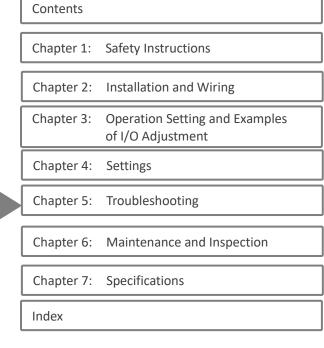


Introduction

Ps-H100 SERIES

Basic Guide HITACHI Ps-H100 Series Inverter

Ps-H100





If you have any inquiry or problem,
Refer to Chapter 5 Troubleshooting
or
Contact the Technical Inquiry Service
for Inverter.

When making a contact, inform the reference number on below.

Introduction

Thank you for purchasing Hitachi Ps-H100 Series Inverter. This is a guide that describes the basic handling and maintenance of the Ps-H100 Series Inverter.

- About the Basic Guide (this document)
 The Basic Guide provides the minimum information
 necessary for handling the product. Please make sure to
 read this document.
- Handling an optional products

 If you use the inverter with optional products, also you should read the instruction enclosed in those products.

Cautions

■ Proper use of the inverter

Please read the Basic Guide, and optional products instruction before handling. Read carefully the Basic Guide, or optional product instruction before handling or performing maintenance of the product.

Before attempting installation, operation, maintenance, and inspection work, you should understand the knowledge of equipment, information of safety, precaution and how to use and service the inverter.

Cautions

No part of this document may be reproduced or reformed in any form without the publisher's permission.

The contents of the document are subject to change without prior notice.

If you lose the Basic Guide and need another one in printed form, you will be charged for resupply, so please keep it carefully.

You "CANNOT DO" what is not described in Basic Guide. We are not responsible for any impact from operations regardless of unexpected failure or accident due to the operation or handling of the product in a manner not specified in Basic Guide. We apologize in advance for any inconvenience this may cause.

If you find any unclear or incorrect description, missing description, or misplaced or missing pages, please takes time to inform Hitachi inverter technical service office.

Note that, the Basic Guide, and the instruction for each optional product enclosed, should be delivered to the end user of the inverter. And also make sure to be accessible any other guides or instruction to the end user.

Method of Inquiry and Product Warranty

Method of Inquiry about Product

 For an inquiry about product damage or faults or a question about the product, notify your supplier or Hitachi inverter technical service office.

Product Warranty

- The product Ps-H100 Series inverter will be warranted by Hitachi Industrial Equipment (Nanjing) Co., Ltd. afterward "HINC", during the warranty period from your date of purchase only under proper usage of product.
- Furthermore, the warranty expressed here is covered only for
 the product delivered from HINC, and will not be responsible
 for others damage or loss of products like a motor or any
 equipment or systems damage caused by improper usage of
 the product. Minimize the consequence on equipment or
 system by applying safety design which is able to notify a
 hazard alarm to the user in case of malfunction or damage of
 the delivered product. The selection and application of
 delivered product must be done with sufficient margin on
 performance, as well as other equipment or system with
 sufficient redundancy design. Also, the compatibility of the
 product with the customer's intended use is not warranted,
 hence the validation test should be done by the customer by
 their responsibility before put in operation.
- In case of delivery a defective product, or encountered a
 defects on quality during a manufacturing process, HINC will
 repair or exchange with free of charge, only when the
 product is in warranty period (afterward, we call "warranty
 service").
- The product will be warranted for one year from your date of purchase. However, depending on case, sending technical assistance for repairing will be charged to the customer. Also, HINC will not be responsible of any readjustment or testing on site.
- After warranty service, the exchanged or repaired part will be warranted for 6 month from date of warranty service. HINC will be responsible for repair or exchange of defective part only for the exchanged or repaired part only during this warranty period.

- Inverter Model: It is beginning with PsH100- in specification label.
- Manufacturer Number (MFG No.): It shows in specification label.
- Date of purchase: Customer's purchased period.
- Inquiry contents:
 - · Inform us the defective point and its condition.
 - · Inform us the suspicious content and its detail.
- In order to receive warranty service, you should present the recipe issued by product supplier or any other document that permit to check the purchase date. However, any defects, damage, malfunction or any other failure caused by one of the following facts will not be covered by warranty service.
 - (1) Cannot confirm the purchase date.
 - (2) The damage or fault resulted from improper usage or inadequate handling of the product and not conforming usage described into the basic guide.
 - (3) Incorrect usage of product, inadequate setting of product and optional product, remodeling or inadequate repair and repair carried out by unqualified repair center.
 - (4) Deterioration and wear resulted from normal operation.
 - (5) Fault resulted from natural disaster, such as earthquake, fire disaster, lightning strike, pollution, salt pollution, or abnormal voltage or any others external factor.
 - (6) Shock, falling, or Vibration resulted during transportation or displacement after purchase.
 - (7) Damage or fault resulted from remodeling firmware by unqualified personal not belonging to HINC.
 - (8) Damage or fault resulted from customer's made programing function (EzSQ).
- By warranty service, might lose the data stored inside the product, as well as, customers made (EzSQ) program. Make sure to back up by own responsibility. However, in case of malfunction resulting from the circuit board of the storage devices, the backup will not be possible. It is recommended to keep a backup during the testing phase by using keypad VOP (option) or PC software ProDriveNext.

Liability Limitation

- Neither HINC, Affiliated company nor related dealer are liable to the written and unwritten public requirement including the common sense of the product or requirement in specific application.
- Even more, HINC, affiliated company or related dealer are not responsible of any incidental damage, special damage, direct loss, or indirect loss (even predictable or not) resulted on customer because of product defect.

Warranty Service

- The customer is able to receive a warranty service from product supplier or service station, if the product does not meet the function described on basic guide.
- Contact your supplier or local Hitachi inverter sales office for fare-paying services.

Change on Product Specification

 We are sorry because any information described in Brochure, Basic Guide, or Technical Document would be modified without notice

Precaution for Product Application

- The product should apply following the condition of use, handling method and precautions described in Basic Guide.
- The installed product should be confirmed previously by own that the product installation has done as intended in the customer system.
- · When using Hitachi inverter consider on below
 - (1) Select inverter with sufficient capacity for rate current and performance.
 - (2) Safety design, for example, redundant system design.
 - (3) Equipment design where minimize hazard in case of inverter failure.
 - (4) For safety precautions, make a system configuration that alarms the hazard to user.
 - (5) Periodic maintenance of Hitachi inverter and customer's equipment.
- Hitachi inverter is designed and manufactured intentionally
 to be applied for general industrial equipment application.
 It is not intended to be used for the applications listed
 below therefore. In case inverter is used for these
 applications, it is out of warranty unless there is a special
 written agreement. Otherwise, the product will not be
 warranted.
 - Special application such as aircraft, spacecraft, nuclear, electric power, passenger transportation, medical, submarine repeater, etc.
 - (2) For application such as elevator, amusement equipment, medical equipment which might have a big effect on human life and property.
- Even for above application, in case there is an agreement for the limitation of the purpose and quality, please contact our sales office. Further study will be carried out to check whether inverter is applicable for that specific application or not.
- For applications that involve human life, or have risk of important loss, make sure to avoid a critical accident by installing a fail-safe device, protecting device, detecting device, alarm device, or spare device, etc.
- This inverter is only for three phase induction motor [IM] or three phase synchronous motor [SM(SMM)].
- For any other application make inquiries.

Supplement

- Refer to "Chapter 7 Specification" for short lifespan component.
- · For optional product refer attached instruction.
- This warranty term will not restrict a legal right of customer who has purchased the product.
- Contact the local supplier for warranty of purchased product sales in oversea.

Contact Information

Hitachi Asia Ltd.

Industrial Components & Equipment Division No.30 Pioneer Crescent, #10-15 West Park Bizcentral, Singapore 628560, Singapore

TEL: +65-6305-7400 FAX: +65-6305-7401

Hitachi Industrial Equipment (Nanjing) Co., Ltd.

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TEL: +86-25-5792-9191 FAX: +86-25-5792-9104

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Chapter 1 Safety Instructions

1.1 Types of Warnings

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

Display meanings



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.



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.



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.

Even more, that "ACAUTION" 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 \triangle 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

Read carefully following safety instruction for handling.

1.3.1 Caution





Incorrect handling may result in personal death or severe injury, or may result in damage to the inverter, motor or the whole system.

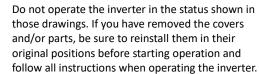


Be sure to read this Basic Guide and appended documents thoroughly before installing, wiring, operating, maintaining, inspecting or using the



Practice

Many of the drawings in the Basic Guide show the inverter with covers and/or parts blocking your view as removed to illustrate the details.



1.3.2 Precautions for installation



WARNING



You run the risk of fire!

Do not place flammable materials near to the installed inverter.



Prevent foreign matter (e.g., cut pieces of wire, sputtering welding materials, iron chips, wire, and dust) from penetrating into the inverter.





- Install the inverter on a non-flammable surface, such as, metal surface.
- Install the inverter in a well-ventilated indoor site not exposed to direct sunlight. Avoid places where the inverter is exposed to high temperature, high humidity, condensation, dust, explosive gases, corrosive gases, flammable gases, grinding fluid mist, or salt water.

Do not install and operate the inverter if it is

You run the risk of injury!

damaged or its parts are missing.



You run the risk of injury due to the inverter falling

Injury

Do not hold its cover parts when carrying the



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.



You run the risk of failure of the inverter!



The inverter is precision equipment. Do not allow it to fall or be subject to high impacts.

Also do not step on it, or place a heavy load on

1.3.3 Precautions for Wiring



DANGER



In jury

Prohibited

You run the risk of electric shock or fire!



Practice

- Be sure to ground the inverter.
- Commit wiring work to a qualified electrician.
- Before wiring, make sure that the power supply



shock Injury

You run the risk of electric shock and injury!



Practice

Perform wiring only after installing the inverter.



Short circuit Ground fault

Prohibited

You run the risk of short circuit and ground

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



You run the risk of failure of the inverter!



Do not pull the wire after wiring.

Prohibited

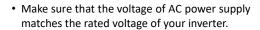
WARNING



Prohibited

You run the risk of injury or fire!

• Do not connect AC power supply to any of the output terminals (U, V, and W).





You run the risk of fire!

- Do not use a single-phase input.
- Do not connect a resistor directly to any of the DC terminals (PD, P, and N).
- Do not use the magnetic contactor installed on the primary and secondary sides of the inverter to stop its operation.



Prohibited • 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).



Flectric

shock

Injury

Practice

You run the 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 and wait for 10 minutes (*1) or 15 minutes (*2) before wiring.
- Practice (*1) PsH100-0148HFC~PsH100-0480HFC
 - (*2) PsH100-075HFC~PsH100-6600HFCD

1.3.4 Precautions to Run and Test Running



DANGER



You run the 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.



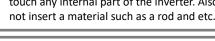
Electric

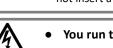
shock

Prohibited

Fire

While power is supplied to the inverter, do not touch any internal part of the inverter. Also do





You run the 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.





In jury

Damage

You run the risk of injury!

machine.

status occurs in retry mode.

 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.)

You run the risk of injury and damage to

Do not select the retry mode for controlling an

elevating or traveling device because free-running



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.



You run the 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.







WARNING

 You run the risk of injury and damage to machine.



Practice

- 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 manufacture of a permitting revolution of the respective motor and machine.
- Check the rotate motor direction, abnormal sound, and vibrations while operating.



You run the risk of burn injury.

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



Prohibited



You run the risk of injury!



Practice

• Install an external brake system if needed.

1.3.5 Precautions for Maintenance/Inspection

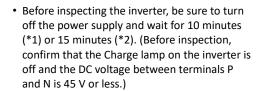


DANGER



Practice

You run the risk of electric shock!





- 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.)
- (*1) PsH100-0148HFC~0610HFC
- (*2) PsH100-0750HFC \sim 6600HFCD

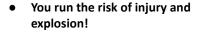
1.3.6 Precautions for disposal



DANGER

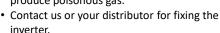


Practice





 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.

CAUTION

1.3.7 Other Cautions



DANGER



 You run the risk of electric shock, fire and injury!

Never modify the inverter.



Prohibited



You run the 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.

(Memo)

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.



Inverter



Basic Guide

The model of the product is as follows:

E.g.: 400V class input voltage

- Configuration and description contents vary depending on the model. Contact your supplier or local Hitachi inverter sales office for more details.
- If the inverter is shipped incorporated with optional products, optional instruction will be enclosed.

PsH100-0148HFC example illustration in below.

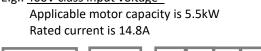


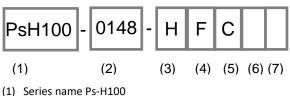
Heat sink

terminals

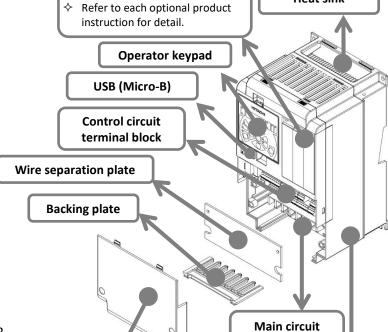
Specification label

Eye bolts for hanging the inverter PsH100-0750HFC~PsH100-6600HFCD



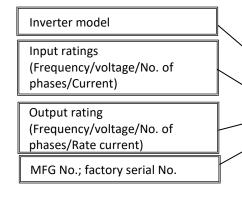


- (2) Rated output current
- (3) Input power specification H: three-phase 400V class
- (4) Panel
 - F: Digital Operator (MOP)
 - T: LCD Operator (VOP)
- (5) Region:
 - C: China/Southeast Asia
- (6) DCL:
 - D: Internally equipped with DCL
- (7) Version:
 - 2: Second generation product



Optional slots

· Specification label example Description example for PsH100-3800HFCD2





Terminal block cover

2.2 Install the Inverter



Transportation

- The inverter is made of plastics component. When carrying the inverter, handle it carefully to prevent damage to the parts.
- 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:

- -10 to 50°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

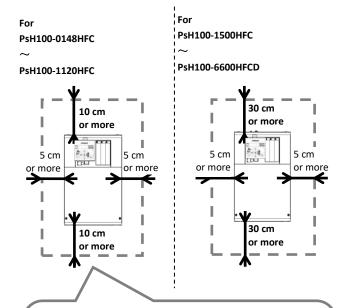
- Avoid installing the inverter in a place where the relative humidity goes above or below the range (20% to 90% RH), as defined by the standard inverter specification. Avoid a place where the inverter is subject to condensation.
- Condensation inside the inverter will result in short circuits, which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



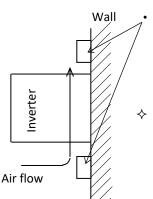
Install inverter on nonflammable

(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.
- Keep sufficient distance between the inverter and other heat sources (e.g., braking resistors and reactors) if they are installed in the vicinity.



- To replace life cycle parts on following models, require a clearance of 22cm or more:
 - •PsH100-0320HFC~PsH100-0480HFC
- To replace life cycle parts on following models is required to remove the installed units:
 - PsH100-0148HFC~PsH100-0250HFC



- 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.



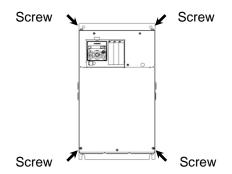
Installation environment

- 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 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

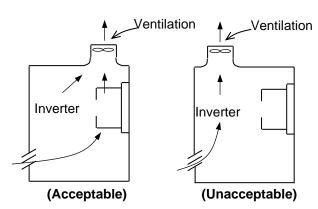
- Install the inverter vertically and securely with screws or bolts on a surface that is free from vibrations and that can bear the inverter weight.
- If the inverter is not installed properly, its cooling performance may be degraded, and tripping or inverter damage may result.





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 invertercooling 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 mounting for the inverter

PsH100-0148H~PsH100-0750H

Requires an optional metal fitting.

- Other models than above can be installed with the originally attached metal fitting. 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.



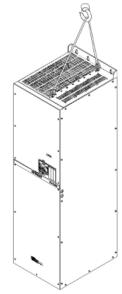
A Precautions for lifting

 Before lifting the PsH100-0910HFC~PsH100-2170HFC models, please tighten the lifting rings inside the packaging box to the threaded holes above the inverter.

(PsH100-3050HFCD~PsH100-6600HFCD models have already installed the lifting rings at the factory)



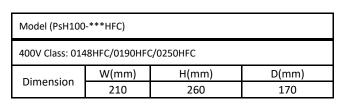
• When lifting vertically, fasten the supplied lifting bolts on the top left and right. Use an appropriate sling tool to achieve an appropriate swing angle in order to maintain sufficient load capacity considering the weight of the inverter. (Figure 2)

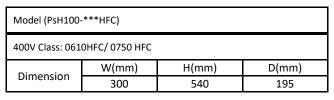


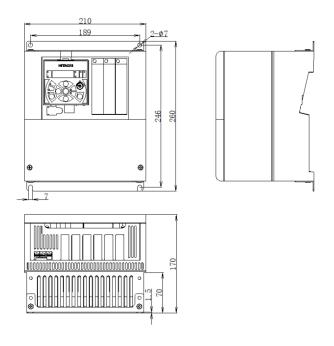
2.3 Dimension Drawing

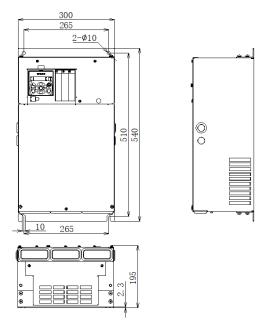
❖ If you add optional parts to the inverter, some extra space is required in the direction of the depth of the inverter depending on the wiring layout. Keep a clearance of 50 mm or more. For details, refer to the instruction manual for each optional product.

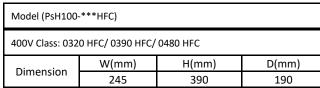
(Eg.) See "Chapter 7 Specifications" for details.

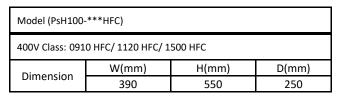


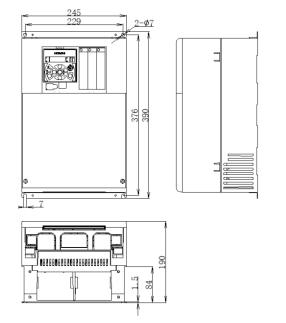


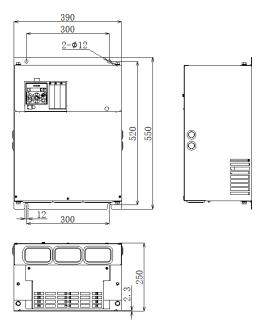




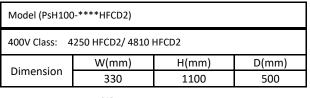


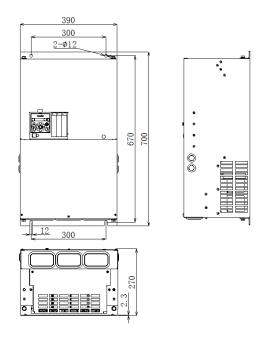






Model (PsH100-***HFC)					
400V Class: 1800 HFC/ 2170 HFC					
Dimensian	W(mm)	H(mm)	D(mm)		
Dimension	390	700	270		

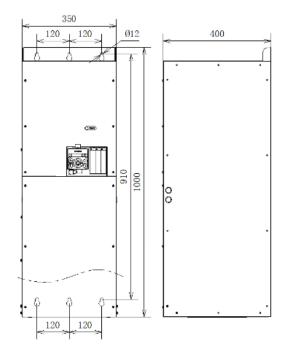


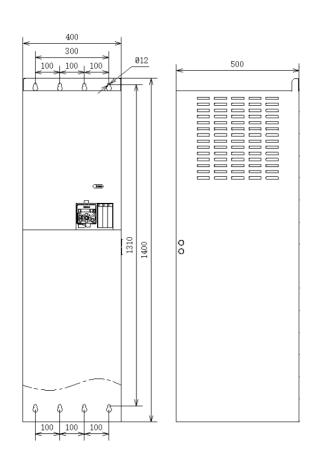


120 120 Ø 12	500
1010	000
\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	

Model (PsH100-***HFCD)					
400V Class : 3050 HFCD/ 3450 HFCD/ 3800HFCD2					
Dimension	W(mm)	H(mm)	D(mm)		
Dimension	350	400			

Model (PsH100-***HFCD)				
400V Class : 5600 HFCD/ 6600 HFCD				
Dimension	W(mm)	H(mm)	D(mm)	
Dimension	400	1400	500	





2.4 Inverter Wiring

Applicable peripheral equipment



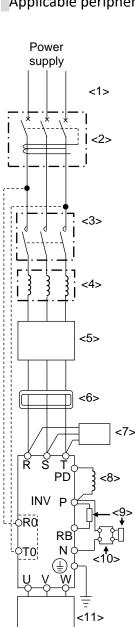
Notes:

- The description of peripheral equipment is for Hitachi 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
- 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 ELCB with rated sensitivity 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.

delayed-type circuit breaker, because the high-speed type may malfunction.

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

	T	500 III 01 less 100
No		Function
<1> <2>	Earth-leakage circuit breaker ELCB or MCCB	See "Recommended cable gauges, wiring accessories, and crimp terminals" on Page 2-8.
<4>		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 (NF-***)	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>	Radio noise filter (Zero-phase reactor) (ZCL-**)	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) (CFI-*)	Use this noise filter to reduce the radiant noise radiated from input cables.
<8>	DC Choke(DCL-*-**)	Use DC chokes to reduce the harmonic generated by the inverter.
<9>	. 0	Use these devices to increase the braking torque of the inverter for operation in which the inverter turns the connected load on and off
<10:	Regenerative braking unit (BRD-***)	very frequently or decelerates the load running with a high moment of inertia.
<11:	Noise filter on the output side (ACF-C*)	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	> Radio noise filter (Zero-phase reactor) (ZCL-***)	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 For reducing vibrations and preventing thermal relay malfunction (ACL-*-**)	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.
<14	> LCR filter	Connect this noise filter between the inverter and motor to convert the inverter output into a sinusoidal waveform and to reduce the motor vibration, motor noise and the radiant noise radiated from cables. Surge voltage can be also controlled.



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<13>

<14>

М

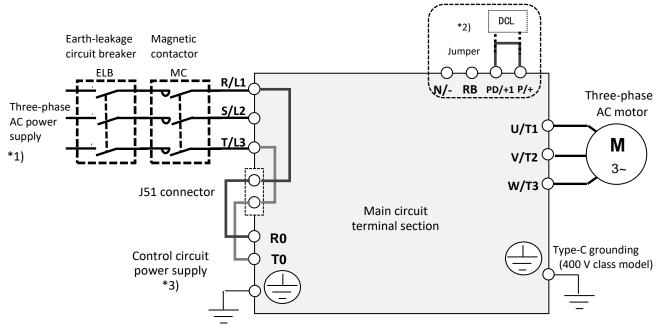
Motor

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.



- 1*) PsH100-0148HFC~PsH100-2170HFC: 380 to 460Vac; PsH100-3050HFCD~PsH100-6600HFCD :380 to 440Vac
- 2*) PsH100-3050~6600 HFCD :Contains DCL without RB terminal; PsH100-0148~2170HFC : Does not contain DCL, with RB terminals.
- 3*) PsH100-3050HFCD~PsH100-6600HFCD: R0, T0 power supply NOT available.

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. Leave these terminals unconnected when using a regenerative converter (HS900A series).
U, V, W (T1, T2, T3)	Inverter output	Connect a Three-phase motor.
PD, P (+1, +)	DC choke connection terminal	Remove the PD-P jumper from terminals and connect the optional DC choke for power factor improvement.
P, RB (+, RB)	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.
	Inverter ground terminal	This serves as a ground terminal for the inverter chassis to ground. Connect 400V class models to Type-C grounding.

- The screw size may vary depending on terminal. Refer to Page 2-8/2-9 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 2-11 or later.
- The tables on Page 2-8/2-9 list the specifications of cables, crimp terminals, and terminal screw tightening torques for reference.

2.6 Recommended wire gauges, wiring accessories, and crimp terminals

■400V class

PsH100-0148HFC 12(3.3) 12(3.3) 12(3.3) M5 5.5-5/5.5-5 3.0/3.0 PsH100-0190HFC 10(5.3) 10(5.3) 10(5.3) M5 5.5-5/5.5-5 3.0/3.0 PsH100-0250HFC 8(8.4) 8(8.4) 8(8.4) M6 8-6/8-6 4.0/4.0 PsH100-0320HFC 8(8.4) 8(8.4) 8(8.4) M6 8-6/8-6 4.0/4.0 PsH100-0390HFC 8(8.4) 8(8.4) 8(8.4) M6 8-6/8-6 4.0/4.0 PsH100-0480HFC 6(13.3) 8(8.4) 6(13.3) M6 8-6/8-6 4.0/4.0 PsH100-0610HFC 3(26.7) 6(13.3) 3(26.7) M6 38-6/14-6 2.5~3.0/- PsH100-0750HFC 1(42.4) 6(13.3) 1(42.4) M6 38-6/14-6 2.5~3.0/- PsH100-1120HFC 1/0(53.5) 4(21.2) - M8 60-8/14-8 15.0/11. PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11.
PsH100-0250HFC 8(8.4) 8(8.4) 8(8.4) M6 8-6/8-6 4.0/4.0 PsH100-0320HFC 8(8.4) 8(8.4) 8(8.4) M6 8-6/8-6 4.0/4.0 PsH100-0390HFC 8(8.4) 8(8.4) 8(8.4) M6 8-6/8-6 4.0/4.0 PsH100-0480HFC 6(13.3) 8(8.4) 6(13.3) M6 8-6/8-6 4.0/4.0 PsH100-0610HFC 3(26.7) 6(13.3) 3(26.7) M6 38-6/14-6 2.5~3.0/4 PsH100-0750HFC 1(42.4) 6(13.3) 1(42.4) M6 38-6/14-6 2.5~3.0/4 PsH100-1120HFC 1/0(53.5) 4(21.2) - M8 60-8/14-8 15.0/11. PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11.
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PsH100-0480HFC 6(13.3) 8(8.4) 6(13.3) M6 8-6/8-6 4.0/4.0 PsH100-0610HFC 3(26.7) 6(13.3) 3(26.7) M6 38-6/14-6 2.5~3.0/4 PsH100-0750HFC 1(42.4) 6(13.3) 1(42.4) M6 38-6/14-6 2.5~3.0/4 PsH100-0910HFC 1(42.4) 6(13.3) - M8 60-8/14-8 15.0/11 PsH100-1120HFC 1/0(53.5) 4(21.2) - M8 60-8/14-8 15.0/11 PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11
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PsH100-0750HFC 1(42.4) 6(13.3) 1(42.4) M6 38-6/14-6 2.5~3.0/s PsH100-0910HFC 1(42.4) 6(13.3) - M8 60-8/14-8 15.0/11. PsH100-1120HFC 1/0(53.5) 4(21.2) - M8 60-8/14-8 15.0/11. PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11.
PsH100-0910HFC 1(42.4) 6(13.3) - M8 60-8/14-8 15.0/11. PsH100-1120HFC 1/0(53.5) 4(21.2) - M8 60-8/14-8 15.0/11. PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11.
PsH100-1120HFC 1/0(53.5) 4(21.2) - M8 60-8/14-8 15.0/11. PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11.
PsH100-1500HFC 1/0(53.5) 4(21.2) - M8 60-8/22-8 15.0/11.
PsH100-1800HFC $1/0 \times 2(53.5 \times 2)$ 3(26.7) - M10 60-10/22-8 10.0 \sim 12.0,
PsH100-2170HFC 2/0×2(67.4×2) 1(42.4) - M10 60-10/38-8 10.0~12.0
ND 3/0×2(85.0×2) 1/42.4) 80-8/60-10 6.0~10.0/10.0
PsH100-3050HFCD LD 4/0×2(107×2) 1(42.4) - M8 100-8/60-10 (12.0/16.
ND 3/0×2(85.0×2) 80-8/70-10 6.0~10.0/10.0
PsH100-3450HFCD LD 4/0×2(107×2) 2/0(67.4) - M8 150-8/70-10 (12.0/16.
ND ND 2501 will (2012) 2 (2012) 10.0~12
PsH100-3800HFCD2
ND 250kcmil×2(127×2) 150-10/70-10 10.0~12
PsH100-4250HFCD2 LD 300kcmil×2(152×2) 2/0(67.4) M10 150-10/70-10 (16.5)
ND 300kcmil×2(152×2) 150-10/70-10 10.0~12
PsH100-4810HFCD2
ND 400kcmil×2(203×2) 200-10/70-10 10.0~12
PsH100-5600HFCD
ND 500kcmil×2(253×2) 10.0~12
PsH100-6600HFCD LD 600kcmil×2(304×2) 4/0(107) - M10 325-10/100-10 (16.5)

[♦] 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 of crimp terminals 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.

2.7 Applicable circuit breaker

■400V class

			Applicable devices (Input Voltage 400 to 440V)									
	Appli	cable		Without reactor	(DCL or ALI)		With reactor	(DCL or ALI)			
Model	Motor		Motor		Earth-leaka	ge breaker(ELB)	Magnetic C	ontactor(MC)	Earth-leakage	breaker(ELB)	Magnetic Co	ontactor(MC)
	(k\	N)	Example model	Current Rate	AC-1	AC-3	Example model	Current Rate	AC-1	AC-3		
PsH100-0148HFC	5.	.5	EXK60-C	20	HS8	HS20	EXK60-C	15	HS8	HS20		
PsH100-0190HFC	7.	.5	EXK60-C	30	HS8	HS25	EXK60-C	20	HS8	HS20		
PsH100-0250HFC	1	1	EXK60-C	40	HS20	HS35	EXK60-C	30	HS20	HS25		
PsH100-0320HFC	1	5	EXK60-C	50	HS25	HS50	EXK60-C	40	HS25	HS35		
PsH100-0390HFC	18	.5	EXK125-C	75	HS35	HS50	EXK60-C	50	HS35	HS50		
PsH100-0480HFC	2	2	EXK125-C	75	HS50	H65C	EXK60-C	60	HS50	HS50		
PsH100-0610HFC	3	0	EXK125-C	100	HS50	H80C	EXK125-C	75	HS50	H65C		
PsH100-0750HFC	3	7	EXK125-C	125	H80C	H100C	EXK125-C	100	H80C	H80C		
PsH100-0910HFC	4	5	EXK225	150	H80C	H125C	EXK125-C	125	H80C	H100C		
PsH100-1120HFC	5	5	EXK225	200	H100C	H125C	EXK225	150	H100C	H125C		
PsH100-1500HFC	7.	5	EX400	250	H150C	H200C	EXK225	200	H150C	H200C		
PsH100-1800HFC	9	0	EX400	300	H200C	H250C	EXK225	225	H200C	H200C		
PsH100-2170HFC	11	10	EX400	400	H200C	H300C	EX400	300	H200C	H250C		
D.11400 20501150D	ND	132	EX600B	500	H250C	H300C	EX400	350	H250C	H300C		
PsH100-3050HFCD	LD	160	EX600B	600	H400C	H300C	EX400	400	H400C	H400C		
D 11400 04501150D	ND	160	EX600B	600	H400C	H400C	RX400B	400	H400C	H400C		
PsH100-3450HFCD	LD	185	EX600B	600	H400C	H600C	RX400B	500	H400C	H600C		
	ND	185					RX600B	500	H400C	H600C		
PsH100-3800HFCD2	LD	200					RX600B	500	H600C	H600C		
2-114.00 4250115002	ND	200					RX600B	500	H600C	H600C		
PsH100-4250HFCD2	LD	220					RX600B	500	H600C	H600C		
2-11400 404015053	ND	220					RX600B	500	H600C	H600C		
PsH100-4810HFCD2	LD	250					RX600B	600	H600C	H600C		
D-11400 ECONTECT	ND	250					RX600B	600	H600C	H600C		
PsH100-5600HFCD	LD	280					RX600B	700	H600C	H600C		
D-11400 CC0011505	ND	315					RX800B	700	H800C	H800C		
PsH100-6600HFCD	LD	355					RX800B	700	H800C	H800C		
						~						

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 Hitachi 400Vac, 60Hz, 4 pole IE3 motor.

[♦] Refer to the wire gauge table on chapter 2.6 for power line cable.

Electrical endurance for AC-1 magnetic contactor is 500000 times, however, for emergency stop in motor operation will be only 25

Select AC-3 class magnetic contactor for inverter output for application which has an emergency stop or commercial power line operation.

When selecting oversize inverter capacity compare to motor rating, select magnetic contactor according to the inverter capacity.

2.8 Chopper Braking Resistor

Ps-H100 Series has a built-in chopper braking circuit in model below. PsH100-0148H to PsH100-0750H

 By using an optional braking resistor, permit to use for high regeneration load application such as lift or high-speed load.

- Ps-H100 Series can offer when desired a built-in chopper braking circuit in models below.
 - PsH100-0910H to PsH100--1500H
- Using optional braking unit or regenerative 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.

■400V

				Bı	aking F	Resistor	
Model PsH100- ***H	Appli cable motor (kW)	Min. Resis tor (Ω)	Resistor selection Ex. (Ω)	Model	Usage ratio (%)	Short	Rated capacity (kW)
-0148H	5.5	70	100	SRB300-1 ×2 series	7.5	5	0.6
-0190H	7.5	70	100	SRB300-1 ×2 series	7.5	5	0.6
-0250H	11	35	70	SRB400-1 ×2 series	7.5	7.2	0.8
-0320H	15	35	50	RB1 ×2 series ×2 parallel	10	10.4	1.6
-0390H	18.5	24	35	RB2 ×2 series ×2parallel	10	15.2	2.4
-0480H	22	24	35	RB2 ×2 series ×2parallel	10	15.2	2.4
-0610H	30	20	25	RB1 ×2 series ×4parallel	10	20.8	3.2
-0750H	37	15	17	RB3 ×2 series ×2parallel	10	30.8	4.8
-0910H	45	15	17	RB3 ×2 series ×2parallel	10	30.8	4.8
-1120H	55	10	10	CA-KB (10Ω5unit)	10	45	17
-1500H	75	10	10	CA-KB (10Ω5unit)	10	45	17

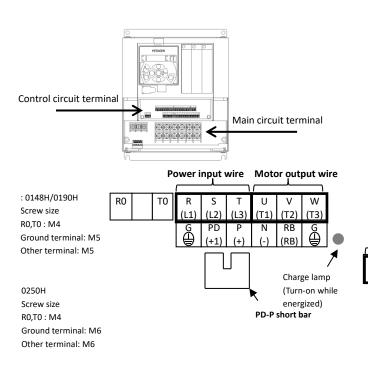
[♦] When using RB2×2series×2parallel, will require in total 4 RB2 units.

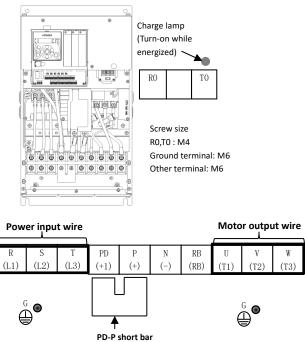
2.9 Wiring



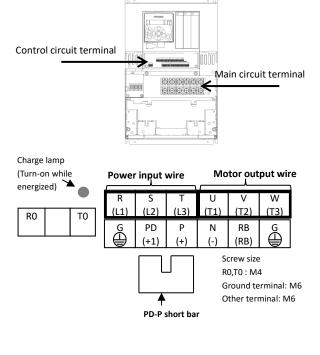
When J51 connector is removed, charge lamp doesn't indicate R0-T0 status. Please make sure that power is off and care for safety. For own safety, make sure to power off before handling the inverter.

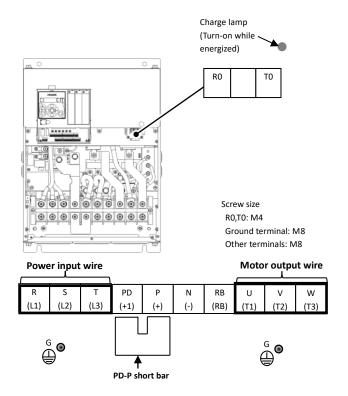
Model PsH100- ***HFC 400V class: 0148HFC, 0190HFC, 0250HFC Model PsH100- ***HFC 400V class: 0610HFC,0750HFC



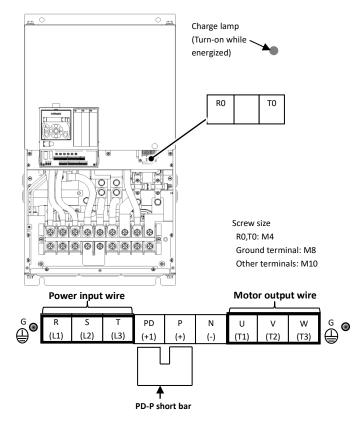


Model PsH100- *** HFC 400V class: 0320HFC, 0390HFC, 0480HFC Model PsH100- ***HFC 400V class: 0910HFC, 1120HFC, 1500HFC



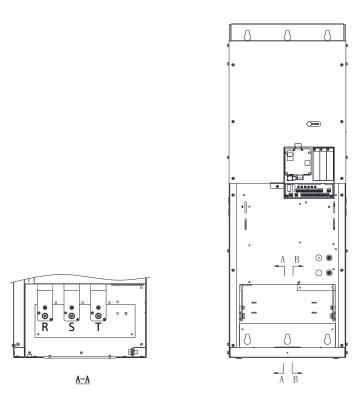


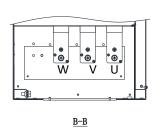
Model PsH100- ***HFC 400V class: 1800HFC,2170HFC



Model PsH100-****HFCD

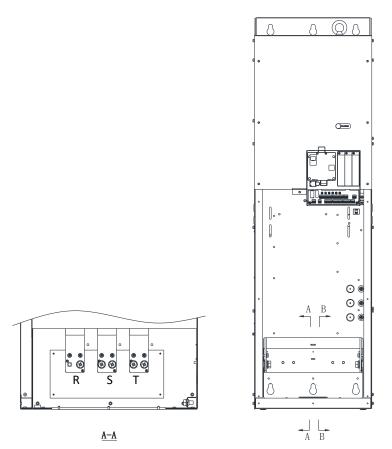
400V class: 3050HFCD,3450HFCD,3800HFCD2

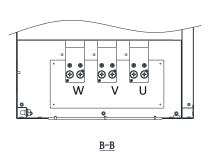




Model PsH100-****HFCD

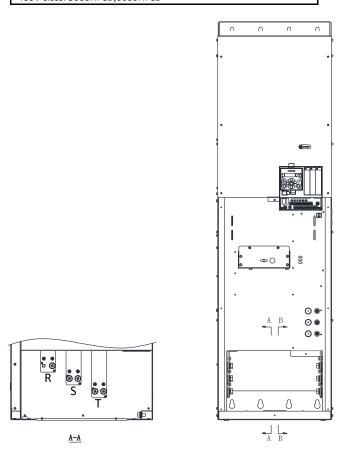
400V class: 4250HFCD2,4810HFCD2

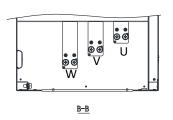




Model PsH100-****HFCD

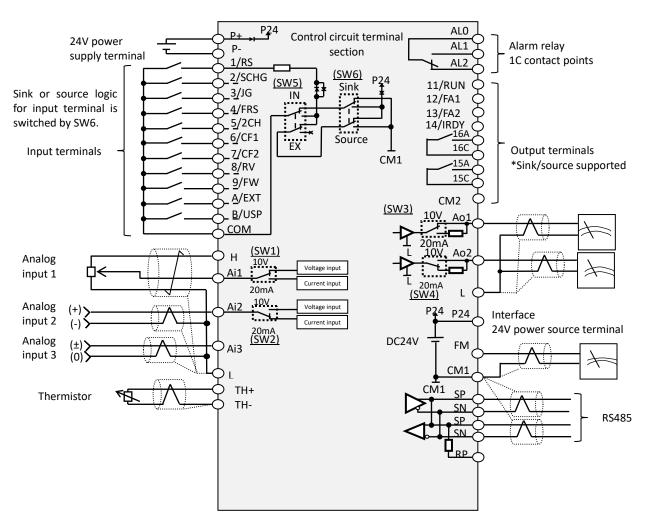
400V class: 5600HFCD,6600HFCD





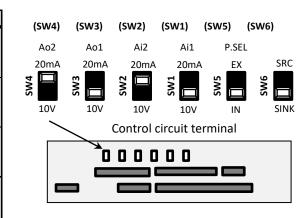
2.10 Wiring of the control circuit

♦ An example for sink logic.



Switch configuration

Label	Switch Name	Description
Ai1 (SW1)	Analog input 1 switch	It changes the input specification of Analog input 1 (Ai1 terminal). 10V: Voltage input is available. 20mA: Current input is available.
Ai2 (SW2)	Analog input 2 switch	It changes the input specification of Analog input 2 (Ai2 terminal). 10V: Voltage input is available. 20mA: Current input is available.
Ao1 (SW3)	Analog output 1 switch	It changes the output specification of Analog output 1 (Ao1 terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
Ao2 (SW4)	Analog output 2 switch	It changes the output specification of Analog output 2 (Ao2 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. Is enabled when SW5 is in IN position. SINK: Switch to Sink logic. SRC: Switch to Source logic.



Make 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 improved reliability of connectivity.
- The control circuit terminal adopts screw type wiring terminal blocks.

Ferrule terminal with sleeves

Crimping tool: CRIMPFOX UD 6-4 or CRIMPFOX ZA 3

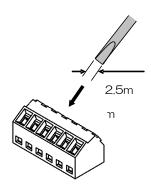
Power cable size mm ² (AWG)	Ferrule terminal Model*	L1 [mm]	L2 [mm]	φd [mm]	φ D [mm]	> < [∅] d □
0.25 (24)	AI 0,25-8YE	4	12.5	0.8	2.0	
0.34 (22)	AI 0,34-8TQ	4	12.5	0.8	2.0	
0.5 (20)	AI 0,5-8WH	4	14	1.1	2.5	φD

^{*)} Manufacturer: Phoenix Contact

Wiring procedure

- 1. Open the insertion hole of the control circuit terminal block into the socket with a slotted screwdriver (with a wide of 2.5mm or less).
- 2. Insert the wire or ferrule terminal into the wire insertion hole (round) while screwing up with a slotted screwdriver.

• Even for pulling out the wire from the socket with a slotted screwdriver (the insertion hole will be opened).





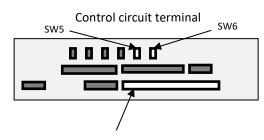


Insert the wire or ferrule terminal into the wire insertion hole while screwing up with a slotted screwdriver.

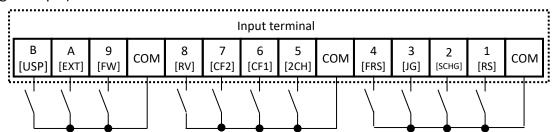
2.11 Control circuit wiring section

Input terminals

- All COMs have the same electric potential.
- Change SW5 to external power source (EX) to connect the power source between Input terminals 1 to 9, A or B, 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
minal		Contact	9, 8, 7, 6, 5, 4, 3, 2, 1	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)
Intelligent input terminal	Digital input	Pulse	А	Pulse input- A	This is a terminal for pulse input. A and B terminals can be used also as an input terminal.	Voltage between an input and COM terminals ON voltage Min.DC18V
Intelligen	Dig		В	Pulse input- B	Terminal functions are selectable according to the parameter settings for each terminal. The maximum input pulse rate is 32kpps.	 OFF voltage Max.DC3V Max. allowable voltage DC27V Load current 5.6mA (at DC27V) Max input pulse rate 32kpps
		Common	СОМ	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.]) [RS:028] Reset

· Reset at every trip.

[SCHG:015] Command source change

 Change to the main speed command [AA101] (OFF) or subspeed command [AA102] (ON).

[JG:029] Jogging

 Run at a frequency of [AG-20] upon receipt of the operation command by [JG]ON.

[FRS:032] Free-run stop

• [FRS]ON sets the motor in a free-run state.

[2CH:031] Two-step acceleration/deceleration

• [2CH] ON enables acceleration/deceleration time-2[AC124] [AC126].

[EXT:033] External trip

• [EXT]ON issues Trip [E012].

[FW:001] Forward rotation and [RV:002] Reverse rotation

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

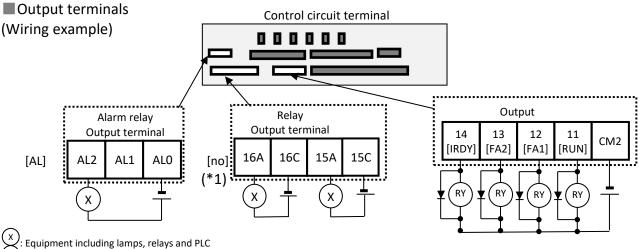
[CF1:003] Multispeed-1 and [CF2:004] Multispeed-2 commands

Multispeed-1 CF1	Multispeed-2 CF2	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 CF3 and 4 allows you to set up to 16-speed.

[USP:034] Unattended start protection

• In a [USP]ON state, if an operation command has been input before the power supply is ON, Trip [E013] is issued.



Equipment including lamps, relays and PLC RY: Relays

• [] it means factory default settings.

	•		Terminal label	Terminal name	Description	Electric characteristics
		Open collector	14 13 12 11	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 CM2 • Voltage drop when turned on: 4 V or less • Max. allowable voltage 27V • Max. allowable current 50mA
minals			CM2	Output (common)	Output (common) This is a common terminal for output	
gent output ter	Digital output		16A,16C ,15A,15C,	1a relay terminal Relays for A contact output	1a relay terminal Relays for A contact output	Maximum contact capacity: • AC250V, 2A(resistance) • AC250V, 1A(inductive load) Minimum contact capacity • DC1V, 1mA
Intelligent output terminals			ALO AL1 AL2	1c relay terminal Relays for C contact output	1c relay terminal Relays for C contact output	Maximum contact capacity: • AC250V, 2A(resistance) • AC250V, 0.2A(inductive load) AL2/AL0: • AC250V, 1A(resistance) • AC250V, 0.2A(inductive load) Minimum contact capacity (common) • AC100V, 10mA • DC5V, 100mA

■ Terminal's default function

[RUN:001] Running signal

• Turns ON during operation (PWM output).

[FA1:002] Frequency-arrival signal

• Turns ON when the output frequency reaches the control frequency.

[FA2:003] Frequency-arrival signal 2

• Turns ON when the output frequency reaches the control frequency [CE-10] to [CE-13].

[IRDY:007]

• Turns ON when is ready for operation.

[OL:035] Overload notice advance signal

 Turns ON when the current exceeds the overload warning level.

[AL:017] Operation

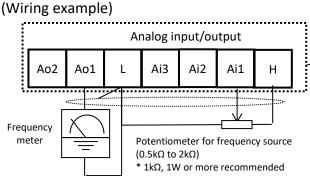
• In case of [CC-17] =00 (factory setting)

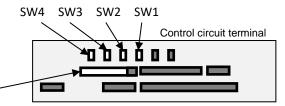
Power supply	Status AL ₀ -AL ₁		AL ₀ -AL ₂
ON	Normal operation	Open	Closed
ON	Tripping	Closed	Open
OFF	_	Open	Closed

• In case of [CC-17] =01

Power supply	Status	AL ₀ -AL ₁	AL ₀ -AL ₂	
ON	Normal operation	Closed	Open	
ON	Tripping	Open	Closed	
OFF	-	Open	Closed	

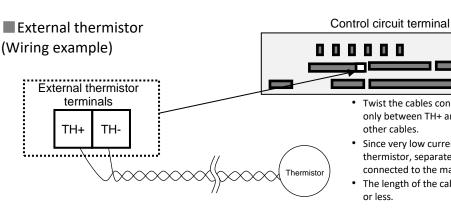
Analog input/output





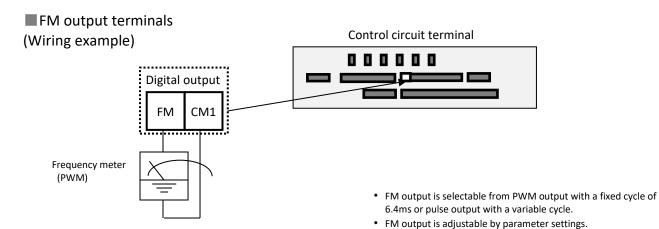
- When variable resistor is connected on H-Ai1-L terminal, voltage input is given to inverter, Sw1 for analog input 1 (Ai1) is to be set on "voltage" side therefore.
- If a frequency meter connected in left example is current type (4 to 20mA), set SW3 for analog output 1 (Ao1) as current output.

		Terminal label	Terminal name	Description	Electric characteristics
	Иррlу	L	COM for analog power supply	COM terminals for analog input terminals (Ai1, Ai2, Ai3) and analog output terminals (Ao1,Ao2). One L terminals are available.	
tput terminal	Power supply	Н	Speed setting power supply	DC10V power supply. Used for voltage input with analog input terminals (Ai1, Ai2,Ai3) using a variable resister.	Max. allowable input current 20mA
		Ai1	Analog input terminal 1 (Voltage/current selector SW1)	Either Ai1 or Ai2 can be used by switching the selector switch to DC0 to 10V voltage input or 0-	For voltage input: Input impedance Approx.10kΩ Allowable input voltage DC-0.3V to 12V
Voltage/current switchable analog input/output terminal	Analog input	Ai2	to 20mA cur	to 20mA current input. Used as speed input and feedback input.	For current input: Input impedance Approx.100Ω Max. allowable input current 24mA
ritchable an		Ai3	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
urrent sw		Ao1	Analog output terminal 1 (Voltage/current selector SW3)		For voltage output: • Max. allowable output current 2mA
Voltage/c	Analog output	Ao2	Analog output terminal 2 (Voltage/current selector SW4)	Either Ao1 or Ao2 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.	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)

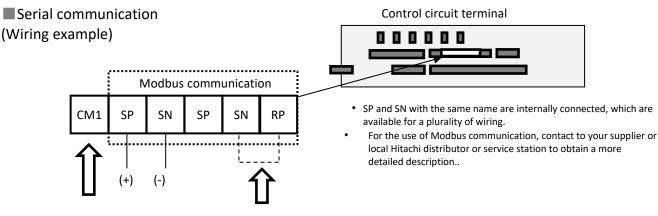


- Twist the cables connected from a thermistor to the TH terminal only between TH+ and TH- and separate the twisted cables from other cables.
- Since very low current flows through the cables connected to the thermistor, separate the cables from those (power line cables) connected to the main circuit.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

		Terminal label	Terminal name	Description	Electric characteristics
terminal	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	DC0 to 5V [Input circuit]
Thermistor t	Analog ir	TH-	Common terminal for external thermistor input	$10,000\Omega. \\ [Recommended thermistor properties] \\ Allowable rated power: 100 mW or more \\ Impedance at temperature error: 3k\Omega$	$\begin{array}{c c} TH & & \downarrow & 1k\Omega \\ \hline Thermistor & & \downarrow & 2k\Omega \\ \hline TH- & & & & \end{array}$



		Termina I label		Terminal name	Description	Electric characteristics
output rminal	output	or output	FM	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
FM	FM	Monit	CM1	COM for digital	This is a common terminal for digital monitor. This is also used as 0V reference potential for P24.	



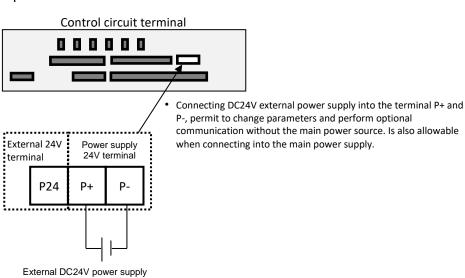
Connect CM1 Into the SG (signal ground) of external devices,

For enabling the termination resistor, short-circuit between RP and SN.

		Terminal label	Terminal name	Description	Electric characteristics
RS485 communication	Serial communication	SP SN RP (CM1)	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)



	Terminal label	Terminal name	Description	Electric characteristics
	P24	24V output power source terminal	This terminal supplies DC24V power for contact signals.	Max. output 100mA
٠, -	CM1	Reference terminal for 24V output	This serves as a 0V reference terminal for contact signal. This is used also as a common terminal for FM output.	
24V power	Terminal for external 24V input (24V)		Input external DC24V power supply to the inverter. 24V power supply input permit to change parameter settings	Allowable input voltage DC24V±10%
	P-	Terminal for external	and perform optional communication operations without control power supply.	Max. allowable current 1A

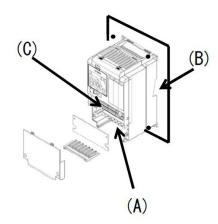
2.12 Residual risk

Parts subject to residual risk

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

Residual risk checklist No.

Targ et secti on	Name of part	<u>↑</u> DANGER	<u>↑</u> WARNING	<u>^</u> 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
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	Installation	Installation	-	CAUTION	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	Installation	Installation	-	CAUTION	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	Installation	Installation	(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	Installation	Installation	-	CAUTION	Damage to parts due to entry of dust and corrosive gases.	Install the product inside a totally enclosed panel.	
6	Installation	Installation	-	CAUTION	Shortened lifetime of parts due to reduced cooling capability by placing the product horizontally.	Install the product vertically.	
7	Installation	Installation	-	CAUTION	A cooling fan failed due to waterdrops or oil mist when the heat sink is positioned outside.	With the heat sink positioned outside, install the product in places free from waterdrops 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	Installation Maintenance	Wiring	-	DANGER	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(*1)/15 (*2)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	Use Maintenance	Wiring Inspection	(C)	DANGER	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(*1)/15 (*2) 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.

^(*2) PsH100-0610HFC~PsH100-2170HFC PsH100-3050HFCD~PsH100-6600HFCD

No.	Operational phase	Work	Part	Residual risk	Details of harm or damage	Preventive measures	1
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)	Installation	Wiring	-	DANGER	Motor damage due to insulation failure caused by motor voltage unmatched.	Use motor according to the inverter voltage class.	
12 (c)	Installation	Wiring	-	DANGER	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.	
	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)						Set adequate value for related function parameter of motor electronic thermal level [bC-01] to [bC125].	
	Use Maintenance	Setting	-	DANGER	Motor damage due high current on motor caused by inadequate parameter setting.	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	General	General			Damage or injury occurrence by missing acquisition of information related to risk	Obtain the latest version of Basic 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.

(Memo)

Chapter 3

See "Chapter 4 Settings" for detailed operating instructions

Operation Setting and

Examples of I/O Adjustment

This chapter describes <u>basic settings</u>, <u>frequency source</u> required for operation, examples of run command <u>source settings</u> and <u>examples of adjusted I/O terminals</u>.

■ Basic settings

3.1 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.	
[Hb102]	Capacity selection	0.01 to 160.00 (kW)	
[Hb103]	Motor poles setting	2 to 48 (poles)	
[Hb104]	Base frequency	10.00 to 590.00 (Hz)	
[Hb105]	Maximum frequency	10.00 to 590.00 (Hz)	
[Hb106]	Rated voltage	1 to 1000 (V)	
[Hb108]	Rated current	0.01 to 10000.00 (A)	

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

Parameter	Details	Setting data
[AA121]	Control pulse setting	11: SM(PMM) Sensorless vector control
[Hd102]	Capacity selection	0.01 to 160.00 (kW)
[Hd103]	Motor poles setting	2 to 48 (poles)
[Hd104]	Base frequency	10.00 to 590.00 (Hz)
[Hd105]	Maximum frequency	10.00 to 590.00 (Hz)
[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.

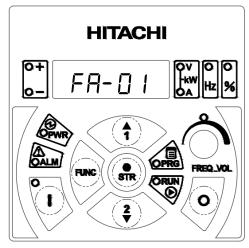
The frequency source and run command source are necessary to drive the motor.

■ Frequency source 1

3.2 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.

Eg.) 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]*)	Main speed command	0.00Hz
[Ab110]*)	Multispeed-0 speed No. 1	0.00Hz

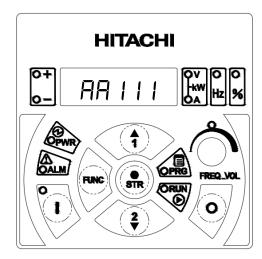
*) While [AA101] = 07, a change made in either [FA-01] or [Ab110] will be automatically reflected in the other. When no change can be made or is reflected in [FA-01], the operator keypad is not specified as a command source by the terminal function or [AA101].

You need to set the frequency value to a value other than 0.00.

■ Run command source 1

3.3 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.

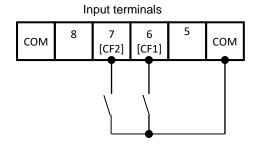
Parameter

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

■ Frequency source 2

3.4 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 source
- Change the frequency command by turning ON/OFF from multispeed input terminals [CF1] and [CF2].

Parameter

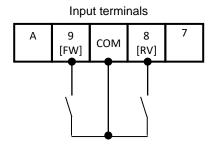
Parameter	Details	Setting data		
[AA101]	Frequency setting from keypad	07		
[FA-01] *1)	Main speed source	0.00Hz		
[Ab110] *1)	Multispeed 0 setting 1 st motor ([CF1]OFF/[CF2]OFF)	0.00Hz		
[Ab-11] *2)	Multispeed 1 setting ([CF1]ON/[CF2]OFF)	0.00Hz		
[Ab-12] *2)	Multispeed 2 setting ([CF1]OFF/[CF2]ON)	0.00Hz		
[Ab-13] *2)	Multispeed 3 setting ([CF1]ON/[CF2]ON)	0.00Hz		
[CA-06]	The terminal 6 for [CF1]	001		
[CA-07]	The terminal 7 for [CF2]	002		

- *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 or 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.

■ Run command source 2

3.5 Operate using FW/RV terminal

• Select [AA111] = 00 [FW][RV] terminal from parameter setting screen.



- Run/stop command
- Run or stop by turning either [FW] terminal or [RV] terminal ON/OFF.

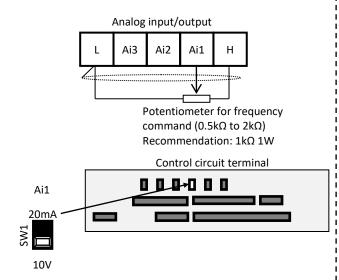
Parameter

Parameter	Details	Setting data
[AA111]	Run using FW/RV terminal	00
[CA-09]	The terminal 9 for [FW]	001
[CA-08]	The terminal 8 for [RV]	002

■ Frequency source 3

3.6 Potentiometer frequency command

- Select [AA101] = 01 Ai1 terminal input from parameter setting screen.
- * Select voltage input (0 to 10V) for Ai1 switch of control circuit board.



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

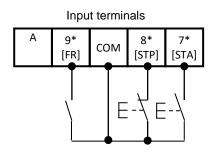
Parameter

Parameter	Details	Setting data
[AA101]	Set as frequency command for Ai1 input terminal.	01

Run command source 3

3.7 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 7[CA-07] = 016; terminal 8[CA-08] = 017; terminal 9[CA-09] = 018



Run/stop command

 To run turn ON [STA] terminal, and turn ON [STP] terminal to stop. Select the rotation direction with [FR] terminal.

Parameter

Parameter	Details	Setting data
[AA111]	Set the operation command for 3WIRE function.	01
[CA-09]	The terminal 9 is [FR].	018
[CA-08]	The terminal 8 is [STP].	017
[CA-07]	The terminal 7 is [STA].	016

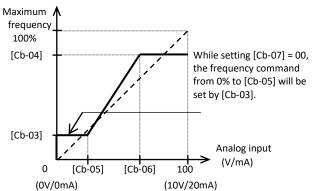
■ Example for adjusting I/O terminals 1

3.8 Adjust the analog input (Ai1/Ai2)

E.g.) Adjust operation (E.g. for Ai1)

• Set the ratio to input to limit the operating range of the frequency command.

(When selecting the frequency through terminal input)

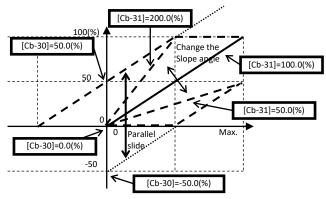


Parameter

Parameter		Dataila		
Ai1	Ai2	Details		
[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.		

• Ai2 adjustment can be done in similar way to Ai1 by using Ai2 parameters in order to Ai1.

E.g.) Make a fine adjustment (E.g. for Ai1)



Parameter

Parameter		Deteile		
Ai1	Ai2	Details		
[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.		

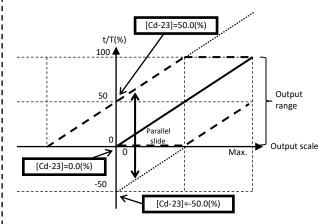
*) Use the switch on control circuit terminal board to change for voltage/current input.

■ Example for adjusting I/O terminals 2

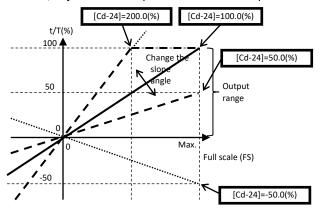
3.9 Adjust the analog output (Ao1/Ao2/FM)

E.g.) Adjust operation (E.g. for Ao1)

· Set a value equivalent to 0% output first.



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



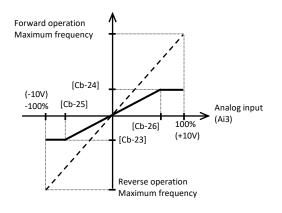
Parameter

Parameter			Dataila
Ao1	Ao2	FM	Details
[Cd-23]	[Cd-33]	1	Adjust the zero-point reference line for voltage output 10V/current output 20mA and data at 100%.
[Cd-24]	[Cd-34]	ı	Adjust the slope for voltage output 10V/current output 20mA and data at 100%.
-	ı	[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%.

■ Example for adjusting I/O terminals 3

3.10 Adjust the analog input (Ai3)

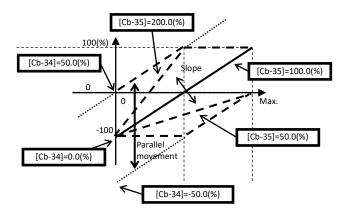
E.g.) Adjust operation (E.g. for Ai3)



Parameter

Parameter	D. A. H.		
Ai3	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.		

E.g.) Make a fine adjustment



■ Parameter

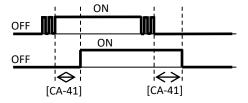
Parameter	Details	
Ai3		
[Cb-34]	Adjust -10V on the reference line for -10V/10V and the frequency.	
[Cb-35]	Adjust the slope of the reference line.	

Example for adjusting I/O terminals 4

3.11 Prevent input terminal malfunction

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

Operation of the input terminal 1 Operation of the internal functions



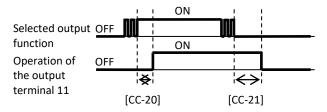
Parameter

Input terminal	Response time	Input terminal	Response time
1	[CA-41]	7	[CA-47]
2	[CA-42]	8	[CA-48]
3	[CA-43]	9	[CA-49]
4	[CA-44]	Α	[CA-50]
5	[CA-45]	В	[CA-51]
6	[CA-46]		

■ Example of adjusted I/O terminals 5

3.12 Stabilize an output terminal

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



■ Parameter

Output terminal	On-delay time	Off-delay time
11	[CC-20]	[CC-21]
12	[CC-22]	[CC-23]
13	[CC-24]	[CC-25]
14	[CC-26]	[CC-27]
15	[CC-28]	[CC-29]
16A-16C *1)	[CC-30]	[CC-31]
AL1-AL0/ AL2-AL0	[CC-32]	[CC-33]

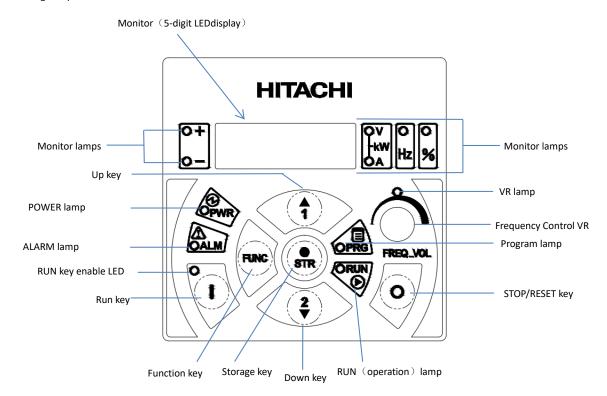
^{*1)} Ps-H100 Series do not have this terminal.

Chapter4 Settings

4.1 Keypad overview

4.1.1Names and Functions of components

How to operate the digital operator



Name	Function
POWER lamp	Lights when the control circuit power is on.
ALARM lamp	Lights to indicate that the inverter has tripped.
RUN (operation) lamp	Lights to indicate that the inverter is operating.
VR lamp	Lights when the VR is effective.
program lamp	Lights when the monitor shows a value set for a function. This lamp starts blinking to indicate a warning (when the set value is invalid).
Monitor	Displays a frequency, output current, or set value.
Monitor lamps	Indicates the type of value and units displayed on the monitor. Hz: frequency V: voltage A: current kW: electric power %: percentage +: positive value -: negative value
RUN key enable LED	Lights up when the inverter is ready to respond to the RUN key. (When this lamp is on, you can start the inverter with the RUN key on the digital operator.)
RUN key	Starts the inverter to run the motor. This key is effective only when the operating device is the digital operator. (To use this key, comfirm that the operating device indicator lamp is on.)
STOP/RESET key	Decelerates and stops the motor or resets the inverter from alarm status.
Function key	Makes the inverter enter the monitor, function, or extended function mode.
Storage Key	Stores each set value.(Always press this key after changing a set value)
Up/Down Key	Switches the inverter operation mode(among monitor,function,and extended function modes) or increases or decreases the value set on the monitor for a function.

4.1.2 Code display system

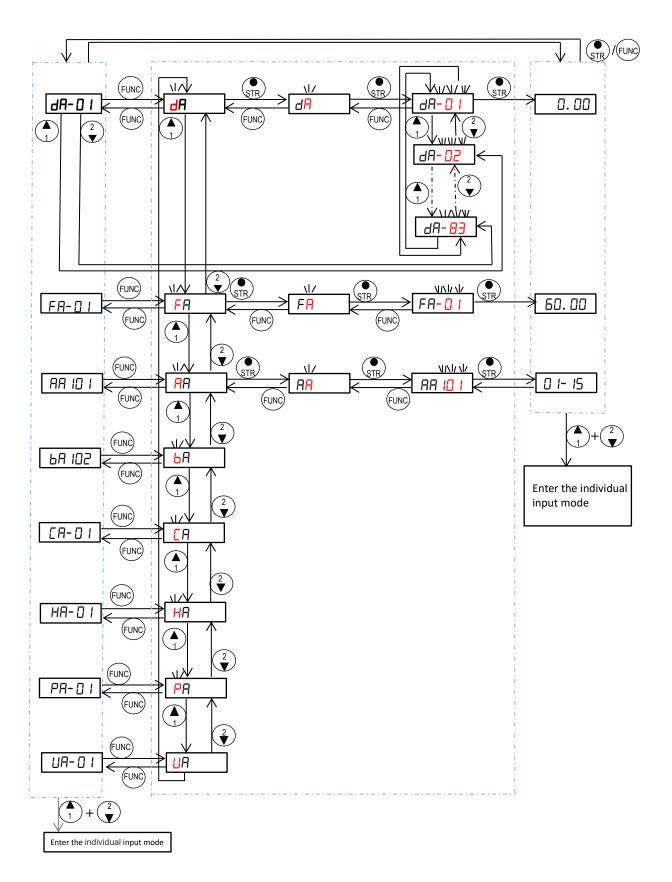
Note: The display contents on the monitor depend on the setting of function "UA-10" (function code display restriction), "UA-91" (initial-screen selection), and "UA-30" (automatic setting of user parameters).

Item	Function code	Data	Description		
	UA-10	00	Full display		
		01	Function-specific display		
Function code display restriction		02	user setting		
		03	Data comparison diaplay		
		04	Basic diaplay (factory setting)		
Initial-screen selection (Initial display at power-on)	UA-91 (*1)	dA-01	Output frequency monitoring (factory setting)		
		dA-02	Output current monitoring		
		dA-03	Rotation direction monitoring		
		dA-06	Scaled output frequency monitoring		
		FA-01	Output frequency setting		
Selection of automatic	UA-30	00	Disable (factory setting)		
user-parameter settings	(*1)	01	Enable		

(*1) Not displayed with the	e factory setting。						_
≪The following procedure €	enables you to turr	n the monitor display	back to 🛮	IA-01	or l	0.00	
Hold down the FUNC keep During this status, press t							
Note:The monitor shows	0.00	only when the moto	or driven by	the inverter is s	topped	.While the m	notor is

Running, the monitor shows an output frequency.

4.1.3 Transition of the monitored data on display



4.1.4 Procedure for directly specifying or selecting a code

You can specify or select a code or data by entering each digit of the code or data instead of scrolling. The following shows an example of the procedure for changing the monitor mode code to extended function code.

Display the monitor mode code.



2 Change to the extended function mode.



Character"d"in the leftmost digit starts blinking. Press the $\binom{\blacktriangle}{1}$ twice.



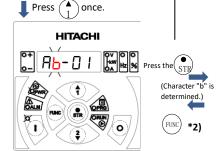
Character"A"is blinking, Pressing the storage key determines the blinking character.

*2) FUNC Press the STR key (to determine character "A").

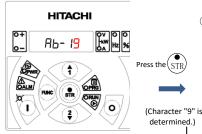
3 Change the fourth digit of the code.



Character "A" is blinking.



Character "b" in the fourth digit is blinking. Since thefourth digit need not be changed, press the [STR] key to determine the character "0".



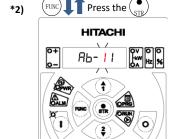
Character "9" in the first digit is blinking.

 \uparrow Press the $\binom{\blacktriangle}{1}$ eight times.

4 Change the first digit of the code"AA101".



Character "1" in the first digit is blinking.



Character "1" in the second digit is blinking. Since the second digit need not be changed, press the [STR] key to determine the character "1".

Press the $\binom{\blacktriangle}{1}$ once .

⑤ Change the second digit of the code"AA101".



Press the STR

6 Change the third digit of the code"AA101".



" in the third digit is blinking. Since the third digit need not be changed, press the [STR] key to determine.

7 End the change of the extended function code.



Selection of code "Ab-19" is completed.

leph If a code that is not defined in the code list or not intended for display is entered, the leftmost digit (fifrth digit) (character "A" in this example) will start blinking again.

Press the (FUNC) key to display the data corresponding To the function code, change the data with the $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$ and/ or $\begin{pmatrix} 2 \\ 2 \end{pmatrix}$ key, and then press the $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$ key to store the changed data. (*4)

Note that you can also use the procedure (steps 1 to 7) described here to change the data. (*3)(*4)

- This procedure can also be used on screens displaying a code other than "dA-01".
- If the $\binom{\text{FUNC}}{\text{key}}$ key is pressed while a digit is blinking, the display will revert to the preceding status for entering the digit to the right of the blinking digit.
- If the $\left(\text{FUNC} \right)$ key is pressed while the leftmost (fifth) digit is blinking, the characters having been entered to change the code will be cancelled and the display will revert to the original code shown before the $\binom{\blacktriangle}{1}$ and $\binom{\blacktriangledown}{2}$ keys were pressed in step 1).

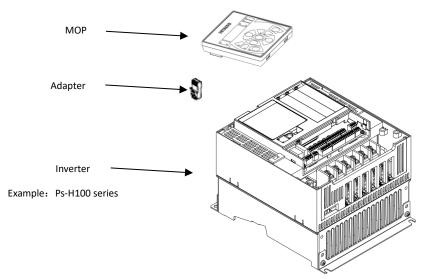
When changing data, be sure to press the $\left(\begin{array}{c} \bullet \\ \text{STR} \end{array} \right)$ key.

4.1.5 Installation and Wiring

4.1.5.1 Installing the standard digital operator into the inverter

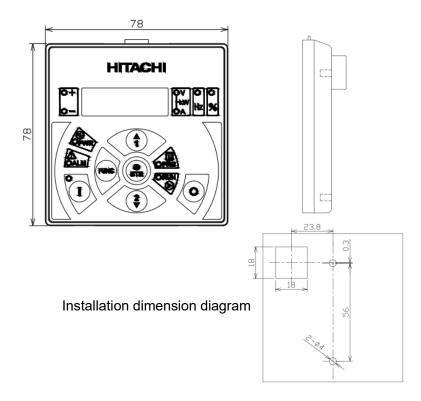
As shown below, vertically press the standard digital operator into the surface cover plate of inverter, until the sound is heard.

Power-on and Confirm that the LED is lighting up.



4.1.5.2 Installing the standard operator into the control cabinent

Installing it According to the following dimensions of the standard operator and Installation dimension diagram.

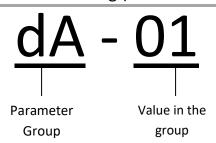


Note: When installing into the control cabinet, please use the communication cable that meets the following specifications.

- \bullet Linear communication cable above 10BASE-T category5 $\,$ (CAT5 $)\,$ of UTP or STP $_{\circ}$
- $\bullet \ \, \text{Within 3m}_{\circ} \qquad \ \, \text{\% \ UTP \ (Unshielded twist pair cable)} \quad \text{STP \ (Shielded twist pair cable)}$

[dA-<u>01</u>] to [dA-<u>41</u>]

4.2 Monitor naming (Nomenclature)



4.3 Description of monitor functions

※For more details, please contact your supplier or local Hitachi inverter sales office.

Monitor data list

■ Monitor mode (d code)

Code/Name	Range (unit)
dA-01 Output frequency monitor	0.00 to 590.00(Hz) <actual frequency="" output=""></actual>
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) *2)	-590.00 to 590.00(Hz) <as target="" value=""></as>
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=""></encoder>
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) *1)	-1000.0 to 1000.0(%) <torque control="" mode="" required=""></torque>
dA-16 Torque limit monitor	0.0 to 500.0(%)
dA-17 Output torque monitor *2)	-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 (pls) Parameter setting other than above -2147483648 to +2147483647(pls)
dA-26 Pulse train position deviation monitor	-2147483647 to +2147483647(pls)
dA-28 Pulse count monitor	0 to 2147483647(pls)
dA-30 Input power monitor	0.00~655.35(kW)
dA-32 Accumulated input power monitor	0.0 to 1000000.0(kWh)
dA-34 Output power monitor	0.00~655.35(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 BRD load rate monitor	0.00 to 100.00(%)

[dA-42] to [dA-83]

	[dA- <u>42]</u> to [dA- <u>83]</u>
Code/Name	Range (unit)
dA-42 Electronic thermal load	
rating monitor (MTR)	0.00 to 100.00(%)
dA-43 Electronic thermal load	
rating monitor (CTL)	00(no input)/01(P-1A)/
dA-45 Safety STO monitor *3)	02(P-2A)/03(P-1b)/ 04(P-2b)/05(P-1C)/ 06(P-2C)/07(STO)
dA-46 Safety option hardware monitor *3)	0000 to FFFF
dA-47 Safety option function monitor *3)	00(no input)/ 01(STO)/ 02(SBC)/03(SS1)/04(SLS)/ 05(SDI)/06(SSM)
dA-50 Control terminal type	00(SH1-TM)/02(P1-TM2)/ 15(not connect)
dA-51 Input terminal monitor	A B 9 8 7 6 5 4 3 2 1 Input B,A,9,8,7,6,5,4,3,2&1: OFF
dA-54 Output terminal monitor	Output (-),14: ON Output AL,15,13,12, 11: OFF
dA-60 Analog input/output status monitor *4)	Ao4 Ao3 Ai4 Ai3 Ao2 Ao1 Ai2 Ai1 Terminal Ao4,Ao3, Ai4, Ai3, Ao1,Ai2,Ai1: Voltage Terminal Ao2: Current
dA-61 Analog input [Ai1] monitor	
dA-62 Analog input [Ai2] monitor	0.00 to 100.00(%)
dA-63 Analog input [Ai3] monitor	-100.00 to 100.00(%)
	0.00 to 100.00(%)
dA-64 Analog input [Ai4] monitor	` ,
dA-65 Analog input [Ai5] monitor	0.00 to 100.00(%)
dA-66 Analog input [Ai6] monitor	-100.00 to 100.00(%)
dA-70 Pulse train input monitor (internal)	-100.00 to 100.00(%)
dA-71 Pulse train input monitor (option)	-100.00 to 100.00(%)
dA-81 Option slot-1 status	00:(none)/01:(P1-EN)/
dA-82 Option slot-2 status	02:(P1-ECT)/03:(P1-PN)/ 05:(P1-DN)/06:(P1-PB) /
dA-83 Option slot-3 status	07:(P1-CCL)/18:(P1-AG) 33:(P1-FB)(only dA-82) 48:(P1-FS)(only dA-83) *5)
*1) (After calculation) means that it is after or addition frequency and calculation su	

or addition frequency and calculation such as torque bias.

^{*2)} dA-17 is invalid when the Control mode selection (AA121/AA221) setting is 00 to 06 (V/f control mode).

^{*3)} The parameter is about Safety function, is not suitable for Ps-H100 series.

^{*4)} dA-60 is available also for the terminals of the option terminal board.

^{*5)}This option is not suitable for Ps-H100 series.

[db-<u>01</u>] to [db-<u>64</u>]

Code/Name	Range (unit)			
db-01 Program download monitor	00(Program is not installed)/ 01(Program is installed)			
db-02 Program No. monitor	0000 to 9999			
db-03 Program counter (Task-1)				
db-04 Program counter (Task-2)				
db-05 Program counter (Task-3)	1 to 1024			
db-06 Program counter (Task-4)				
db-07 Program counter (Task-5)				
db-08 User monitor-0				
db-10 User monitor-1				
db-12 User monitor-2	-2147483647 to +2147483647			
db-14 User monitor-3				
db-16 User monitor-4				
db-18 Analog output monitor YA0				
db-19 Analog output monitor YA1				
db-20 Analog output monitor YA2	0.00 to 100.00%			
db-21 Analog output monitor YA3	0.00 to 100.00%			
db-22 Analog output monitor YA4				
db-23 Analog output monitor YA5				

Code/Name	Range (unit)	
db-30 PID1 feedback value 1 monitor		
db-32 PID1 feedback value 2 monitor	-100.00 to 100.00(%) (it also depends on [AH-04], [AH-05], [AH-06])	
db-34 PID1 feedback value 3 monitor		
db-36 PID2 feedback value monitor	-100.00 to 100.00(%) (it also depends on [AJ-04], [AJ-05], [AJ-06])	
db-38 PID3 feedback value monitor	-100.00 to 100.00(%) (it also depends on [AJ-24], [AJ-25], [AJ-26])	
db-40 PID4 feedback value monitor	-100.00 to 100.00(%) (it also depends on [AJ-44], [AJ-45], [AJ-46])	
db-42 PID1 target value monitor	-100.00 to 100.00(%) (it also depends on [AH-04],	
db-44 PID1 feedback value monitor	(It also depends on [AH-04], [AH-05], [AH-06])	
db-50 PID1 output monitor	-100.00 to +100.00(%)	
db-51 PID1 deviation monitor		
db-52 PID1 deviation 1 monitor	200 00 +- +200 00/0/\	
db-53 PID1 deviation 2 monitor	-200.00 to +200.00(%)	
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	0.00 to 100.00(s)	
db-64 PID feedforward monitor	0.00 to 100.00(%)	

[dC-01] to [dE-50]

2.1.5:	[aC- <u>01</u>] to [aE- <u>50</u>]	
Code/Name	Range (unit)	
dC-01	01(Low duty)/	
Inverter load type status	02(Normal duty) *1	
dC-02 Rated current monitor	0.0 to 6553.5(A)	
dC-07 Main speed input source monitor	01 to 34 *2)	
dC-08 Sub speed input source monitor	00 to 06,08,25 to 33 *2)	
dC-10 RUN command input source monitor	00([FW]/[RV] terminal)/ 01(3-wire)/ 02(Keypad's RUN key) 03(RS485)/04(Option1)/ 05(Option2)/06(Option3)	
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) [Right](board capacitor life span)	
dC-20 Accumulated number of starts monitor dC-21 Accumulated number of power-on times monitor	1 to 65535(cycles)	
dC-22 Accumulated RUN time monitor dC-24 Accumulated power-on time monitor	1 to 1000000(hr)	
dC-26 Accumulated cooling-fan run time monitor		
dC-37 Icon 2 LIM monitor *3)	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 *3)	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 *3)	00(Other than below) 01(Waiting for retry) 02(Waiting for restart)	
dC-40 Icon 2 NRDY detail monitor *3)	00(Other than below) (Output terminal 007[IRDY]= ON, When the state is other than the following) 01(Trip occurrence) 02(Power supply error) 03(Resetting) 04(STO) *4) / 05(Standby) 06(Data Warning, etc) 07(EzSQ Sequence error) 08(Free run) / 09(Forced stop)	
dC-45 IM/SM monitor	00 (IM selected)/ 01 (SM selected)	
dC-50 Firmware ver. Monitor	00.00 to 99.99	
dC-53 Firmware Gr. Monitor	00(Standard)	
*1) PsH100-0148~2170HFC can only se	lect 02(ND), and the setting is	

^{*1)} PsH100-0148~2170HFC can only select 02(ND), and the setting is forbidden to change.

PsH100-3050 $^{\sim}6600$ HFCD can select 02(ND) and 01(LD).

^{*2)00(}disabled)/01(Ai1)/02(Ai2)/03 (Ai3)/04(Ai4)/05(Ai5)/06(Ai5) 07(Multi-speed 0)/08(auxiliary speed)/09 to 23(Multi-speed1 to 15)/ 24(JG[AG-20])/25(RS485)/26(option-1)/27(option-2)/28(option-3)/ 29(Pulse train input(internal))/30(Pulse train input(option))/31(EzSQ) 32(PID)/33(MOP-VR)/34(AHD retention speed)/

^{*3)} This parameter is only effective when using the liquid crystal operator VOP (option)

^{*4)} The parameter is about Safety function, is not suitable for Ps-H100 series.

[dE-<u>01</u>] to [dE-<u>50</u>]

[FA-<u>01</u>] to [FA-<u>40</u>]

Code/Name	Range (unit)	
dE-01 Trip Counter	0∼65535 times	
dE-11~20 Trip monitoring	Factor,frequency(±),current,voltage across P-N,INV status,LAD status, INV control mode, restriction status, sepecial status, running time,Power-on time	
dE-31~40 Retry monitoring	Factor, frequency(±), current, voltage across P-N, INV status, LAD status, INV control mode, restriction status, sepecial status, running time, Power-on time	
dE-50 warning monitor	Refer to the table below. For more information, contact your supplier or local Hitachi inverter sales office.	

No.	Judgment condition			MOP display
1	1st highest frequency	<	1st frequency upper limit limiter	102
2	1st highest frequency	<	1st frequency lower limit limiter	103
3	1st highest frequency	<	1st main speed command	106
4	1st highest frequency	<	1st auxiliary speed command	107
5	2nd highest frequency	<	2nd frequency upper limit limiter	202
6	2nd highest frequency	<	2nd frequency lower limit limiter	203
7	2nd highest frequency	<	2nd main speed command	206
8	2nd highest frequency	<	2nd auxiliary speed command	207

■ Variable mode monitor (F code)

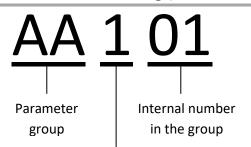
If a parameter that is being monitored by one of the [FA] parameters can be modified, it can directly be modified through that [FA] parameter.

Code/Name

Range (unit)

Code/Name	Range (unit)	
FA-01 Main speed reference setting or monitor	0.00 to 590.00(Hz)	
FA-02 Sub-speed reference setting or monitor	-590.00 to 590.000(Hz) (at monitor) 0.00 to 590.00(Hz) (at setting)	
FA-10 Acceleration time setting or monitor FA-12 Deceleration time setting or monitor	0.00 to 3600.00(s)	
FA-15 Torque reference setting or monitor	-500.0 to 500.0(%)	
FA-16 Torque bias setting or monitor	-500.0 to 500.0(%)	
FA-20 Position reference setting or monitor	When [AA121]≠10 or [AA123]≠03 -268435455 to +268435455 (pls) Other than above1073741823 to +1073741823 (pls)	
FA-30 PID1 set-point 1 setting or monitor FA-32 PID1 set-point 2 setting or monitor FA-34 PID1 set-point 3 setting or monitor	-100.00 to 100.00(%) (Adjustable with [AH-04][AH-05][AH-06])	
FA-36 PID2 set-point setting or monitor	-100.00 to 100.00(%) (Adjustable with [AJ-04][AJ-05][AJ-06])	
FA-38 PID3 set-point setting or monitor	-100.00 to 100.00(%) (Adjustable with [AJ-24][AJ-25][AJ-26])	
FA-40 PID4 set-point setting or monitor	-100.00 to 100.00(%) (Adjustable with [AJ-44][AJ-45][AJ-46])	

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

Input terminal 024[SET] 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]
• • •	• • •
[Hb102]	[Hb202]
[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.

T classification numbers "-" and "1" are lined without distinction, except "2" which is lined-up after "-" and "1".

Example) Regarding the order

 $[AA1\underline{01}] \Rightarrow [AA1\underline{02}] \Rightarrow [AA1\underline{04}] \Rightarrow [AA1\underline{05}] \Rightarrow ...$

⇒[AA123]⇒[AA201]⇒...⇒[AA223]⇒

 $[Ab-\underline{01}] \Rightarrow [Ab-\underline{03}] \Rightarrow [Ab1\underline{10}] \Rightarrow [Ab-\underline{11}] \Rightarrow ...$

(Parameters order depends on the last 2 digit.)

⇒[Ab-<u>25</u>]⇒[Ab2<u>10</u>]⇒

[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].

[AA101] to [AA106]

4.6 Parameter explanation



Working

- For the motor protection, the following parameters are necessary to be set.
- -[Hb102] to [Hb108](If [IM])
- -[Hd102] to [Hd108](If [SM/PMM])
- -[bC110](Electronic thermal level setting, 1st-motor)

■ Parameter mode (A code)

Frequency reference selection

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

- *1)00(Disable)/01(Terminal[Ai1])/02(Terminal[Ai2])/03(Terminal[Ai3])/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(Program function)/15(PID)/16(MOP VR)
- 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 015[SCHG] can change the frequency reference input source between the main(OFF) and sub(ON).
- Through the [AA105] selection, the operator for the main and sub speed frequency calculation is set.

Temporary frequency addition

<u> </u>		
Code/Name	Range (unit)	Initial value
AA106 Add frequency	-590.00 to +590.00(Hz)	0.00
setting, 1st-motor	330.00 10 (330.00(1.12)	

• When the input terminal 014[ADD] is ON the frequency set in [AA106] will be temporarily 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([FW]/[RV] terminal) 01(3-wire) 02(Keypad's RUN-key) 03(RS485) 04(Option-1) 05(Option-2) 06(Option-3)	02(JPN)/ 00(EU) (USA) (ASIA) (CHN)

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

Keypad keys setting

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 at only trip reset)	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 behavior of the STOP key of keypad. When 01 (enable) (initial value) is set, the STOP key performs stop operation regardless of the run command selection. When stopping only with the command selected in the run command selection, change it to 00(disabled). If the run command selectin [AA111] is set to 02(Keypad's RUN key), the STOP key on the Keypad is valid regardless of the [AA-13] setting.

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

• In the case of an incorrect RUN command, [AA114] setting prevents the output from unintended rotation.

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(Restart at 0Hz)/ 01(Restart with matching frequency)/ 02(Restart with active frequency matching)/ 03(Detect speed) *1)	00

- *1) Requires encoder feedback to the P1-FB option or the input terminal function 103[PLA]/104[PLB] assigned [A]/[B] terminals.
- In [AA115] setting, deceleration stop or free-run stop can be selected when a stop command is executed.
- If input terminal 032[FRS] is active (ON), free-run stop is possible.
- With [bb-40], a restart with the release of the [FRS], or a restart operation that will be executed after the free-run-stop operation will be selected.
- If it 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] Fixed 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 encoder] Fixed torque characteristics (IM)/ 05 ([V/f with encoder] Reduced torque characteristics (IM)/ 06 ([V/f with encoder] Free V/f (IM)/ 07 ([V/f with encoder] Auto torque boost (IM)/ 08 (Sensorless vector control (SLV) (IM))/ 11(Synchronous start type sensorless vector control(SM/PMM))/	00

- Generally for a light duty control (such as fans or pumps), the [V/f] control with fixed torque characteristics or the [V/f] control with reducing torque characteristics similar to the operation characteristics of fans and pumps is selected.
- For a magnet motor, select the sensorless vector control (SM/PMM).

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

- Torque control is effective only when the AA121 setting is 08 /11and the AA123 setting is 00.
- For more information, contact your supplier or local Hitachi inverter sales office.

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

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

[Ab-01] to [Ab-25]

Frequency scale conversion monitor [dA-06]

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

 The visualized "Output frequency scale conversion monitor[dA-06]" is equal to the "Output frequency monitor[dA-01]" multiplied by the "Frequency conversion gain[Ab-01]".

Multi-speed command

Watti-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) *1)	0.00			
Ab-11 Multi-speed 1 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-12 Multi-speed 2 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-13 Multi-speed 3 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-14 Multi-speed 4 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-15 Multi-speed 5 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-16 Multi-speed 6 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-17 Multi-speed 7 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-18 Multi-speed 8 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-19 Multi-speed 9 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-20 Multi-speed 10 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-21 Multi-speed 11 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-22 Multi-speed 12 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-23 Multi-speed 13 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-24 Multi-speed 14 setting	0.00 to 590.00(Hz) *1)	0.00			
Ab-25 Multi-speed 15 setting	0.00 to 590.00(Hz) *1)	0.00			

^{*1)} The actual setting range is limited to the maximum frequency setting ([Hb105/205] [Hd105/205]).

 For the 16 speeds selection, set [Ab-03]=00 for assigning the intelligent terminals 003[CF1] to 006[CF4] makes available the use of the speeds 0 to 15.

makes avai	makes available the use of the speeds 0 to 15.						
Multi-speed	CF4	CF3	CF2	CF1			
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						
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 source selection	00(Parameter setting)/ 01(Option-1)/ 02(Option-2)/ 03(Option-3)/ 04(Function EzSQ)	00

 [AC-01] changes the reference source for the Accel/Decel time command.

Individual Accel/Decel time 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 Accel/Decel time settings [AC120][AC122] or [AC124][AC126] will be in effect.
- 2-stage Accel/Decel time change functions from [AC115] to [AC117] can be set.
- When [AC-02]=01, the Accel/Decel 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 time setting [AC120] [AC122] or Accel/Decel time setting [AC124] [AC126] are enabled.
- [CA-64]/[CA-66] takes precedence during the input terminal 020[FUP]/021[FDN] function. And [AH-78] takes precedence during the PID soft start function.

[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)/	00
AC-04 Deceleration curve selection	03(Reverse U-curve)/ 04(Elevator S-curve)	00
AC-05 Acceleration curve constant setting	1 to 10	2
AC-06 Deceleration curve constant setting	1 to 10	2
AC-08 EL-S-curve ratio @start of acceleration		25
AC-09 EL-S-curve ratio @end of acceleration	0 to 100(%) *1)	25
AC-10 EL-S-curve ratio @start of deceleration	0 (0 100(///) 1)	25
AC-11 EL-S-curve ratio @end of deceleration		25

- *1) 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), the Accel/Decel time operation becomes linear toward the target value.
- When [AC-03]/[AC-04] = 01 (S-curve), the start and end of the Accel/Decel time operation is made loose and shockless operation is performed.
- When [AC-03]/[AC-04] = 02 (U-curve), at the start of the Accel/Decel time operation is made loose.
- When [AC-03]/[AC-04]=03(Reverse -U-curve), at the end of the Accel/Decel time operation is made loose.
- For S-curve, U-curve and Reverse U-curve, the curve degree of Accel/Decel time operation can be set with [AC-05]/[AC-06].
- When [AC-03]/C-04] = 04 (EL-S-curve), at the start and end of the Accel/Decel time operation is made loose.
- For EL-S-curve shockless operation, the curve degree of Accel/Decel time operation can be adjusted with [AC-08] to [AC-11].

2-stage Accel/Decel time change

2-stage Accely Decel tillle change		
Code/Name	Range (unit)	Initial value
AC115 Accel/Decel change trigger, 1st-motor	00(Switching by [2CH] terminal)/ 01(Switching by setting)/ 02(Switching only when rotation is reversed)	00
AC116 Accel1 to Accel2 frequency transition point, 1st-motor	0.00 to 500.00(Hz)	0.00
AC117 Decel1 to Decel2 frequency transition point, 1st-motor	0.00 to 590.00(Hz)	0.00

- Depending on the setting of [AC115], switching to Accel/Decel time 2 is selected from the following.
 - "When the input terminal 031 [2CH] is turned ON",
 - "When the set frequency [AC116]/[AC117] is reached",
 - "When the operating frequency is switched between forward and reverse".
- Set the Accel/Decel time1 with [AC120] and [AC122], Accel/Decel time2 with [AC124] and [AC126].

[AC120] to [AC126]

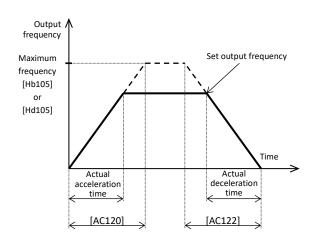
Acceleration/deceleration time setting

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		30.00
AC124 Acceleration time setting 2, 1st-motor		15.00
AC126 Deceleration time setting 2, 1st-motor		15.00

- Assign the Accel/Decel time that takes from 0Hz to reach the maximum frequency.
- In case that the 2-stage Accel/Decel time function is not meant to be used, the Acceleration time 1[AC120] and Deceleration time 1 [AC122] are used.
- The Accel/Decel time setting is from 0 Hz to the maximum frequency setting ([Hb105]/[Hd105]).
- Ex) In the case of maximum frequency = 60 Hz,

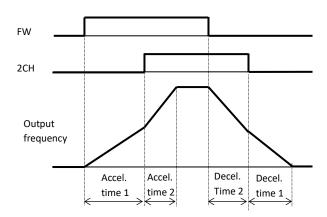
Accel time =30sec

At this case, if command=30Hz, it reaches 30Hz in 15sec. (Under conditions when Accel/Decel time does not pause or etc for other functions.)



• Example of using the 2-stage Accel/Decel time function is following.

With [AC115] = 00

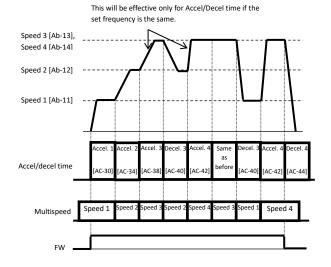


[AC-30] to [AC-88]

Individual Accel/Decel time for Multispeed

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

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



[AC215] to [AC226], [Ad-01] 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 *1)	07
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 setting of torque control.
- Torque control is enabled when input terminal 067[ATR] torque control enabled is turned ON when control mode AA 121 setting is set to 08/ 11.

For more information, contact your supplier or local Hitachi inverter sales office.

Torque bias setting

Code/Name	Range (unit)	Initial value
Ad-11 Torque bias input source selection	01 to 13 /15 *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)	00

[•] For setting the torque bias.

For more information, contact to your supplier or local Hitachi distributor or service station.

Speed limitation for torque control

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

- The speed limit during the torque control can be set.
 For more information, contact to your supplier or local Hitachi distributor or service station.
- *1)00(Disable)/01(Terminal[Ai1])/02(Terminal[Ai2])/03(Terminal[Ai3])/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(PID calc.)
- *2) The actual setting range is limited to 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	1 to 10000	1
AE-04 Positioning completed range setting	0 to 10000(pls)	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	0.00
AE-07 Position loop gain setting	0.00 to 100.00	0.50
AE-08 Position bias setting	-2048 to 2048(pls)	0

- Position control requires encoder feedback to the P1-FB option or the input terminal 103[PLA]/104[PLB] assigned to [A]/[B] terminals.
- See also input terminal 073[STAT],074[PUP],075[PDN] and output terminal 042[PDD], 043[POK] for position control.

For more information, contact your supplier or local Hitachi inverter sales office.

Home search function setting

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 4095	0
AE-12 Speed reference of home search function	0.00 to 120.00(Hz) *1)	0.00
AE-13 Direction of home search function	00(Forward)/01(Reverse)	00

^{*1)} If the maximum frequency setting ([Hb105/205] [Hd105/205]) is less than 120 Hz, the maximum value of [AE-12] will be limited to it.

For more information, contact your supplier or local Hitachi inverter sales office.

[AE-20] to [AE-61]

Absolute position control

Code/Name	Range (unit)	Initial value
AE-20 Position reference 0		0
AE-22 Position reference 1		0
AE-24 Position reference 2		0
AE-26 Position reference 3		0
AE-28 Position reference 4		0
AE-30 Position reference 5	When [AA121]≠10	0
AE-32 Position reference 6	or [AA121]≠03 -268435455 to	0
AE-34 Position reference 7	+268435455 (pls)	0
AE-36 Position reference 8	Parameter setting	0
AE-38 Position reference 9	other than above.	0
AE-40 Position reference 10	-1073741823 to +1073741823 (pls)	0
AE-42 Position reference 11	- 10.07 (p.07)	0
AE-44 Position reference 12		0
AE-46 Position reference 13		0
AE-48 Position reference 14		0
AE-50 Position reference 15		0
AE-52 Position control range setting (forward)	When [AA121]≠10 or [AA123]≠03 0 to +268435455(pls) Other than above. 0 to +1073741823(pls)	268435455
AE-54 Position control range setting (reverse)	When [AA121]≠10 or [AA123]≠03 -268435455 to 0 (pls) Other than above. -1073741823 to 0 (pls)	-268435455
AE-56 Position control mode selection	00(Limited)/ 01(Not limited)	00

- Set the absolute position function.
- Absolute position reference 0 to 15 can be switched by the combination
 of input terminals 076[CP1] multistage position 1 to 079[CP4]
 multistage position 4. See also position control functions such as input
 terminal 082[FOT] Forward over travel, 083[ROT] Reverse over travel,
 084[SPD] speed/position switching, 085[PSET] position data presetting
 and etc.

For more information, contact your supplier or local Hitachi inverter sales office.

Teach-in function

Code/Name	Range (unit)	Initial value
AE-60 Teach-in function	00 to 15(X00 to X15)	00
target selection	00 to 15(x00 to x15)	

- Sets the teaching position for absolute position control.
- Use the input terminal 110[TCH] for teach-in function.
 For more information, contact your supplier or local Hitachi inverter sales office.

Enable position saving when power is cut off

	·	
Code/Name	Range (unit)	Initial value
AE-61 Save current position	00(Disable)/	00
at power off	01(Enable)	50

•When AE-61 is set to 01, the absolute position is automatically saved into the inverter at the power supply is cut-off.

For more information, contact your supplier or local Hitachi inverter sales office.

[AE-62] to [AE-73]

Pre-set position

Code/Name	Range (unit)	Initial value
AE-62 Pre-set position data	When [AA121]≠10 or [AA121]≠03 -268435455 to +268435455(pls) Other than above1073741823 to +107374182(pls)	0

• During absolute position control, turning on the input terminal 085[PSET] sets the current position to the value set in [AE-62] preset position data.

The current position monitor [dA-20] is also changed. For more information, contact your supplier or local Hitachi inverter sales office.

Positioning operation 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	0.00 to 100.00(%)	0.20

- *APR: Automatic Position Regulator
- Adjustment of control operation for positioning operation.

For more information, contact your supplier or local Hitachi inverter sales office.

Homing (Return to reference position)

nonning (Neturn 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)	00
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) *1)	0.00

- *1) The actual setting range is limited to the maximum frequency setting ([Hb105/205] [Hd105/205]).
- Set the Homing function for absolute position mode.
- When using the homing function, assign the input terminal 080[ORL] Limit signal of homing function and 081[ORG] Start signal of homing function.

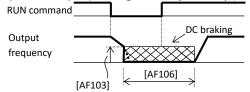
For more information, contact your supplier or local Hitachi inverter sales office.

[AF101] to [AF109]

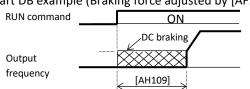
DC braking (DB) function

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)	00
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 *2)	0 to 100(%)	30
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 *2)	0 to 100(%)	30
AF109 DC braking active time at start, 1st-motor	0.00 to 60.00(s)	0.00

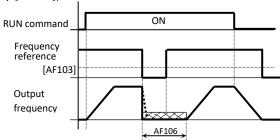
- DB function can be activated at start-up and stop state ([AF101]=01) or at setting frequency ([AF101]=02), selectively.
- DC braking can be also used if Intelligent input terminal 030[DB] is ON.
- *2) Depending on the setting of inverter capacity, an internal limit is applied to DC braking force.
- 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.

[AF1<u>20</u>] to [AF1<u>52</u>]

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	0.00 to 2.00(s)	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)	0.00 to 5.00(s)	0.00
AF133 Brake wait time for stopping, 1st-motor (Forward)	0.00 to 5.00(s)	0.00
AF134 Brake confirmation signal wait time, 1st-motor (Forward)	0.00 to 5.00(s)	0.00
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)	Inv rated current × 1.0(A)
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)	0.00 to 5.00(s)	0.00
AF140 Brake wait time for stopping, 1st-motor(Reverse)	0.00 to 5.00(s)	0.00
AF141 Brake confirmation signal wait time, 1st-motor(Reverse)	0.00 to 5.00(s)	0.00
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)	Inv rated current × 1.0(A)
AF144 Braking frequency, 1st-motor (Reverse)	0.00 to 590.00(Hz)	0.00
AF150 Brake open delay time, 1st-motor	0.00 to 2.00(s)	0.20
AF151 Brake close delay time, 1st-motor	0.00 to 2.00(s)	0.20
AF152 Brake response check time, 1st-motor	0.00 to 5.00(s)	0.10

[AF1<u>53</u>] to [AF2<u>54</u>]

Code/Name	Range (unit)	Initial value
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	0.00 to 10.00(s)	0.60

Set brake control and contactor control.
 In addition to these parameters, the brake control function uses the input terminal 037[BOK] Answer back from Brake and the output terminal 037[BRK] Brake release, 038[BER]
 Brake error. And the contactor control function uses the input terminal 107[COK] Contactor check signal and the output terminal 039[CON] Contactor control.

For more information, contact your supplier or local Hitachi inverter sales office.

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

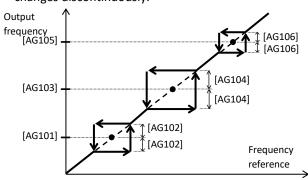
AF201 DC braking selection, 2nd-motor AF202 Braking type selection, 2nd-motor AF203 DC braking frequency, 2nd-motor AF204 DC braking delay time, 2nd-motor AF205 DC braking force setting, 2nd-motor AF206 DC braking active time at stop, 2nd-motor AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF200 Contactor control enable, 2nd-motor AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF233 Brake wait time for accel., 2nd-motor AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor AF236 Brake release current setting, 2nd-motor AF236 Brake release current setting, 2nd-motor Same as AF136	2nd motor When Intelligent Input terminal 024[SET] is enabled.			
AF202 Braking type selection, 2nd-motor AF203 DC braking frequency, 2nd-motor AF204 DC braking delay time, 2nd-motor AF205 DC braking force setting, 2nd-motor AF206 DC braking active time at stop, 2nd-motor AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF200 DC braking active time at start, 2nd-motor AF200 DC braking active time at start, 2nd-motor AF201 Run delay time, 2nd-motor AF202 Contactor control enable, 2nd-motor AF203 Brake control enable, 2nd-motor AF203 Brake release wait time, 2nd-motor AF204 Brake wait time for accel., 2nd-motor AF205 Brake wait time for stopping, 2nd-motor AF206 DC braking active time at start, 2nd-motor AF207 Same as AF107 Same as AF108 Same as AF138	Coge/Name			
AF203 DC braking frequency, 2nd-motor AF204 DC braking delay time, 2nd-motor AF205 DC braking force setting, 2nd-motor AF206 DC braking active time at stop, 2nd-motor AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF200 Contactor control enable, 2nd-motor AF210 Run delay time, 2nd-motor AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF213 Brake release wait time, 2nd-motor AF221 Brake wait time for accel., 2nd-motor AF222 Brake wait time for stopping, 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	DC braking selection, 2nd-motor Same as AF101			
AF204 DC braking delay time, 2nd-motor AF205 DC braking force setting, 2nd-motor AF206 DC braking active time at stop, 2nd-motor AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF200 Contactor control enable, 2nd-motor AF210 Run delay time, 2nd-motor AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	Braking type selection, 2nd-motor Same as AF102			
AF205 DC braking force setting, 2nd-motor AF206 DC braking active time at stop, 2nd-motor AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF200 Contactor control enable, 2nd-motor AF201 Run delay time, 2nd-motor AF202 Contactor off delay time, 2nd-motor AF203 Contactor response check time, 2nd-motor AF203 Brake control enable, 2nd-motor AF204 Brake release wait time, 2nd-motor (Forward) AF205 Brake wait time for accel., 2nd-motor (Forward) AF206 Brake confirmation signal wait time, 2nd-motor(Forward) AF207 Brake release frequency setting, 2nd-motor (Forward) AF208 Brake release current setting, 2nd-motor (Forward) AF209 DC braking active time at stop, 2nd-motor Same as AF109 Same as AF109	DC braking frequency, 2nd-motor Same as AF103			
AF206 DC braking active time at stop, 2nd-motor AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF200 Contactor control enable, 2nd-motor AF201 Run delay time, 2nd-motor AF202 Contactor off delay time, 2nd-motor AF203 Contactor response check time, 2nd-motor AF203 Brake control enable, 2nd-motor AF204 Brake release wait time, 2nd-motor (Forward) AF205 Brake wait time for accel., 2nd-motor (Forward) AF206 Brake confirmation signal wait time, 2nd-motor(Forward) AF207 Brake release frequency setting, 2nd-motor (Forward) AF208 Brake release current setting, 2nd-motor (Forward) Same as AF132 Same as AF133 Same as AF134 Same as AF134 Same as AF135 Same as AF136	DC braking delay time, 2nd-motor Same as AF104			
AF207 DC braking operation method selection, 2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF220 Contactor control enable, 2nd-motor AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	DC braking force setting, 2nd-motor Same as AF105			
2nd-motor AF208 DC braking force at start, 2nd-motor AF209 DC braking active time at start, 2nd-motor AF220 Contactor control enable, 2nd-motor AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	DC braking active time at stop, 2nd-motor Same as AF106			
AF209 DC braking active time at start, 2nd-motor AF220 Contactor control enable, 2nd-motor Same as AF120 AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor Same as AF121 AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	I Same as AFIU/			
AF209 DC braking active time at start, 2nd-motor AF220 Contactor control enable, 2nd-motor Same as AF120 AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor Same as AF121 AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	DC braking force at start, 2nd-motor Same as AF108			
AF220 Contactor control enable, 2nd-motor AF221 Run delay time, 2nd-motor AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136				
AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136				
AF222 Contactor off delay time, 2nd-motor AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136	Run delay time, 2nd-motor Same as AF121			
AF223 Contactor response check time, 2nd-motor AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136				
AF230 Brake control enable, 2nd-motor AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136 Same as AF136				
AF231 Brake release wait time, 2nd-motor (Forward) AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136 Same as AF136 Same as AF136				
AF232 Brake wait time for accel., 2nd-motor (Forward) AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136 Same as AF136	Brake release wait time, Same as AF131			
AF233 Brake wait time for stopping, 2nd-motor (Forward) AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136 Same as AF136	Brake wait time for accel., 2nd-motor Same as AF132			
AF234 Brake confirmation signal wait time, 2nd-motor(Forward) AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136 Same as AF136	Brake wait time for stopping, 2nd-motor Same as AF133			
AF235 Brake release frequency setting, 2nd-motor (Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136 Same as AF136	Brake confirmation signal wait time, Same as AF134			
(Forward) AF236 Brake release current setting, 2nd-motor (Forward) Same as AF136				
(Forward)	rd)			
AE227 Braking frequency 2nd motor (Ferward) Camp as AE12	Jaille as AF130			
AF237 Braking frequency, Zhu-motor (Forward) Same as AF13.	Braking frequency, 2nd-motor (Forward) Same as AF137			
AF239 Brake wait time for accel., 2nd-motor (Reverse) Same as AF139	. I Same as AF139			
AF240 Brake wait time for stopping.	Brake wait time for stopping, Same as AF140			
AF241 Brake confirmation signal wait time	Brake confirmation signal wait time, Same as AF141			
AF242 Brake release frequency setting.	Brake release frequency setting, Same as AF142			
AF243 Brake release current setting, 2nd-motor	Brake release current setting, 2nd-motor Same as AF143			
	· · · · · · · · · · · · · · · · · · ·			
AF253 Servo lock/DC injection time at	Servo lock/DC injection time at Same as AF153			
AF254 Servo lock/DC injection time at stop.	Servo lock/DC injection time at stop, 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	0.00 to 10.00(Hz)	0.00
AG103 Jump frequency 2, 1st-motor	0.00 to 590.00(Hz)	0.00
AG104 Jump frequency width 2, 1st-motor	0.00 to 10.00(Hz)	0.00
AG105 Jump frequency 3, 1st-motor	0.00 to 590.00(Hz)	0.00
AG106 Jump frequency width 3, 1st-motor	0.00 to 10.00(Hz)	0.00

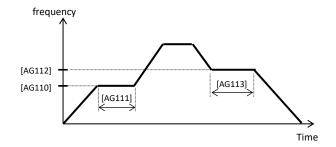
 Using above parameters prevents from the passing of the output frequency in a resonant point. Output frequency changes discontinuously.



Motor Accel/Decel time 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 Accel/Decel time operation during the Accel/Decel operation stop time after the inverter output reaching as the setted by Accel/Decel time operation stop frequency, when the load has a large inertia.
- If the Intelligent input terminal 100[HLD] is in ON state, the acceleration and deceleration will be stopped (Hold activation).

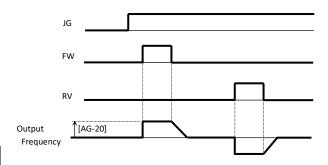


[AG-20] to [AG213]

Jogging function

Code/Name	Range (unit)	Initial value
AG-20 Jogging frequency	0.00 to 10.00(Hz)	6.00
AG-21 Jogging stop mode selection	O0 (Free run at Jogging stop (Disable at run)) O1 (Deceleration stop at Jogging stop	00

- The jogging frequency is outputted when Input terminal 029[JG] is active (ON) and the RUN command is given.
 The frequency and stop method can be set when the jogging motion performing.
- In the case [AG-21]=01



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

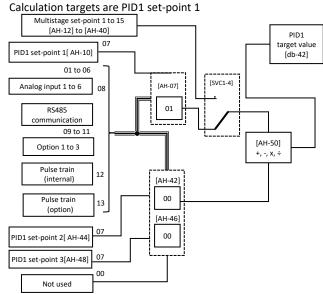
- The PID1 function is enabled with the above parameter.
- If [AH-01]=01 when the PID output reaches negative value, the PID output is limited to 0.
- If [AH-01]=02 when the PID output reaches negative value, the PID output lets out an inverted output.
- When the PID output is negative, the motor will rotate in the contrary direction.
- If input terminal 041[PID] is ON, the PID control is disabled and the PID target value becomes the frequency reference.

the FID target value becomes the frequency reference.			
Code/Name	Range (unit)	Initial value	
AH-02 PID1 deviation inversion	00(Disable)/ 01(Enable)	00	
PID target value Feedback Value	PID1 deviation inversion [AH-02]	PID deviation	

Code/Name	Range (unit)	Initial value
AH-03 Unit selection for PID1	Refer <unit table=""> of the end of this chapter.</unit>	01
AH-04 PID1 adjustment (0%)	-10000 to 10000	0
AH-05 PID1 adjustment (100%)	-10000 to 10000	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.
- PID1 is capable of 3 target value inputs and 3 feedback inputs, and various operations can be performed with [AH-50] and [AH-54].

\blacksquare AH-50 = 01 to 04 (+,-,×,/)



(selected with [AH-07] and [AH-10] to [AH-40]) and PID1 set-point 2 (selected with [AH-42]).

[AH-07] to [AH-50]

Code/Name	Range (unit)	Initial value
AH-07 PID1 set-point 1 input source selection	00 to 13 *2)	09
AH-10 PID1 set-point-1 setting		0.00
AH-12 PID1 multistage set-point 1		0.00
AH-14 PID1 multistage set-point 2		0.00
AH-16 PID1 multistage set-point 3		0.00
AH-18 PID1 multistage set-point 4		0.00
AH-20 PID1 multistage set-point 5		0.00
AH-22 PID1 multistage set-point 6		0.00
AH-24 PID1 multistage set-point 7	-100.00 to 100.00(%)	0.00
AH-26 PID1 multistage set-point 8	*1)	0.00
AH-28 PID1 multistage set-point 9		0.00
AH-30 PID1 multistage set-point 10		0.00
AH-32 PID1 multistage set-point 11		
AH-34 PID1 multistage set-point 12		0.00
AH-36 PID1 multistage set-point 13		0.00
AH-38 PID1 multistage set-point 14		0.00
AH-40 PID1 multistage set-point 15		0.00
AH-42 PID1 set-point 2 input source selection	00 to 13 *2)	00
AH-44 PID1 set-point 2 setting	-100.00 to 100.00(%) *1)	0.00
AH-46 PID1 set-point 3 input source selection	00 to 13 *2)	0.00
AH-48 PID1 set-point 3 setting	-100.00 to 100.00(%) *1)	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

- *1) Display range can be set by [AH-04], [AH-05] and [AH-06].
- *2) 00(Not used)/01(Terminal[Ai1])/02(Terminal[Ai2])/
 03(Terminal[Ai3])/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)

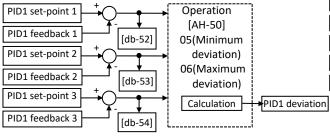
• If Input terminal 051[SVC1] to 054[SVC4] are used, the PID1 set-point 1 can be changed for the Multistage.

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

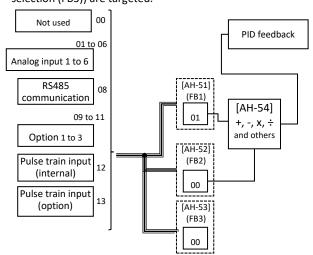
[AH-51] to [AH-54]

Code/Name	Range (unit)	Initial value
AH-51 PID1 feedback 1 input source selection		01
AH-52 PID1 feedback 2 input source selection	00 to 06/08 to 13 *1)	00
AH-53 PID1 feedback 3 input source selection		00
AH-54 PID1 feedback calculation symbol selection	01(Addition FB1+FB2)/ 02(Subtraction FB1-FB2)/ 03(Multiplication FB1×FB2)/ 04(Division FB1 / FB2)/ 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

- *1)00(Not used)/01(Terminal[Ai1])/02(Terminal[Ai2])/03(Terminal[Ai3])/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))
- ■AH-50 = 05, 06 (minimum deviation, maximum deviation)
 The maximum value or the minimum value of deviation 1 to 3 of PID1 is taken as PID1 deviation (at this time, [AH-54] becomes invalid).

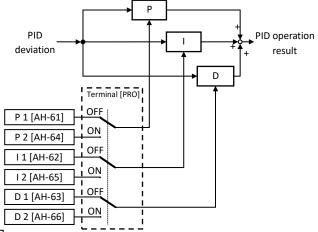


- PID feedback of PID1 by setting [AH-51] to [AH-54] Is calculated.
- When 01 to 07 is selected in [AH-54], the operation target is [AH-51] PID1 feedback data 1 (FB1) and [AH-52] PID1 feedback data 2 (FB2). When 08 to 10 is selected in [AH-54], feedback data 1 ([AH-51] selection (FB1)) to 3 ([AH-53] selection (FB3)) are targeted.



[AH-<u>60</u>] to [AH-<u>70</u>]

Code/Name	Range (unit)	Initial value
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)	1.0
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)	0.0
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



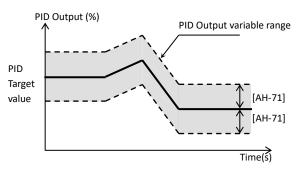
- If input terminal 042[PIDC] is active (ON), the value of the integral constant is cleared. If it is done while the inverter is in running, the driving condition may become unstable.
- The PID gain can be switched by turning on the input terminal 055 [PRO]. When OFF gain 1 is enabled.
 When ON gain 2 is enabled.

Code/Name	Range (unit)	Initial value
AH-70 PID1 feed-forward input source selection	00(Not used)/ 01(Terminal[Ai1])/ 02(Terminal[Ai2])/ 03(Terminal[Ai3])/ 04(Terminal[Ai4])/ 05(Terminal[Ai5])/ 06(Terminal[Ai6])	00
Not used 00 [AH	-70]	
Analog input 1 01		
Analog input 2 02	PID feedforwa	ard value
Analog input 3 03		
Analog input 4 04		
Analog input 5 05 06		
Analog input 6		

• The input source for PID feed forward control is selected by AH-70.

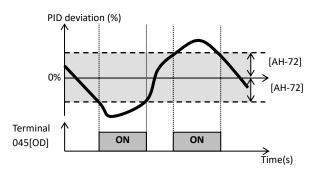
[AH-71] to [AH-74]

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



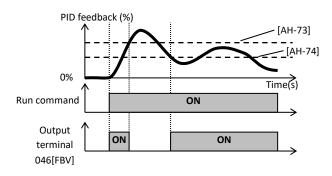
• [AH-71] Limits the output range of the PID. If [AH-71] = 0.00 the limit is disabled.

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 045[OD] Deviation over for PID control is ON.

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 to 100.00(%)	0.00

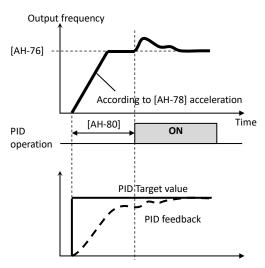


 When the PID feedback cross over the [AH-73] level, the output terminal 046[FBV] is OFF. If the PID feedback crosses under the [AH-74] level, 046[FBV] is turned on. [AH-<u>75</u>] to [AH-<u>92</u>]

PID soft start function

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[E120]) 02(Enable:Warning[SSE])	00
AH-82 PID soft start error detection level	0.00 to 100.00(%)	0.00

- In order to start the shockless PID, normal operation is performed with the base frequency × [AH-76] as the target frequency from the start of operation to the set time of [AH-80].
- The acceleration time at soft start can be set with [AH-78].



- When an error is judged, the operation changes depending on the setting of [AH-81] PID soft start error detection enable.
 - If [AH-81] is 00, nothing is done.
 - If [AH-81] is 01, the abnormal state will trip with [E120] PID start error after the set time of [AH-80] has elapsed.
 - If [AH-81] is 02, the output terminal 093[SSE] PID soft start error signal turns ON after the abnormal state has passed for the [AH-80] setting time.
 - Output terminal 093[SSE] signal is turned ON while the inverter is in running.

[AH-85] to [AH-96]

PID sleep function

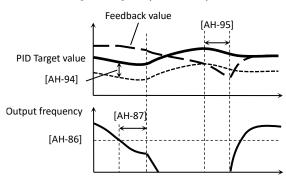
Code/Name	Range (unit)	Initial value
AH-85 PID sleep trigger selection	00(Disable)/ 01(Low output)/ 02([SLEP] terminal)	00
AH-86 PID sleep start level	0.00 to 590.00(Hz)	0.00
AH-87 PID sleep active time	0.00 to 100.00(s)	0.00
AH-88 Enable set-point boost before PID sleep	00(Disable)/ 01(Enable)	00
AH-89 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(%)	0.00
AH-91 Minimum RUN time before PID sleep	0.00 to 100.00(s)	0.00
AH-92 Minimum active time of PID sleep	0.00 to 100.00(s)	0.00
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)	0.00
AH-96 PID wake start deviation value	0.00 to 100.00(%)	0.00

- The PID sleep function temporally reduces the PID output, achieving an energy saving state.
- If [AH-88]"Enable set-point boost before PID sleep" is enable, during [AH-89] setting time before PID sleep, the [AH-90] boost amount is added to the PID target value to increase the feedback amount.

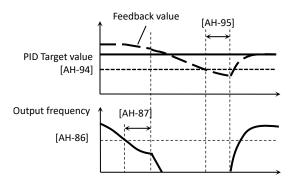
As a result, it is possible to maintain sleep for a longer time.

• Operation example of the sleep function.

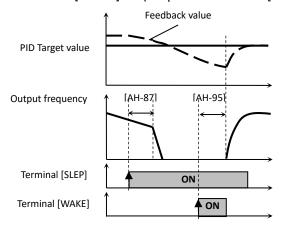
Example 1) [AH-85]=01(Low output) [AH-93]=01(deviation)



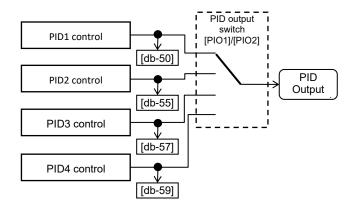
Example 2) [AH-85]=01(Low output) [AH-93]=02(Low feedback)



Example 3) [AH-85]=02(output terminal 058[SLEP]) [AH-93]=03(output terminal 059[WAKE])



■There are 4 independent PID control blocks in Ps-H100. By switching the input terminal 056[PIO1]/057[PIO2], PID1 to PID4 can be switched.



Combination of [PIO1]/[PIO2]

	057[PIO2]	056[PIO1]
PID1 is enabled	OFF	OFF
PID2 is enabled	OFF	ON
PID3 is enabled	ON	OFF
PID4 is enabled	ON	ON

PID2 function

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

- The PID2 function is enabled with the above parameter.
- 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 turning on the input terminal 043[PID2], the PID2 output becomes 0.

Code/Name	Range (unit)	Initial value
AJ-02 PID2 deviation inversion	00(Disable)/ 01(Enable)	00
PID target value Feedback Value	PID2 deviation inversion [AJ-02] OO	PID deviation

• PID2 deviation can be reversed.

Code/Name	Range (unit)	Initial value
AJ-03 PID2 unit selection	Refer <unit table=""> of the end of this chapter.</unit>	01
AJ-04 PID2 scale adjustment (0%)	-10000 to 10000	0
AJ-05 PID2 scale adjustment (100%)	-10000 to 10000	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 *2)	07
AJ-10 PID2 set-point setting	-100.00 to 100.00(%) *1)	0.00

- *1) Adjustable with [AJ-04] [AJ-05] [AJ-06]
- 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 *2)	02

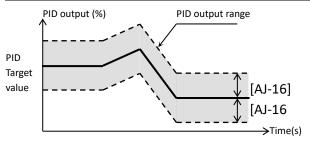
- Selects the PID2 feedback reference.
- *2) 00(Not used)/01(Terminal[Ai1])/02(Terminal[Ai2])/03(Terminal[Ai3])/04(Terminal[Ai4])/05(Terminal[Ai5])/06(Terminal[Ai6])/07(Parameter setting)/08(RS485)/09(Option-1)/10(Option-2)/11(Option-3)/12(Pulse train input (internal)/13(Pulse train input (option)/15(PID1 output)

[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)	1.0
AJ-15 PID2 derivative gain	0.00 to 100.00(s)	0.00

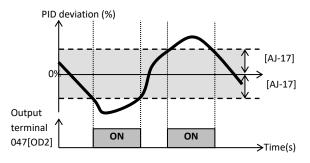
- The PID2 gains are set by the above parameters.
- If input terminal 044[PIDC2] is active (ON), the value of the integral constant is cleared. If it is done while the inverter is in running, the driving condition may become unstable.

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



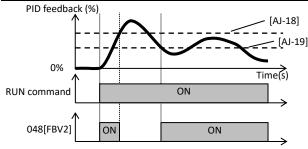
• [AJ-16] Limits the output range of the PID. If [AJ-16] =0.00 the limit is disabled.

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 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 to 100.00(%)	0.00



 When the PID feedback cross over the [AJ-18] level, the output terminal 048[FBV2] is OFF. If the PID feedback crosses under the [AJ-19] level, 048[FBV2] is turned 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

- The PID3 function is enabled with the above parameter.
- 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 turning on the input terminal 045[PID3], the PID3 output becomes 0.

Code/Name	Range (unit)	Initial value
AJ-22PID3 deviation inversion	00(Disable)/ 01(Enable)	00
PID target value - X(-	PID3 deviation inversion [AJ-22] OO	PID deviation

• PID3 deviation can be reversed.

Code/Name	Range (unit)	Initial value
AJ-23 PID3 unit selection	refer <unit table=""> of the end of this chapter.</unit>	01
AJ-24 PID3 scale adjustment (0%)	-10000 to 10000	0
AJ-25 PID3 scale adjustment (100%)	-10000 to 10000	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 *1)	07
AJ-30 PID3 set-point setting	-100.00 to 100.00(%) *2)	0.00

*2) Adjustable with [AJ-24] [AJ-25] [AJ-26]

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

the parameter setting, [A3-30] gets enabled.		
Code/Name	Range (unit)	Initial value
AJ-32 PID3 feedback input source selection	00 to 06/08 to 13 *1)	01

• Selects the PID3 feedback reference.

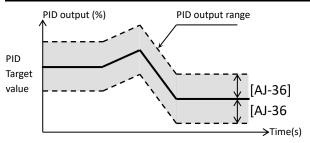
*1) 00(Not used)/01(Terminal[Ai1])/02(Terminal[Ai2])/03(Terminal[Ai3])/ 04(Terminal[Ai4])/05(Terminal[Ai5])/06(Terminal[Ai6])/07(Parameter setting)/08(RS485)/09(Option-1)/10(Option-2)/11(Option-3)/12(Pulse train input (internal)/13(Pulse train input (option)

[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)	1.0
AJ-35 PID3 derivative gain	0.00 to 100.00(s)	0.00

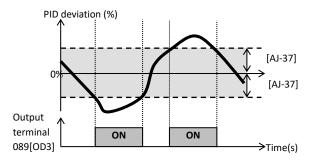
- The PID3 gains are set by the above parameters.
- If input terminal 046[PIDC3] is active (ON), the value of the integral constant is cleared. If it is done while the inverter is in running, the driving condition may become unstable.

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



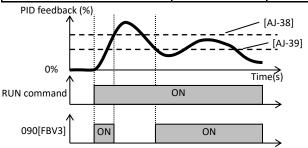
• [AJ-36] Limits the output range of the PID. If [AJ-36] =0.00 the limit is disabled.

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 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 to 100.00(%)	0.00



• When the PID feedback cross over the [AJ-38] level, the output terminal 090[FBV3] is OFF. If the PID feedback crosses under the [AJ-39] level, 090[FBV3] is turned on.

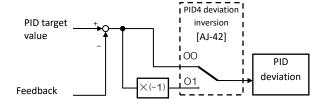
[AJ-41] to [AJ-52]

PID4 function

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

- The PID4 function is enabled with the above parameter.
- 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 turning on the 047[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	Refer <unit table=""> of the end of this chapter.</unit>	01
AJ-44 PID4 scale adjustment (0%)	-10000 to 10000	0
AJ-45 PID4 scale adjustment (100%)	-10000 to 10000	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 *1)	07
AJ-50 PID4 set-point setting	-100.00 to 100.00(%) *2)	0.00

- *2) Adjustable with [AJ-44] [AJ-45] [AJ-46]
- When PID4 target value input is selected, if the selected is the parameter setting. [AI-50] gets enabled.

Code/Name	Range (unit)	Initial value
AJ-52 PID4 feedback input source selection	00 to 06/08 to 13 *1)	01

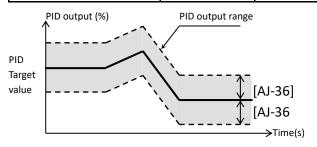
- Selects the PID4 feedback reference.
- *1) 00(Not used)/01(Terminal[Ai1])/02(Terminal[Ai2])/03(Terminal[Ai3])/ 04(Terminal[Ai4])/05(Terminal[Ai5])/06(Terminal[Ai6])/07(Parameter setting)/08(RS485)/09(Option-1)/10(Option-2)/11(Option-3)/12(Pulse train input (internal)/13(Pulse train input (option)

[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)	1.0
AJ-55 PID4 derivative gain	0.00 to 100.00(s)	0.00

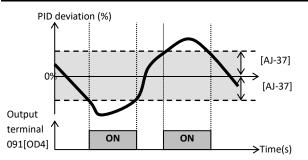
- The PID4 gains are set by the above parameters.
- If input terminal 048[PIDC4] is active (ON), the value of the integral constant is cleared. If it is done while the inverter is in running, the driving condition may become unstable.

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



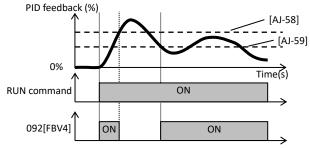
• [AJ-56] Limits the output range of the PID. If [AJ-56] =0.00 the limit is disabled.

Code/Name	Range (unit)	Initial value
AJ-57 PID4 over deviation	0.00 to 100.00(%)	3.00
level	0.00 to 100.00(70)	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 to 100.00(%)	0.00



 When the PID feedback cross over the [AJ-58] level, the output terminal 092[FBV4] is OFF. If the PID feedback crosses under the [AJ-59] level, 092[FBV4] is turned on.

[bA101] to [bA116]

■ Parameter mode (b code)

Frequency limit

Code/Name	Range (unit)	Initial value
bA101 Upper frequency limit source selection, 1st-motor	00(Disable)/ 01(Terminal[Ai1])/ 02(Terminal[Ai2])/ 03(Terminal[Ai3])/ 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	0.00 to 590.00(Hz)	0.00

• The upper and lower limits of the frequency reference are set by the above parameters.

Torque limit

Torque illinit	Range (unit)	Initial
Code/Name	Kange (unit)	value
bA110 Torque limit selection, 1st-motor	00(Disable)/ 01(Terminal[Ai1])/ 02(Terminal[Ai2])/ 03(Terminal[Ai3])/ 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(Switch by [TRQ1]/ [TRQ2] terminals)	00
bA112 Torque limit 1 (Forward drive), 1st-motor	0.0 to 500.0(%)	150.0(%)
bA113 Torque limit 2 (Reverse regenerative), 1st-motor	0.0 to 500.0(%)	150.0(%)
bA114 Torque limit 3 (Reverse drive), 1st-motor	0.0 to 500.0(%)	150.0(%)
bA115 Torque limit 4 (Forward regenerative), 1st-motor	0.0 to 500.0(%)	150.0(%)
bA116 Torque limit LADSTOP selection, 1st-motor	00(Disable)/ 01(Enable)	00

- •The torque limit function is effective for vector control. (with sensor, sensorless, OHz range sensorless).
- •If the input terminal 060[TL] torque limit enabled is not assigned, [bA110] is always enabled.
- When input terminal 060 [TL] is assigned and turned on, the torque limit function [bA110] becomes valid. When it is off, the torque limit value becomes the maximum value in the data setting range.
- When the torque is limited, the output terminal 022[TRQ] torque limiting signal is ON.

[bA120] to [bA128]

Overcurrent suppression function setting

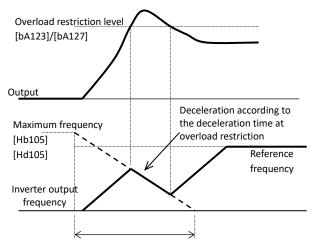
Code/Name	Range (unit)	Initial value
bA120 Overcurrent suppression enable, 1st-motor	00(Disable)/ 01(Enable)	00/01 *1)
bA121 Overcurrent suppression level, 1st-motor	Inverter rated Current ×(0.0 to 2.0)(A)	Inverter rated current×1.8

 Overcurrent can be suppressed, but in that case there is a possibility the motor become in a step-out state.

Overload restriction function setting

Code/Name	Range (unit)	Initial value
bA122 Overload restriction 1 mode 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 Overload restriction 1 active level, 1st-motor	Inverter rated current ×(0.2 to 2.0)(A)	Inverter rated current × 1.5(A)
bA124 Overload restriction 1 action time, 1st-motor	0.10 to 3600.00(s)	1.00
bA126 Overload restriction 2 mode 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 Overload restriction 2 active level, 1st-motor	Inverter rated current ×(0.2 to 2.0)(A)	Inverter rated current × 1.5(A)
bA128 Overload restriction 2 action time, 1st-motor	0.10 to 3600.00(s)	1.00

 When the current is increased over "Overload restriction level", the overload restriction function reduces the current automatically by lowering the frequency.



• Using input terminal 038[OLR] state, the overload restriction 1(OFF) and overload restriction 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	(400V class) 0.0 to 820.0(Vdc)	(400V class) 440.0
bA-32 Instantaneous power failure non-stop function, target voltage level	(400V class) 0.0 to 820.0(Vdc)	(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 bus 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 bus 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 bus voltage exceeds the [bA-32], the deceleration is temporally stopped.
- When [bA-30] = 02/03, at the time of DC bus voltage drop, PI control is performed to generate a regenerative state by deceleration and keep the DC bus voltage at the [bA-32] set value.
- During Instantaneous power failure non-stop deceleration, output terminal 023[IPS] turns ON.

Overvoltage suppression - deceleration

Overvoitage 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	(400V class) 660.0 to 800.0(Vdc)	(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 inverter stops with the deceleration time extended so that the DC bus voltage do not cross over the [bA141] level.
- When [bA140] = 02, 03, the inverter accelerates once so that the DC bus voltage do not cross over [bA141] level.

[bA146] to [bA-63]

Overvoltage suppression - Over-excitation

Code/Name	Range (unit)	Initial value
bA146 Over-magnetization 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)	02
bA147 Over-magnetization function output filter time constant, 1st-motor	0.00 to 1.00(s)	0.30
bA148 Over-magnetization function voltage gain, 1st-motor	50 to 400(%)	100
bA149 Over-magnetization function level setting, 1st-motor	(400V Class) 660.0 to 800.0(Vdc)	(400V Class) 720

- This function disables the AVR(Automatic output Voltage Regulation) function, 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 bus voltage exceeds [bA-149] level.

Dynamic braking (BRD) function

, , ,		
Code/Name	Range (unit)	Initial value
bA-60 Dynamic brake use ratio	0.0 to 10.0(%) *1)	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	(400V class) 660.0 to 800.0(V)	(400V class) 720.0
bA-63 Dynamic brake resistor value	Inverter minimum resistor value to $600(\Omega)$	Minimum resistance

- *1) The actual dynamic brake use ratio is [bA-60]×([bA-63] / (Inverter minimum resistor))^2.
- This function operates the braking resistor of the built-in braking circuits models. To use the BRD, 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.

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)	00

- 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 source 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	C	- 4444
selection, 2nd-motor	Same as	DAIII
bA212 Torque limit 1 (Forward drive), 2nd-motor	Same as	bA112
bA213 Torque limit 2 (Reverse regenerative),	Same as	h 112
2nd-motor	Saille as	UA113
bA214 Torque limit 3 (Reverse drive), 2nd-motor	Same as	bA114
bA215 Torque limit 4 (Forward regenerative),	Same as	h / 11 E
2nd-motor	Saille as	UA113
bA216 Torque limit LADSTOP selection, 2nd-motor	Same as	bA116
bA220 Overcurrent suppression enable,	Same as	hΔ120
2nd-motor	Saille as	UA120
bA221 Overcurrent suppression level, 2nd-motor	Same as	bA121
bA222 Overload restriction 1 mode selection, 2nd-motor	Same as	bA122
bA223 Overload restriction 1 active level,		
2nd-motor	Same as	bA123
bA224 Overload restriction 1 action time,		
2nd-motor	Same as	bA124
bA226 Overload restriction 2 mode selection,	C 1	. 4426
2nd-motor	Same as I	0A126
bA227 Overload restriction 2 active level,	C	- 4127
2nd-motor	Same as I	JA127
bA228 Overload restriction 2 action time,	Same as I	. 120
2nd-motor	Saille as i	JAIZO
bA240 Overvoltage suppression enable,	Same as I	Δ140
2nd-motor	Jaille as i	JA140
bA241 Overvoltage suppression active level,	Same as I	1Δ1Δ1
2nd-motor	Suite do l	·· · · · · · ·
bA242 Overvoltage suppression active time,	Same as I	A142
2nd-motor		
bA244 Constant DC bus voltage control P gain, 2nd-motor	Same as I	A144
bA245 Constant DC bus voltage control I gain,	_	
2nd-motor	Same as I	A145
bA246 Over magnetization function selection,	C	- 1 1 1 C
2nd_motor	Same as I	DA146
bA247 Over magnetization function output filter	Cama a- I	. 1 1 7
time constant, 2nd-motor	Same as l	JA14/
bA248 Over magnetization function voltage gain, 2nd-motor	Same as I	A148
bA249 Over magnetization function level	Same as I	A149
setting, 2nd-motor		

[bb1<u>01</u>] to [bb-<u>23</u>]

Reduction of electromagnetic sound

Code/Name	Range (unit)	Initial value
bb101 Carrier frequency setting, 1st-motor	• 400V PsH100-0148HFC to PsH100-1120HFC [Ub-03]= 02: 0.5 to 16.0(kHz) • 400V PsH100-1500HFC to PsH100-1800HFC [Ub-03]= 02: 0.5 to 10.0(kHz) • 400V PsH100-2170HFC [Ub-03]= 02: 0.5 to 6.0(kHz) • 400V PsH100-3050HFCD to PsH100-6600HFCD [Ub-03]= 02(ND): 0.5 to 5.0(kHz)	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)	00

- To decrease high frequency electromagnetic noise, [bb101] should be set small. To lower motor sound loudness, [bb101] has to be set bigger.
- 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)	00
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] Restart mode after RS release.200

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	0 to 16/255	0
bb-22 Number of retries after overcurrent	0 to 5	0
bb-23 Number of retries after over voltage	0 to 5	0

- 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 the value of these parameters other than 0.

[bb-24] to [bb-42]

Restart mode after instantaneous power failure/under-voltage error

Code/Name	Range (unit)	Initial value
bb-24 Restart mode selection after instantaneous power failure/under-voltage error	*1)	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)	0.3
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	*1)	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	*1)	01
bb-31 Retry wait time after an overvoltage error	0.3 to 100.0(s)	0.3

- *1) 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 FRS/RS

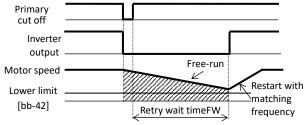
Code/Name	Range (unit)	Initial value
bb-40	00(Restart at 0Hz)/ 01(Restart with matching	00
Restart mode after FRS release	frequency)/	
bb-41	02(Restart with active frequency matching)/	00
Restart mode after RS release	03(Detect speed) *2)	

- *2) Requires encoder feedback to the P1-FB option or the input terminal 103[PLA]/104[PLB] assigned [A]/[B] terminals.
- When using input terminal 032[FRS] and 028[RS], restart mode can be selected.
- By [bb-40], input terminal 032 [FRS] Free run ON and restart operation after free run at stop are selected.
- By [bb-41], select the operation after input terminal 028[RS] reset ON, the operation after reset by power off, and the restart operation after reset release at trip.
- When the input terminal 035[CS] commercial power supply change is turned ON, the inverter will be in free running state, and restart with matching frequency will be performed after [bb-26] time has elapsed.
 For more information, contact your supplier or local Hitachi inverter sales office.

Minimum level of frequency matching

	<u> </u>	
Code/Name	Range (unit)	Initial value
bb-42 Frequency matching	0.00 to 590.00(Hz)	0.00
minimum restart frequency	,	5.55

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

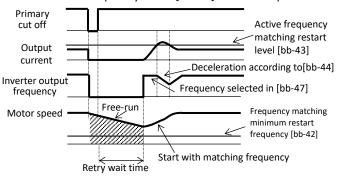


[bb-43] to [bb-62]

Active frequency matching

Code/Name	Range (unit)	Initial value
bb-43 Active frequency matching restart level	Inverter rated current ×(0.2 to 2.0)(A)	Inverter rated current×1.0
bb-44 Active frequency matching restart constant(speed)	0.10 to 30.00(s)	0.50
bb-45 Active frequency matching restart constant (voltage)	0.10 to 30.00(s)	0.50
bb-46 OC-supress level at active frequency matching	Inverter rated current ×(0.0 to 2.0)(A)	Inverter rated current × 1.0(A)
bb-47 Active frequency matching restart speed selection	00(Output frequency at shut down)/ 01(Maximum frequency)/ 02(Setting frequency)	00

- The reset interval is set with [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	Inverter rated current × (0.2 to 2.2) (A)	Inverter rated current × 2.2(A)

- The motor protection level for overcurrent can be set.
- In the case of a permanent magnet motor, set this parameter 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	(400V Class) 600.0 to 820.0(V)	(400V Class) 780.0

- When the input suffers an overvoltage and if the DC bus voltage is higher than the value in [bb-62], a warning is issued in accordance with [bb-61].
- If [bb-61] is 01, the output terminal 081 [OVS]"Overvoltage power Supply" signal turns on and trips with [E015] error. if [bb-61] is 00, only the output terminal 081[OVS] signal is ON.

Selection of Ground fault detection

Code/Name	Range (unit)	Initial value
bb-64 Detect ground fault	00(Disable)/	01
selection	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	00(Disable)/01(Enable)	00
bb-67 Output phase loss detection sensitivity	1 to 100(%)	10

 Above function 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 detectionl

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, if the time which the speed deviation (absolute of [dA-12]-[dA-08]) is greater than the "maximum frequency setting" x [bb-83] exceeds [bb-84] value, an error or warning will occur and the output terminal 041[DSE] turn ON.

Abnormal deviation in position control

Abilionilal 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

- In position control, an error will occur if the time which position deviation is greater than [bb-86] exceeds [bb-87].
- When the input terminal 072[PCLR] is turned ON, the position deviation is cleared

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

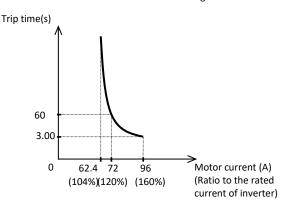
Code/Name	Range (unit)	Initial value
bC110 Electronic thermal level setting, 1st-motor	Inverter rated current × (0.0 to 3.0)(A)	Inverter rated current ×1.0(A)
bC111 Electronic thermal characteristic selection, 1st-motor	00(Reduced torque (VT))/ 01(Constant torque (CT))/ 02(Free setting)	00(JPN)/ 01(EU)(USA) (ASIA)(CHN)
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
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
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

- The setting of [bC112] enables subtraction of the motor's thermal integration value. If [bC113] is lowered from the initial value, the risk of motor burnout may increase, so set it appropriately according to the heat dissipation characteristics of the motor. The inverter protection thermal (user setting not possible) operates separately.
- Electronic thermal protection

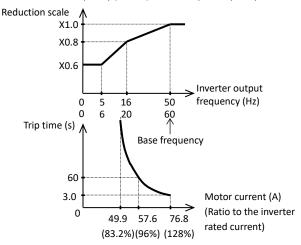
The electronic thermal protection function allows you to protect the motor against overheating. Make settings of this function based on the rated current of the motor. The inverter will trip for overheat protection according to the settings. (Example) Setting on the PsH100-0610HFC

Rated current: 60A

When 60A is set as the electronic thermal setting (bC110), the time-limit characteristic is as shown on the right.

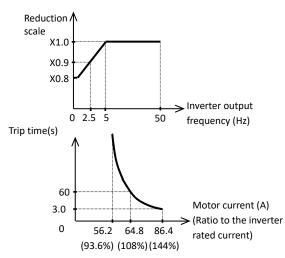


(Example) When [bC111]=00, Inverter rated current:60A, [bC110]=60(A), Base frequency [Hb104]=50Hz, Output frequency=16Hz



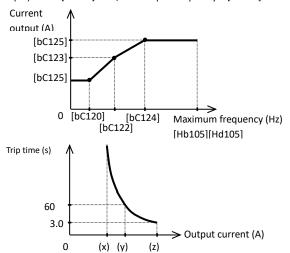
• In case of output frequency = 10Hz (base=50Hz) or 20Hz (base = 60hz), the reduction scale is ×0.8, then the inverter will trip when the output current of 96%(120%×0.8) flows continuously above 60s(≥60s) according to the curve.

(Example) When [bC111]=01, Inverter rated current:60A, [bC110]=60(A), Base frequency[Hb103]=50Hz, Output frequency=2.5Hz



• In case of output frequency = 2.5Hz, the reduction scale is x0.9, Functional Safety terminal (STO) *1) then, the inverter will trip when the output current of 108%(=120%×0.9) flows continuously above 60s(≥60s) according to the curve.

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



(x):[bC123]×about 104% (y):[bC123]×120% (z):[bC123]×Z%(Z value depends on specific model)

[bC210] to [bC225]

[bd-01] to [bd-04]

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	

Code/Name	Range (unit)	Initial value
bd-01 STO input display selection *1)	00(Warning(display))/ 01(Warning(without display))/ 02(Trip)	00
bd-02 STO input change time *1)	0.00 to 60.00(s)	1.00
bd-03 Display selection during STO input change time *1)	00(Warning(display))/ 01(Warning(without display))	00
bd-04 Action selection after STO input change time *1)	00(Maintain current status)/ 01(Disable)/ 02(Trip)	00

*1)These parameters are just about Safety function, not suitable for Ps-H100 series.

Contact your supplier or local Hitachi inverter sales for more details.

[CA-<u>01</u>] to [CA-<u>31</u>]

■ Parameter mode (C code)

Intelligent input terminals setting

Code/Name	Range (unit)	Initial value
CA-01 Input terminal [1] function	Reference	028(RS)
CA-02 Input terminal [2] function	<input terminal</input 	015(SCHG)
CA-03 Input terminal [3] function	function list>	029(JG)
CA-04 Input terminal [4] function		032(FRS)
CA-05 Input terminal [5] function	103 [PLA] Pulse train	031(2CH)
CA-06 Input terminal [6] function	input A is	003(CF1)
CA-07 Input terminal [7] function	restricted to [CA-10],	004(CF2)
CA-08 Input terminal [8] function	104 [PLB]	002(RV)
CA-09 Input terminal [9] function	Pulse train input B is restricted to	001(FW)
CA-10 Input terminal [A] function		033(EXT)
CA-11 Input terminal [B] function	[CA-11],	034(USP)

• The functions for the input terminals 1 to 9,A,B are assigned in [CA-01] to [CA-09],[CA-10],[CA-11].

Input terminal NO/NC setting

input terminar NO/NC setting				
Code/Name	Range (unit)	Initial value		
CA-21 Input terminal [1] active state		00		
CA-22 Input terminal [2] active state		00		
CA-23 Input terminal [3] active state		00		
CA-24 Input terminal [4] active state		00		
CA-25 Input terminal [5] active state	00(Normally	00		
CA-26 Input terminal [6] active state	Open: NO)/ 01(Normally	00		
CA-27 Input terminal [7] active state Closed: NC)		00		
CA-28 Input terminal [8] active state		00		
CA-29 Input terminal [9] active state	it terminal [9] active state			
CA-30 Input terminal [A] active state		00		
CA-31 Input terminal [B] active state	e (

- NO/NC for the Intelligent input terminals 1 to 9,A,B are assigned in [CA-21] to [CA-29],[CA-30],[CA-31].
- However, in the case of [RS] assignment the NO/NC will not apply, only NO will apply.

[CA-41] to [CA-55]

Input terminal chatter prevention

Code/Name	Range (unit)	Initial value
CA-41 Input terminal [1] response time		2
CA-42 Input terminal [2] response time		2
CA-43 Input terminal [3] response time		2
CA-44 Input terminal [4] response time		2
CA-45 Input terminal [5] response time	0 to 400(ms)	2
CA-46 Input terminal [6] response time		2
CA-47 Input terminal [7] response time		2
CA-48 Input terminal [8] response time		2
CA-49 Input terminal [9] response time		2
CA-50 Input terminal [A] response time		2
CA-51 Input terminal [B] response time		2

 Above parameters set 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]

[Input terminal function list]				
Function	Symbol	Function	Description	
code	Syllibol	name	Description	
000	No	Not use	-	
001	FW	Forward rotation	Activating (ON) only one of them	
			will grant forward or reverse	
002	RV	Reverse rotation	rotation command. ⇒ [AA111]	
003	CF1	Multi-speed		
	Ţ	selection 1		
004	CF2	Multi-speed		
		selection 2 Multi-speed		
005	CF3	selection 3	Changing the states of these	
205	CE 4	Multi-speed	Changing the states of these terminals, allow to set different	
006	CF4	selection 4	motor speeds and change among	
007	SF1	Multi-speed Bit-1	them.	
008	SF2	Multi-speed Bit-2	⇒[Ab110] to [Ab-25],	
009	SF3	Multi-speed Bit-3	[Ab210]	
010	SF4	Multi-speed Bit-4		
011	SF5	Multi-speed Bit-5		
012	SF6	Multi-speed Bit-6		
013	SF7	Multi-speed Bit-7		
013	31 7	Water Speed Bit 7	When [ADD] is turned ON, the	
		Trigger for	specified frequency value is	
014	ADD	frequency addition	added to the current frequency	
		addition	reference.→[AA106]	
		Main/Sub speed	Main speed(OFF)/Sub-speed	
015	SCHG	reference change	(ON), to change between them	
			use ⇒[AA105]	
016	STA	3-wire start	[STA]'s ON starts the motor. [STP]'s OFF stops the motor.	
047	CTD	2	The inverter forwards operation	
017	STP	3-wire stop	direction if [F/R] is (OFF), and	
019	г /p	3-wire	reverses operation direction if it	
018	F/R	forward/reverse	is (ON). ⇒[AA111]	
			When the main speed input	
		Analog command	source selection [AA101] is the	
019	AHD	holding	analog input 01 to 06, if AHD	
		Ü	terminal is in ON state, holds the Analog terminal value.⇒[AA101]	
		Remote control	Analog terminal value [AA101]	
020	FUP	speed-UP		
		function	If the frequency can be set ([AHD]	
		Remote control	ON included),[FUP] ON accelerates, and [FDN] ON	
021	FDN	speed-DOWN	decelerates, and [1 DN] ON	
		function	[UDC] returns to the saved value.	
022	LIDC	Remote control	⇒[CA-60] to [CA-66]	
022	UDC	Speed data clearing		
		cicaring	[F-OP]'s ON switches command.	
023	F-OP	Force operation	⇒[CA-70],[CA-71]	
			Change between 1st-motor (OFF)	
024	SET	2nd-motor	and 2nd-motor (ON).	
		control	⇒By parameter	
028	RS	Reset	Reset trip⇒[bb-41], [CA-72]	
029	JG	Jogging	Activates Jogging operation.	
023	,,,		⇒[AG-20],[AG-21]	
030	DB	External dynamic	Enables the DC braking operation	
L		brake	⇒[AF101] to [AF109]	
031	2CH	2-stage	[2CH]'s ON changes	
		Accel/Decel time	the Accel/Decel time. ⇒[AC115]	
032	FRS	Free run stop	[FRS]'s ON allows the motor to free run. ⇒[AA115],[bb-40]	
033	EXT	External fault	[EXT]'s ON occurs error E012.	
033	LAI	External fault	When [USP] is ON, the RUN	
			command is ON when the power	
	USP	11	supply is turned on to prevent	
034		Unattended	the inverter from starting	
		start protection	suddenly (Ex: Power supply is	
			turned on with the [FW] ON). In	
			this case, E013 error occurs.	
		Commercial	[CS] is used when switching to	
		1	commercial power. When [CS] is	
035	CS	power supply		
035	CS	power supply change	turned ON, the inverter output is	
		change	turned ON, the inverter output is cut off.	
035	CS SFT		turned ON, the inverter output is	

[Input terminal function list]

037 038 039 040 041 042 043 044	BOK OLR KHC OKHC PID PIDC2	Answer back from Brake Overload restriction selection Accumulation input power clearance Accumulation output power clearance Disable PID1 PID1 integration reset Disable PID2	Description The brake confirmation signal is inputted for the brake control. Switches between Overload limit 1(OFF) and 2(ON). ⇒[bA122] to [bA128] [KHC]'s ON clears the Accumulated input power monitor. ⇒[UA-12] [OKHC]'s ON clears the Accumulated input power monitor. ⇒[UA-14] If ON, disables PID1 and changes the PID target value for the frequency reference. ⇒[AH-01] If ON, clears the integral value of the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference. ⇒[AH-61] For N, disables PID2 and changes the PID target value for the frequency reference. ⇒[AH-01]
038 039 040 041 042 043	OLR KHC OKHC PID PIDC	from Brake Overload restriction selection Accumulation input power clearance Accumulation output power clearance Disable PID1 PID1 integration reset Disable PID2	inputted for the brake control. Switches between Overload limit 1(OFF) and 2(ON). ⇒[bA122] to [bA128] [KHC]'s ON clears the Accumulated input power monitor. ⇒[UA-12] [OKHC]'s ON clears the Accumulated input power monitor. ⇒[UA-14] If ON, disables PID1 and changes the PID target value for the frequency reference. ⇒[AH-01] If ON, clears the integral value of the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference.
039 040 041 042 043	KHC OKHC PID PIDC	restriction selection Accumulation input power clearance Accumulation output power clearance Disable PID1 PID1 integration reset Disable PID2	1(OFF) and 2(ON). ⇒[bA122] to [bA128] [KHC]'s ON clears the Accumulated input power monitor. ⇒[UA-12] [OKHC]'s ON clears the Accumulated input power monitor. ⇒[UA-14] If ON, disables PID1 and changes the PID target value for the frequency reference. ⇒[AH-01] If ON, clears the integral value of the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference.
040 041 042 043	OKHC PID PIDC	input power clearance Accumulation output power clearance Disable PID1 PID1 integration reset Disable PID2	input power monitor. ⇒[UA-12] [OKHC]'s ON clears the Accumulated input power monitor. ⇒[UA-14] If ON, disables PID1 and changes the PID target value for the frequency reference. ⇒[AH-01] If ON, clears the integral value of the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference.
041 042 043 044	PIDC PID2	Disable PID1 PID1 integration reset Disable PID2	Accumulated input power monitor. ⇒[UA-14] If ON, disables PID1 and changes the PID target value for the frequency reference. ⇒[AH-01] If ON, clears the integral value of the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference.
042 043 044	PIDC PID2	PID1 integration reset Disable PID2	the PID target value for the frequency reference. ⇒[AH-01] If ON, clears the integral value of the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference.
043	PID2	integration reset Disable PID2 PID2	the control. ⇒[AH-62],[AH-65] If ON, disables PID2 and changes the PID target value for the frequency reference.
044		PID2	the PID target value for the frequency reference.
	PIDC2		4 1 1 4
045		integration reset	If ON, clears the integral value of the control. ⇒[AJ-14]
043	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	
052	SVC2	Multi set-point selection 2	The target value can be selected by changing the pattern of ON/OFF
053	SVC3	Multi set-point selection 3	states. ⇒[AH-06]
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).
057	PIO2	PID output switching 2	PID1 Enable(OFF:OFF) PID2 Enable(OFF:ON) PID3 Enable(ON:OFF) PID4 Enable(ON:ON)
058	SLEP	SLEEP condition activation	In case of [SLEP] terminal selected as sleep trigger, [SLEP]'s ON activates the sleep function. ⇒ [AH-85]
059	WAKE	WAKE condition activation	In case of [WAKE] terminal selected as wake trigger, [WAKE]'s ON activates the wake function. ⇒ [AH-93]
060	TL	Torque limit enable *1)	[TL]'s ON enables torque limit.
061	TRQ1	Torque limit selection bit 1	The target value can be
062	TRQ2	Torque limit selection bit 2	selected by changing the pattern of ON/OFF states.

^{*1)} These functions are disabled when the Control mode selection (AA121/AA221) setting is 00 to 06 (V/f control mode).

[Input terminal function list]

unction code	Symbol	Function name	Description
063	PPI	P/PI control mode selection	For drooping control, [PPI] 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	[SON]'s ON executes the Servo-Lock operation.
066	FOC	Forcing (Pre-excitation)	Turning ON this terminal before operation, accelerates the torquise by supplying an exciting current in advance.
067	ATR	Permission of torque control	[ATR]'s ON enables the torque control.
068	TBS	Torque bias enable	[TBS]'s ON enables the torque bias.
069	ORT	Home search function	[ORT]'s ON execute the home position return function in pulse train position control.
071	LAC	Acceleration/ Deceleration (LAD) *1) cancellation	[LAC]'s 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 reference input enable	In the pulse train position control, if [STAT] is ON, the pulse train input is enabled.
074	PUP	Position bias (ADD)	In pulse train position control, when [PUP]/[PDN] is turned on,
075	PDN	Position bias (SUB)	"Position bias setting[AE-08]" is added/subtracted to/from the position reference.
076	CP1	Multistage position settings selection 1	
077	CP2	Multistage position settings selection 2	The position reference can be
078	CP3	Multistage position settings selection 3	selected by changing the pattern of ON/OFF states.
079	CP4	Multistage position settings selection 4	
080	ORL	Limit signal of homing function	Used by the Zero-Return position
081	ORG	Start signal of homing function	operations of the position control.
082	FOT	Forward over travel	When this signal is ON, the forward drive in absolute position control mode is limited (The torque limit value in the forward direction is set to 10%).
083	ROT	Reverse over travel	When this signal is ON, reverse drive in absolute position control mode is limited (Torque limit value in reverse direction is set to 10%).
084	SPD	Speed/Position switching	Switches position control (OFF) and speed control (ON).

[Input terminal function list]

Function code	Symbol	Function name	Description
085	PSET	Position data presetting	[PSET]'s ON sets the actual position to the Pre-set position [AE-62].
086	MI1	General-purpos e input 1	
087	MI2	General-purpos e input 2	
088	MI3	General-purpos e input 3	
089	MI4	General-purpos e input 4	
090	MI5	General-purpos e input 5	When these functions are
091	MI6	General-purpos e input 6	assigned, they become general purpose input signals of the EzSQ
092	MI7	General-purpos e input 7	function.
093	MI8	General-purpos e input 8	
094	MI9	General-purpos e input 9	
095	MI10	General-purpos e input 10	
096	MI11	General-purpos e input 11	
097	PCC	Pulse counter clearing	[PCC]'s ON clears the count for the pulse counter function.
098	ECOM	EzCOM activation	[ECOM]'s ON activates EzCOM.
099	PRG	Program RUN	[PRG]'s ON executes EzSQ.
100	HLD	Acceleration/ Deceleration disable	[HLD]'s ON stagnates Accel/Decel time temporally.
101	REN	RUN enable	Run command is not possible when the input terminal function [REN] is assigned and it is OFF.
102	DISP	Display lock	[DISP]'s ON locks the keypad screen.
103	PLA	Pulse count A	For pulse train input use.
104	PLB	Pulse count B	For pulse train input use.
105	EMF	Emergency-forc e drive activation	Forces the set operation in emergency state.
107	сок	Contactor check signal	Regarding the braking control, check signal for the contactor.
108	DTR	Data trace start	[DTR]'s ON starts data trace function.
109	PLZ	Pulse train input Z	Z phase pulse input of the external encoder. It is invalid when using P1-FB.
110	ТСН	Teach-in signal	[TCH]'s ON starts teach-in function.

[CA-60] to [CA-84]

[FUP] / [FDN] operations

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

- [CA-60] sets as operation target the frequency reference or the PID target value for 020[FUP]/021[FDN].
- [CA-61] sets whether the modified values of [FUP] / [FDN] should be saved or not in the inverter non volatile memory.
- [CA-62] selects the frequency reference when input terminal 022[UDC] is ON
- If [FUP]/[FDN] 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 reference source selection when [F-OP] is active	01(Terminal[Ai1])/02(Terminal[Ai2])/ 03(Terminal[Ai3])/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)	01
CA-71 RUN command source selection when [F-OP] is active	00([FW]/[RV] terminal)/ 01(3-wire)/02(Keypad's RUN key)/ 03(RS485)/04(Option-1)/ 05(Option-2)/06(Option-3)	00

 If input terminal 023[F-OP] is ON, the above settings are carried out.

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 (For control terminal block [A]/[B])

Train enterties in part (1 or control terminal block [74]/[5]		
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	1 to 10000	1

 Above parameters set the main encoder input and the motor gear ratio involved in the encoder feedback.

[CA-90] to [CA-99]

Pulse train input terminal[A][B]

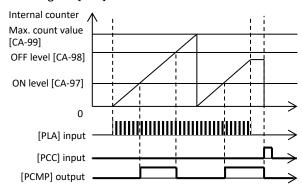
Code/Name	Range (unit)	Initial value
CA-90 Pulse train input, target function selection	00(Disable)/ 01(Reference)/ 02(Speed feedback)/ 03(Pulse count)	00
CA-91 Pulse train input mode selection	00(90 degrees shift pulse train)/ 01(Forward/Reverse pulse train and direction signal)/ 02(Forward pulse train and reverse pulse train)	00
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 to 100.0(%)	0.0

When [CA-90] is other than 00, the input terminals [A]/[B] become pulse train input terminals.
 Assign the input terminal function 103[PLA]/104[PLB] to terminals [A]/[B] to perform pulse train input frequency reference, vector control with encoder feedback or absolute position control. The pulse train count method follows the setting of [CA-91].

Pulse train input 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	0 to 65535	0
CA-99 Pulse counter maximum value	0 to 65535	65535

- Set 044[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-<u>01</u>] to [Cb-<u>35</u>]

Analog input adjustment

Analog input adjustment		
Code/Name	Range (unit)	Initial value
Cb-01 [Ai1] Filter time constant	1 to 500(ms)	16
Cb-03 [Ai1] Start value	0.00 to 100.00(%)	0.00
Cb-04 [Ai1] End value	0.00 to 100.00(%)	100.00
Cb-05 [Ai1] Start rate	0.0 to [Cb-06](%)	0.0
Cb-06 [Ai1] End rate	[Cb-05] to 100.0(%)	100.0
Cb-07 [Ai1] Start value selection	00(Start value)/ 01(0%)	01
Cb-11 [Ai2] Filter time constant	1 to 500(ms)	16
Cb-13 [Ai2] Start value	0.00 to 100.00(%)	0.00
Cb-14 [Ai2] End value	0.00 to 100.00(%)	100.00
Cb-15 [Ai2] Start rate	0.0 to [Cb-16](%)	20.0
Cb-16 [Ai2] End rate	[Cb-15] to 100.0(%)	100.0
Cb-17 [Ai2] Start value selection	00(Start value)/ 01(0%)	01
Cb-21 [Ai3] Filter time constant	1 to 500(ms)	16
Cb-22 Terminal [Ai3] selection	00(Single)/ 01(Added to Ai1/Ai2: forward and reverse) 02(Added to Ai1/Ai2: Forward only)	00
Cb-23 [Ai3] Start value	-100.00 to 100.00(%)	-100.00
Cb-24 [Ai3] End value	-100.00 to 100.00(%)	100.00
Cb-25 [Ai3] Start rate	-100.0 to [Cb-26]	-100.0
Cb-26 [Ai3] End rate	[Cb-25] to 100.0	100.0
Cb-30 [Ai1] Voltage/Current bias adjustment	-100.00 to 100.00(%)	0.00
Cb-31 [Ai1] Voltage/Current gain adjustment	0.00 to 200.00(%)	100.00
Cb-32 [Ai2] Voltage/Current bias adjustment	-100.00 to 100.00(%)	0.00
Cb-33 [Ai2] Voltage/Current gain adjustment	0.00 to 200.00(%)	100.00
Cb-34 [Ai3] Voltage bias adjustment	-100.00 to 100.00(%)	0.00
Cb-35 [Ai3] Voltage gain adjustment	0.00 to 200.00(%)	100.00

 Regarding the adjustment method of the Analog input, refer to the "chapter 3.9 Adjust the analog input (Ai1/Ai2)" and "chapter 3.11 Adjust the analog input (Ai3)".

[Cb-40] to [Cb-57][CC-01] to [CC-17]

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

MOP(VR) input adjustment

Code/Name	Range (unit)	Initial value
Cb-51 MOP-VR input filter time constant	1 to 500	100
Cb-53 MOP-VR start value	0.00 to 100.00(%)	0.00
Cb-54 MOP-VR end value	0.00 to 100.00(%)	100.00
Cb-55 MOP-VR start ratio	0.0 to [Cb-56](%)	0.0
Cb-56 MOP-VR end ratio	[Cb-55] to 100.0(%)	100.0
Cb-57 MOP-VR start selection	00(Start value)/ 01(0%)	01

 These are the parameters when using optional operation keypad (MOP(VR))(option).

Intelligent Output terminals setting

Code/Name	Range (unit)	Initial value
CC-01 Output terminal [11] function	Reference <intelligent function="" list="" output="" terminal=""></intelligent>	001(RUN)
CC-02 Output terminal [12] function		002(FA1)
CC-03 Output terminal [13] function		003(FA2)
CC-04 Output terminal [14] function		007(IRDY)
CC-05 Output terminal [15] function		035(OL)
CC-06 Output terminal [16] function *1)		000(NO)
CC-07 Output terminal [AL] function		017(AL)

• The functions for the output terminals 11 to 15 ,AL are assigned in [CC-01] to [CC-05] ,[CC-07].

Output terminal NO/NC setting

Code/Name	Range (unit)	Initial value
CC-11 Output terminal [11] active state	00(Normally open: NO)/ 01(Normally closed: NC)	00
CC-12 Output terminal [12] active state		00
CC-13 Output terminal [13] active state		00
CC-14 Output terminal [14] active state		00
CC-15 Output terminal [15] active state		00
CC-16 Output terminal [16] active state*1)		00
CC-17 Output terminal [AL] active state		01

[•] The NO/NC setting for the Intelligent output terminals 11 to 15 ,AL are assigned in [CC-11] to [CC-15], [CC-17].

^{*1)} Ps-H100 series do not have this terminal.

[CC-<u>20</u>] to [CC-<u>33</u>]

Output terminals stabilization

Code/Name	Range (unit)	Initial value
CC-20 Output terminal [11] on-delay time	0.00 to 100.00(s)	0.00
CC-21 Output terminal [11] off-delay time	0.00 to 100.00(s)	0.00
CC-22 Output terminal [12] on-delay time	0.00 to 100.00(s)	0.00
CC-23 Output terminal [12] off-delay time	0.00 to 100.00(s)	0.00
CC-24 Output terminal [13] on-delay time	0.00 to 100.00(s)	0.00
CC-25 Output terminal [13] off-delay time	0.00 to 100.00(s)	0.00
CC-26 Output terminal [14] on-delay time	0.00 to 100.00(s)	0.00
CC-27 Output terminal [14] off-delay time	0.00 to 100.00(s)	0.00
CC-28 Output terminal [15] on-delay time	0.00 to 100.00(s)	0.00
CC-29 Output terminal [15] off-delay time	0.00 to 100.00(s)	0.00
CC-30 Output terminal [16] on-delay time*1)	0.00 to 100.00(s)	0.00
CC-31 Output terminal [16] off-delay time*1)	0.00 to 100.00(s)	0.00
CC-32 Output terminal [AL] on-delay time	0.00 to 100.00(s)	0.00
CC-33 Output terminal [AL] off-delay time	0.00 to 100.00(s)	0.00

[•] The above parameters set the delay time from the change of the output terminal to the actual response.

[output terminal function list]

Function code	Symbol	Function name	Description
000	No	Not use	_
000	RUN	Running	While output is active
001	KUN	Kullillig	Turn on when output
002	FA1	Constant-frequency	frequency is reached
002	17.1	reached	frequency reference.
			Turns ON when the output
000		Set frequency	frequency reaches or
003	FA2	overreached	exceeds the specified arrival
			value. [CE-10][CE-11]
			Turns ON only when the
004	FA3	Set frequency	specified arrival frequency
001	17.5	reached	has been reached.
			[CE-12][CE-13]
005	E A 4	Set frequency	Turns ON when the specified
005	FA4	overreached 2	arrival frequency is reached
			or exceeded. [CE-12][CE-13]
		Set frequency	Turns ON only when the specified arrival frequency
006	FA5	reached 2	has been reached.
		reactied 2	[CE-12][CE-13]
007	IRDY	Inverter ready	ON when inverter is ready
008	FWR	Forward rotation	ON while in forward drive
009	RVR	Reverse rotation	ON while in reverse drive
203		Frequency	
010	FREF	reference = Keypad	ON if the frequency
		is selected	reference is from keypad
011	555	Run command =	ON if the RUN command is
011	REF	Keypad is selected	from keypad.
012	CETNA	2nd control is	ON if 2 and an observation and observation
012	SETM	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 *2)	ON if torque exceeds the
019	oiq	Over-torque 2)	level [CE120] to [CE123].
			After the main power supply
			R,S,T is established,
020	IP	Instantaneous	it turns ON when an
		power failure	instantaneous power failure
			of the main power supply is detected.
021	UV	Under-voltage	Turns on when main power drops or control power fails.
022	TRQ	Torque limited	ON if torque limit operates
022	TNQ	IP-Nonstop function	ON if IP-Nonstop function
023	IPS	is active	operates in power loss.
		Accumulated	ON if set time [CE-36] is
024	RNT	operation time over	exceeded
		Accumulated	ON if set time [CE-36] is
025	CALT		
023	ONT	power-on time over	exceeded
	ONT	,	exceeded
026	THM	Electronic thermal	exceeded
		,	exceeded ON if motor thermal integral
		Electronic thermal alarm signal(MTR)	exceeded ON if motor thermal integral value exceeds set value
		Electronic thermal alarm signal(MTR)	exceeded ON if motor thermal integral value exceeds set value [CE-30]
026	ТНМ	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL)	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal
026	THM	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31]
026	ТНМ	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set
026	THM	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning
026 027 029	THM THC WAC	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31]
026 027 029	THM THC WAC	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop Starting contact	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning
026 027 029 030	THM THC WAC	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning ON by life warning ON while in operation
026 027 029 030 031	THM THC WAC WAF	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop Starting contact	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning ON by life warning ON while in operation ON when the heatsink
026 027 029 030	THM THC WAC	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop Starting contact signal	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning ON by life warning ON while in operation ON when the heatsink temperature is over the setti
026 027 029 030 031	THM THC WAC WAF	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop Starting contact signal Heat sink overheat	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning ON by life warning ON while in operation ON when the heatsink temperature is over the settivalue [CE-34].
026 027 029 030 031	THM THC WAC WAF	Electronic thermal alarm signal (MTR) Electronic thermal alarm signal (CTL) Capacitor life warning Cooling-fan speed drop Starting contact signal Heat sink overheat	exceeded ON if motor thermal integral value exceeds set value [CE-30] ON if inverter thermal integral value exceeds set value [CE-31] ON by life warning ON by life warning ON while in operation ON when the heatsink temperature is over the setti

^{*2)} This function is disabled when the Control mode selection (AA121/AA221) setting is 00 to 06 (V/f control mode).

^{*1)} Ps-H100 series do not have this terminal.

[Output terminal function list]

Symbol **Function name** Description code ON if output current is less Low-current 034 LOC₂ indication signal than the setting value [CE103]. Overload notice ON if output current exceeds 035 OL specified value [CE106] advance signal 1 ON if output current exceeds Overload notice 036 012 specified value [CE107] advance signal 2 BRK 037 Brake release ON when brake releases ON if abnormality in sequence 038 BER Brake error happens. This signal is used for power CON 039 Contactor control line contactor control. OHz speed ON if output frequency is less 040 ZS detection than set value [CE-33] ON if speed deviation exceeds Speed deviation 041 DSF the set value.[bb-82] [bb-83] [bb-84] ON if position deviation Position deviation 042 PDD exceeds the set value.[bb-85] over [bb-86] [bb-87] Positioning 043 POK ON if positioning is completed completed ON when set value and pulse Pulse count 044 **PCMP** compare match train counter match. output [CA-97] to [CA-99] Deviation over ON if PID control deviation 045 for PID control exceeds the set value [AH-72] PID1 feedback ON if PID feedback is within 046 FBV range. [AH-73] [AH-74] comparison **OD: Deviation** ON if PID control deviation 047 OD2 over for PID2 exceeds the set value [AJ-17] control PID2 feedback ON if PID feedback is within 048 FBV2 comparison range. [AJ-18] [AJ-19] Communication ON if communication is lost 049 NDc line with operation keypad disconnection Analog [Ai1] ON if Analog input 1 is less than 050 Ai1Dc disconnection the set value [CE-50] [CE-51] detection Analog [Ai2] ON if Analog input 2 is less than 051 Ai2Dc disconnection the set value [CE-52] [CE-53] detection Analog [Ai3] ON if Analog input 3 is less than 052 Ai3Dc disconnection the set value [CE-54] [CE-55] detection Analog [Ai4] ON if Analog input 4 is less than 053 Ai4Dc disconnection the set value [oE-44] [oE-45] detection Analog [Ai5] ON if Analog input 5 is less than 054 Ai5Dc disconnection the set value [oE-46] [oE-47] detection Analog [Ai6] ON if Analog input 6 is less than 055 Ai6Dc disconnection the set value [oE-48] [oE-49] detection Window ON if Analog input 1 is within 056 WCAi1 comparator Ai1 range. [CE-40] to [CE-42] Window ON if Analog input 2 is within WCAi2 057 comparator Ai2 range. [CE-43] to [CE-45] Window ON if Analog input 3 is within 058 WCAi3 comparator Ai3 range. [CE-46] to [CE-48] ON if Analog input 4 is within Window 059 WCAi4 comparator Ai4 range. [oE-35] to [oE-37] Window ON if Analog input 5 is within WCAi5 060 range. [oE-38] to [oE-40] comparator Ai5 Window ON if Analog input 6 is within 061 WCAi6 range. [oE-41] to [oE-43] comparator Ai6

[Output terminal function list]

Function code	Symbol	Function name	Description
062	LOG1	Logical operation result 1	
063	LOG2	Logical operation result 2	
064	LOG3	Logical operation result 3	Determined by the
065	LOG4	Logical operation result 4	calculation results of two output terminals
066	LOG5	Logical operation result 5	
067	LOG6	Logical operation result 6	
068	LOG7	Logical operation result 7	
069	M01	General-purpose output 1	
070	MO2	General-purpose output 2	
071	МОЗ	General-purpose output 3	
072	MO4	General-purpose output 4	Set if case of use of EzSQ
073	MO5	General-purpose output 5	
074	MO6	General-purpose output 6	
075	MO7	General-purpose output 7	
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	This signal turns on until the trace start triggers are input.
079	TRA	Trace function data logging	ON while in data sampling.
080	LBK	Low-battery of keypad	ON while in low battery or when keypad transfers no clock data.
081	OVS	Overvoltage power Supply	ON when overvoltage is detected in stop status.
084	AC0	Alarm code bit-0	Alama infana - Harata
085	AC1	Alarm code bit-1	Alarm information is output as bits by these
086	AC2	Alarm code bit-2	signals. *1)
087	AC3	Alarm code bit-3	31511a13. I)
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

^{*1)} It will be effective when you use the Liquid crystal operator VOP (option).

[CC-40] to [CC-60]

Logic output terminals setting

Logic output termin	Range (unit)	Initial value
CC-40 LOG1 operand-1 selection	<intelligent output<br="">terminal function list> reference *1)</intelligent>	000
CC-41 LOG1 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-42 LOG1 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00
CC-43 LOG2 operand-1 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-44 LOG2 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-45 LOG2 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00
CC-46 LOG3 operand-1 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-47 LOG3 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-48 LOG3 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00
CC-49 LOG4 operand-1 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-50 LOG4 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-51 LOG4 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00
CC-52 LOG5 operand-1 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-53 LOG5 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-54 LOG5 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00
CC-55 LOG6 operand-1 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-56 LOG6 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-57 LOG6 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00
CC-58 LOG7 operand-1 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-59 LOG7 operand-2 selection	<pre><intelligent function="" list="" output="" terminal=""> reference *1)</intelligent></pre>	000
CC-60 LOG7 logical calculation selection	00(AND)/01(OR)/ 02(XOR)	00

- *1) 062[LOG1] to 068[LOG7] can not be selected.
- The logical operation function outputs the operation results of the two selected output functions to the output terminal functions [LOG1] to [LOG7].

[Cd-<u>01</u>] to [Cd-<u>35</u>]

Analog output terminal adjustment

Code/Name	Range (unit)	Initial value
Cd-01 [FM] Output wave form selection	00(PWM)/ 01(Frequency)	00
Cd-02 [FM] Output base frequency (At digital frequency output)	0 to 3600(Hz)	2880
Cd-03 [FM] Output monitor selection		dA-01
Cd-04 [Ao1] Output monitor selection	Set monitor code	dA-01
Cd-05 [Ao2] Output monitor selection		dA-01
Cd-10 Analog monitor adjustment mode enable	00(Disable)/ 01(Enable)	00
Cd-11 [FM] Output filter time constant	1 to 500(ms)	100
Cd-12 [FM] Data type selection	00(Absolute value)/ 01(Signed value)	00
Cd-13 [FM] Bias adjustment	-100.0 to 100.0(%)	0.0
Cd-14 [FM] Gain adjustment	-1000.0 to 1000.0(%)	100.0
Cd-15 Adjustment mode [FM] output level	-100.0 to 100.0(%)	100.0
Cd-21 [Ao1] Output filter time constant	1 to 500(ms)	100
Cd-22 [Ao1] Data type selection	00(Absolute value)/ 01(Signed value)	00
Cd-23 [Ao1] Bias adjustment	-100.0 to 100.0(%)	0.0
Cd-24 [Ao1] Gain adjustment	-1000.0 to 1000.0(%)	100.0
Cd-25 Adjustment mode [Ao1] output level	-100.0 to 100.0(%)	100.0
Cd-31 [Ao2] Output filter time constant	1 to 500(ms)	100
Cd-32 [Ao2] Data type se lection	00(Absolute value)/ 01(Signed value)	00
Cd-33 [Ao2] Bias adjustment	-100.0 to 100.0(%)	20.0
Cd-34 [Ao2] Gain adjustment	-1000.0 to 1000.0(%)	80.0
Cd-35 Adjustment mode [Ao2] output level	-100.0 to 100.0(%)	100.0

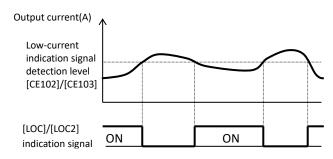
 Regarding the adjustment method of the Analog output, refer to the "chapter 3.10 Adjust the analog output (Ao1/Ao2/FM)"

[CE101] to [CE107]

Low-current detection signal

Low carrent actection 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	Inverter rated current×(0.00 to 2.00)(A)	Inverter rated current ×1.00(A)		

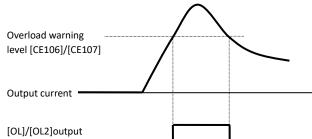
 When the output current is low, output terminal 033[LOC]/034[LOC2] Low-current indication signal 1/2 Outputs low current signal.



Overload detection 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)	01		
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	Inverter rated current×(0.00 to 2.00)(A)	Inverter rated current ×1.00(A)		

•When overload occurs, Output terminal 035[OL]/036[OL2] overload notice advance signals are output.



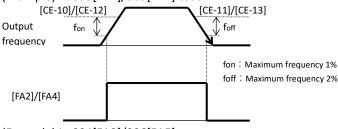
[CE-10] to [CE-31]

Frequency arrival signal setting

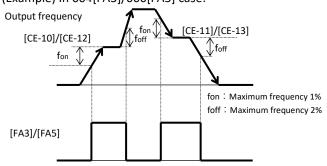
Code/Name	Range (unit)	Initial value
CE-10 Arrival frequency 1 value setting during acceleration		0.00
CE-11 Arrival frequency 1 value setting during deceleration	0.00 to	0.00
CE-12 Arrival frequency 2 value setting during acceleration	590.00(Hz)	0.00
CE-13 Arrival frequency 2 value setting during deceleration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

• Set the operation of the frequency arrival signal.

(Example) In 003[FA2]/005[FA4] case:



(Example) In 004[FA3]/006[FA5] case:



Over-torque signal

Code/Name	Range (unit)	Initial value
CE120 Over-torque level (Forward drive), 1st motor		100.0
CE121 Over-torque level (Reverse regenerative), 1st motor	0.0 to 500.0(%)	100.0
CE122 Over-torque level (Reverse drive), 1st motor	0.0 to 300.0(%)	100.0
CE123 Over-torque level (Forward regenerative), 1st motor		100.0

 Set 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 (MTR)	0.00 to 100.00(%)	80.00
CE-31 Electronic thermal warning level (CTL)		80.00

- [CE-30] sets the level to output the motor electronic thermal warning 026[THM].
- [CE-31] sets the level to output the inverter electronic thermal warning 027[THC].

[CE-33] to [CE-51]

OHz speed detection signal

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

 Set the level in which the output terminal 040[ZS] Zero speed detection turns ON.

Cooling fin overheat warning signal

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

 Set the level in which output terminal 032[OHF]Heat sink overheat warning turns ON.

Accumulated RUN time / Accumulated PowerON time warning

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

 Set the warning level in which the output terminal 024[RNT] accumulated operation time over and output terminal 025[ONT] accumulated power-on time over turn ON.

Window comparator (detection of terminal disconnection)

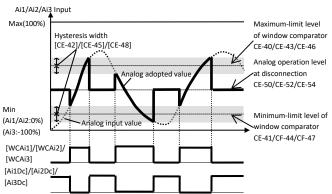
Code/Name	Range (unit)	Initial value
CE-40 [Ai1] Window comparator higher limit	0 to 100(%)	100
CE-41 [Ai1] Window comparator lower limit	0 to 100(%)	0
CE-42 [Ai1] Window comparator hysteresis width	0 to 10(%)	0
CE-43 [Ai2] Window comparator higher limit	0 to 100(%)	100
CE-44 [Ai2] Window comparator lower limit	0 to 100(%)	0
CE-45 [Ai2] Window comparator hysteresis width	0 to 10(%)	0
CE-46 [Ai3] Window comparator higher limit	-100 to 100(%)	100
CE-47 [Ai3] Window comparator lower limit	-100 to 100(%)	-100
CE-48 [Ai3] Window comparator hysteresis width	0 to 10(%)	0
CE-50 [Ai1] Operation set level at disconnection or compare event	0 to 100(%)	0
CE-51 [Ai1] Operation set level implement timing	00(Disable)/ 01(Enable(at WC*active)/ 02(Enable(at WC*de-active)	00

[CE-52] to [CE-55][CE201]to[CE223]

Code/Name	Range (unit)	Initial value
CE-52 [Ai2] Operation set level at disconnection or compare event	0 to 100(%)	0
CE-53 [Ai2] Operation set level implement timing	00(Disable)/ 01(Enable (at WC*active)/ 02(Enable (at WC*de-active)	00
CE-54 [Ai3] Operation set level at disconnection or compare event	-100 to 100(%)	0
CE-55 [Ai3] Operation set level implement timing	00(Disable)/ 01(Enable (at WC*active)/ 02(Enable (at WC*de-active)	00

- Window comparator function output signals whenever the analog inputs value are within or out of range.
- In the case of disconnection judgment, the reference value can be set to the [CE-50]/[CE-52]/[CE-54] setting value when it is within or out of the range of the window comparator.

If in case [CE-51] [CE-53] [CE-55] = 02:



• When using the P1-AG analog input/output option, Output terminal 053[Ai4Dc] to 055[Ai6Dc] and 059 [WCAi4] to 061[WCAi6] can be output in the same operation as the above figure by using parameters [oE-35] to [oE-49].

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

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-<u>01</u>] to [CF-<u>11</u>]

Modbus communication

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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)	05
CF-02 RS485 communication node address	1 to 247	1
CF-03 RS485 communication parity selection	00(No parity)/ 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)/ 02(EzCOM)/ 03(EzCOM Administrator)	01
CF-11 Register data conversion function (A,V⇔%)	00(A, V)/ 01(%)	00

- Set the Modbus communication function for its use.
- When using communication function between inverter EzCOM, set a value except 01 for [CF-08].
- When communication disconnection occurs, the output terminal 049[NDc] turns ON.
 049[NDc] signal is turned off when the error is cleared.
 Contact your supplier or local Hitachi inverter sales office for more details.

[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.	1 to 8	1
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	0000 to FFFF	0000
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	0000 to FFFF	0000
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	0000 to FFFF	0000
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	0000 to FFFF	0000
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	0000 to FFFF	0000

[•] Set for the use of EzCOM function. Contact to your supplier or local Hitachi distributor or

USB node setting

service station for more details.

Code/Name	Range (unit)	Initial value
CF-50 USB communication	1 to 247	1
node address	10217	-

- Sets the USB node address in the case of connection with ProDriveNext(PC software). It is also required to confirm the USB node in the ProDriveNext side (The initial value of ProDriveNext is also node address 1).
- When connecting Ps-H100 and ProDriveNext at first time, keep the setting value 1.

[HA-01] to [HA115]

■ Parameter mode (H code)

Auto-tuning

Code/Name	Range (unit)	Initial value
HA-01 Auto-tuning selection	00(Disable)/ 01(No-rotation)/ 02(Rotation)/ 03(IVMS) *1)	00
HA-02 Auto-tuning RUN command source selection	00(Keypad "RUN" key)/ 01(Setting by [AA111]/[AA211])	00
HA-03 Online auto-tuning selection	00(Disable)/ 01(Enable)	00

- 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)
- *1) This setting (03) is not suitable for Ps-H100 series.

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.

Control mode response adjustment

Code/Name	Range (unit)	Initial value
HA115 Speed response, 1st-motor	0 to 1000(%)	100

- The speed response in the operation control of the inverter will be adjusted.
- ⇒[AA121] control mode

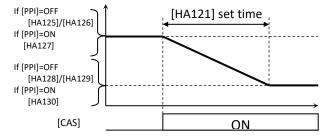
[HA120] to [HA134]

Control response ASR gain switching

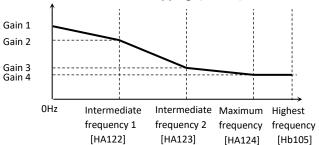
Code/Name	Range (unit)	Initial value
HA120 ASR gain switching mode selection, 1st-motor	00([CAS] terminal)/ 01(Parameter setting)	00
HA121 ASR gain switching time setting, 1st-motor	0 to 10000(ms)	100
HA122 ASR gain mapping intermediate speed 1, 1st-motor	0.00 to 590.00(Hz)	0.00
HA123 ASR gain mapping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

- *ASR: Automatic Speed Regulator
- Speed response gain of the motor control can be changed.
- The PI gain used for control is as follows according to the state of the input terminal 063[CAS] and 064[PPI] terminals.
- In the case of input terminal [cas]

witching,[HA120]=00



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



[HA2<u>10</u>] to [HA2<u>34</u>]

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

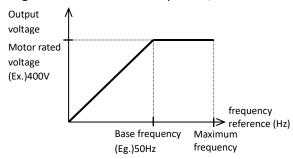
Code/Name	Range (unit)	Initial value
HA210 Stabilization constant, 2nd-motor	Same as HA110	
HA215 Speed response, 2nd-motor	Same as	HA115
HA220 ASR gain switching mode selection, 2nd-motor	Same as	HA120
HA221 ASR gain switching time setting, 2nd-motor	Same as	HA121
HA222 ASR gain mapping intermediate 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

[Hb1<u>02</u>] to [Hb1<u>08</u>]

Basic parameters for Induction motor

Code/Name	Range (unit)	Initial value
Hb102 Async. Motor capacity setting, 1st-motor	0.01 to 160.00 (kW)	Motor capacity setting
Hb103 Async. Motor number of poles setting, 1st-motor	2 to 48 (Pole)	4P
Hb104 Async. Motor base frequency setting, 1st-motor	10.00 to [Hb105] (Hz)	60.00(JPN)(USA)/ 50.00(EU)(ASIA)(CHN)
Hb105 Async. Motor maximum frequency setting, 1st-motor	[Hb104] to 590.00 (Hz)	60.00(JPN)(USA)/ 50.00(EU)(ASIA)(CHN)
Hb106 Async. Motor rated voltage, 1st-motor	1 to 1000 (V)	(400V Class) 400(JPN)(EU)(ASIA)(CHN) 460(USA)
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 Hitachi 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.

XInitial value depends on the inverter.

Motor typical data	Code	Range of values (Unit)	
Capacity	[Hb102]	0.01 to 160.00 (kW)	
Number of poles	[Hb103]	2 to 48 (poles)	
Fraguancy	[Hb104]	10.00 to 590.00 (Hz)	
Frequency	[Hb105]	10.00 to 590.00 (Hz)	
Voltage	[Hb106]	1 to 1000 (V)	
Current	[Hb108]	0.01 to 10000.00 (A)	

[Hb110] to [Hb131]

Induction motor constants

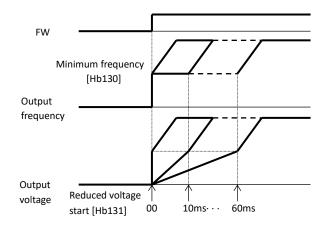
Code/Name	Range (unit)	Initial value
Hb110 Async. Motor constant R1, 1st-motor	0.000001 to 1000.000000 (Ω)	Motor capacity setting
Hb112 Async. Motor constant R2, 1st-motor	0.000001 to 1000.000000 (Ω)	Motor capacity setting
Hb114 Async. Motor constant L, 1st-motor	0.000001 to 1000.000000 (mH)	Motor capacity setting
Hb116 Async. Motor constant IO, 1st-motor	0.01 to 10000.00 (A)	Motor capacity setting
Hb118 Async. Motor constant J, 1st-motor	0.00001 to 10000.00000 (kgm2)	Motor capacity setting

- If the motor capacity[Hb102] and number of poles [Hb103] are changed, the motor characteristics are set according to the internal Hitachi 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.

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 the torque at the time of start-up is not enough, you can change the setting to raise the lowest frequency.
- if the trip occurs when raised the minimum frequency, set a longer "reduced voltage start time setting".

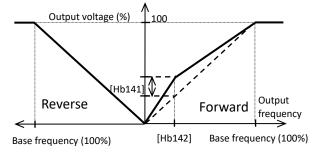


[Hb140] to [Hb146]

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(%)	0.0
Hb142 Manual torque boost peak speed, 1st-motor	0.0 to 50.0(%)	0.0

- 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	050

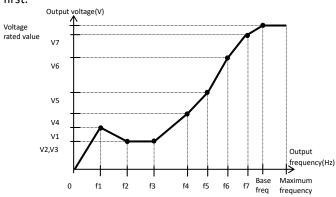
• In V/f control, if the Eco Drive function is enabled, enters an energy saving control.

[Hb1<u>50</u>] to [Hb1<u>71</u>]

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 at first.



V/f feedback control adjustment

V/1 reedback 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	0 to 1000(%)	100	

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

[Hb180] [Hb202] to [Hb280]

Output voltage adjustment

Code/Name	Range (unit)	Initial value
Hb180 Output voltage gain,	0 to 255(%)	100
1st-motor	0 10 200(70)	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
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		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	0 to 255(%)	100

 These parameters are adjusted when the automatic torque boost control function is selected in [AA121].
 For more information, please Contact to your supplier or local Hitachi distributor or service station.

Vector control start adjustment

Code/Name	Range (unit)	Initial value
HC110 Zero speed range limit, 1st-motor(IM-0Hz-SLV) *1)	0 to 100(%)	80
HC111 Boost value at start, 1st-motor (IM-SLV,IM-CLV) *1)	0 to 50(%)	0
HC112 Boost value at start, 1st-motor (IM-0Hz-SLV) *1)	0 to 50(%)	10

- When [AA121] is sensorless vector control, start boost is possible.
- *1)0Hz-SLV and CLV have no effect on Ps-H100 series.

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/ sensorless) 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).

Torque reference value conversion method

Code/Name	Range (unit)	Initial value
HC115 Torque conversion method selection, 1st-motor	00(Torque)/ 01(Current)	00

• Select the 100% reference value of the torque related setting parameter. (Setting 01 is the same method as the SJ700 series.)

For more information, please Contact your supplier or local Hitachi inverter sales office.

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 reference of sensorless vector control vector control with encoder.
- [HC121] adjusts the compensation amount of feedforward control for sensorless vector control, and vector control with encoder.

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(IM-0Hz-SLV) *2)	Same as	HC110
HC211 Boost value at start, 2nd-motor (IM-SLV,IM-CLV) *2)	Same as	HC111
HC212 Boost value at start, 2nd-motor (IM-0Hz-SLV) *2)	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 conversion method selection, 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

^{*2)0}Hz-SLV and CLV have no effect on Ps-H100 series.

[Hd102] to [Hd118]

Permanent Magnet Sync. Motor(SM/PMM) basic parameters

Code/Name	Range (unit)	Initial value
Hd102 Sync. Motor capacity setting, 1st-motor	0.01 to 160.00(kW)	Factory setting
Hd103 Sync. Motor number of poles setting, 1st-motor	2 to 48(Pole)	Factory setting
Hd104 Sync. Base frequency setting, 1st-motor	10.00 to [Hd105](Hz)	60.00(JPN)(USA)/ 50.00(EU)(ASIA)(CHN)
Hd105 Sync. Maximum frequency setting, 1st-motor	[Hd104] to 590.00(Hz)	60.00(JPN)(USA)/ 50.00(EU)(ASIA)(CHN)
Hd106 Sync. Motor rated voltage, 1st-motor	1 to 1000(V)	(400V Class) 400(JPN)(EU)(ASIA)(CHN) 460(USA)
Hd108 Sync. Motor rated current, 1st-motor	0.01 to 10000.00 (A)	Factory setting

Code/Name	Range (unit)	Initial value
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)	Factory setting
Hd114 Sync. Motor constant Lq, 1st-motor	0.000001 to 1000.000000 (mH)	Factory setting
Hd116 Sync. Motor constant Ke, 1st-motor	0.1 to 100000.0 (mVs/rad)	Factory setting
Hd118 Sync. Motor constant J, 1st-motor	0.00001 to 10000.00000 (kgm2)	Factory setting

- The motor capacity and the number of poles will be set by Hitachi characteristics table.
- For SM/PMM, frequency, voltage, and the motor constants setting 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 160.00 (kW)	
Number of poles [Hd103]		2 to 48 (Poles)	
Fraguancy	[Hd104]	10.00 to 590.00 (Hz)	
Frequency	[Hd105]	10.00 to 590.00 (Hz)	
Voltage	[Hd106]	1 to 1000 (V)	
Current	[Hd108]	0.01 to 10000.00 (A)	

XInitial value depends on the inverter.

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

[Hd130] to [Hd-58]

Minimum frequency setting

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

- The synchronous control is switched to sensorless vector control when the frequency reference is the base frequency[Hd104] × [Hd130].
- 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	0 to 255	10
Hd135 IMPE detect number for Sync.M, 1st-motor	0 to 255	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(deg)	0

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

IVMS setting *1)

IVIVIS SELLING 1)		
Code/Name	Range(unit)	Initial Value
Hd-41 IVMS carrier frequency *1)	0.5 to 10.0(kHz)	2.0
Hd-42 Filter gain of IVMS current detection *1)	0 to 1000	100
Hd-43 Open-phase voltage detection gain *1)	00/01/02/03	00
Hd-44 Open-phase switching threshold compensation *1)	00(Disable)/ 01(Enable)	01
Hd-45 SM(PMM)-IVMS speed control P gain *1)	0 to 1000	100
Hd-46 SM(PMM)-IVMS speed control I gain *1)	0 to 10000	100
Hd-47 SM(PMM)-IVMS wait time for open-phase switching *1)	0 to 1000	15
Hd-48 SM(PMM)-IVMS restriction on the rotation-direction determination *1)	00(Disable)/ 01(Enable)	01
Hd-49 SM(PMM)-IVMS open-phase voltage detection timing adjustment *1)	0 to 1000	10
Hd-50 SM(PMM)-IVMS minimum pulse width adjustment *1)	0 to 1000	100
Hd-51 IVMS threshold current limit *1)	0 to 255(%)	100
Hd-52 IVMS threshold gain *1)	0 to 255(%)	100
Hd-58 IVMS carrier-frequency switching start/finish point *1)	0 to 50(%)	5

^{*1)} This setting is not suitable for Ps-H100 series.

[Hd2<u>02</u>] to [Hd2<u>37</u>]

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

	Code/Name		Initial value
	Hd202 Sync. Motor capacity setting, 2nd-motor	Same as I	Hd102
MM)	Hd203 Sync. Motor number of poles setting, 2nd-motor	Same as I	Hd103
M/PI	Hd204 Sync. Base frequency setting, 2nd-motor	Same as I	Hd104
or (SI	Hd205 Sync. Maximum frequency setting, 2nd-motor	Same as Hd105	
Mot	Hd206 Sync. Motor rated voltage, 2nd-motor	Same as Hd106	
Perm. Magnet Sync. Motor (SM/PMM)	Hd208 Sync. Motor rated current, 2nd-motor	Same as I	⊣d108
າet S	Hd210 Sync. Motor constant R, 2nd-motor	Same as I	Hd110
Magr	Hd212 Sync. Motor constant Ld, 2nd-motor	Same as I	Hd112
rm. I	Hd214 Sync. Motor constant Lq, 2nd-motor	Same as I	Hd114
Pe	Hd216 Sync. Motor constant Ke, 2nd-motor	Same as I	Hd116
	Hd218 Sync. Motor constant J, 2nd-motor	Same as I	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-<u>10</u>] to [oA-<u>33</u>][ob-<u>01</u>] to [ob-<u>04</u>]

- Parameter mode (o code)
- "o" parameters are displayed by the [UA-22] = 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, contact your supplier or local Hitachi inverter sales office.

Optional cassette error operation

Code/Name	Range (unit)	Initial value
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
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
oA-30 Operation selection at an option error (SLOT-3) *1)	00(Error)/ 01((Ignore error (keep running))	00
oA-31 Communication Watch Dog Timer (SLOT-3)*1)	0.00 to 100.00(s)	1.00
oA-32 Action selection at a communication error (SLOT-3) *1)	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) *1)	00(Disable)/ 01(Enable)	00

- *1) Ps-H100 series does not support slot 3, and related functions are invalid.
- In P1-CCL CC-Link communication option, there are no dedicated parameters other than the above parameters. For more information, contact your supplier or local Hitachi inverter sales office.

P1-FB Encoder Feedback Option setting

Code/Name	Range (unit)	Initial value
ob-01 Encoder constant setting	32 to 65535(pls)	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	1 to 10000	1

• Above parameters set the main encoder input and the motor gear ratio involved in the encoder feedback for the P1-FB.

[ob-<u>10</u>] to [ob-<u>16</u>][oC-<u>01</u>] to [oC-<u>28</u>]

P1-FB Encoder Feedback Option Pulse train input terminal setting

Code/Name	Range (unit)	Initial value
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°shift pulse train)/ 01(Forward/ Reverse pulse train and direction signal)/ 02(Forward pulse train and Reverse pulse train)	01
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 to 100.0(%)	0.0

- Set when using the option feedback.
- For more information, contact your supplier or local Hitachi inverter sales office.

P1-FS Functional Safety Option operation *1)

P1-F3 Functional Safety Option operation *1)		
Code/Name	Range(unit)	Initial value
oC-01 Safety option input display selection	00(Warning: with display)/ 01(Warning: without display)	00
oC-10 SS1-A deceleration time setting	0.00 to 3600.00(s)	30.00
oC-12 SLS-A deceleration time setting	0.00 to 3600.00(s)	30.00
oC-14 SLS-A speed upper limit (Forward)	0.00 to 590.00(Hz)	0.00
oC-15 SLS-A speed upper limit (Reverse)	0.00 to 590.00(Hz)	0.00
oC-16 SDI-A deceleration time setting	0.00 to 3600.00(s)	30.00
oC-18 SDI-A direction limit mode	00(Limit) 01(Invert)	00
oC-20 SS1-B deceleration time setting	0.00 to 3600.00(s)	30.00
oC-22 SLS-B deceleration time setting	0.00 to 3600.00(s)	30.00
oC-24 SLS-B speed upper limit (Forward)	0.00 to 590.00(Hz)	0.00
oC-25 SLS-B speed upper limit (Reverse)	0.00 to 590.00(Hz)	0.00
oC-26 SDI-B deceleration time setting	0.00 to 3600.00(s)	30.00
oC-28 SDI-B direction limit mode	00(Limit)/01(Invert)	00

^{*1)} For Ps-H100 series, function safety is invalid.

[oE-<u>01</u>] to [oE-33]

P1-AG Analog Input/Output Option analog input adjustment

Code/Name	Range (unit)	Initial value
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	0.00 to 100.00(%)	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
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	0.00 to 100.00(%)	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
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 to 100.00(%)	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
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/output option, For more information, contact your supplier or local Hitachi inverter sales office.

[oE-<u>35</u>] to [oE-<u>49</u>]

P1-AG Analog Input/Output Option Window comparator output condition

Code/Name	Range (unit)	Initial value
oE-35 [Ai4] Window comparator upper limit	0 to 100(%)	100
oE-36 [Ai4] Window comparator lower limit	0 to 100(%)	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 to 100(%)	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 to 100(%)	-100
oE-43 [Ai6] Window comparator hysteresis width	0 to 10(%)	0
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

- Window comparator function output signals whenever the analog value inputs are 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- $\underline{50}$] to [oE- $\underline{70}$] [oH- $\underline{01}$] \sim [oH- $\underline{06}$]

P1-AG Analog Input/Output Option Analog output terminal adjustment

Code/Name	Range (unit)	Initial value
oE-50 [Ao3] Output monitor selection		dA-01
oE-51 [Ao4] Output monitor selection	Set monitor code	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(%)	100.0
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 method of the analog input/output option, For more information, contact your supplier or local Hitachi inverter sales office.

P1-EN Ethernet communication Option setting

. I Lit Line net communication option setting		
Code/Name	Range (unit)	Initial value
oH-01 IP-address selection(P1-EN)	00(Group 1)/ 01(Group 2)	00
oH-02 Communication speed (port-1) (P1-EN)	00(Auto-negotiation)/ 01(100M:full duplex)/ 02(100M:half duplex)/	00
oH-03 Communication speed (port-2) (P1-EN)	03(10M:full duplex)/ 04(10M:half duplex)	00
oH-04 Ethernet communication timeout(P1-EN)	1 to 65535(×10ms)	3000
OH-05 Modbus TCP Port No.(IPv4) (P1-EN)	502, 1024 to 65535	502
oH-06 Modbus TCP Port No.(IPv6) (P1-EN)	502, 1024 to 65535	502

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[oH-<u>20</u>] to [oH-<u>45</u>]

P1-PB PROFIBUS Communication Option setting

30000		
Code/Name	Range (unit)	Initial value
oH-20 PROFIBUS Node address(P1-PB)	0 to 125	0
oH-21 Profibus Clear Mode selection(P1-PB)	/For fortom:	00
oH-22 Profibus Map selection(P1-PB)	(For factory setting. Do not	00
oH-23 Profibus master setting selection(P1-PB)	change.)	00
oH-24 PROFIBUS Telegram group selection(P1-PB)	00(Gr.A)/01(Gr.B)/ 02(Gr.C)	00

[•] For more information, contact your supplier or local Hitachi inverter sales office.

P1-PN PROFINET Communication Option setting

Code/Name	Range (unit)	Initial value
oH-30 PN IP-Address select(P1-PN)	(For factory setting. Do not change.)	00
oH-31 PN Communication speed (port-1) (P1-PN)		00
oH-32 PN Communication speed (port-2)(P1-PN)		00
oH-33 PN Ethernet communication timeout(P1-PN)		3000
oH-34 PROFINET Telegram group selection	00(Gr.A)/01(Gr.B)/ 02(Gr.C)	00

[•] For more information, contact your supplier or local Hitachi inverter sales office.

P1-DN DeviceNet Communication Option setting

setting		
Code/Name	Range (unit)	Initial
		value
OH-40 DeviceNet Node address (MAC ID)(P1-DN)	0 to 63	0
OH-41 DeviceNet assembly instance number selection(P1-DN)	00(Instance 20, 70)/ 01(Instance 21, 71)/ 02(Instance 100, 150)/ 03(Instance 101, 151)/ 04(Instance 101, 153)/ 05(Instance 110, 111)/ 06(Instance 123, 173)/ 07(Instance 139, 159)	00
oH-42 DeviceNet speed unit selection(P1-DN)	00(Hz)/ 01(min-1)	01
OH-44 DeviceNet flexible Gr. format selection(P1-DN)	00(Gr. A)/01(Gr. B)/02(Gr. C)	00
OH-45 DeviceNet idle mode action selection(P1-DN)	00(Trip)/ 01(Decel-Trip)/ 02(Ignore)/ 03(Free run stop)/ 04(Decel stop)/	00

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[oJ-<u>01</u>] to [oJ-2<u>0</u>]

Communication Option Interface

• Group A option I/F flexible command

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

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[oJ-<u>21</u>] to [oJ-<u>40</u>]

• Group B option I/F flexible command

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

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[oJ-<u>41</u>] to [oJ-<u>60</u>]

• Group C option I/F flexible command

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

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[oL-<u>01</u>] to [oL-<u>36</u>]

P1-EN Ethernet communication Option Group 1 setting

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

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[oL-<u>40</u>] to [oL-<u>76</u>]

P1-EN Ethernet communication Option Group 2 setting

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

[•] For more information, contact your supplier or local Hitachi inverter sales office.

[PA-01] to [PA-05]

■ Parameter mode (P code)

Em-force mode setting

ziii ioide iiidde settiiig		
Code/Name	Range (unit)	Initial value
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) *1)	0.00
PA-03 Emergency-force drive direction command	00(Forward)/ 01(Reverse)	00
PA-04 Commercial power supply bypass function selection	00(Disable)/ 01(Enable)	00
PA-05 Commercial power supply bypass function delay time	0.0 to 1000.0(s)	5.0

- *1) The actual setting range is limited to the maximum frequency setting ([Hb105/205] [Hd105/205])
- Settings for EM-force mode in case of abnormality.
- Enable Emergency-force drive mode [PA-01] is set to 01(Enable) and input terminal 105[EMF] is turned on, the forced operation mode is executed. The output terminal 076[EMFC] turns on during the Em-forced drive mode.
- When [PA-04] is set to 01 (enabled), it is possible to switch to the commercial power operation mode (bypass mode) when the specified operation is not able to change during forced operation. In bypass mode, the output terminal 077 [EMBP] signal in bypass mode is ON and the inverter output is cut off.

For more information, contact to your supplier or local Hitachi distributor or service station.

[PA-<u>20</u>] to [PA-<u>31</u>]

Simulation mode setting

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 [Ai1])/ 03(Setting by terminal [Ai2])/ 04(Setting by terminal [Ai3])/ 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 Inverter rated current \times 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 [Ai1])/ 03(Setting by terminal [Ai2])/ 04(Setting by terminal [Ai3])/ 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	400V Class: 0.0 to 900.0(Vdc)	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 [Ai1])/ 03(Setting by terminal [Ai2])/ 04(Setting by terminal [Ai3])/ 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	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 [Ai1])/ 03(Setting by terminal [Ai2])/ 04(Setting by terminal [Ai3])/ 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 [Ai1])/ 03(Setting by terminal [Ai2])/ 04(Setting by terminal [Ai3])/ 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, contact your supplier or local Hitachi inverter sales office.

[UA-01] to [UA-19]

■ Parameter mode (U code)

Password setting

Code/Name	Range (unit)	Initial value
UA-01 Password for display(UA-10)	0000 to FFFF	0000
UA-02 Password for softlock(UA-16)	0000 to FFFF	0000

- 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.

keypad display mode

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, contact your supplier or local Hitachi inverter sales office.

Accumulated power display adjustment/clear

Accumulated power display adjustificity creat			
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 input terminal 039[KHC] is turned ON, the accumulated input power can be clear.
- If input terminal [OKHC] is turned ON, the accumulated output power can be clear.

Software lock operation setting

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)	00

• Sets the software lock operation.

Keypad copy function restriction *1)

Code/Name	Range (unit)	Initial value
UA-18 Data R/W	00(Enable R/W by operator)	00
selection	01(Disable R/W by operator)	30

- Restricts the copy function(Read/Write function).
- *1)This parameter will be effective when you use the liquid crystal operator VOP (option).

Keypad low battery warning *2)

Code/Name	Range (unit)	Initial value
UA-19 Low battery warning enable	00(Disable)/ 01(Warning [LBK])/ 02(Error[E042])	00

- Sets the behaviour when the battery in the keypad is low.
- *2) This parameter will be effective when you use the liquid crystal operator VOP (option).

[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 output after deceleration stop)/ 02(Ignore)/03(Free run stop)/ 04(Deceleration stop)	02

2nd-motor/option parameter display selection

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

 If options and 2nd-motor are not used, it is recommended to hide their parameters.

For more information, contact your supplier or local Hitachi inverter sales office.

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
UA-32 User-parameter 2 selection		no
UA-33 User-parameter 3 selection	1	no
UA-34 User-parameter 4 selection		no
UA-35 User-parameter 5 selection		no
UA-36 User-parameter 6 selection	1	no
UA-37 User-parameter 7 selection	1	no
UA-38 User-parameter 8 selection	1	no
UA-39 User-parameter 9 selection		no
UA-40 User-parameter 10 selection	1	no
UA-41 User-parameter 11 selection		no
UA-42 User-parameter 12 selection		no
UA-43 User-parameter 13 selection		no
UA-44 User-parameter 14 selection		no
UA-45 User-parameter 15 selection	no/	no
UA-46 User-parameter 16 selection	(Parameters excluding	no
UA-47 User-parameter 17 selection	[UA-31] to	no
UA-48 User-parameter 18 selection	[UA-62])	no
UA-49 User-parameter 19 selection		no
UA-50 User-parameter 20 selection		no
UA-51 User-parameter 21 selection		no
UA-52 User-parameter 22 selection		no
UA-53 User-parameter 23 selection		no
UA-54 User-parameter 24 selection		no
UA-55 User-parameter 25 selection		no
UA-56 User-parameter 26 selection		no
UA-57 User-parameter 27 selection		no
UA-58 User-parameter 28 selection		no
UA-59 User-parameter 29 selection		no
UA-60 User-parameter 30 selection	}	no
UA-61 User-parameter 31 selection		no
UA-62 User-parameter 32 selection		no

 The above parameters store the changed parameters history in [UA-31] to [UA-62] when [UA-30] = 01, or set the data to be displayed when [UA-10] = 02. ([UA-10] = 02 setting is priority)

[UA-<u>90</u>] to [UA-<u>94</u>][Ub-<u>01</u>] to [Ub-<u>05</u>]

MOP(VR) keypad setting

Code/Name	Range (unit)	Initial value
UA-90 Waiting time for turning off the display(MOP)	0 to 60(min)	0
UA-91 Initial display selection (MOP)	(Select from d, F parameters)	dA-01
UA-92 Enable auto-return to the initial display (MOP)	00(Disable)/ 01(Enable)	00
UA-93 Enable frequency changes through monitor display(MOP)	00(Disable)/ 01(Enable)	00
UA-94 Enable multi-speed frequency changes through monitor display (MOP)	00(Disable)/ 01(Enable)	00

• Setting parameter for MOP(VR) keypad(option).

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(Error history clear & Data initialize)/ 05(All data except terminal configuration)/ 06(All data except communication configuration) 07(All data except terminal & communication configuration)/ 08(EzSQ only)	00
Ub-02 Initialize data selection	00(JP)/01(EU)/ 02(US)/03(CHN)	00(JPN) 01(EU) 02(USA) 03(CHN)
Ub-03 *1) Load type selection	01(Low Duty)/ 02(Normal Duty)	00
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 to 1, initialize process is start.
- *1) PsH100-0148~2170HFC can only select 02(ND), and the setting is forbidden to change.

PsH100-3050~6600HFCD can select 02(ND) and 01(LD).

Factory setting

Code/Name	Range (unit)	Initial value
UC-01 (-)	(Do not change)	(00)

^{*2)} Trace start is also possible from ON of input terminal 108[DTR] or from ProDriveNext. And while the inverter is in trace function, the output terminal [TRA] turns ON.

For more information, contact your supplier or local Hitachi inverter sales office.

[Ud-<u>01</u>] to [Ud-<u>37</u>]

Trace function

Code/Name	Range (unit)	Initial value
Ud-01 Trace function enable	00(Disable)/01(Enable)	00
Ud-02 Trace start *2)	00(Stop)/01(Start)	00
Ud-03 Number of trace data setting	0 to 8	1
Ud-04 Number of trace signals setting	0 to 8	1
Ud-10 Trace data 0 selection		dA-01
Ud-11 Trace data 1 selection		dA-01
Ud-12 Trace data 2 selection		dA-01
Ud-13 Trace data 3 selection	(parameters of the	dA-01
Ud-14 Trace data 4 selection	d**** and F*** mode)	dA-01
Ud-15 Trace data 5 selection		dA-01
Ud-16 Trace data 6 selection		dA-01
Ud-17 Trace data 7 selection		dA-01
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]	001
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]	001
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]	001
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]	001
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]	001
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]	001

[Ud-38] to [Ud-60]

[UQ-38] to $[UQ-60]$		
Code/Name	Range (unit)	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]	001
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]	001
Ud-50 Trace trigger 1 selection	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)	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	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)	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

• For more information, contact your supplier or local Hitachi inverter sales office.

[UE-01] to [UE-48]

EzSQ (Program operation function)

Code/Name	Range (unit)	Initial value
UE-01 EzSQ execution cycle	00(1ms)/ 01(2ms: SJ700/L700 compatible)	00
UE-02 EzSQ enable setting	00(Disable)/ 01([PRG] terminal)/ 02(Always enabled)	00

• EzSQ creates a program with inverter setup software ProdriveNext. To operate the EzSQ function, it is necessary to download the program into the inverter.

Code/Name	Range (unit)	Initial value
UE-10 EzSQ User parameter U(00)	0 to 65535	0
UE-11 EzSQ User parameter U(01)	0 to 65535	0
UE-12 EzSQ User parameter U(02)	0 to 65535	0
UE-13 EzSQ User parameter U(03)	0 to 65535	0
UE-14 EzSQ User parameter U(04)	0 to 65535	0
UE-15 EzSQ User parameter U(05)	0 to 65535	0
UE-16 EzSQ User parameter U(06)	0 to 65535	0
UE-17 EzSQ User parameter U(07)	0 to 65535	0
UE-18 EzSQ User parameter U(08)	0 to 65535	0
UE-19 EzSQ User parameter U(09)	0 to 65535	0
UE-20 EzSQ User parameter U(10)	0 to 65535	0
UE-21 EzSQ User parameter U(11)	0 to 65535	0
UE-22 EzSQ User parameter U(12)	0 to 65535	0
UE-23 EzSQ User parameter U(13)	0 to 65535	0
UE-24 EzSQ User parameter U(14)	0 to 65535	0
UE-25 EzSQ User parameter U(15)	0 to 65535	0
UE-26 EzSQ User parameter U(16)	0 to 65535	0
UE-27 EzSQ User parameter U(17)	0 to 65535	0
UE-28 EzSQ User parameter U(18)	0 to 65535	0
UE-29 EzSQ User parameter U(19)	0 to 65535	0
UE-30 EzSQ User parameter U(20)	0 to 65535	0
UE-31 EzSQ User parameter U(21)	0 to 65535	0
UE-32 EzSQ User parameter U(22)	0 to 65535	0
UE-33 EzSQ User parameter U(23)	0 to 65535	0
UE-34 EzSQ User parameter U(24)	0 to 65535	0
UE-35 EzSQ User parameter U(25)	0 to 65535	0
UE-36 EzSQ User parameter U(26)	0 to 65535	0
UE-37 EzSQ User parameter U(27)	0 to 65535	0
UE-38 EzSQ User parameter U(28)	0 to 65535	0
UE-39 EzSQ User parameter U(29)	0 to 65535	0
UE-40 EzSQ User parameter U(30)	0 to 65535	0
UE-41 EzSQ User parameter U(31)	0 to 65535	0
UE-42 EzSQ User parameter U(32)	0 to 65535	0
UE-43 EzSQ User parameter U(33)	0 to 65535	0
UE-44 EzSQ User parameter U(34)	0 to 65535	0
UE-45 EzSQ User parameter U(35)	0 to 65535	0
UE-46 EzSQ User parameter U(36)	0 to 65535	0
UE-47 EzSQ User parameter U(37)	0 to 65535	0
UE-48 EzSQ User parameter U(38)	0 to 65535	0

[UE-<u>49</u>] to [UE-<u>73</u>][UF-<u>02</u>] to [UF-<u>32</u>]

Code/Name	Range (unit)	Initial value
UE-49 EzSQ User parameter U(39)	0 to 65535	0
UE-50 EzSQ User parameter U(40)	0 to 65535	0
UE-51 EzSQ User parameter U(41)	0 to 65535	0
UE-52 EzSQ User parameter U(42)	0 to 65535	0
UE-53 EzSQ User parameter U(43)	0 to 65535	0
UE-54 EzSQ User parameter U(44)	0 to 65535	0
UE-55 EzSQ User parameter U(45)	0 to 65535	0
UE-56 EzSQ User parameter U(46)	0 to 65535	0
UE-57 EzSQ User parameter U(47)	0 to 65535	0
UE-58 EzSQ User parameter U(48)	0 to 65535	0
UE-59 EzSQ User parameter U(49)	0 to 65535	0
UE-60 EzSQ User parameter U(50)	0 to 65535	0
UE-61 EzSQ User parameter U(51)	0 to 65535	0
UE-62 EzSQ User parameter U(52)	0 to 65535	0
UE-63 EzSQ User parameter U(53)	0 to 65535	0
UE-64 EzSQ User parameter U(54)	0 to 65535	0
UE-65 EzSQ User parameter U(55)	0 to 65535	0
UE-66 EzSQ User parameter U(56)	0 to 65535	0
UE-67 EzSQ User parameter U(57)	0 to 65535	0
UE-68 EzSQ User parameter U(58)	0 to 65535	0
UE-69 EzSQ User parameter U(59)	0 to 65535	0
UE-70 EzSQ User parameter U(60)	0 to 65535	0
UE-71 EzSQ User parameter U(61)	0 to 65535	0
UE-72 EzSQ User parameter U(62)	0 to 65535	0
UE-73 EzSQ User parameter U(63)	0 to 65535	0

[•] EzSQ up to 16 bits data can be set.

Code/Name	Range (unit)	Initial value
UF-02 EzSQ User parameter UL(00)	-2147483647 to 2147483647	0
UF-04 EzSQ User parameter UL(01)	-2147483647 to 2147483647	0
UF-06 EzSQ User parameter UL(02)	-2147483647 to 2147483647	0
UF-08 EzSQ User parameter UL(03)	-2147483647 to 2147483647	0
UF-10 EzSQ User parameter UL(04)	-2147483647 to 2147483647	0
UF-12 EzSQ User parameter UL(05)	-2147483647 to 2147483647	0
UF-14 EzSQ User parameter UL(06)	-2147483647 to 2147483647	0
UF-16 EzSQ User parameter UL(07)	-2147483647 to 2147483647	0
UF-18 EzSQ User parameter UL(08)	-2147483647 to 2147483647	0
UF-20 EzSQ User parameter UL(09)	-2147483647 to 2147483647	0
UF-22 EzSQ User parameter UL(10)	-2147483647 to 2147483647	0
UF-24 EzSQ User parameter UL(11)	-2147483647 to 2147483647	0
UF-26 EzSQ User parameter UL(12)	-2147483647 to 2147483647	0
UF-28 EzSQ User parameter UL(13)	-2147483647 to 2147483647	0
UF-30 EzSQ User parameter UL(14)	-2147483647 to 2147483647	0
UF-32 EzSQ User parameter UL(15)	-2147483647 to 2147483647	0

[•] EzSQ up to 32 bits data can be set.

[Unit table]

Number	Unit
00	Non
01	%
02	Α
03	Hz
04	V
05	kW
06	W
07	hr
08	S
09	kHz
10	ohm
11	mA
12	ms
13	Р
14	kgm2
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

L	Offic ta
Number	Unit
31	cm
32	°F
33	I/s
34	l/min
35	l/h
36	m3/s
37	m3/min
38	m3/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	ft3/s
48	ft3/min
49	ft3/h
50	lb/s
51	lb/min
52	lb/h
53	mbar
54	bar
55	Pa
56	kPa
57	PSI
58	mm

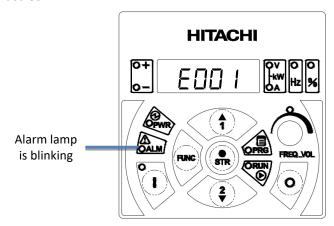
Chapter 5

Troubleshooting

5.1 Error events

Next are the descriptions of the basic errors that may occur. For more information, contact your supplier or local Hitachi inverter sales office.

■Trip event screen



■Error events

Code	Details	Corrective actions	Related parameter
		If the acceleration is fast, increase the acceleration time	[AC120]
		Use the overcurrent suppression function	[bA120]
E001	 By the load and the operating conditions, overcurrent has occurred 	Use the overload restriction function	[bA122]
	conditions, overcurrent has occurred	Use the overcurrent retry function	[bb-22]
		 In order to stabilize the control, adjust the constant 	[HA-01]
		If the acceleration is fast, increase the acceleration time	[AC120]
E005	 By the load and the operating 	Use the overload restriction function	[bA122]
E039	conditions, current has increased.	 If the motor sound is abnormal, in order to stabilize the control, adjust the constant 	[HA-01]
F006	Dealth and the control of the Stant	If the deceleration is fast, increase the deceleration time	[AC122]
E006	Braking resistor use is limited.	Reselection of the braking resistor is necessary	[bA-60]
		If the deceleration is fast, increase the deceleration time	[AC122]
F007	 Internal voltage has increased 	Use the overvoltage suppression functions	[bA140][bA146]
E007	 Insufficient capacity of the inverter 	Use the overvoltage retry function	[bb-23]
		Use a braking option	-
E008	- Main CDII also amerality	Carry out counter measures for the inverter noise	-
E011	Main CPU abnormality	Consecutive errors may cause a failure	-
E009	Main circuit supply has drop	To disable the undervoltage error, change setting	[bb-27]
	,	 Use the undervoltage retry function 	[bb-21]
E010		 Carry out counter measures for the inverter noise 	-
*1)	Current detector abnormality	 Consecutive errors may cause a failure, replacement of the components is necessary 	-
		Check the signal status of the input terminal	[dA-51]
E012	• [EXT] input terminal is ON	 Check if there are no operations by communication or programme 	-
E013	• [USP] input terminal is ON if at the start-up, the RUN command was issued right at the start up	Make sure that an operation command is not introduced at the time of turning ON the inverter	[dA-51]
E014 *1)	Ground fault is detected at main power supply turned ON.	Check insulation deterioration and ground fault such as motor and wiring	-
E015	The main power supply voltage has been continuously above the limit.	 Review the power circumstances, such as the power supply capacity 	[dA-40]
E016	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]

^{*1)} As a major failure error, the output terminal function [MJA] turns ON. And these errors could not be canceled with input terminal 028[RS].

Code	Details	Corrective actions	Related parameter
E019 *1)	Abnormality in temperature detector	Carry out counter measures for the inverter noise	-
1019 1)	circuit	If it occurs consecutively, there is a possibility of inverter failure	-
	The internal temperature of the inverter is rising because the	 The cooling fan is reached its lifetime, and it is needed replacement 	-
E020 *1)	rotational speed of the cooling fan is reduced and the cooling is insufficient	Lower the carrier frequency	[bb101]
		 Requires a review of the installation circumstances 	-
E021	Internal temperature has increased	• Due to clogging or life of the cooling fan, The cooling fan may not be operating normally	-
		Lower the carrier frequency	[bb101]
E024	 Disconnection of the wiring in the 	Check the fastening of the input wiring with screws	-
	supply side has occurred	Check that the 3 phases are correctly inserted	-
E030	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	Disconnection of the wiring in the motor side has occurred	Check the output wiring disconnection, motor insulation failure, etc.	-
	motor side has occurred	Check that the 3 phases are correctly inserted	-
	Abnormal motor temperature	Improve the motor cooling circumstances	-
E035		Use the overload restriction function	[bA122]
	Thermistor abnormality	Check if the thermistor is damaged	-
	,	Check the thermistor settings	[Cb-40]
E036	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	Increase of current during slow speed operation	 If torque is needed during slow speed, a review of the inverter capacity is necessary 	-
E040	Keypad disconnection error	Check for the disconnection of the keypad MOP from the inverter	[UA-20]
	Reypad disconnection error	Noise counter-measures are necessary	-
E041	RS485 communication error	Noise counter-measures are necessary	-
		Check the communication setting	[CF-01]to[CF-08]
E042	• RTC error	Battery replacement for the keypad VOP(option) is necessary	-
E043 to E045 E050 to E059	 There is an error in the EzSQ programme 	For more information, contact your supplier or local Hitachi inverter sales office	
E060 to E089	There is an error in the option	For more information, contact your supplier or local Hitachi inverter sales office	
1:E090 to E093 2:E094 to E097	1:There is an error in the STO path *2) 2:There is an error in the P1-FS *2)	 For more information, contact your supplier or local Hitachi inverter sales office 	
E100	A disconnection error of the signal line occurred at P1-FB	This error related to the feedback option	-
E104	The current position has exceeded the setting range of [AE-52] and [AE-54] in position control		[AE-52] [AE-54]
E105	The speed deviation exceeded "[bb-83] Speed deviation error detection level"	These are errors related to feedback control. Review the operating conditions, check the wiring, encoder	[bb-82] [bb-83]
E106	Position deviation exceeded "[bb-86] Position deviation error detection level"	settings and other related parameter settings again.	[bb-86] [bb-87]
E107	The speed has exceeded "[bb-80] Over-speed detection level"		[bb-80] [bb-81]
E110	A contactor error has occurred	Re-check [AF120] to [AF123] and wiring etc. of external contactor	[AF120] to [AF123]
E112	This error related to the feedback option	For more information, contact your supplier or local Hitachi inverter sales office	-
	This is an error when starting up PID	Check the wiring and check the parameter settings related to PID	[AH-75] to

 $\ensuremath{\mbox{\%}}\mbox{For others errors not shown above, contact your supplier or local Hitachi inverter sales office .$

^{*1)} As a major failure error, the output terminal function [MJA] turns ON. And these errors could not be canceled with input terminal 028[RS]. However the E020 error can be reset after the inverter temperature drops down.

^{*2)} For Ps-H100 series, function safety is invalid.

Code	Details	Corrective actions	Related parameter
	Waiting in undervoltage status: If the input voltage falls, the inverter will shut off its output, display the	Check whether the power supply voltage has fallen (Recover the power supply.)	-
	code shown on the left, and wait for the recovery of the input voltage.	Check the MCB and magnetic contactors for poor contacts (Replace the MCB and magnetic contactors.)	-
	The inverter will display the same error code also during an instantaneous power failure.	Check whether the voltage across the P and N terminals is normal (Check the voltage across the P and N terminals.)	-
	Communication error: If a problem occurs in the	Check whether the relay plug is fitted correctly (Check the relay plug for connection.)	-
	communication between the digital operator and inverter, the inverter will display the code shown on the left.	Check whether the digital operator is connected correctly (Check the digital operator for connection.)	-
00000	Waiting for retry: When the retry after instantaneous power failure or tripping has been enabled, the inverter displays the code shown on the left while awaiting retry after an instantaneous power failure or tripping.	-	[bb-10] [bb-20]
	Power-off: The inverter displays the code shown on the left when the inverter power is turned off.	-	-
00000	Restricted operation command: When an operation direction has been restricted by the setting of "AA114", the inverter will display the error code shown on the left if the operation command specifying the restricted operation direction is input.	-	[AA114]
55555	Resetting: The inverter displays the code shown on the left(the display turns around)while resetting, because the intelligent input terminals RS and CM1 are short-circuited.	Check whether the intelligent input terminals RS and CM1 are short-circuited or not?	-
••••	Empty trip history: If the inverter has not tripped before, the inverter displays	-	[dE-11]

5.2 Possible errors and solutions

If the corrective action does not solve the problem, please contact your supplier or local Hitachi inverter sales office.

Event ▶	Estimated cause ▶	Corrective action	
Screen is not	• Keypad in idle mode	Press a key of the Keypad and the screen will light up	
displayed even when POWER Led			
is illuminated	Keypad has been detached	Recover and reinsert the keypad	
	• 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	
A ft au inquire a			
After issuing a RUN command, the motor does	Speed source not introduced	Check that the main speed source [AA101] and the reference (terminal, keypad, etc.) are correct	
not start			
	Activate a stop function	Check if functional safety terminals and 028[RS]/032[FRS] 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	
	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.	
Motor speed does	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 reference value is low	Increase the frequency source 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	
	Several parameters are not adequately set	Check for the motor basic parameters	
Output frequency is unstable	• Big variation in the load	Review the power capacity of both the inverter and motor	
is unstable			
	Supply voltage fluctuates	To keep to a minimum the supply fluctuations, by using an optional AC reactor(ALI-****), DC link choke(DCI-***) or /and input filter, improvement is possible	
	V/f control is selected	Can switch in [AA121] to torque boost, sensorless vector control, etc	
Low torque or Torque stall	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	
	4		
	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 	

(Memo)

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 *1) or 15 minutes *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)

- *1) For models PsH100-0148HFC \sim PsH100-0480HFC
- *2) For models PsH100-0610HFC \sim PsH100-2170HFC PsH100-3050HFCD \sim PsH100-6600HFCD

 Other than the designated person, do not perform any maintenance, inspection or component replacement.
 (Before starting to operate, remove any wristwatch or metal accessories such as bracelets, and use always isolated tools)

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
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 multimeter or a similar tool to confirm:

No.	Details	1
1	Voltage supply fluctuation	
2	Line-to-line voltage balance	

6.1.2 Cleaning

Keep the inverter in a clean condition.

No.	Details	1
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.	

6.1.3 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, please contact to your supplier or local Hitachi distributor or service station.

No.	Details	1
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 capacitor and relay.	

6.2 Daily and periodic inspections

			Inspection cycle		cycle				
Inspected part	Inspection entry	Details of inspection	Daily	Every 1 2 year years		Inspection method	Criterion	Tester device	
General	Surrounding environment	Check the ambient temperature, level of humidity, dust, etc.	0	year	years	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 Power supply	Check abnormal vibrations or noises Check that the main circuit voltage	0			Check visually and auditorily. Measure the line-to-line voltage of the inverter main	Without abnormalities Within the AC voltage	Multimeter, Digital multimeter Meter	
	voltage	is normal.				circuit terminals R,S and T. Dismantle the inverter main	permissible variation.		
Main circuit	General check	(1)Check the resistance between the main circuit and the ground terminals.		0		circuit terminals input/output wiring and the control terminal board, after that, shortcircuit the terminals R,S,T,U,V,W,P,PD,N,RB,RO,TO, and measure between this shortcircuit and the ground.	Resistance no less than 5MΩ.	DC 500V class Ohmmeter (megger®)	
		(2)Check looseness in fastened parts		0		Confirm tighten of fasteners.	Without abnormalities		
	Conductor and	(3)Check for overheating traces. (1)Check for straining in conductors		0		Check visually.	Without abnormalities		
	cables	(2)Check for cable coating damage		0	ļ	Check visually.	Without abnormalities		
	Terminal block	Check for any damage.		0		Check visually.	Without abnormalities		
	Inverter and converter circuits (Including resistors)	Check the resistance between all the terminals			0	Remove the inverter main circuit terminal wiring, and measure the following: - Resistance between terminals RST and PN Resistance between terminals UVW and PN	Consult the "Checking method for inverter/ converter". The inverter, capacitor and thyristor lifespan before replacing the componentes is of 10 ⁶ start/stop cycles *3)	Analogue multimeter	
	Smoothing capacitor	(1)Check for capacitor fluid leakage (2)Check that the relief valve does not swells or protudes.	0			Check visually.	That there are no abnormalities Estimated number life span before exchanging component: 10 years *1) *3) *4)	Capacitance meter	
	Relay	(1)No chatter sound while operating		0		Check auditorily.	That there are no abnormalities.		
Control and protection circuits	Operation check	(2)Check contacts for damage While performing a unit operation of the inverter, check the balance of the output voltage among the individual phases 		0		Check visually. Measure the voltage between the U,V,W terminals of the inverter main circuit.	That there are no abnormalities. Phase-to-phase voltage balance 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		0		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	0			Turn by hand while electricity is not being supplied	Smooth operation without abnomalities. Replace every: 10 years		
		(2)Check for loose joints		0		Check visually.	*2) *3) *5)		
	Heat sink	Check for obstructions/clogging.	_	0		Check visually.	That there are not obstructions.		
Display	Display	(1)Check that LED lamps lights up (2)Display cleaning	0	0	<u> </u>	Check visually. With cleaning rag.	Confirm it lights up		
	Meter	Check that Indicated values are normal.	0			Check the meter readings on the panel.	Regulation and control value are satisfactory.	Voltmeter Ammeter Etc.	
Motor	General	(1)Check abnormal vibrations or noises	0			Check visually, auditorily, and by touch	Without abnormalities		
		(2)Check that there is no stench.	0			Check for abnormal superheating, damages an so on.	Without abnormalities		
	Insulation resistance	Check the resistance between the main circuit and the ground terminals.		*6)		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 5M Ω .	DC 500V class Ohmmeter (megger®)	

^{*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 capacitors are replaced after that the storage period of 3 years has expired, before the first use please refer to the aging process under the following conditions before using them:

[•] 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.

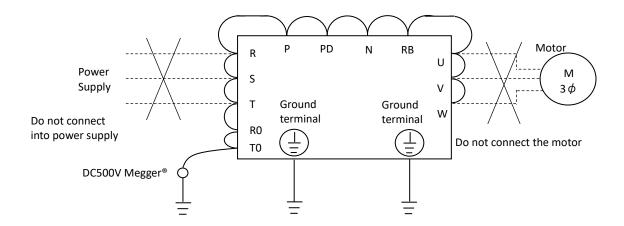
^{*5)} In the case that the cooling-fan if affected by dust, obstructing it; remove the dust, after that may take 5 to 10 seconds to start again.

^{*6)} Follow the installed motor instructions.

6.3 Insulation resistance test

- •When performing a insulation resistance test, remove all cables to external circuits and the components connected to the terminals, to prevent it to be exposed to the test voltage.
- In the control circuit carry out a conduction test, use a multimeter (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.
- Is recommended the use of a DC500V megger® for the insulation resistance test.

- Before the main circuit test with a megger, and then connect terminals R, S, T, U, V, W, P, PD, N, RB, RO, and TO by wires as shown in the figure below. Subsequently, carry out the test.
- After the insulation resistance test, remove the cable connected to R, S, T, U, V, W, P, PD, N, RB, R0, T0.
- Furthermore, depending on the model, the RB terminal may not be present. Please confirm in "2.9 Wiring to the main circuit terminal block".



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

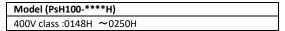
- Using the multimeter, you can check if the inverter or converter unit are defective or non-defective.
 (Preparation)
- (1) Remove the supply (R,S,T) and motor wiring (U,V,W), and also the regenerative braking resistor(P,RB).
- $\begin{tabular}{ll} \end{tabular}$ Prepare the multimeter. (Application measurement range is $1\Omega)$

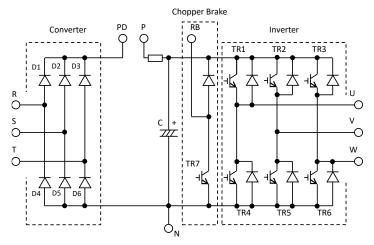
(Checking method)

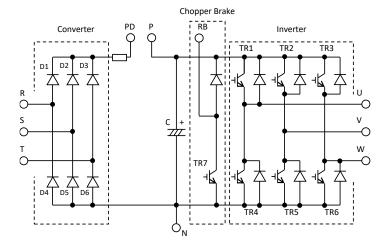
 Measure and check the current conduction at each of the inverter main circuit terminals R, S, T, U, V, W, RB, P, N, by changing the polarity of the multimeter alternately.

		Multimete	er polarity		
		⊕ (Red)	(Black)	Measured result	
Converter circuit	D1	R	PD	No conduction	
	D1	PD	R	Conduction	
	D2	S	PD	No conduction	
	DZ	PD	S	Conduction	
	D3	T	PD	No conduction	
	D3	PD	T	Conduction	
	D4	R	N	Conduction	
	υ4	N	R	No conduction	
	D5	S	N	Conduction	
	כט	N	S	No conduction	
	D6	T	N	Conduction	
		N	T	No conduction	
	TR1	U	Р	No conduction	
	IVI	Р	U	Conduction	
	TR2	٧	Р	No conduction	
بي	INZ	Р	V	Conduction	
Inverter circuit	TR3	W	Р	No conduction	
ŗ	1173	Р	W	Conduction	
rte	TR4	U	N	Conduction	
٦٧e	1114	N	U	No conduction	
=	TR5	V	N	Conduction	
	כאו	N	V	No conduction	
	TR6	W	N	Conduction	
	IVO	N	W	No conduction	
t	,	RB	Р	No conduction	
paı	TR7	Р	RB	Conduction	
BRD part	IK/	RB	N	No conduction	
В		N	RB	No conduction	

- *1) Before checking the circuits, measure the voltage across terminals P and N with the multimeter 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 conducting, indicates a value around several tens of ohms Ω . The measurements with different multimeters 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: PsH100-0148H ~ PsH100-0750H

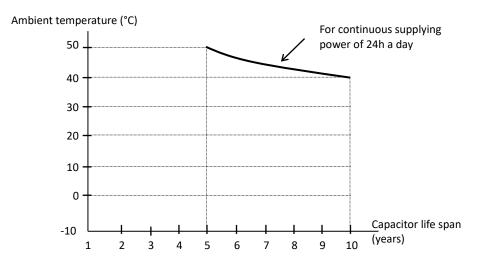






6.6 Smoothing capacitor life span curve

380% of the rated current value for continuous drive.



 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.

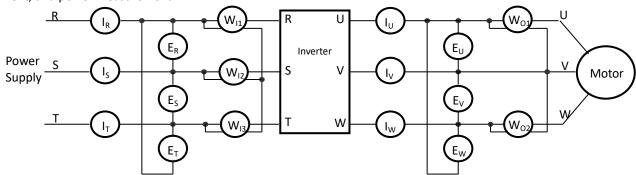
6.7 Lifespan alarm output

• Thanks to the self-diagnostic, you can 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] ~ [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.

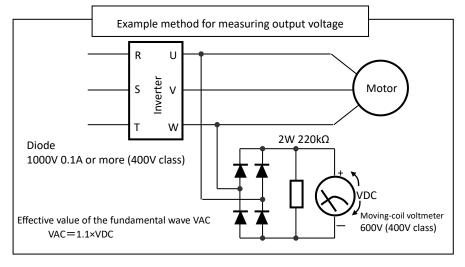
- 2) The smoothing capacitor has a limited life because of the chemical reactions occurring inside the capacitor while operating. The capacitor should be replaced after 10 years *1) of use, as a reference standard (10 years is not the guaranteed lifespan, but rather, the design lifespan). Note that the 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.
- *1) Ambient temperature: annual average temperature 40°C (using in without causticity gas, flammability gas, oil fog, dust, and so on) Output Current: 80% of the rated current value Continuous Operation Hours: 7000 Hours/year

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	400V class:380~460V 50/60Hz
Input current I _{IN}	R, S, T current (I_R) , (I_S) , (I_T)	Moving-iron ammeter	Effective value of full waves	If there is unbalance in the input supply IIN= $(I_R+I_S+I_T)/3$
Input power W _{IN}	R-S, S-T, T-R (W ₁₁)+(W ₁₂)+(W ₁₃)	Electrodynamometer-type wattmeter	Effective value of full waves	Three-wattmeter method
Input power factor Pf _{IN}	Is calculated from the measurement (I_{IN}) and supply poor $Pf_{IN} = \frac{W_{IN}}{\sqrt{3} \times F_{IN} \times F_{IN}}$,	E _{IN}), input	
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 ₀₁)+(W ₀₂)	Electrodynamometer-type wattmeter	Effective value of full waves	Two-wattmeter method (Otherwise the three-wattmeter method)
Output power factor Pf _{OUT}	Is calculated from the measuremt (I_{OUT}) and output properties $Pf_{OUT} = \frac{W_{OUT}}{\sqrt{3} \times F_{OUT}}$		(E _{OUT}), output	



When measuring...

- 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.
- 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 specifications

Model name							PsH	100-***	*HFC						
S	standard capacity		0148	0190	0250	0320	0390	0480	0610	0750	0910	1120	1500	1800	2170
Appli	Applicable motor capacity (4 poles)(kW)		5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
		d output rent(A)	14.8	19.0	25.0	32.0	39.0	48.0	61.0	75.0	91.0	112.0	150.0	180.0	217.0
Output		ad current ng *1)		120% 60sec / 150% 3sec											
Inc	Rated ou	tput voltage			Thre	e-phase(3	3 wire)38	0 to 460°	/ (Corres	ponding	to the in	coming volt	age)		
	Rated	400V	10.3	13.2	17.3	22.2	27.0	33.3	42.3	52.0	63.0	77.6	103.9	124.7	150.3
	capacity (kVA)	460V	11.8	15.1	19.9	25.5	31.1	38.2	48.6	59.8	72.5	89.2	119.5	143.4	172.9
	Rated input current(A) *2)		17.6	22.6	29.8	38.1	46.4	57.1	72.6	89.3	108.3	133.3	178.6	214.3	258.3
Input	Rated input AC voltage		Control power supply : Single-phase supply 380 to 460V (Permissible AC voltage 323 to 506), 50Hz(allowable variation range: 47.5-52.5Hz)/60Hz (allowable variation range:57-63Hz)												
lnp				Main circuit power supply: Three-phase(3 wire) 380to 460V (Permissible AC voltage 323 to 506) , 50Hz(allowable variation range: 47.5-52.5Hz)/60Hz (allowable variation range:57-63Hz)											
	Power supply capacity (kVA) *3)		13.4	17.2	22.7	29.0	35.4	43.5	55.3	68.0	82.5	101.6	136.0	163.2	196.8
Carrie	er frequer *4)	ncy variation		0 5~16 0kHz								0.5~6.0 kHz			
St	tarting to	rque *5)		200%/0.3Hz											
ng	Regenerative		ı	Internal BRD circuit (external discharge resistor value) *6)						6)	External regenerative braking unit				
Braking	_	m resistance lue(Ω)	70	35	35	24	24	20	15	15	10	10	10	-	-
Dimensions *7)	H(heigl	ht)(mm)	260	260	260	390	390	390	540	540	550	550	550	700	700
ens *7)	W(wid	th)(mm)	210	210	210	245	245	245	300	300	390	390	390	390	390
Dim	D(Dept	h)(mm)	170	170	170	190	190	190	195	195	250	250	250	270	270
Pr	otective s	structure							IP20						
Α	prox. wei	ght (kg)	6	6	6	8.5	8.5	8.5	22	22	31	31	31	41	41

Note:

^{*1)} Electronic thermal protection is accordance to derating.

^{*2)} 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.

^{*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 recommended to set the carrier frequency settings [bb101]/[bb201] equal or greater than the (maximum output frequency x 10)Hz. For induction motor IM, it is recommended to set the carrier frequency to 2 kHz or more except V/f control. For synchronous motor (SM)/Permanent magnet motor (PMM), it is recommended to set the carrier frequency to 8 kHz or more.

^{*5)} The value for the sensorless vector control are assigned according to the values in the ND rating in the Hitachi standard motor table. Torque characteristics may vary by the control system and motor use.

^{*6)} Usually an external regenerative braking unit is required. However, with an optional built –in chopper braking circuit and external discharge resistor can eliminate a external regenerative unit. The built-in chopper braking circuit is offered by order. In order to purchase, contact the nearest sales office.

^{*7)} The key height of keypad are exclued from dimensions. When an option is connected, the depth is increased. Refer to the each optional instruction.

Model name			PsH100-****HFCD/HFCD2									
standard capacity			3050	3450	3800	4250	4810	5600	6600			
Applicable motor capacity LD		LD	132	160	185	200	220	250	315			
	(4 poles)(k	W)	ND	160	185	200	220	250	280	355		
	Rated o	utput	ND	260.0	310.0	350.0	380.0	430.0	480.0	600.0		
	currer	nt(A)	LD	305.0	345.0	380.0	425.0	481.0	560.0	660.0		
	Overload	current	ND		•		150% 60sec / 200%	3sec		•		
Ħ	rating	*1)	LD			1	120% 60sec / 150%	3sec				
Output	Rated o	utput volta	ige		Three-pha	se (3 wire)380	to 440V (Correspon	ding to the incom	ing voltage)			
0		400V	ND	180.1	214.7	242.0	263.0	294.4	332.5	415.7		
	Rated capacity	u	LD	211.3	239.0	263.0	294.4	333.2	365.8	457.2		
	(kVA)	440V	ND	198.1	236.2	266.7	289.6	327.7	382.4	457.2		
	(,		LD	232.4	262.9	289.6	323.9	366.6	426.8	503.0		
	Rated input current(A) *2)		LD	286.0	325.5	367.5	399.0	451.5	504.0	630.0		
.			ND	320.3	362.3	399.0	446.3	506.0	586.5	690.5		
Input	Rated input AC voltage			Control power supply: Single-phase supply 380 to 440V (-15%,+10%) ,50Hz/60Hz(±5%)								
_	Power supply capacity (kVA) *3)		LD	220.0	248.1	280.0	304.1	344.1	384.1	480.1		
			ND	244.1	276.1	304.1	340.1	385.6	424.1	526.2		
	DO	CL		Internally equipped with DCL								
Cai	rrier frequen	cy variatioi	n *4)	0.5~5.0kHz								
	Starting to	rque *5)		180%/0.3Hz								
	Bral	king			External regenerative braking unit							
sio ()	H(height)(H(height)(mm)			1000		110	00	140	00		
Dimensio ns *6)	W(width)(mm)			350			330		400			
Dir n	D(Depth)(mm)				400		50	0	50	0		
	Protective	structure					IP00					
	Aprox. we	eight (kg)			82		98	3	15	0		

This type inverter is under developed and the parameters of the inverterarepredefined.

Note:

^{*1)} Electronic thermal protection is accordance to derating.

^{*2)} The rated input current, is the value of the rated output current. The value of the impedance at the supply side changes by the wiring, breaker, inputreactor, etc.

^{*3)} The power supply capacity is the value of the output rated current at 440V with internal DCL. The impedance at the supply side may be affected by the wiring, breaker, input reactor, etc.

^{*4)} Carrier frequency may be limited in the range according to the use of drive.

^{*5)} The values for the sensorless vector control are assigned according to the values in the ND rating in the Hitachi standard motor table. Torque characteristics may vary by the control system and the motorin use.

^{*6)} Except the dimensions of the panel. When option is connected, the necessary depth is increased. Please refer to the user's guide.

7.2 Common specifications

	D\A/	/M system	Sing-waye PM	/M system					
—		'M system quency range *1)	Sine-wave PWM system 0.00~590.00Hz						
-					0/				
	Freque	ency accuracy	For the highest frequency, digital±0.01%, analog±0.2% (25±10°C)						
	Freque	ncy resolution	Digital: 0.01H Analog: Max.	z frequency/4000					
	rreque	ncy resolution	-		10V or 0 \sim +20mA, Ai3 terminal 12bit/-10 \sim +10V)				
					orque/reduced torque/ free / automatic boost control)				
	_		IM		tant torque/reduced torque/ free / automatic boost control)				
	Contro	ol system *2)		Cascade type sensorless vector control, Vector control with encoder					
			SM/PMM	synchronous startup fo	r smart sensorless vector control				
	Speed f	fluctuation *3)	±0.5%(sensor	less vector control)					
Α	cceleration	/deceleration time	0.00~3600.0	Os (Linear, S-curve, U-cur	ve, Inverted-U-curve, EL-S-curve)				
		Display			utput torque, trip history, input/output terminal status, input/output terminal function, etc, the rest is described in the chapter 4.				
	Star	t functions	DC braking a	fter the start, matching fr	requency after the start, active frequency matching start, Low-voltage start, retry restart.				
	Stop	o functions	After free rui	n stop, deceleration stop,	, DC braking or external DC braking operation (Braking force, time, adjustment of operation				
	Stall prev	vention function		it function, overcurrent s	upression, overvoltage suppresion function				
Г	ļ				ake resistor overload, Overvoltage error, Memory error, Undervoltage error, Current detector				
			error, CPU er	ror, External trip error, U	ISP error, Ground error, Supply overvoltage error, Power loss error, Temperature detector				
	Protection	on functions *5)		•	rease temperature error, Temperature error, Input open-phase error, IGBT error, Output				
		·	open-phase error, Thermistor error, brake error, low-speed range overload error, Controller overload error, RS485communication						
				error, RTC error, EzSQ related error, option related error, position control range error, speed deviation error, position deviation error, overspeed error, contactor error, PID start error.					
			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						
	Othe	er functions	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 power						
			stop, various signal output, inilization setting, PID control, auto-decel at snut-on, brake control function, commercial power switching function, auto-tuning (on/offline), etc. the rest is described in the chapter 4.						
		Keypad	UP, DOWN k	eys according to the set p	parameter.				
			Ai1/Ai2 term	inal (for voltage input)	$0{\sim}10$ Vdc set by the voltage input (Input impedance: 10 k Ω)				
	Frequency reference		Ai1/Ai2 term	inal (for current input)	$0{\sim}20$ mA set by the current input (Input impedance: 100Ω)				
	Frequency reference	External signal *6)	Ai3 terminal		-10 \sim +10Vdc set by the voltage input (Input impedance:10k Ω)				
	F. e		Multi-speed		16multi-speed(With the use of the intelligent input terminal)				
			Pulse train-ir		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) Forward (FW)/Reverse(RV)(When input terminal functions are allocated)						
	N/S rwa ever	External signal			ninal functions are allocated)				
	중 6 %	Communication Port	Set by RS485	communication (Maximu	um: 115.2kbps)				
1			11 terminals	(A or B terminal accept a	pulse train)				
					ation), CF1 to CF4(Multi-speed 1 to 4), SF1 to SF7(Multi-speed bit 1 to 7), ADD(Trigger for				
Input			frequency addition), SCHG(Main/Sub speed reference change), STA(3-wire start)/STP(3-wire stop)/ F/R(3-wire Forward/reverse),						
'n			AHD(Analog command holding), FUP(Remote speed up)/FDN(Remote speed down)/UDC(Remote speed data clearing), F-OP(Force						
			operation), SET(2nd-motor), RS(Reset), JG(Jogging), DB(External Dynamic brake), 2CH(2-stage Accel/Decel), FRS(Free-run stop), EXT(External fault), USP(Unattended start protection), CS(Commercial power supply change), SFT(Software lock), BOK(Braking						
			confirmation), OLR(Overload restriction selection), KHC(Accumulated input power clearance), OKHC(Accumulated output power						
			clearance), PID to PID4(PID1 to PID4 disable), PIDC to PIDC4(PID1 to PID4 integration reset), SVC1 to 4(PID1 multistage target value						
	Intellige	ent input terminals	1 to 4), PRO(PID gain change), PIO1/2(PID output switching 1/2), SLEP(SLEEP condition activation)/WAKE(WAKE condition activation), TL(Torque limit enable), TRQ1/2(Torque limit selection1/2), PPI(P/PI mode selection), CAS(Control gain change),						
			activation), TL(Torque limit enable), TRQ1/2(Torque limit selection1/2), PPI(P/PI mode selection), CAS(Control gain change), SON(Servo-ON), FOC(Forcing), ATR(Permission of torque control), TBS(Torque bias enable), ORT(Home search function), LAC(LAD						
					ion deviation), STAT(pulse train position reference input enable), PUP(Position bias (ADD)),				
					Multistage position 1 to 4), ORL(Limit signal of Homing), ORG(Start signal of Homing),				
			•		e over travel), SPD(Speed/position switching), PSET(Position data presetting), Mi1~ C(Pulse counter clearing), ECOM(EzCOM activation), PRG(Program RUN), HLD(accel/decel				
					lay lock), PLA(Pulse count A), PLB(Pulse count B), EMF(Emergency-force drive activation),				
			**		a trace start), PLZ(Pulse train input Z), TCH(Teach-in signal)				
	Backu	p supply terminal	P+/P-: DC24\	/ input(Input allowable vo	oltage: 24V±10%)				
	Thermis	stor input terminal	1 terminal (PTC/NTC resistor allowed)						

^{*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. Please contact Hitachi inverter distributers for more information.

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

^{*5)} 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.

^{*6)} At factory setting, the maximum output frequency for analog input signal Ai1/Ai2 is adjusted to 9.8V for voltage input and 19.6mA for current input. In order to adjust the specification use analog start/end function.

7.2 Common specifications (continue)

		Transistor output terminal 5, 1c contact relay 1 point							
	Intelligent output terminals	RUN(Running), FA1~5(Reached frequency signal), IRDY(Inverter ready), FWR(Forward rotation), RVR(Reverse rotation), FREF(Frequency referenc=Keypad is selected), REF(Run command = Keypad is selected), SETM(2nd-motor selected), OPO(Option-Output), AL(Alarm							
Output	Relay/ Alarm relay (1a, 1c) function	signal), MJA(Major failure signal), OTQ(Over-torque) *7), IP(Instantaneous power failure), UV(Undervoltage), TRQ(Torque limited), IPS(Decel. Power loss), RNT(Accumulated RUN time over), ONT(Accumulated power-on time over), THM(Motor electronic thermal warning), THC(Iverter Electronic thermal warning), WAC(Capacitor life warning), WAF(Cooling-fan life warning), FR(Starting contact 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(Zero speed detection), DSE(Speed deviation over), PDD(Position deviation over), POK(Positioning completed), PCMP(Pulse counter compare match output), OD/OD2/OD3/OD4(Output deviation for PID control), FBV/FBV3/FBV3/FBV4(PID feedback comparison), NDc(Communication line disconnection), Ai1Dc/Ai2Dc/Ai3Dc(Analog Ai1/Ai2/Ai3 disconnection), Ai4Dc/Ai5Dc/Ai6Dc(Option analog Ai4/Ai5/Ai6 disconnection), WCAi1/WCAi2/WCAi3(Window comparator Ai1/Ai2/Ai3 WCAi4/WCAi5/WCAi6(Window comparator Ai4/Ai5/Ai6), LOG1 to 7(logical operation result 1 to 7), MO1 to 7(General-purpose output to 7), EMFC(Emergency force drive indicator), EMBP(Bypass mode indicator), WFT(Trace waiting signal), TRA(Trace running signal), LBK(Low battery of keypad), OVS(Overvoltage power Supply), ACO-3{ Alarm code bit-0 to 3}, SSE(PID soft start error)							
	Output terminal monitor *7)	The data of the monitor can be selected by the parameter of the output.							
PC	external access	USB Micro-B							
ent	Ambient temperature *8)	-10 to 50°C (in 40∼50°C, derating applied)							
Operating environment	Storage temperature *9)	-20 to 65°C							
en	Level of humidity	$20{\sim}90$ RH(No condensation allowed)							
ting	Vibration tolerance	5.9m/s ² (0.6G), 10~55Hz PsH100-0148HFC~PsH100-0480HFC							
era	*10)	2.94m/s ² (0.3G) 10~55Hz PsH100-0610HFC~PsH100-2170HFC,PsH100-3050HFCD~PsH100-6600HFCD							
0	Installation place *11)	1000 altitude or lower (location free from corrosive gas, oil mist, and dust)							
	Coating color	Black							
(Optional slots	2 ports(Communication:1 Feedback:1)							
		· Communication option : Ethernet(Modbus-TCP)(P1-EN), EtherCAT® (P1-ECT), PROFINET® (P1-PN), PROFIBUS® (P1-PB),							
Or	otion cassettes	CC-Link [®] (P1-CCL), DeviceNet [®] (P1-DN)							
*12)		• Encoder Feedback option (Line driver input(RS422))(P1-FB)							
	,	Encoder Feedback option (Line driver input(RS422))(P1-FB) Analog input/output option (P1-AG)							
Other o	ptional components	Braking resistor, AC reactor, DC reactor, noise filter, operator cable, harmonics suppresion unit, LCRfilter, analog panel, regenerative braking unit, power regeneration converter, PC software ProdriveNext, Dual-relay output plug-in control terminal block option, Singal-relay output screw control terminal block option, LCD operator(VOP)							

^{*7)}The analog voltage and analog current monitor are estimated outputs of the analog meter connection. Maximum output value might deviate slightly from 10V or 20mA by variation of the analog 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.

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CC-Link® is trade names of Mitsubishi Electric Co. DeviceNet® is the trademark of Open DeviceNet Vendor Association, Inc.

^{*8)} Derating is set in accordance to carrier frequency.

^{*9)} Storage temperature is the temperature during transport.

^{*10)} In accordance with the test methods of IEC 60068-2-6:2007.

^{*11)} 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.

^{*12)} Modbus® is a registered trademark of Schneider Automation Inc.

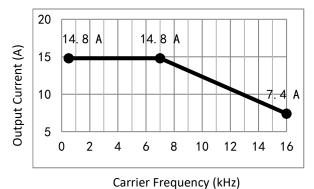
7.3 Current derating

For using with carrier frequency over 2.1kHz, refer to the Current derating table as below.

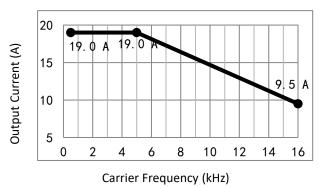


Please use the inverter within the current range according to the derating table of each model. Please note that exceeding the derating range may cause damage to the inverter or shorten the service life.

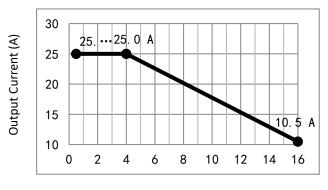
PsH100-0148HFC



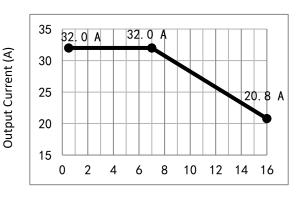
PsH100-0190HFC



PsH100-0250HFC

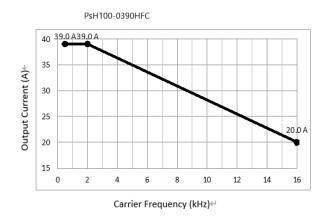


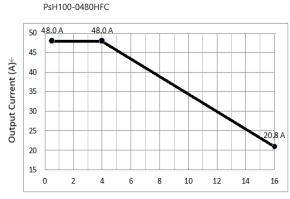
PsH100-0320HFC



Carrier Frequency (kHz)

Carrier Frequency (kHz)





Carrier Frequency (kHz)←

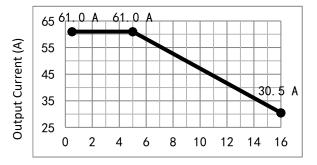
7.3 Current derating(continue)

For using with carrier frequency over 2.1kHz, refer to the Current derating table as below.



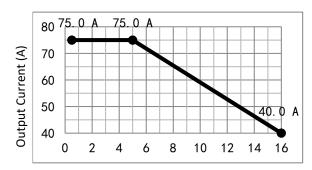
Please use the inverter within the current range according to the derating table of each model. Please note that exceeding the derating range may cause damage to the inverter or shorten the service life.

PsH100-0610HFC



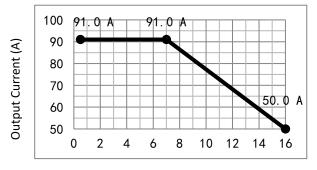
Carrier Frequency (kHz)

PsH100-0750HFC



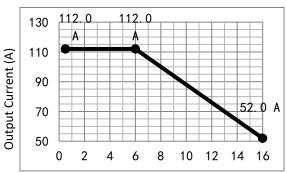
Carrier Frequency (kHz)

PsH100-0910HFC



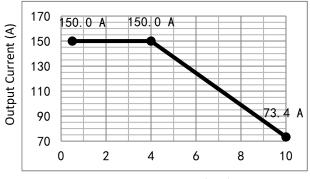
Carrier Frequency (kHz)

PsH100-1120HFC



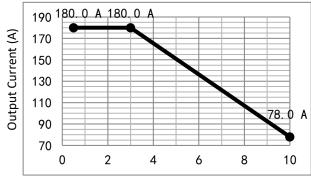
Carrier Frequency (kHz)

PsH100-1500HFC



Carrier Frequency (kHz)

PsH100-1800HFC



Carrier Frequency (kHz)

Specifications Chapter 7

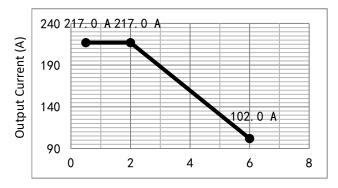
7.3 Current derating(continue)

For using with carrier frequency over 2.1kHz, refer to the Current derating table as below.

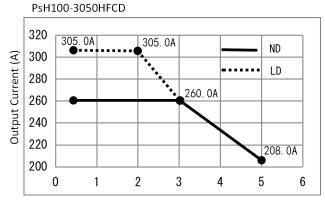


Please use the inverter within the current range according to the derating table of each model. Please note that exceeding the derating range may cause damage to the inverter or shorten the service life.

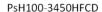
PsH100-2170HFC

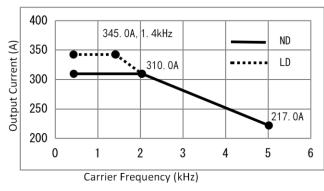


Carrier Frequency (kHz)

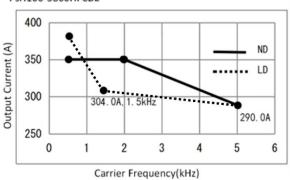


Carrier Frequency (kHz)

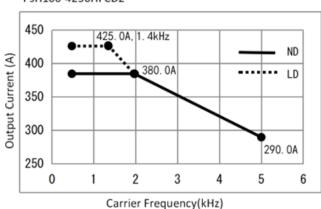




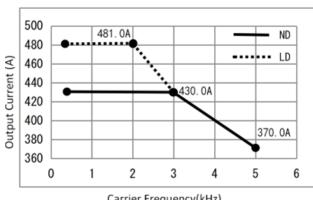
PsH100-3800HFCD2



PsH100-4250HFCD2



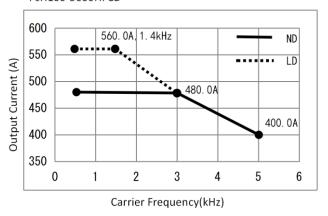
PsH100-4810HFCD2



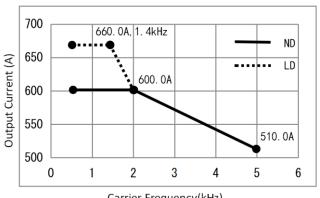
Carrier Frequency(kHz)

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PsH100-5600HFCD



PsH100-6600HFCD



Carrier Frequency(kHz)

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(memo)

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Revised record

Version No.	Content	Update date
NT9631 X	Initial version	2025/1

 $[\]ensuremath{\ensuremath{\mathbb{W}}}$ We will correct the incorrect words, missing words and so on without prior notice.