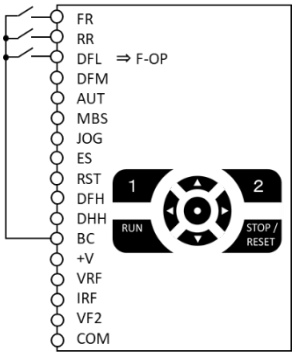
Cd-23: Max. output (the ratio of 10V or 20mA to %)

Setting methods for frequency

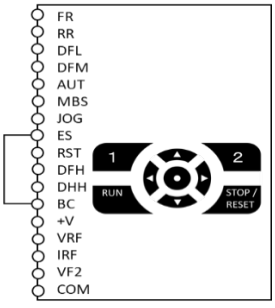
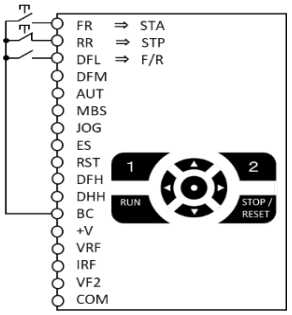
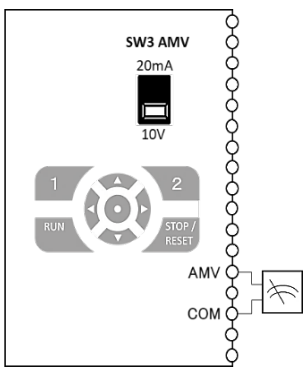
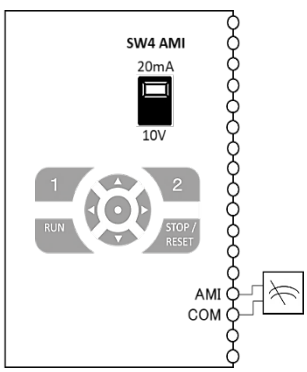
(1) Keypad setting	Parameter setting	(2) Potentiometer (VR) setting	Parameter setting
	AA101=07 (Initial value) <Reference> Output frequency：Ab110		AA101=01 Dip switch 1=10V (Initial value)
0(3) Voltage signal setting (0-10V)	**Parameter setting**	**(4) Current signal setting (4-20mA)**	**Parameter setting**
	AA101=01 Cb-03=0 (Initial value) Cb-04=100 (Initial value) Cb-05=0 (Initial value) Cb-06=100 (Initial value) Cb-30=0 (Initial value) Cb-31=100 (Initial value) Dip switch 1=10V (Initial value) <Reference> Max. frequency: Hb105		AA101=02 Cb-13=0 (Initial value) Cb-14=100 (Initial value) Cb-15=20 (Initial value) Cb-16=100 (Initial value) Cb-32=0 (Initial value) Cb-33=100 (Initial value) Dip switch 2=20mA (Initial value) <Reference> Max. frequency: Hb105 0-20mA: Cb-15 = 20→0
(5) Up and Down using terminal	**Parameter setting**	**(6) Multi-stage speed**	**Parameter setting**
	AA101=07 (Initial value) CA-05=020 CA-07=021 <Reference> Output frequency: Ab110		AA101=07 (Initial value) CA-03=003 (Initial value) CA-04=004 (Initial value) Mul. stage / DFL / DFM / Frequency speed 0 / OFF / OFF / Ab110 or FA-01 speed 1 / ON / OFF / Ab-11 speed 2 / OFF / ON / Ab-12 speed 3 / ON / ON / Ab-13 Ab110 and FA-01 is set at same time.
(7) Change (0-10V/Keypad)	**Parameter setting**	**(8) Change (0-10V/Multi-stage)**	**Parameter setting**
	AA101=01 AA102=07 AA105=00 (Initial value) CA-05=015 (Initial value) Dip switch1=10V (Initial value) <Reference> Output frequency: Ab110 AUT-BC Open: Voltage AUT-BC Closed: Keypad		AA101=01 CA-03=003 (Initial value) CA-04=004 (Initial value) Dip switch1=10V (Initial value) Mul. stage / DFL / DFM / Frequency speed 0 / OFF / OFF / Ab110 or FA-01 speed 1 / ON / OFF / Ab-11 speed 2 / OFF / ON / Ab-12 speed 3 / ON / ON / Ab-13 Ab110 and FA-01 is set at same time.
(9) Change (4-20mA/Keypad)	**Parameter setting**	**(10) Change (4-20mA/Multi-stage)**	**Parameter setting**
	AA101=02 AA102=07 AA105=00 (Initial value) CA-05=015 (Initial value) Dip switch2=20mA (Initial value) <Reference> Output frequency：Ab110 AUT-BC Open: Current AUT-BC Closed: Keypad		AA101=02 CA-03=003 (Initial value) CA-04=004 (Initial value) Dip switch2=20mA (Initial value) Mul. stage / DFL / DFM / Frequency speed 0 / OFF / OFF / Ab110 or FA-01 speed 1 / ON / OFF / Ab-11 speed 2 / OFF / ON / Ab-12 speed 3 / ON / ON / Ab-13 Ab110 and FA-01 is set at same time.

(11) Change (0-10V/4-20mA)	Parameter setting	(12) Change (VR/4-20mA)	Parameter setting
	AA101=01 AA102=02 AA105=00 (Initial value) CA-05=015 (Initial value) Dip switch1=10V (Initial value) Dip switch2=20mA (Initial value) <Reference> AUT-BC Open: Voltage AUT-BC Closed: Current		AA101=01 AA102=02 AA105=00 (Initial value) CA-05=015 (Initial value) Dip switch1=10V (Initial value) Dip switch2=20mA (Initial value) <Reference> AUT-BC Open: Voltage AUT-BC Closed: Current

Setting methods for run command

(13) Run using keypad	Parameter setting	(14) Run using terminal signal	Parameter setting
	AA111=02 (Initial value) <Reference> AA-12: Selection for FR or RR		AA111=00 CA-01=001 (Initial value) CA-02=002 (Initial value)
(15) Serial communication	**Parameter setting**	**(16) Change (Keypad/Terminal)**	**Parameter setting**
	AA111=03		AA111=02 (Initial value) CA-03=023 CA-70=07 CA-71=00 (Initial value) <Reference> (F-OP)-BC Open: Panel (F-OP)-BC Closed: Terminal When F-OP is ON in the motor running, the motor stops at once.

Others

(17) External alarm signal	Parameter setting	(18) 3Wire	Parameter setting
	CA-08=033 8Initial value) <Reference> When ES-BC is closed, alarm signal is ON.		AA111=01 CA-01=016 CA-02=017 CA-03=018 <Reference> STA: contact a STP: contact b Refer to User's guide 「p.12-5-3」.
(19) Current monitor using 0-10V	**Parameter setting**	**(20) Current monitor using 4-20mA**	**Parameter setting**
	Cd-04=dA-02 Cd-23=0.0 (Initial value) Cd-24=100.0 (Initial value) Dip switch 3=10V (Initial value) <Reference> Inverter rated current × 2 = 100 (10V) (at 0% = 0V) Max. value adjust: Cd-24		Cd-04=dA-02 Cd-33=20.0 (Initial value) Cd-34=80.0 (Initial value) Dip switch 4=20mA (Initial value) <Reference> Inverter rated current × 2 = 100 (20mA) (at 0% = 4mA) Max. value adjust: Cd-34.

Wiring Separately to the Control Circuit Power Supply

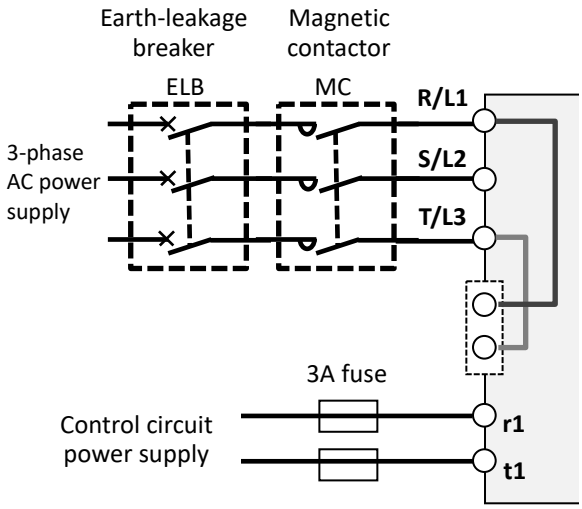
・When the protection circuit of the inverter operates and shuts off the magnetic contactor on the input source of inverter, there will be no power supply that controls the inverter, and the alarm signal of the output terminal function [AL] cannot be retained.
To retain the alarm signal, use the control circuit power supply r1 and t1.

・By the following procedure, connect the terminals for control circuit power supply r1 and t1 to the primary side of the magnetic contactor.
(1) Loosen the screws and remove the wires connected to r1 and t1.
(2) Remove the whole J51 connector.
(3) Connect the control circuit power supply to r1 and t1.

Do
- For r1/t1 terminal wire (terminal screw size: M4), use a wire whose diameter is 1.25mm^2 or larger. The recommended tightening torque is 1.2Nm (maximum of 1.4Nm).
- Connect a 3A fuse to the power line for the control circuit.

- To create a separate line for the control circuit power supply, remove the J51 connector and directly connect the power supply (two wires of the main circuit voltage). If there is abnormality on the main circuit area, you can change or read internal data while the main circuit area is turned off.
- By inputting 24V from an external source, you can change or read data only with the input of 24V power supply.

- If you turn on the control circuit power supply r1 and t1 in advance with the main circuit power supply R, S, and T, ground fault detection is performed upon main circuit power-on.
- When connecting a DC power supply to the control circuit power supply r1 and t1, select the NO(00) state by the output terminal [UPF] to [DHH] active state parameters ([CC-11] to [CC-17]). The signal output may chatter when DC power is shut off. Please be careful.



- Specification of power receipt on the control circuit power supply
200V class: 200 to 240VAC (+10%, -15%) (50, 60Hz ±5%) (282 to 339VDC)
400V class: 380 to 500VAC (+10%, -15%) (50, 60Hz ±5%) (537 to 707VDC)

Caution for the Test Drive

- When performing the test drive under the next conditions, read the notes below carefully and change the parameters for HF-430NEO.
  (1) Check the Input/Output of the inverter without the motor connection.
  (2) Test drive when the motor capacity smaller than the inverter capacity is connected.

- When the motor capacity corresponding to the inverter is connected, the following precautions do not apply at the test drive and the check of the Input/Output for the inverter.

Danger

- **Risk of electric shock or fire！**

- When performing the test drive that the motor is not connected or the motor capacity smaller than the inverter capacity is connected, high voltage and large current may be output from the inverter with [AA121] 1st-control mode set from 04 to 12.

- When checking the Input/Output of the inverter without the motor connection.
  Change the parameter setting of [AA121] 1st-control mode to 00 (V/f constant torque characteristics).

- When performing the test drive that the motor capacity smaller than the inverter capacity is connected.
  Change the parameter setting of [AA121] 1st-control mode to 00 (V/f constant torque characteristics).
  Change the parameter setting of [bA120] 1st-overcurrent suppression enable to 01(Enable).
  Change the parameter setting of [bA121] 1st-overcurrent suppression level to the rated current for the motor to use.

- After the test drive, change the above parameter setting back to the previous setting and use it.
- When using 2nd- control mode, change the parameter [AA221].

- [AA121] 1st-control mode is set to 08 (sensor-less vector control: initial setting) in the inverter for explosion-proof type.
- When [AA121] 1st- control mode is changed 00 (V/f constant torque characteristics) due to the above test drive, you should change [AA121] setting back to 08 (sensor-less vector control) and drive the motor for explosion-proof type.

- In addition to the above, you should also read chapter 1 “Safety instructions” when driving the Inverter and do the work.

Warranty

Warranty period	The warranty shall be 18 months from date of shipment or 12 months after initial operation, whichever is shorter.
Warranty condition	In the event that any problem or damage to the Product arises during the “Warranty Period” from defects in the Product whenever the Product is properly installed and combined with the Buyer’s equipment or machines maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agreed upon in writing between the Seller and Buyer or its customers; the Seller will provide, at its sole discretion, appropriate repair or replacement of the Product without charge at a designated facility, except as stipulated in the “Warranty Exclusions” as described below. However, if the Product is installed or integrated into the Buyer’s equipment or machines, the Seller shall not reimburse the cost of: removal or re-installation of the Product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the Buyer or its customers.
Warranty exclusion	Not withstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the Product that is caused by: 1.Installation, connection, combination or integration of the Product in or to the other equipment or machine that rendered by any person or entity other than the Seller. 2.Insufficient maintenance or improper operation by the Buyer or its customers such that the Product is not maintained in accordance with the maintenance manual provided or designated by the Seller; 3.Improper use or operation of the Product by the Buyer or its customers that is not informed to the Seller, including, without limitation, the Buyer’s or its customers’ operation of the Product not in conformity with the specifications; 4.Any problem or damage on any equipment or machine to which the Product is installed, connected or combined or any specifications particular to the buyer or its customers; 5.Any changes, modifications, improvements or alterations to the Product or those functions that are rendered on the Product by any person or entity other than the Seller; 6.Any parts in the Product that are supplied or designated by the Buyer or its customers; 7.Earthquake, fire, flood, salt air, gas, lightning, acts of God or any other reasons beyond the control of the Seller; 8.Normal wear and tear, or deterioration of the Product’s parts, such as the cooling fan bearings; 9.Any other troubles, problems or damage to the Product that are not attributable to the Seller.
Others	The Seller will not be responsibility for the installation and removal of the inverter. Any inverter transportation cost shall be born by both Seller and Buyer.

To inverter users:

The inverter described in this operation manual is used for variable-speed operation of 3-phase induction motors for general industry use.

⚠ CAUTION

▼ The inverter described in this manual is not designed and manufactured for use in equipment or a system used under the following conditions that will directly lead to death or injury: atomic energy control, aerospace equipment, traffic equipment, medical instrument and all kinds of safety devices. When our products are applied to the above equipment or system, be sure to consult us.

▼ Our products are manufactured under stringent quality control. However, install a safety device on the equipment side in order to prevent serious accidents or loss when our products are applied to equipment that may cause serious accidents or loss due to failure or malfunction.

▼ Do not use the inverter for any load other than 3-phase induction motors.
When an explosion-proof motor is selected, pay attention to the installation environment, because the inverter is not of an explosion-proof type.

▼ Carefully read the “Operation Manual” before use for correct operation.
Read the manual carefully also for long-term storage.

▼ Electrical work is necessary for installation of the inverter. Leave the electric work to specialists.

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Specifications, dimensions, and other items are subject to change without prior notice.

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No.DM3401E-1.9
EA15 Printed 2024.02