1000 Model Energy-saving, Highly efficient Owner's Manual

High-performance Flux Vector Control AC Drive

Version No.1.2 (Complete Version)

200V Series 0.4–110KW (0.5–150HP)
400V Series 0.75–450KW (1–600HP)

Precautions before use

Before operating this product, please read and pay attention to the relevant safety information to ensure your own safety and product safety.

DANGER	**DANGER** ☑ When handling wiring and installing the inverter, be sure to confirm whether the power supply is off. ☑ After the AC power supply is cut off, before the POWER indicator of the inverter is extinguished, it indicates that there is still high voltage inside the inverter. Please do not touch the internal circuits and components. ☑ It is prohibited to modify the internal parts or circuits of the inverter by yourself. ☑ The inverter terminals must be properly grounded in accordance with local regulations. ☑ The inverter and accessories should be installed far away from fire sources, heating elements and flammable materials.
WARNING	**WARNING** ☑ Please do not connect input AC power to the inverter output terminals U/T1, V/T2, W/T3. ☑ The rated voltage of the power supply system installed by the inverter cannot be higher than 115V for 110 series models, 240V for 200 series models, and 480V for 400 series models. ☑ Only qualified electrical engineer professionals can install, wire and repair the inverter. ☑ Even if the three-phase AC motor is stopped, the main circuit terminals of the inverter may still carry dangerous high voltage. ☑ Disinfection of outer box packaging (including wooden boxes, wooden strips, cartons, etc.) during shipping and installation, and precautions for deworming: 1. If packaging materials such as wood or cartons need to be disinfected, dewormed, etc., steam fumigation is prohibited. If the machine is damaged due to this, it will not be included in the warranty. 2. Please use other methods for disinfection and deworming. 3. High-temperature method can be used: the packaging material can be placed at a temperature above 56°C and left for about 30 minutes or more.

- In this manual, in order to explain the product details in detail, the case will be removed or the safety cover will be dismantled, and the description will be made in graphics and text. As for the operation of this product, be sure to install the casing and wiring correctly according to the regulations, and operate according to the manual to ensure safety.
- The icons in the manual are slightly different from the physical models for the convenience of illustrating examples, but they will not affect the rights of customers.
- Then there are updates or modifications to the product files, you can download the latest version from website of Long Shenq Electronics Co., Ltd.

http://www.acinverter.com.tw

TABLE OF CONTENTS

Chapter 1 Safety Precautions

1.1 Marking instructions related to safety

- Please read this instruction manual carefully before installing, wiring, operating and checking the inverter. Please follow this instruction manual and install the drive according to the local standards.
- The following marks are used in this instruction manual to indicate that the site is an important element of safety. Failure to comply with these precautions may result in death or serious injury and damage to the product, related machines and systems.

WARNING	**WARNING** If operated incorrectly, it may result in death or serious injury.

DANGER	**DANGER** If the operation is wrong, it is very likely to cause death or serious injury.

INHIBIT	**INHIBIT** Prohibited actions during product use. Such as the forced operation is likely to result in death or serious injury.

HOT	**HOT Surface** The heat sink is a thermal element, please do not touch it.

1.2 Safety precautions

DANGER	**DANGER** **Please pay attention to all information about safety in this manual.** If you do not follow the warnings, it may result in death or serious injury. Injuries and equipment damage caused by your company or your company's customers failing to comply with the contents of this manual, our company will not take any responsibility. **To prevent electric shock, do not perform wiring work while the power is on.** Please cut off the power to all equipment before checking. Even if the power supply is cut off, there is residual voltage in the internal capacitor. The waiting time after the power is cut off should not be shorter than the time marked on the inverter.

WARNING

Regarding safety measures when the machine restarts, some systems may suddenly move when the machine is powered on, which may cause death or serious injury.
Before powering on the inverter, make sure that there are no people around the inverter, motor, or machinery. In addition, please confirm that the cover, coupling, shaft key and machinery of the inverter have been properly protected.

It is strictly prohibited to modify the inverter.
Otherwise, there is a danger of electric shock. If your company or your company's customers modify the product, our company will not take any responsibility.

Non-electrical professionals are not allowed to perform maintenance, inspection or component replacement.
Installation, wiring, repair, inspection and component replacement should be carried out by a person who is familiar with the installation, adjustment and repair of the inverter.

Do not remove the cover of the inverter or touch the printed circuit board when the power is on.
Otherwise, there is a danger of electric shock.

In order to prevent fire, please confirm whether the rated voltage of the inverter is consistent with the power supply voltage before powering on.
If the main circuit power supply voltage is used incorrectly, there is a danger of fire.

When transporting the inverter, be sure to hold the case.
If you carry the inverter by grasping the front cover or terminal cover, the main body of the inverter will fall, which may cause injury.

Important

When operating the inverter, please follow the steps specified in ESD prevention measures.
Otherwise, the internal circuit of the inverter will be damaged due to static electricity.

No withstand voltage test can be carried out on any part of frequency inverter.
This device uses precision semiconductor components, which may cause damage to the inverter due to high voltage.

Do not operate the damaged machine.
Otherwise, it will aggravate the damage to the machine.If the machine is obviously damaged or parts are missing, do not connect or operate it.

Please follow the local electrical codes and regulations to protect the shunt and short circuit.
If the protection measures for shunting or short circuiting are not proper, the inverter may be damaged.

1.3 Before power on

DANGER

☑ The main circuit terminals must be wired correctly. Single-phase (R/L1, S/L2)/three-phase (R/L1, S/L2, T/L3) are power input terminals, and they must not be connected to U/T1, V/T2 , W/T3 mixed use; when mixed use, power transmission will cause damage to the inverter.

☑ When this product is used in some environments, electromagnetic interference may be caused, so please conduct proper tests before use, and be sure to do grounding works.

☑ Provide motor over temperature protection function.

WARNING

☑ The selected power supply voltage must be the same as the input voltage specification of the inverter.

☑ When moving the inverter, please do not take the front cover directly. It should be carried by the inverter body to prevent the front cover from falling off and avoid the falling of the inverter and causing personal injury or damage to the inverter.

☑ Please install the inverter on non-combustible materials such as metals. Do not install on or near flammable materials to prevent fire.

☑ If multiple inverters are placed in the same control panel, please add a cooling fan to keep the temperature in the panel below 40°C (without dust cover below 50°C) to prevent overheating or fire.

☑ Please turn off the power, and then disassemble or install the keypad operator, and operate the fixed operator according to the figure, so as to avoid poor contact and cause the operator to malfunction or not display.

☑ The installation and use of the product must be carried out by qualified professional electricians.

1.4 Wiring

DANGER

☑ Installing or wiring any inverter, be sure to turn off the main power supply to avoid electric shock and fire.

☑ Confirm that the ground wire is connected to the earth. (200V class: the ground impedance must be lower than 100Ω; 400V class: the ground impedance must be lower than 10Ω).

☑ Ground the inverter according to EN61800-5-1. The wire size may have to be at least 10mm^2 (6AWG) to meet the standard for limiting leakage current.

☑ The ground terminal of the inverter must be properly grounded; if it is not properly grounded, be sure to unplug the ground wire of the control board to avoid damage to the electronic parts by the surge.

☑ RCD must meet the B-type leakage current protection standard.

☑ After the wiring is completed, please confirm that the emergency stop (function parameter control terminal) setting is valid. (The wiring responsibility belongs to the user).

☑ Do not directly touch the input/output power cord, and avoid all wiring contact with the inverter shell and short circuit.

☑ Do not perform withstand voltage test on the inverter, which may damage the semiconductor components.

WARNING	**WARNING** ☑ Confirm that the input main power supply matches the inverter to avoid injury or fire. ☑ Please connect the braking resistor and the braking module according to the relevant wiring diagram, otherwise there is a risk of fire. ☑ Please tighten the terminal screws with the specified torque to avoid the risk of fire. ☑ Do not connect the input power supply to the inverter output terminals. ☑ Do not connect electromagnetic contactor or electromagnetic switch contacts to output terminals. ☑ Do not connect the phase-in capacitor or LC/RC filter to the output circuit. ☑ Ensure that the interference generated by the inverter and motor will not affect the surrounding sensors or equipment.

1.5 Precautions before operation

WARNING	**WARNING** ☑ Please confirm that the model capacity of the inverter is the same as the model capacity set by the function parameters of the inverter before power on. ☑ If the cable length between the inverter and the motor exceeds 25 meters, it is necessary to reduce the carrier frequency or install an output filter to reduce the overvoltage or oscillation at the load end and avoid damage to the motor.

1.6 Parameter setting

WARNING	**WARNING** ☑ When setting the dynamic operation of the motor for automatic adjustment, do not connect the motor to the load (mechanical equipment). ☑ When the motor is set to run dynamically for automatic adjustment, the motor will rotate. confirm the space around the motor to avoid danger.

1.7 Operation

DANGER	**DANGER** ☑ Please confirm that the front cover is installed before turning on the power. ☑ Do not switch in or disconnect the motor unit during operation, otherwise it will cause the inverter to trip over current, or damage the main circuit of the inverter in severe cases. ☑ Do not operate the machine when your hands are wet. ☑ Provide an independent external hardware emergency switch, which can turn off the output of the inverter in a hazard. ☑ Please confirm that the operation command is off before returning to the warning. ☑ If you choose to restart automatically after power recovery, the inverter will start automatically after power is restored. ☑ Before executing the automatic adjustment, please ensure the status of the peripheral systems and mechanical equipment to ensure the safety of personnel. ☑ Regardless of whether the inverter is running or stopped, avoid touching the relevant terminals to prevent danger. ☑ After the power is cut off, the fan may continue to rotate for a while. ☑ Avoid electric shock! The internal DC capacitor of the inverter will not be discharged until 5 minutes after the power is removed. Please disassemble or inspect it 5 minutes after the power is removed. Wait 15 minutes for 15HP or more.

WARNING

☑ The inverter can easily make the motor run from low speed to high speed. Please confirm the allowable range of the motor and machine.
☑ When using products such as brake modules, please pay attention to the relevant settings for their use.
☑ When the inverter is running, do not check the signal on the circuit board.

HOT Surface

☑ Do not touch heating parts such as heat sinks and brake resistors.

1.8 During inspection, maintenance and replacement

DANGER

☑ Before performing maintenance and inspection, please make sure that the power has been turned off and the power LED indicator is off (please confirm DC voltage does not exceed 25 volts).
☑ There are high voltage terminals in the inverter terminals, please do not touch them randomly.
☑ When the power is on, be sure to install the protective cover, and after removing the cover, always disconnect the power through the circuit breaker.
☑ Except for the designated professionals, please do not perform maintenance inspections or replace parts.

WARNING

☑ The surrounding temperature of the inverter should be used in a non-condensing environment of 14 to 104 (140) °F (–10 to +40 (60)°C) 90%RH, but ensure that there is no dripping water and metal dust in the surrounding environment.

1.9 Precautions when the inverter is scrapped

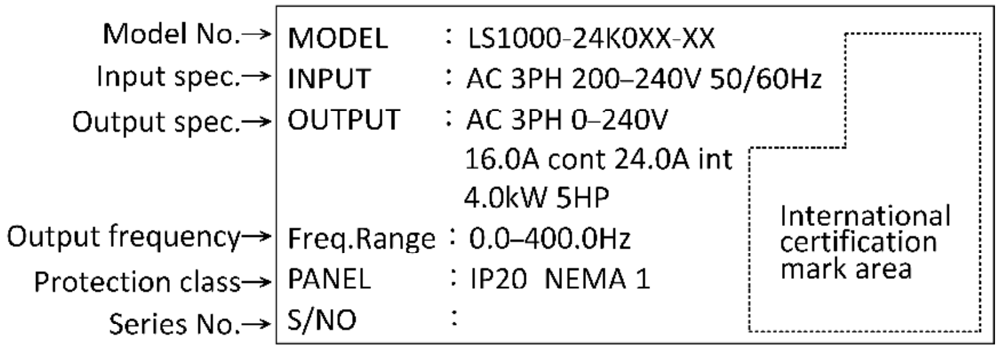
WARNING

When the inverter needs to be scrapped, please dispose of it as industrial waste and pay attention to the following:

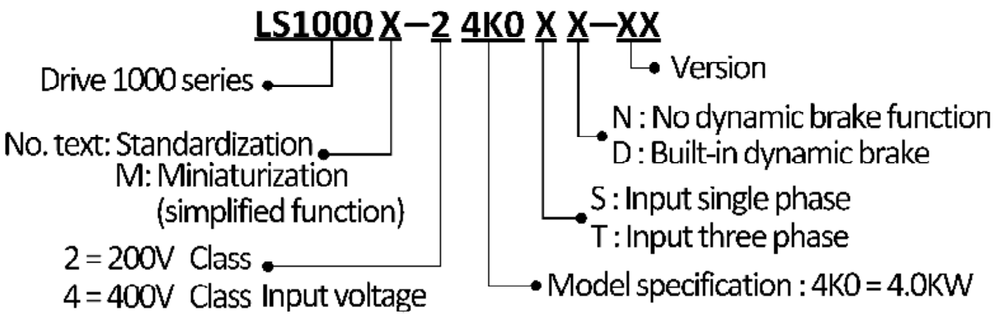
☑ The electrolytic capacitors on the main circuit of the inverter and the electrolytic capacitors on the printed circuit board may explode when burned.
☑ Poisonous gas is generated when the plastic parts such as the housing of the inverter are burned.
☑ Devices with electronic components cannot be disposed of together with domestic waste. They must be recycled separately with electrical and electronic waste in accordance with local regulations.

Chapter 2 Product Installation

2.1 Description of Nameplate



2.2 Model No. and power of ac drive

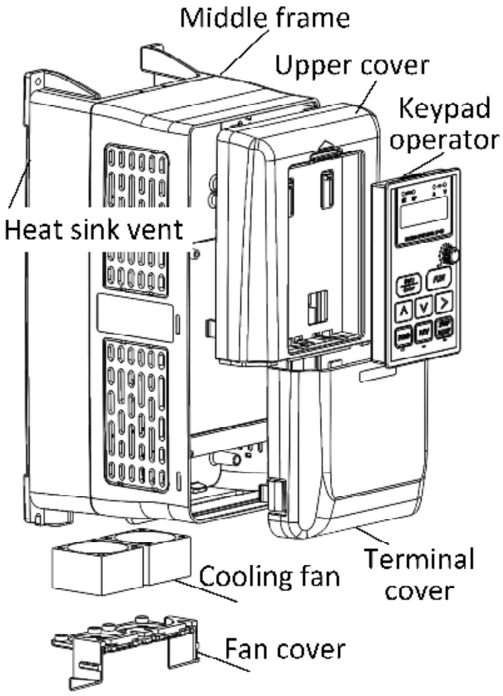


2.3 Comparison of inverter model specifications and motor power

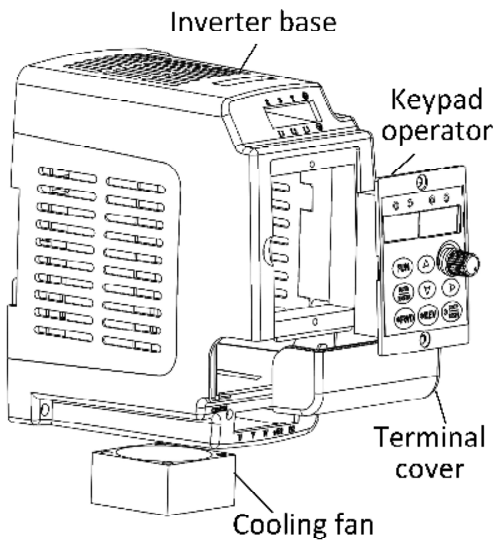
Model No.	Power (KW)	Model No.	Power (KW)	Model No.	Power (KW)
0K4	0.4	018	18.5	132	132
0K7	0.75	022	22	160	160
1K5	1.5	030	30	185	185
2K2	2.2	037	37	220	220
4K0	4.0	045	45	280	280
5K5	5.5	055	55	315	315
7K5	7.5	075	75	355	355
011	11	090	90	400	400
015	15	110	110		

2.4 Production products means

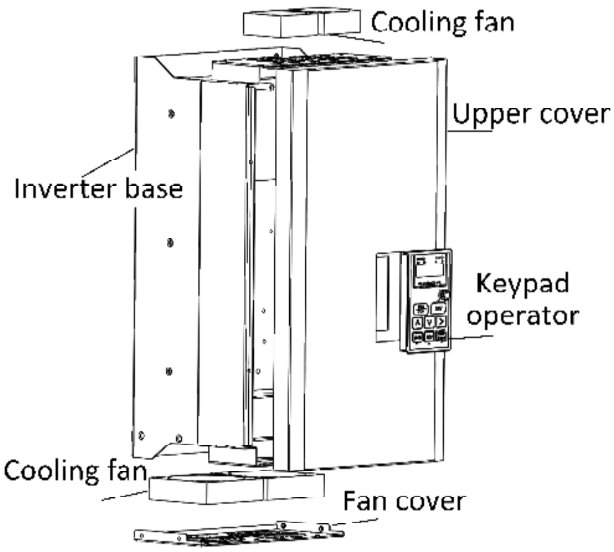
LS1000-XXXXXX-A1



LS1000M-XXXXXX-A1



LS1000-XXXXXX-B1



Chapter 3 Surrounding environment and installation

3.1 Environmental requirements

The installation environment of the inverter has a direct impact on the normal functions of the inverter and its service life. Therefore, the installation environment of the inverter must meet the following conditions:

Installation site setup
Indoor.
Ambient temperature
–10 to 40°C (Closed wall mounting type) –10 to 50°C (In-panel mounting type) ☑ In order to improve the reliability of the machine, please use the inverter in a place where the temperature will not change rapidly. ☑ When using in a closed space such as a control panel , please use a cooling fan or cooling air conditioner for cooling to prevent the internal temperature from exceeding the condition temperature. ☑ Please avoid freezing the inverter.
Humidity
☑ Below 90%RH. ☑ Please avoid condensation of the inverter.
Environment
Please install the inverter in the following places: ☑ Places free of oil mist, corrosive gas, flammable gas, dust, etc. ☑ Metal powder, oil, water and other foreign objects will not enter the place inside the inverter. (Do not install the inverter on top of flammable materials such as wood) ☑ Places free of radioactive materials and flammable materials. ☑ Places free of harmful gases and liquids. ☑ Places with little salt erosion. ☑ Places without direct sunlight.
Altitude
Altitude of 3000 meters or less, When the altitude is above 1000 meters, the rated capacity should be reduced by 2% for every 100 meters.
Vibration resistant
20–50Hz 5.9 m/s 2 (0.6G) or less, 20Hz or less 9.8 m/s 2 (1G) or less.
Installation direction
In order not to reduce the cooling effect of the inverter, be sure to install it vertically.
Storage temperature
–20 to 60°C

Important:

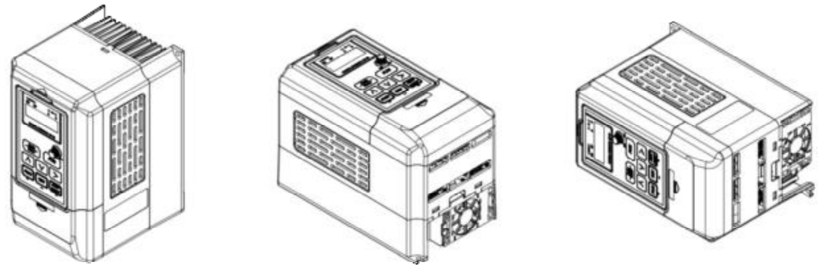
Do not install equipment that generates electromagnetic waves or interference such as transformers around the inverter. Otherwise, it will cause the inverter to malfunction. If such equipment needs to be installed, a shield plate should be installed between it and the inverter.

WARNING	**WARNING** In order to prevent fire, the drive disc is mounted in a closed box or cabinet, use a cooling fan or air conditioning to cool sufficiently to enable the cover mount (IP00) drive the intake air temperature is maintained at 50°C or less , The air intake temperature of the enclosed wall-mounted inverter is kept below 40°C . Otherwise it may cause overheating or fire.

3.2 Installation direction and space

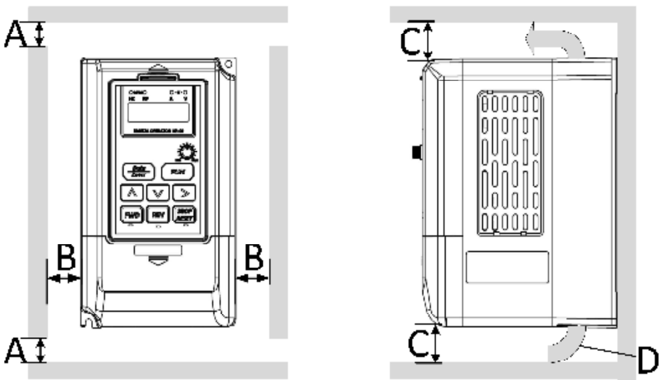
In order not to reduce the cooling effect of the inverter, be sure to install it vertically.

OK NG NG



Vertical installation Horizontal installation Side-down installation

In order not to reduce the cooling effect of the inverter, appropriate space should be reserved during installation so that the air intake and exhaust of the cooling fan are not affected.



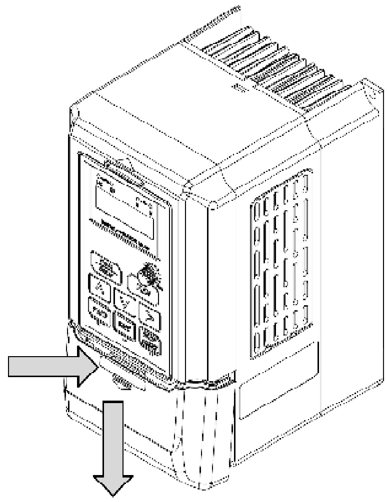
A. Above 50mm.
B. The inverter capacity is 18.5KW (Includes the following capacities), and the minimum recommended width is 30mm.
   The inverter capacity is 22KW (Including the above capacity), and the minimum recommended width is 50mm.
C. More than 120mm.
D. Ventilation holes.

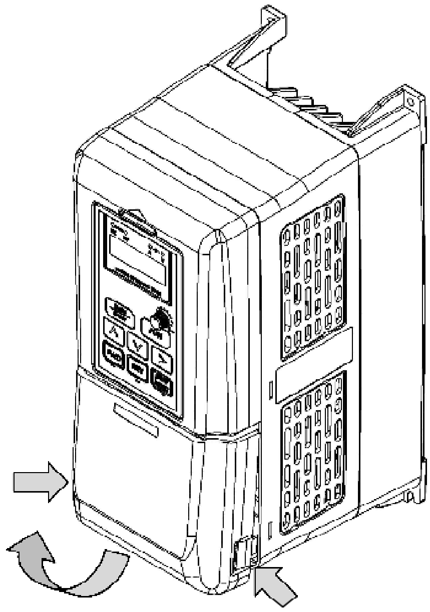
- 🕮 The above A–C are the minimum required distances. If the distance is less than this distance, the cooling performance of the fan will be affected.
- 🕮 The inverter is equipped with a cooling fan. When the temperature rises to 45°C after operation, the cooling fan will start to run. If the temperature rises to 88°C (±3°C) under heavy load and full load or the ambient temperature is too high, Over temperature protection will be activated.
- 🕮 In poor places such as dust, grease, cotton wool, etc., regular cleaning and maintenance are required to ensure the cooling fan and heat dissipation function.

3.3 Disassembly and assembly of the product

LS1000-XXXXXX-A1

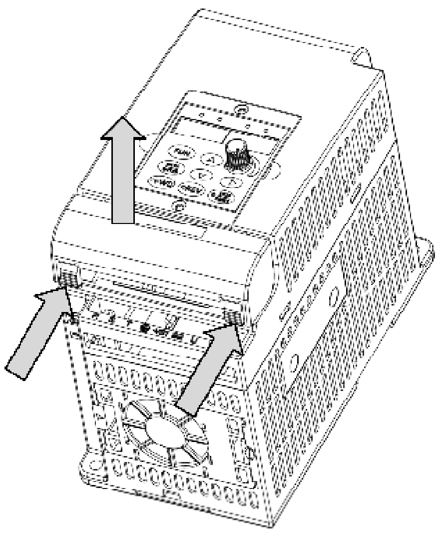
(A) Press the arrow icon and pull it back out.





(B) Press the card grooves on both sides to rotate and take out.

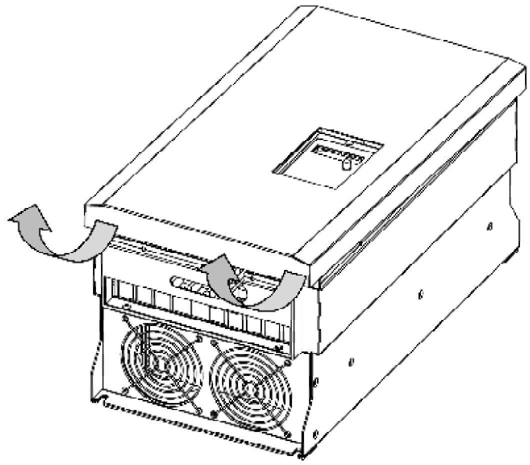
LS1000M-XXXXXX-A1

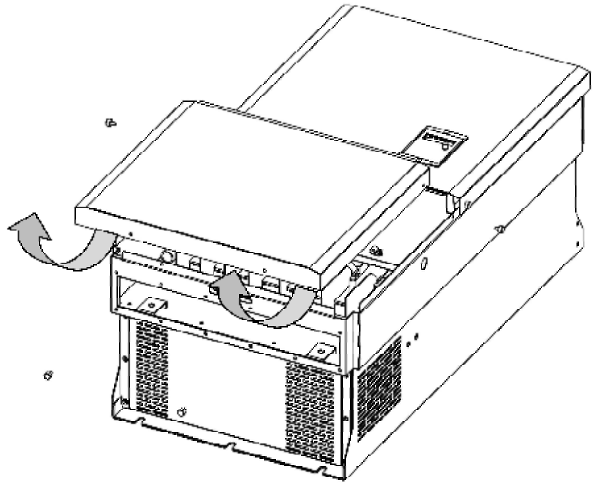


Press the card grooves on both sides to rotate and take out.

LS1000-XXXXXX-B1

(A) Resist PULL UP and push up.

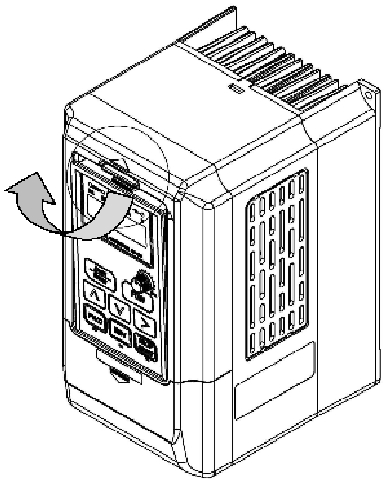


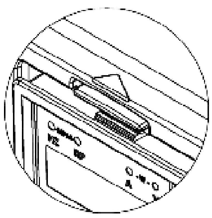


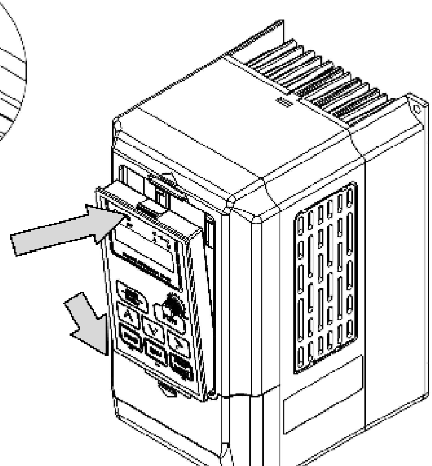
(B) Remove the fixing screw and hold it against the PULL UP and push it up.

Digital Keypad Operator

Disassembly:
Pull the card latch upward, and take out the digital operator after it pops out.







Installation:

1. Clamp the two claws under the digital manipulator Forward Cover and push the upper cover into the groove.
2. Press until you hear a “click” sound.

Chapter 4 Wiring

4.1 Safety precautions

DANGER

DANGER

To prevent electric shock, do not perform wiring work while the power is on. Otherwise, there is a danger of electric shock.

WARNING

WARNING

To prevent electric shock:

☑ Do not operate with the inverter cover removed, otherwise there will be a risk of electric shock.

- In order to illustrate the details of the product, the illustrations in this manual sometimes show the state of removing the outer cover or safety cover. Be sure to follow the instruction manual to operate the inverter with the specified cover or cover installed.

☑ Be sure to ground the ground terminal on the motor side, otherwise it may cause electric shock or fire due to contact with the motor casing.

☑ When wearing loose clothes or wearing jewelry on your body, and when you don't use goggles to protect your eyes, please do not perform relative frequency inverter operation of the device.

☑ Do not remove the cover of the inverter or touch the printed circuit board when the power is on, otherwise there is a danger of electric shock.

☑ Only electric professionals are allowed to perform maintenance, inspection or component replacement, otherwise there is a danger of electric shock.

☑ Before wiring the inverter terminals, please cut off the power of all machines. Even if the power is cut off, there is still residual voltage in the capacitors inside the inverter. The waiting time after the power is cut off should not be shorter than the time marked on the inverter.

To prevent fire:

☑ Please tighten the terminal screws according to the specified torque. If the connection of the main circuit wire is loose, it may cause a fire due to the overheating.

☑ Do not install the inverter on flammable materials, and avoid making flammable materials close to the inverter or attaching flammable materials to the inverter, otherwise there will be a risk of fire.

☑ Do not use the wrong voltage for the main circuit power supply, otherwise there will be a risk of fire.

☑ Before power on, please confirm whether the rated voltage of the inverter is consistent with the power supply voltage. Please connect the brake resistor, the brake resistor unit and the brake unit according to the wiring diagram. Otherwise, there is a risk of fire. At the same time, it may damage the inverter, brake resistor, brake resistor unit and brake unit.

To prevent injuries:

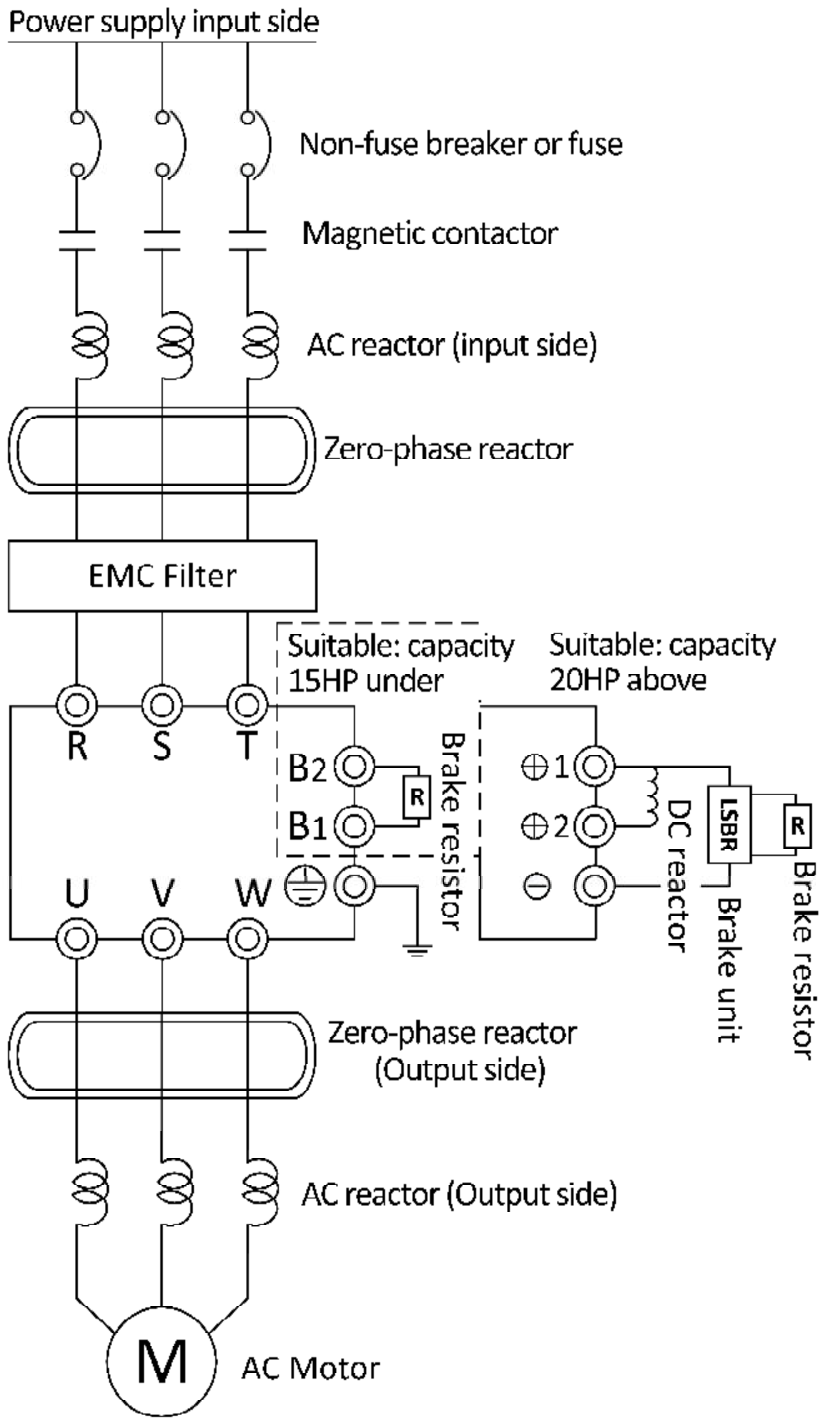
☑ Do not hold the front cover or terminal cover to carry the inverter. If you only hold the front cover, the main body will fall, causing risk of injury.

Important
☑ **When operating the inverter, please follow the steps specified in ESD prevention measures.** Otherwise, the internal circuit of the inverter will be damaged due to static electricity. ☑ **When the inverter is outputting voltage , do not unplug the motor wiring.** Otherwise, the inverter will be damaged. ☑ **When wiring the control circuit, do not use cables other than the shielded wire.** Otherwise it will cause the inverter to operate abnormally. Please use double-stranded shield wire and connect the shield layer to the ground terminal of the inverter. ☑ **Non-professionals do not wire.** Incorrect wiring may damage the circuit of the inverter or brake options. Please read the instructions carefully before connecting the brake option to the inverter. ☑ **Do not change the circuit of the inverter.** Otherwise, the inverter will be damaged, and the repairs caused by this are not within the scope of our company's guarantee. Please never modify the inverter by yourself. If your company or your company's customers modify the product, the company will not be liable. ☑ **After completing the wiring of the inverter and other machines, please confirm that all wiring is correct.** Otherwise, the inverter will be damaged.

4.2 System wiring diagram

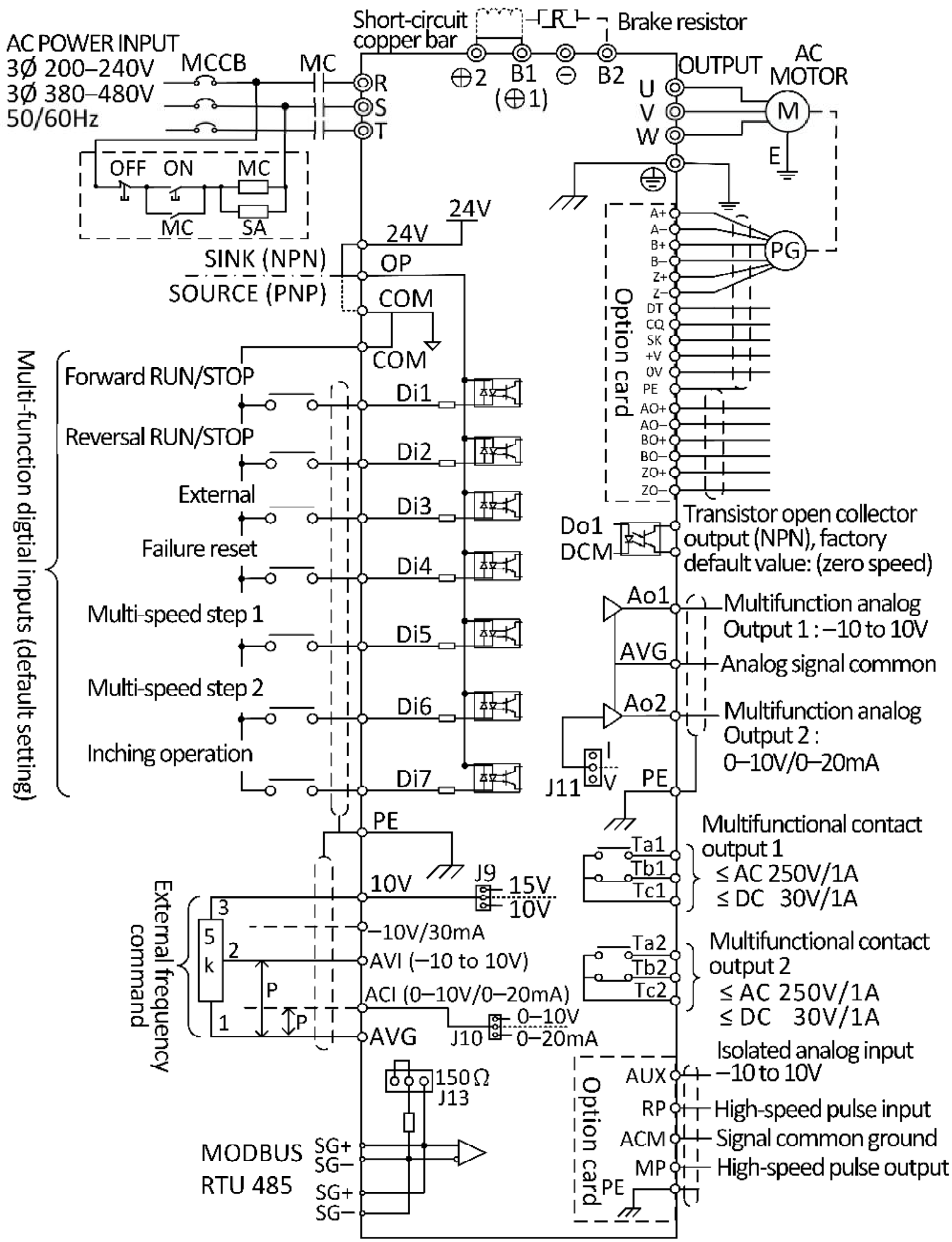
Power input	Please install the power supply according to the rated power specifications in the user manual.
NFB or fuse	There may be a large input current when the power is turned on. Please select an appropriate non-fused breaker or fuse.
Electromagnetic contactor	When installing an electromagnetic contactor (MC) on the power supply side, do not use this (MC) for frequent start and stop operations. To avoid causing inverter failure. The number of times when the MC is switched ON/OFF is limited to once every 30 minutes.
AC reactor (Input)	When connected to a large-capacity (above 600KVA) power transformer, or when the phase-in capacitor is switched, excessive peak current will flow to the input power circuit and damage the inverter. It is recommended to install an AC reactor to improve power factor. The wiring distance must be within 10m.
Zero-phase reactor	It is used to reduce frequency interference, especially in places with audio equipment, and at the same time reduce input and output side interference. The effective range is from AM band to 10MHz.
EMC filter	Can be used to reduce electromagnetic interference.
Braking resistor/ Module	Used to shorten the motor deceleration time. Refer to test the contents of Chapter 9 shown. (Optional)
AC reactor (Output side)	When the output terminal is connected to the motor, the wiring length of the motor will affect the magnitude of the voltage reflected wave. When the wiring length of the motor is longer than 20 meters, it is recommended to install it (the closer to the inverter, the better the effect). (Optional)

System wiring diagram



4.3 Wiring of control circuit terminals

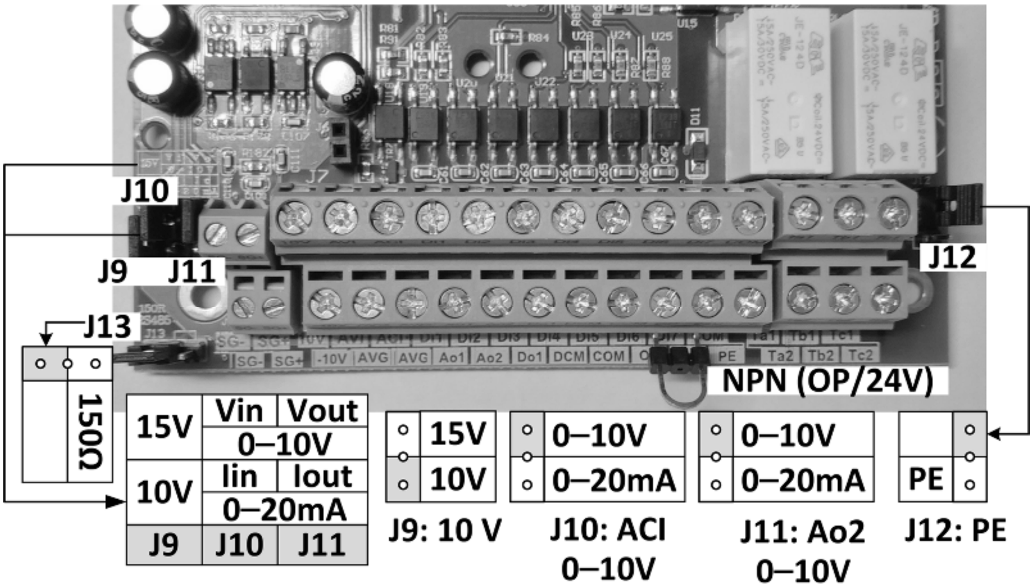
LS1000 Standardization



Control circuit terminal configuration (LS1000)

SG–	SG+	10V	AVI	ACI	Di1	Di2	Di3	Di4	Di5	Di6	Di7	COM	Ta1	Tb1	Tc1
SG–	SG+	–10V	AVG	AVG	Ao1	Ao2	Do1	DCM	COM	OP	24V	PE	Ta2	Tb2	Tc2

Motherboard, Jump configuration instructions (LS1000)



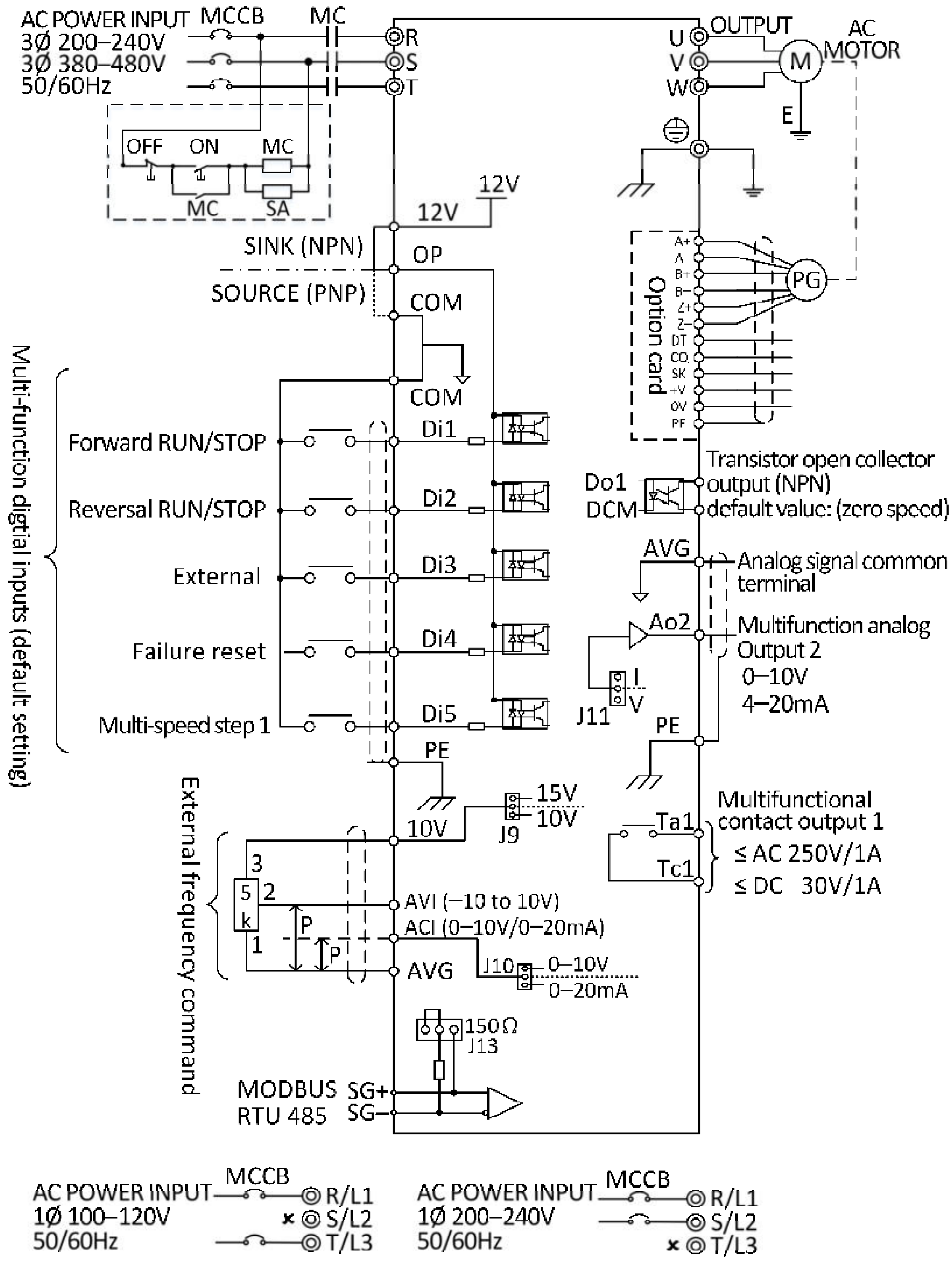
J9	10V terminal-power output 10V (Default setting), 15V selection.
J10	ACI terminal-input voltage and current selection. Voltage (0–10V) (Default setting). Current (0–20mA).
J11	Ao2 terminal-output voltage and current selection. Voltage (0–10V) (Default setting). Current (0–20mA).
J12	PE terminal-When the inverter is not grounded or the grid is floating, the JUMP must be removed from the PE position.
J13	RS485, Termination resistor 150Ω.
NPN/PNP mode. Default setting: NPN (OP/24V)	

Control circuit terminal function (LS1000)

<table>
<tr><th colspan="5">Terminals name</th></tr>
<tr><td>Di1</td><td colspan="4">Forward command</td></tr>
<tr><td colspan="5">When Di1-COM is connected (ON), it is forward rotation.</td></tr>
<tr><td>Di2</td><td colspan="4">Reverse command</td></tr>
<tr><td colspan="5">When Di2-COM is connected (ON), it is reverse rotation.</td></tr>
<tr><td>Di3</td><td colspan="4">Input when external abnormality</td></tr>
<tr><td colspan="5">When Di3-COM is connected (ON), the inverter will trip and stop.</td></tr>
<tr><td>Di4</td><td colspan="4">Abnormal reset</td></tr>
<tr><td colspan="5">Use the control terminal ON (closed) to release the holding state when the fault protection circuit operates.</td></tr>
<tr><td>Di5</td><td colspan="4">Multi-stage speed command 1</td></tr>
<tr><td>Di6</td><td colspan="4">Multi-stage speed command 2</td></tr>
<tr><td colspan="5">Multi-stage speed commands 1, 2. Can perform four-stage speed control.</td></tr>
<tr><td>Di7</td><td colspan="4">Inching operation</td></tr>
<tr><td colspan="5">Execute the jog frequency with ON.</td></tr>
<tr><td>COM</td><td colspan="4">Input common terminal</td></tr>
<tr><td colspan="5">24V output power supply reference ground.</td></tr>
<tr><td>COM</td><td rowspan="2">PNP
SOURCE</td><td colspan="2"></td><td>Input common terminal</td></tr>
<tr><td>OP</td><td>OP</td><td rowspan="2">NPN
SINK</td><td>Digital input common terminal</td></tr>
<tr><td colspan="2"></td><td>24V</td><td>Power output terminal</td></tr>
<tr><td colspan="5">COM : 24V output power supply reference ground.
OP : Digital input common terminal.
24V : Power output 24V/200mA.</td></tr>
<tr><td>10V</td><td colspan="4">Power supply for frequency setting</td></tr>
<tr><td colspan="5">10/15V power supply, current: 30/50mA.</td></tr>
<tr><td>–10V</td><td colspan="4">Negative power supply for frequency setting</td></tr>
<tr><td colspan="5">–10V power supply, current: 30mA.</td></tr>
<tr><td>AVG</td><td colspan="4">Analog signal common terminal</td></tr>
<tr><td colspan="5">The common terminal of analog power, input/output signals.</td></tr>
<tr><td>AVI</td><td colspan="4">Analog voltage frequency command</td></tr>
<tr><td colspan="5">DC –10 to 10V input.</td></tr>
<tr><td>ACI</td><td colspan="4">Analog current frequency instructions</td></tr>
<tr><td colspan="5">DC 0–10V/(0) 4–20mA input. (J10 optional setting)</td></tr>
<tr><td>Do1</td><td colspan="4">Detected in zero speed</td></tr>
<tr><td colspan="5">It is ON in the stop state or below the zero speed level.</td></tr>
<tr><td>DCM</td><td colspan="4">Output common terminal</td></tr>
<tr><td colspan="5">The digital Do1 output signal has a common endpoint.</td></tr>
</table>

Terminals name	
Ta1 Tb1 Tc1	Output when abnormal
When the abnormal protection function of the inverter is activated, it will output with 1a and 1b contacts. Contact capacity: AC 250V/1A, DC 30V/1A. Ta1-Tc1 (ON), Tb1-Tc1 (OFF).	
Ta2 Tb2 Tc2	Output In operation
The inverter output starting frequency is above the set value, and output with 1a, 1b contact action. Contact capacity: AC 250V/1A, DC 30V/1A. Ta2-Tc2 (ON), Tb2-Tc2 (OFF)	
Ao1	Reference output frequency
Analog signal output –10 to 10V.	
Ao2	Output current
The analog signal output 0–10V/0 (4)–20mA. (J11 optional setting)	
AVG	Analog signal common terminal
The common terminal of analog power, input/output signals.	
PE	Shield isolation ground terminal
Covered isolation wire, connection selection ground wire dedicated.	
SG+ SG–	Modbus RS485
RS485 Modbus Communication. (×2)	

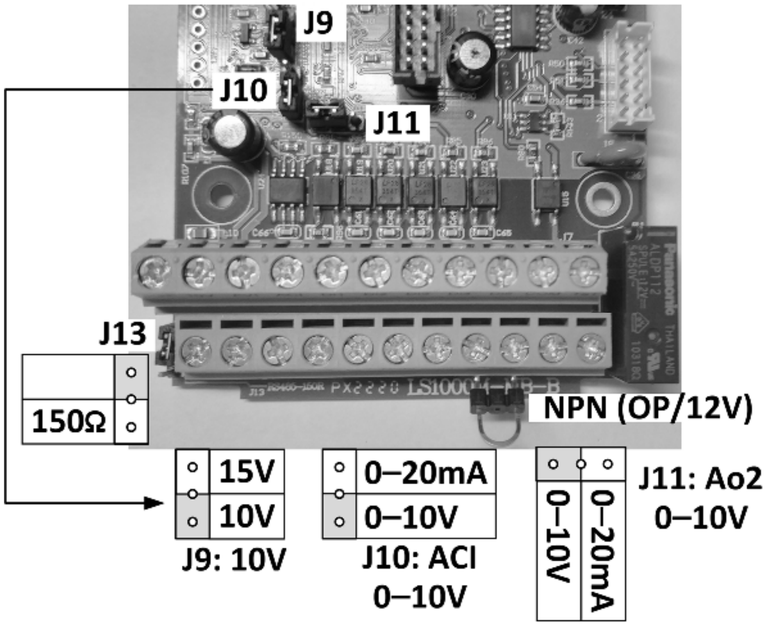
LS1000M miniaturization



Control circuit terminal configuration (LS1000M)

SG+	10V	AVI	ACI	Di1	Di2	Di3	Di4	Di5	COM	Ta1	
SG–	AVG	AVG	Ao2	Do1	DCM	COM	OP	12V	PE	Tc1	

Motherboard, Jump configuration instructions (LS1000M)



J9	10V terminal-power output 10V (Default setting), 15V selection.
J10	ACI terminal-input voltage and current selection. Voltage (0–10V) (Default setting). Current (0–20mA).
J11	Ao2 terminal-output voltage and current selection. Voltage (0–10V) (Default setting). Current (0–20mA).
J13	RS485, termination resistor 150Ω.
NPN/PNP mode. Default setting: NPN (OP/12V).	

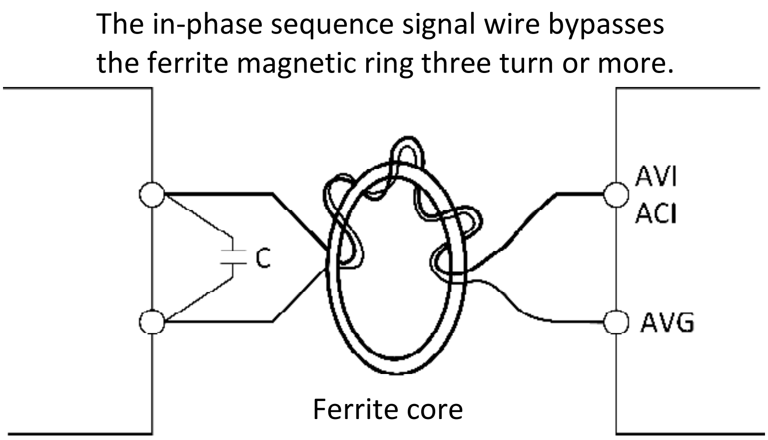
Control circuit terminal function (LS1000M)

<table>
<tr><th colspan="5">Terminals name</th></tr>
<tr><td>Di1</td><td colspan="4">Forward command</td></tr>
<tr><td colspan="5">When Di1-COM is connected (ON), it is forward rotation.</td></tr>
<tr><td>Di2</td><td colspan="4">Reverse command</td></tr>
<tr><td colspan="5">When Di2-COM is connected (ON), it is reverse rotation.</td></tr>
<tr><td>Di3</td><td colspan="4">Input when external abnormality</td></tr>
<tr><td colspan="5">When Di3-COM is connected (ON), the inverter will trip and stop.</td></tr>
<tr><td>Di4</td><td colspan="4">Abnormal reset</td></tr>
<tr><td colspan="5">Use the control terminal ON (closed) to release the holding state when the fault protection circuit operates.</td></tr>
<tr><td>Di5</td><td colspan="4">Multi-stage speed command 1</td></tr>
<tr><td colspan="5">Multi-speed command 1.</td></tr>
<tr><td>COM</td><td colspan="4">Input common terminal</td></tr>
<tr><td colspan="5">12V output power supply reference ground.</td></tr>
<tr><td>COM</td><td rowspan="2">PNP
SOURCE</td><td colspan="2"></td><td>Input common terminal</td></tr>
<tr><td>OP</td><td>OP</td><td rowspan="2">NPN
SINK</td><td>Digital input common terminal</td></tr>
<tr><td colspan="2"></td><td>12V</td><td>Power output terminal</td></tr>
<tr><td colspan="5">COM : 12V output power supply reference ground.
OP : Digital input common terminal.
12V : Power output 12V/200mA.</td></tr>
<tr><td>10V</td><td colspan="4">Power supply for frequency setting</td></tr>
<tr><td colspan="5">10/15V power supply, current: 30/50mA.</td></tr>
<tr><td>AVG</td><td colspan="4">Analog signal common terminal</td></tr>
<tr><td colspan="5">The common terminal of analog power, input and output signals.</td></tr>
<tr><td>AVI</td><td colspan="4">Analog voltage frequency command</td></tr>
<tr><td colspan="5">DC –10 to 10V input.</td></tr>
<tr><td>ACI</td><td colspan="4">Analog current frequency instructions</td></tr>
<tr><td colspan="5">DC: 0–10V/(0) 4–20mA input. (J10 optional setting)</td></tr>
<tr><td>Do1</td><td colspan="4">Detected in zero speed</td></tr>
<tr><td colspan="5">It is ON in the stop state or below the zero speed level.</td></tr>
<tr><td>DCM</td><td colspan="4">Output common terminal</td></tr>
<tr><td colspan="5">The digital Do1 output signal has a common endpoint.</td></tr>
</table>

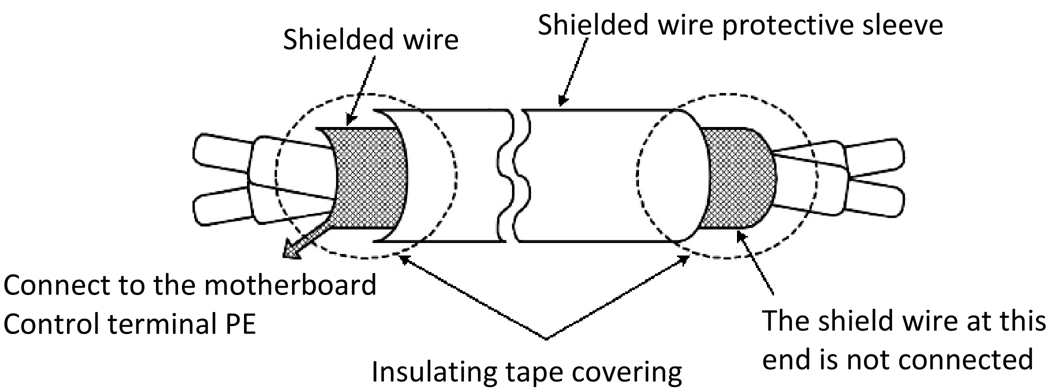
<table>
<tr><th colspan="2">Terminals name</th></tr>
<tr><td>Ta1</td><td rowspan="2">Output when abnormal</td></tr>
<tr><td>Tc1</td></tr>
<tr><td colspan="2">When the abnormal protection function of the inverter is activated, it will output with a contacts.
Contact capacity: AC 250V/1A, DC 30V/1A.</td></tr>
<tr><td>Ao2</td><td>Output current</td></tr>
<tr><td colspan="2">The analog signal output 0–10V/0 (4)–20mA. (J11 optional setting)</td></tr>
<tr><td>AVG</td><td>Analog signal common terminal</td></tr>
<tr><td colspan="2">The common terminal of analog power, input/output signals.</td></tr>
<tr><td>PE</td><td>Shield isolation ground terminal</td></tr>
<tr><td colspan="2">Covered isolation wire, connection selection ground wire dedicated.</td></tr>
<tr><td>SG+</td><td rowspan="2">Modbus RS485</td></tr>
<tr><td>SG–</td></tr>
<tr><td colspan="2">RS485 Modbus Communication.</td></tr>
</table>

Power line connection notes:

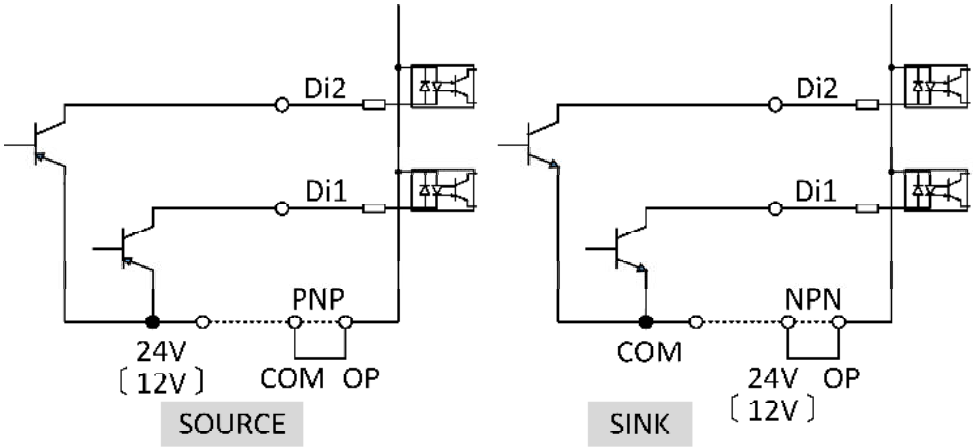
- 🕮 Multi-function input terminals are dry contact characteristics. Any signal source with voltage should not be input. If contact input control is required, in order to prevent poor contact, a contact with high reliability for weak signals should be used.
- 🕮 Control circuit wiring: After the main circuit wiring is separated from other power lines or power lines, perform the control circuit wiring. If you need to cross-connect, please make a 90-degree cross.
- 🕮 All input/output control signals, or the communication lines of the remote digital operation setting device, must be separated as far as possible from the high-current power lines (power, motor, brake). It is absolutely prohibited to be placed in the same trunking.
- 🕮 When the display light of the digital operator is on or the [CHARGE] light is on, do not connect or remove any wiring.
- 🕮 The analog input terminals (AVI, ACI, AVG) are connected to weak analog signals, which are more susceptible to external noise interference, so the wiring should not be too long (recommended to be less than 20m), and shielded wires should be used. In addition, the outer network the shielded cable must be well grounded. If the induced noise is large, the effect of connecting to the AVG terminal will be better.
- 🕮 When connecting the external analog signal, the interference caused by the analog signal output and the AC motor driver may cause malfunction. When this happens, connect a capacitor and ferrite core on the external analog output side to suppress noise. As shown below.



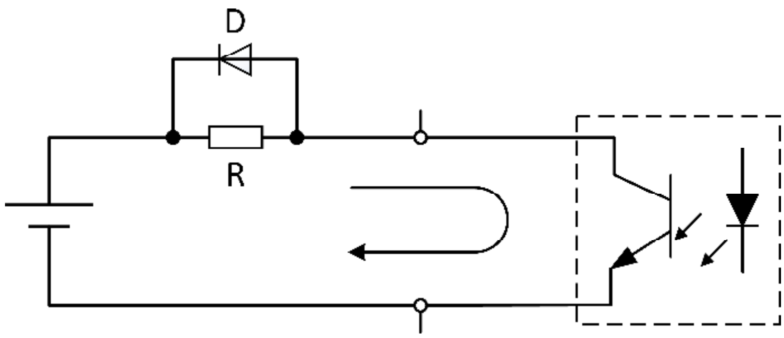
- 🕮 In order to prevent noise interference, the control circuit wiring must use shielded isolation twisted wires, and the wiring distance should not exceed 20m. Please refer to the figure below



Sink mode (OP/24V (12V)) and Source mode (COM/OP) instructions



🕮 Do not assign the functions of frequent ON/OFF operations to the terminals Ta1, Tb1, Tc1, Ta2, Tb2, and Tc2. Otherwise, the life of the relay contacts will be shortened.
🕮 Multi-function contact output terminals Ta1, Tb1, Tc1 and Ta2, Tb2, Tc2, please separate wiring from other control circuits. Otherwise, it will cause the inverter and the machine to malfunction or trip.
🕮 Do output, when driving the control relay, a surge absorber or flywheel diode should be connected in parallel at both ends of the excitation coil, and pay attention to the correct polarity when connecting.



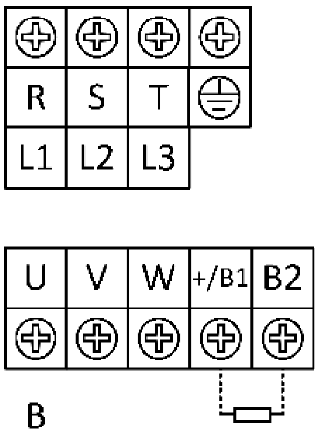
4.4 Main circuit terminal wiring

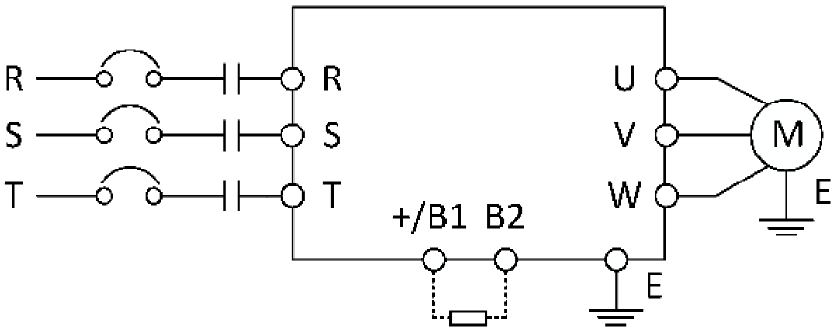
Terminal mark	Content description
R/L1, S/L2, T/L3	Power input terminal (Single-phase/3-phase).
U/T1, V/T2, W/T3	AC motor driver output, connected to 3-phase induction motor or synchronous motor.
+1, +2	For the connection end of the power improvement DC reactor, please remove the short-circuit piece when installing.
B1, B2	Please purchase the braking resistor connection terminal according to the selection table.
–N, [illegible] ,P, N	DC Busbar wiring.
⊜	Please use the third type of grounding for 200V series and special grounding for 400V series according to electrical engineering regulations.

Main circuit terminal block configuration (LS1000M)

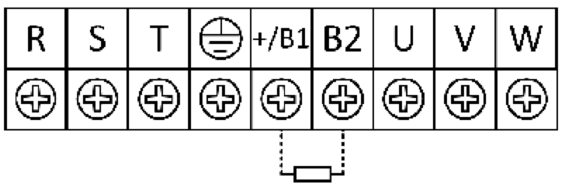
115V	0.4–0.75KW (0.5–1HP)	European standard terminal
220V	0.4–2.2KW (0.5–3HP)	
440V	0.75–4.0KW (1–5HP)	

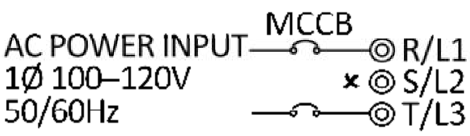
A

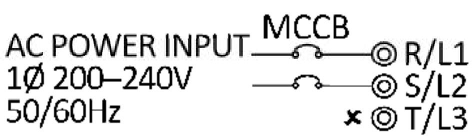




B

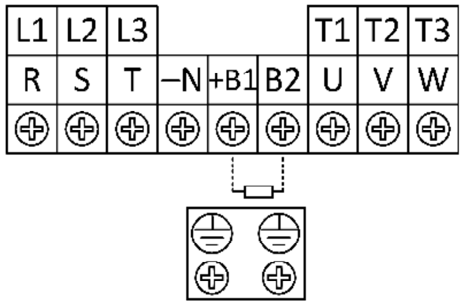


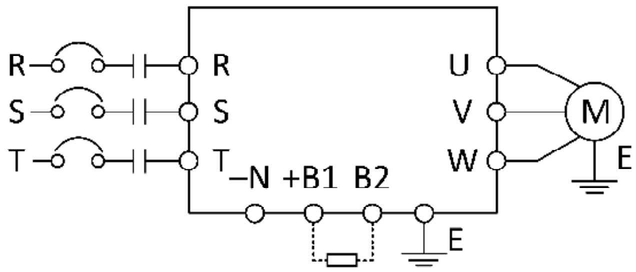




Main circuit terminal block configuration (LS1000)

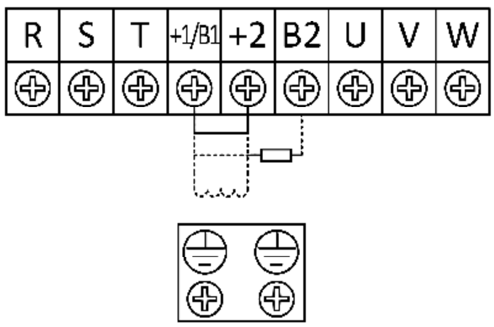
220V	0.75–5.5KW (1–7.5HP)	M4
440V	0.75–7.5KW (1–10HP)	

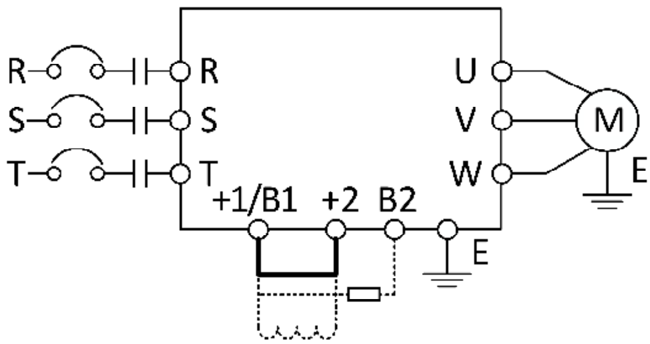




The ground terminal is in front of the power terminal block, M4 screw.

220V	7.5–15KW(10–20HP)	M6
440V	11–18KW (15–25HP)	

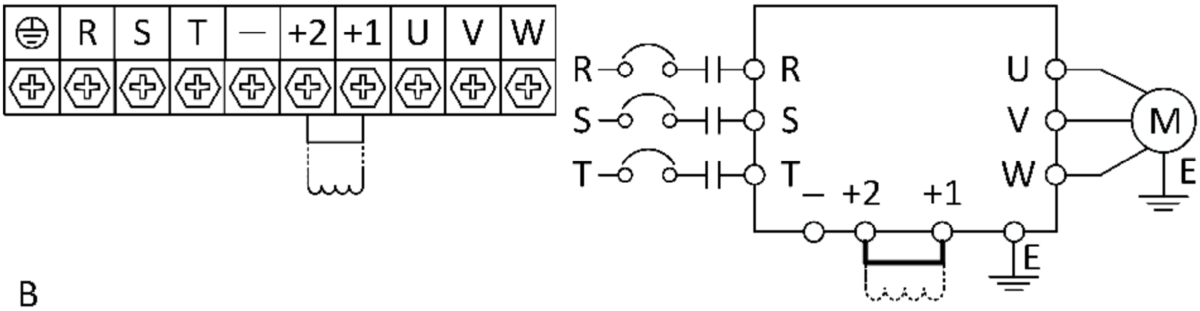




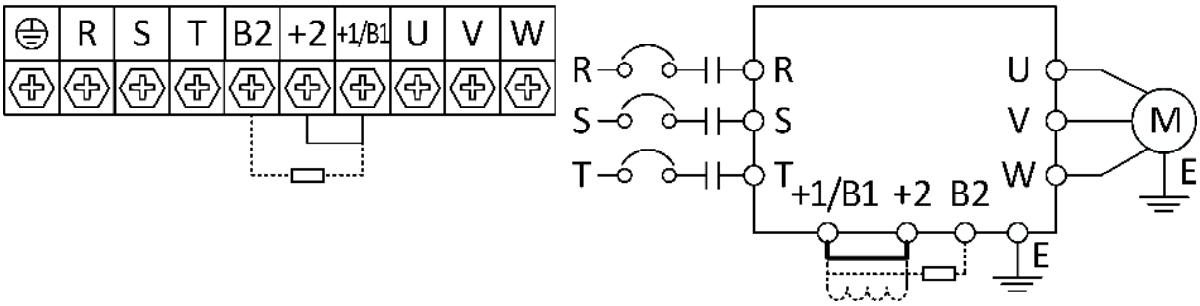
The ground terminal is in front of the power terminal block, M5 screw.

220V	18–30KW (25–40HP)	M6	A: Without BRAKE
440V	22–37KW (30–50HP)		B: With BRAKE

A

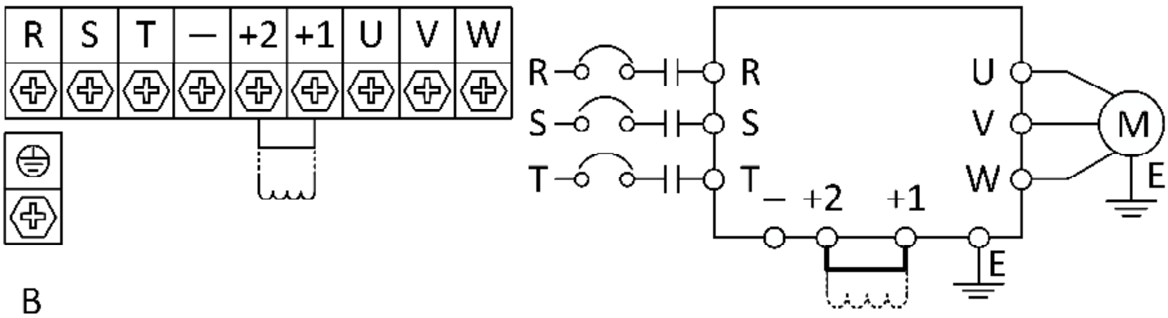


B

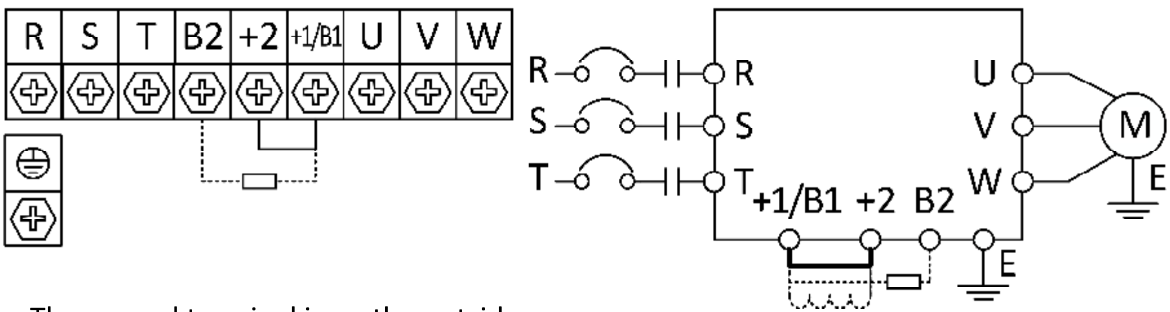


220V	37–55KW (50–75HP)	M8	A: Without BRAKE
440V	45–75KW (60–100HP)		B: With BRAKE

A



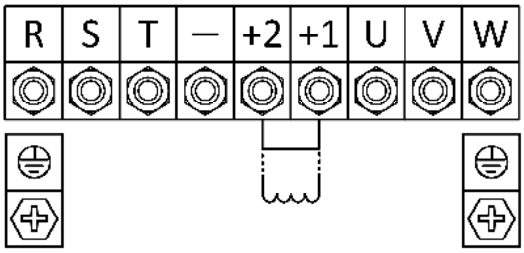
B

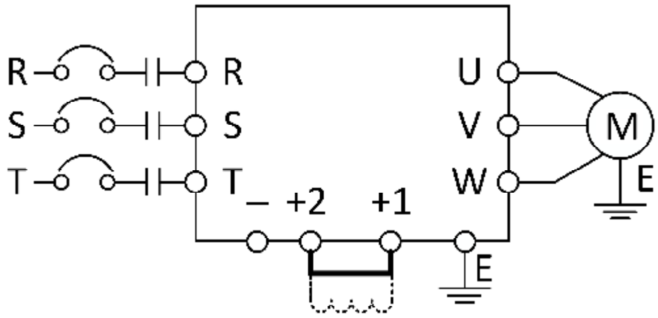


The ground terminal is on the outside of the chassis, M6 screw.

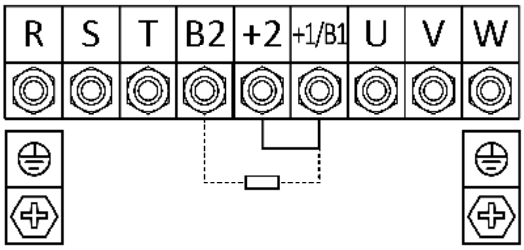
220V	75KW (100HP)	M10 screw cap	A: Without BRAKE
440V	90–132KW (125–175HP)		B: With BRAKE

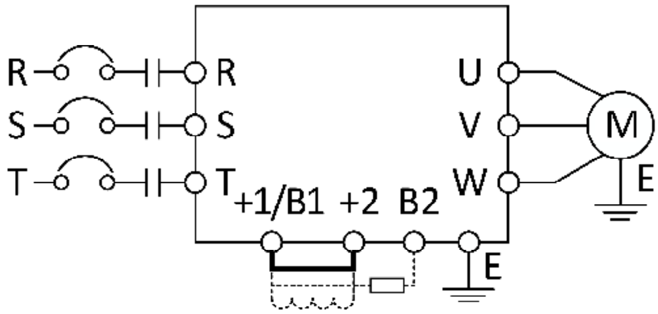
A





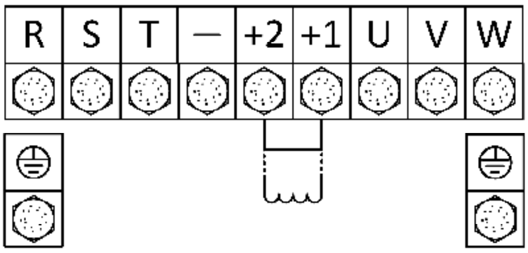
B

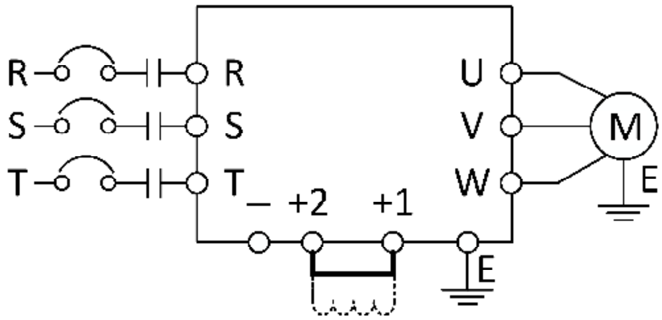




The ground terminal is in front of the power terminal block, M8 screw.

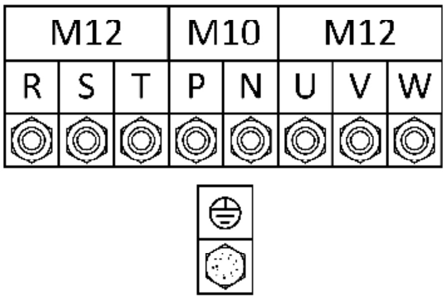
220V	90–110KW (125–150HP)	M10 Bolt
440V	160–220KW (200–300HP)	

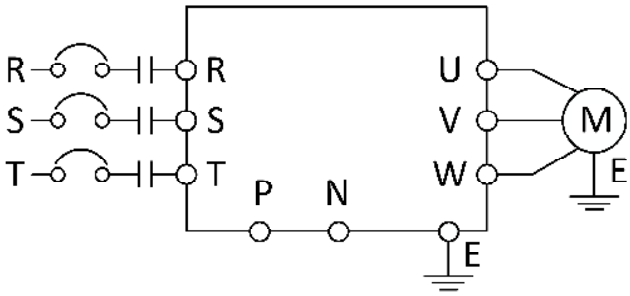




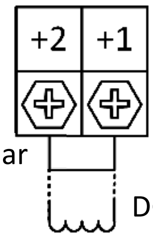
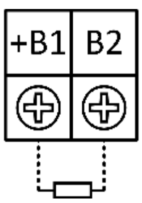
The ground terminal is in front of the power terminal block, M8 screw.

440V	260–317KW (350–425HP)	M12, M10 screw cap





The ground terminal is in front of the power terminal block, M10 Bolt.

WARNING	**WARNING** **DC reactor connection terminals, external braking resistor connection terminals and DC test circuit terminals:** ☑ The connection terminal of DC reactor improves the power factor. When leaving the factory, a short-circuit strip is connected to it. When connecting the DC reactor, take out this short-circuit piece first. ☑ When the reactor is not installed, be sure to lock the short-circuit piece to prevent the inverter from losing power or terminal damage. If the connection is loose, it may cause a fire due to overheating of the wire connection.  Short-circuit copper bar DC reactor (Option to buy) ☑ If inverter is used with frequent deceleration and braking or short deceleration time (high-frequency operation and heavy load operation, etc.), please refer to below wire figure. When the braking capacity of the inverter is insufficient or in order to increase the braking torque, an external braking resistor also is needed. ☑ The braking resistor is connected to B1 and B2 of the inverter, and must not be connected to the other side terminals, otherwise the inverter and braking resistor will be damaged. 

Main circuit terminal wiring diagram

Please refer to the following table for the distance and specifications of the inverter's power input and output.

	Standard length of wiring	Wiring length limit
Power system→distance to the power terminal of the inverter	Within 2–30 meters	Within 30–300 meters
Inverter output terminal → to AC motor terminal	Within 2–25 meters	Within 25–200 meters
The solution to excessive wiring is as described on the right	It is recommended to install input and output reactors	Mandatory installation of input and output reactors

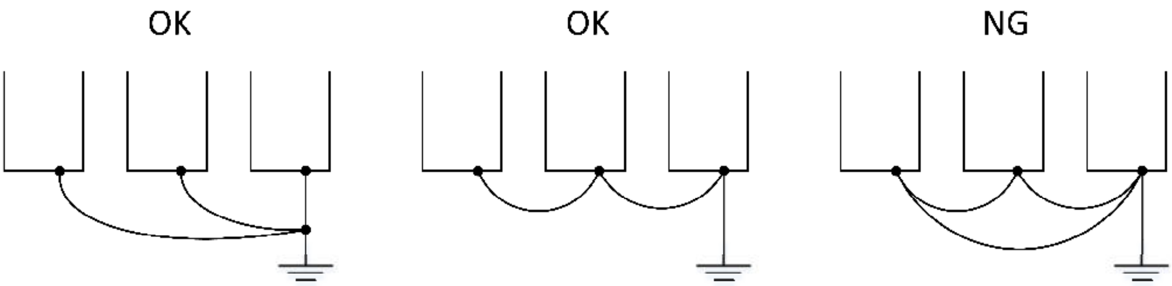
For surge absorbers and coils of inverter peripheral equipment such as electromagnetic contactors, relays, solenoid valves, etc., please connect surge absorbers in parallel to prevent noise interference. Please refer to the table on the next page for the use of surge absorbers:

Voltage	user target audience	Surge absorber specifications
200V	Large capacity coils other than relays	AC 250V, 0.5uf/200Ω
	Control relay	AC 250V, 0.1uf/100Ω
400V	Same as above	AC 500V, 0.5uf/220Ω

WARNING	**WARNING** If the length of the power line is too long, the motor and the power line will generate parasitic capacitance to the ground (low potential end), which will generate high voltage surges and directly damage the insulation withstand voltage of the inverter and the motor.

Ground wire:

1. For safety and noise reduction, the 200V series adopts the third grounding, and the 400V series adopts special grounding.
   🕮 Ground impedance of less than 10Ω.
2. Absolutely avoid sharing the grounding wire with large power equipment such as fusion splicer and power machinery, and keep it away from the power line of large power equipment as much as possible.
3. The size of the grounding wire is in accordance with the technical standards of electrical equipment. The shorter the grounding wire, the better.
4. When multiple inverters are grounded together, please refer to the figure below and do not form a ground loop.



About the wiring distance between the inverter and the motor:

1. When the wiring distance between the inverter and the motor is long (especially at low frequency output), the voltage drop of the cable will reduce the motor torque. Moreover, when the wiring length or the total wiring length when connecting the motors side by side is long, the high-frequency leakage current on the cable will increase, which will cause an increase in the output current of the inverter, which will cause the inverter to trip over current and seriously affect the current detection. Please lower the carrier frequency appropriately.
2. When the total wiring distance between the inverter and the motor is very long, due to the high frequency carrier frequency of the inverter (ie the ON/OFF switching frequency of the IGBT), the leakage current between the wiring and the ground will increase, which will affect the inverter The body and other peripheral equipment. Therefore, when the wiring distance between the inverter and the motor is long, please lower the carrier frequency appropriately.
3. When the system configuration requires that the wiring distance exceeds 100m, please take measures to reduce distributed capacitance (do not use metal sleeves outside the cables, separate the cables of each phase for wiring, etc.).

Wiring distance between inverter and motor	Below 50m	Below 100m	Over 100m
Carrier frequency	Below 15KHz	Below 5KHz	Below 2KHz

🕮 When one inverter is connected to multiple motors, the wiring distance is the total wiring length.
🕮 For PM control, please control the distance between the inverter and the motor within 100m.

WARNING	**WARNING** **Wiring precautions:** ☑ The power input terminal R. S. T and output terminal U. V. W are connected to the motor. They must not be connected by mistake, otherwise the inverter will be seriously damaged. ☑ Do not use phase-in capacitors, LC, RC noise filters and other components at the output of the inverter. ☑ The main circuit wiring of the inverter must be far away from the signal lines of other control equipment (such as PLC, weak current system) to avoid harmful interference. ☑ Between the AC main circuit power supply and the power supply side of the input terminal R.S.T, at least a non-fuse breaker must be installed or Install an electromagnetic contactor for overload to protect the circuit. ☑ The special leakage circuit breaker for the inverter, please select a sensitivity current above 30mA for each inverter. ☑ When using a general leakage circuit breaker, please select a sensitivity current of 200 mA or more for each inverter, and the action time is 0.1 second or more. ☑ In order to reduce noise interference, please remember to install R-C surge absorbers at both ends of the coil of the electromagnetic contactor.

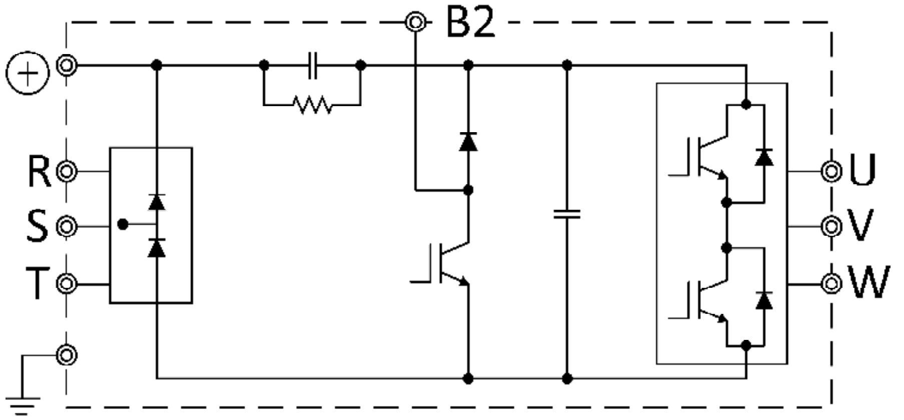
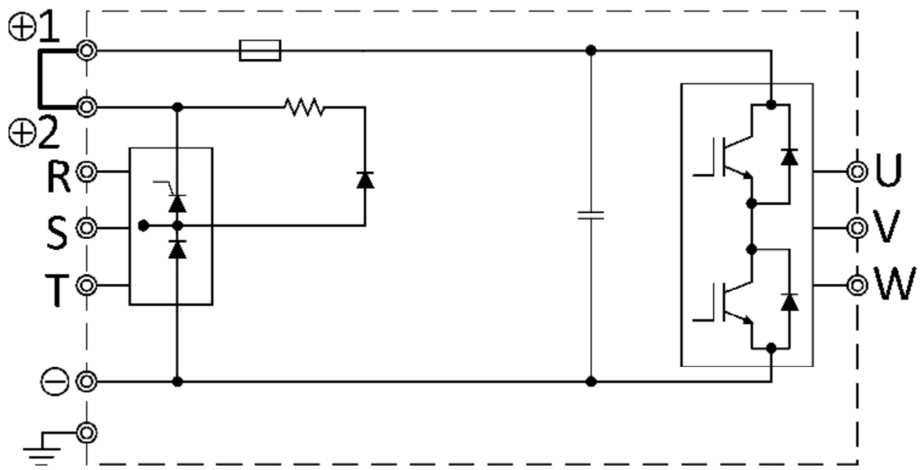
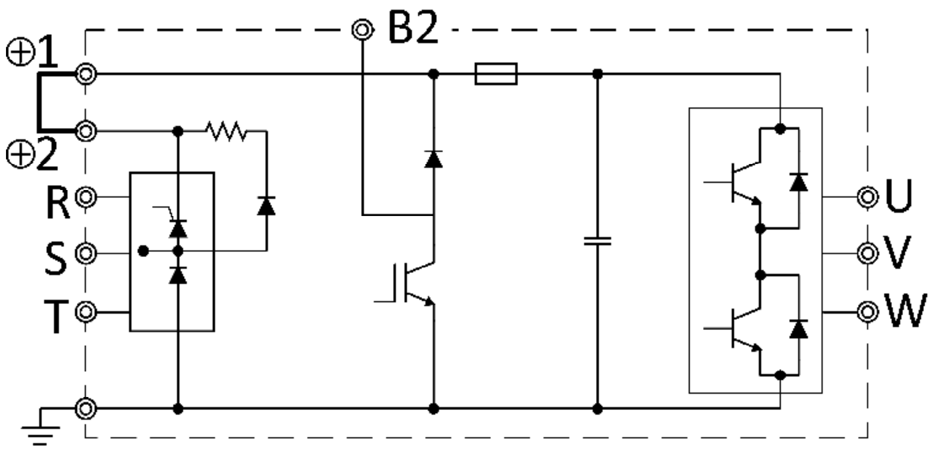
200V Series wiring table

Model	Rated KW	Horsepower	Wire diameter mm ²	Screw specification	MCCB rated Current (A)	Control line mm ²
20K4	0.4	0.5	2	M4	5	0.5 │ 1.25
20K7	0.75	1	2	M4	10	
21K5	1.5	2	2	M4	15	
22K2	2.2	3	2	M4	30	
24K0	4.0	5	3.5	M4	40	
25K5	5.5	7.5	8	M4	50	
27K5	7.5	10	14	M6	60	
2011	11	15	14	M6	100	
2015	15	20	22	M6	125	
2018	18.5	25	30	M6	150	
2022	22	30	38	M6	175	
2030	30	40	60	M6	225	
2037	37	50	80	M8	250	
2045	45	60	100	M8	300	
2055	55	75	80 × 2	M8	400	
2075	75	100	80 × 2	M10	450	
2090	90	125	100 × 2	M10	500	
2110	110	150	125 × 2	M10	550	

400V Series wiring table

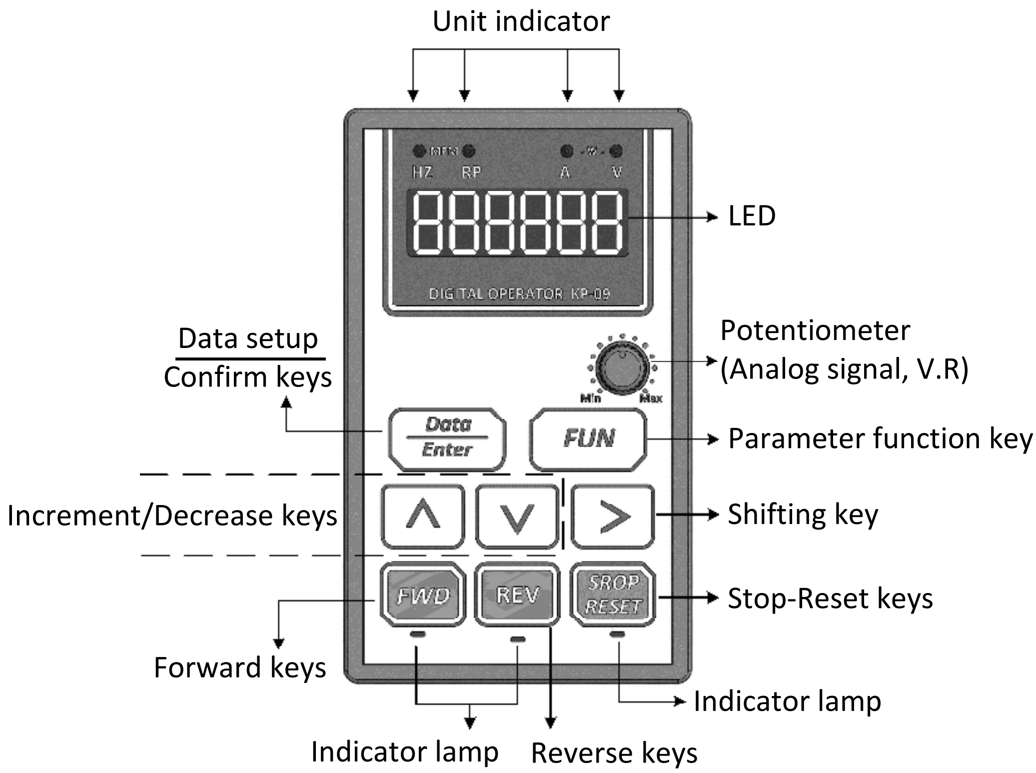
model	Rated KW	Horsepower	Wire diameter mm ²	Screw specification	MCCB rated Current (A)	Control line mm ²
40K7	0.75	1	2	M4	5	0.5 │ 1.25
41K5	1.5	2	2	M4	10	
42K2	2.2	3	2	M4	15	
44K0	4.0	5	3.5	M4	20	
45K5	5.5	7.5	3.5	M4	30	
47K5	7.5	10	5.5	M4	40	
4011	11	15	8	M6	50	
4015	15	20	14	M6	60	
4018	18.5	25	14	M6	75	
4022	22	30	14	M6	100	
4030	30	40	22	M6	125	
4037	37	50	30	M6	150	
4045	45	60	38	M8	175	
4055	55	75	60	M8	200	
4075	75	100	80	M8	225	
4090	90	125	150	M10	250	
4110	110	150	150	M10	275	
4132	132	175	200	M10	300	
4160	160	200	250	M10	350	
4185	185	250	125 × 2	M10	400	
4220	220	300	150 × 2	M10	450	
4260	260	350	80 × 4	M12		
4280	280	375	80 × 4	M12		
4315	315	425	80 × 4	M12		

4.5 Internal wiring diagram of the main circuit

<table>
<tr><th>200V Series 20K4 to 2011</th><th>400V Series 40K7 to 4011</th></tr>
<tr><td colspan="2">
</td></tr>
<tr><th>200V Series 2015 to 2055</th><th>400V Series 4015 to 4075</th></tr>
<tr><td colspan="2">
</td></tr>
<tr><th>200V Series 2015 to 2055 (With Brake circuit)</th><th>400V Series 4015 to 4075 (With Brake circuit)</th></tr>
<tr><td colspan="2">
</td></tr>
</table>

Chapter 5 Digital keypad operator

5.1 Position name of digital keypad operator



The function of digital keypad operator

It can perform functions such as operation, frequency setting, operation status monitoring, parameter setting, abnormal display, parameter storage and parameter copying.

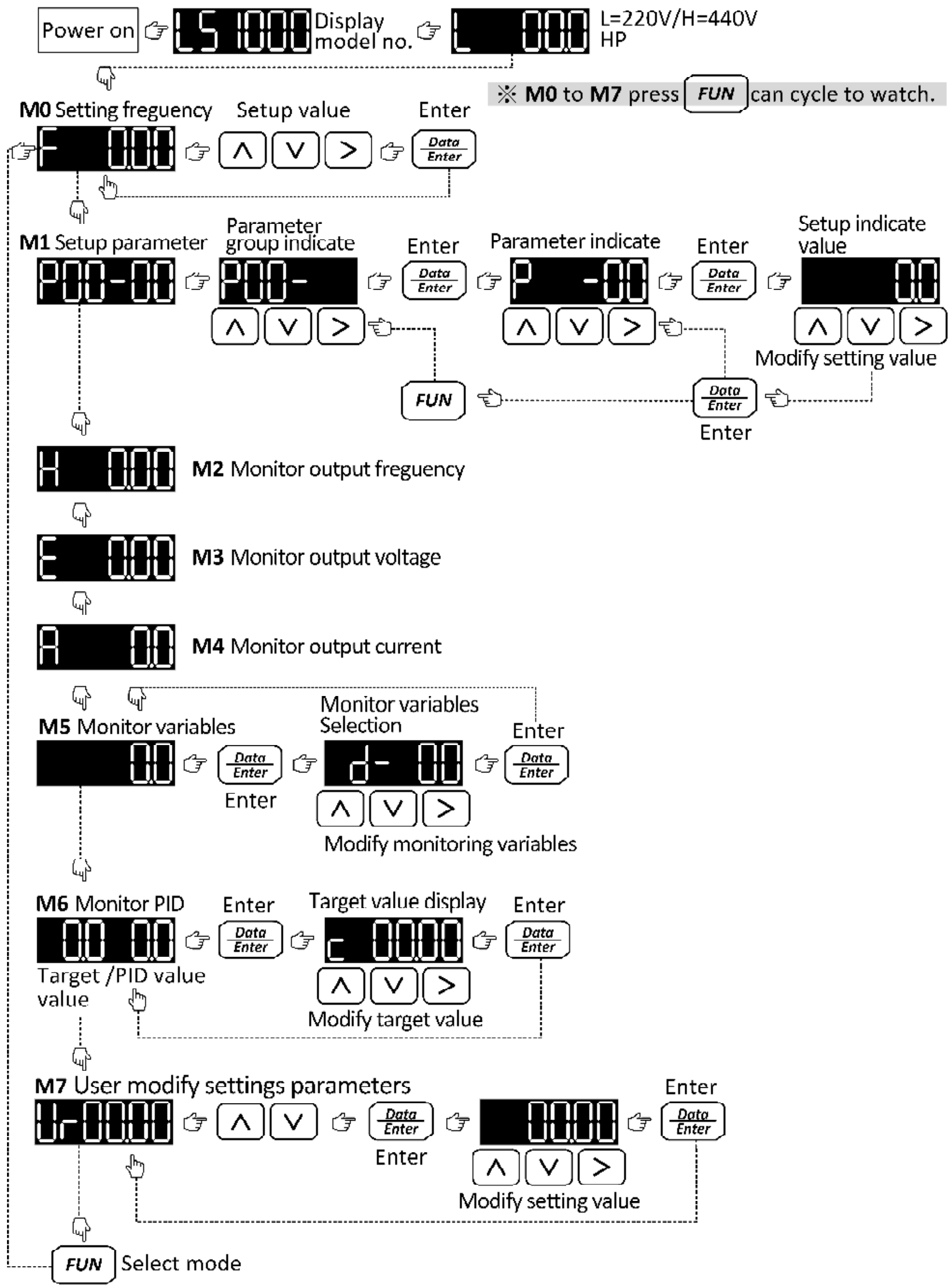
Parameter storage

When all the parameter values that have been confirmed and the test run has reached the required purpose, the content value will be automatically stored in the EEPROM of the DSP, Also it can be stored in the EEPROM of the digital keypad operator as a backup. Multiple identical models can copy these parameters for future use.

5.2 Overview of digital keypad operator

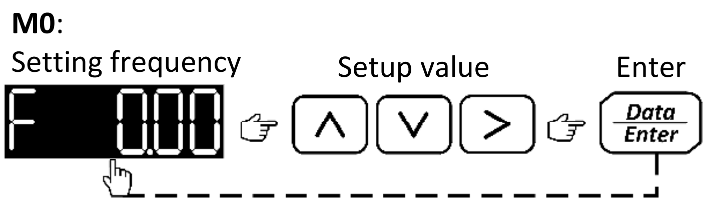
Parameters/Data Key	
Button	Function summary
FUN	Enter the mode to cycle the display key.
Data / Enter	To read, and write parameter settings.
	To confirm and enter data, and save the data at DSP (interior of EEPROM) automatically.
Shift/increment and decrement keys	
>	To move the position of flashing cursor rightward to select the place for data entry.
∧	Parameter group, parameter code, setting value, etc., increase the value.
∨	Parameter groups, parameter codes, setting values, etc., are decremented.
Operation command key	
FWD	Use the operator to execute the forward rotation command and light up the LED indicator.
	When the steering limit does not execute the forward rotation command, it is the function key for the stop operation command.
REV	Use the manipulator to execute the reversing operation command and illuminate the LED light to indicate.
	When the steering limit does not execute the reverse command, it is the function key to stop the running command.
STOP RESET	Carry out the stop operation command, and light up the LED indicator.
	When an abnormality occurs, it is used as an abnormal reset key.
Speed command	
	Keypad operator the AV (V.R, Potentiometer) of the speed control.

5.3 Operation process of digital keypad operator

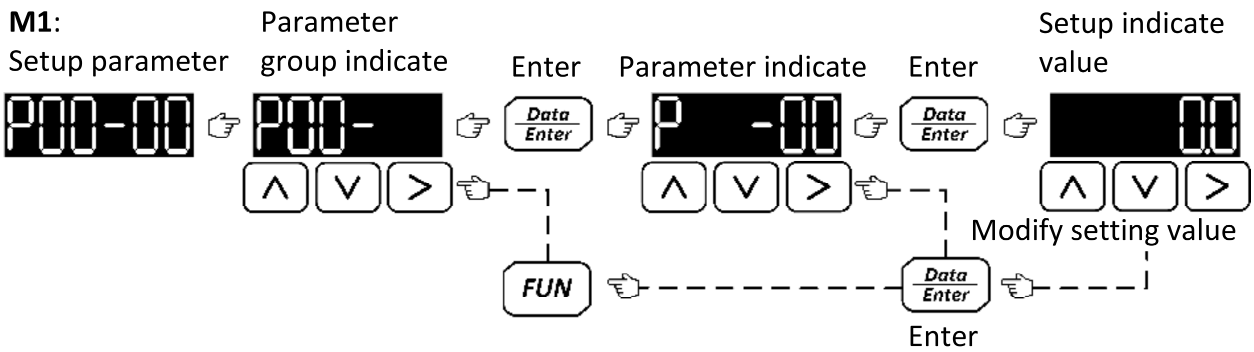


Mode 0: Set frequency

📖 Parameter P03-02, P03-03 = 0 only when there is action. ※P21-45

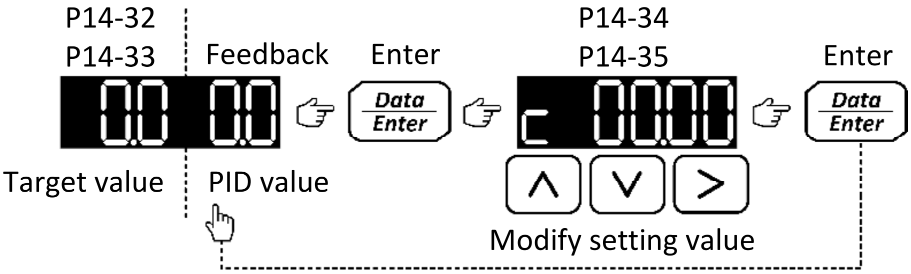


Mode 1: Parameter setting



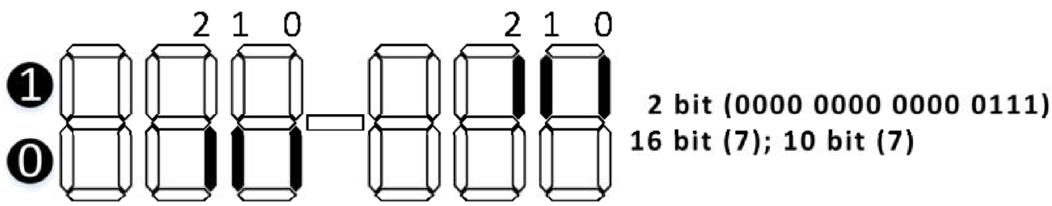
Mode 6: Monitor PID

📖 When parameter P14-00 ≠ 0, display target value and PID value.



Mode 7: User modify settings parameters

📖 P22-32: User modify settings or define parameter setting mode.

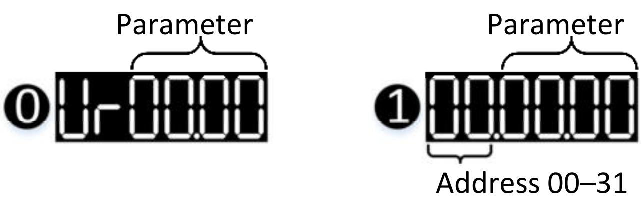


0: **M7** (User modify settings parameters) ⓿: Not Display ❶: Display

1: User modify settings or define parameters address (P22-00 to P22-31)

⓿: Do not update ❶: Update

2: Display ⓿: Ur ❶: 00–31 (Address)



Chapter 6 Test Run

6.1 Safety precautions

DANGER	**DANGER** **To prevent electric shock,** do not perform wiring work while the power is on. Otherwise, there is a danger of electric shock.

WARNING	**WARNING** ☑ Do not operate with the inverter cover removed, otherwise there is a danger of electric shock. ☑ To illustrate the details of the product, the illustrations in this manual are sometimes the status of removing the cover or safety cover. Always carry the inverter in accordance with the instruction manual while the specified cover or cover is installed. ☑ Do not remove the cover of the inverter or touch the printed circuit board when the power is on. Otherwise, there is a danger of electric shock. ☑ If you need to use the brake, please prepare separately. ☑ In an emergency, when the power is off, or when the inverter fails, please use the external sequence controller to ensure the brake is tightened. Otherwise, there is a risk of injury. ☑ When using the elevator, please take safety measures to prevent falling on the machine side. Otherwise, there is a risk of injury. ☑ Avoid electric shock! The internal DC capacitor of the inverter will not be discharged until 5 minutes after the power is removed. Please disassemble or inspect it 5 minutes after the power is removed. Wait 15 minutes for 15HP or more.

6.2 Commissioning operation

Be sure to confirm the following items before turning on the power.

Confirmation of power supply voltage
🕮 Please confirm that the power supply voltage is correct. 200V class: three-phase AC 200–240V, 50/60Hz. 400V class: three-phase AC 380–480V, 50/60Hz. 🕮 Please connect the power input to terminals R. S. T. 🕮 Confirm that the inverter and motor are properly grounded.
Confirm the connection between the inverter output terminal and the motor terminal
🕮 Make sure that the inverter output terminals (the U. V. W) and a motor terminal (the U. V. W) is the connection secure. 🕮 Reverse wiring between input and output is prohibited.
Confirm the connection with the inverter control circuit terminal
🕮 Please confirm whether the connection between the control circuit terminals of the inverter and other control devices is firm.
Confirmation of inverter control terminal status
🕮 Please confirm whether all the inverter control circuit terminals are in the OFF state (the inverter is not running).
Confirmation of load status
🕮 Please confirm whether the motor is in no-load state (the state is not connected to the mechanical system).

Commissioning:

- At the factory, the drive is set to open circuit V/F control mode, the operation control method is a digital operator, and the frequency command source is the incremental and decreasing key setting control P03-08 (Frequency instruction 0).

Please follow the steps below for trial operation:

1. Turn on the power.
2. Confirmation display state display target frequency value (F ××.××).
3. Enter operation control mode (Press FWD key, enter into forward operation control).
4. Input speed command. (The operator of the increment, decrement key to set the frequency values controlled to 20Hz within test run.)
5. Press the STOP button, the motor deceleration to stop.

Inspection items during operation:

- Whether the motor is running in the correct direction. (For example, when the direction of the motor is wrong, turn off the power, and after the display subtitle disappears, adjust any two of the motor cables to change the direction of motor rotation. Or set the parameter P01-21: UVW output phase sequence setting)
- Is the motor running smoothly?
- Does the motor vibrate abnormally?
- Are acceleration and deceleration smooth?
- Is the three-phase load current normal? (During operation, press the (FUN) key for cycling display to monitor voltage, current... and other data.)

6.3 Auto tuning

- **Vector control**, automatic adjustment of the motor parameters must be implemented before running.
- Rotary automatic adjustment (P01-07 = 2, 3) must be performed when the motor is disconnected from the machine.
- Since the automatic adjustment requires about 1 minute of automatic operation, please do not perform automatic adjustment when the motor elevator system is integrated.

Important:

When the motor cannot be separated from the machine, please set P01-07 = 1 (no running electrical parameter detection). When performing automatic adjustment, the frequency inverter the device will energize the motor when the motor is stopped, and automatically determine the required motor data.

Auto tuning related parameter settings:

IM; SVC (Induction motor; Sensorless vector control).

NO.	Item	Range	N
P01-03	Motor selection	0–3	0
0: IM1 Induction motor			
P01-09	Parameter detection-cceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-10	Parameter detection-eceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-04	IM1 control mode setting	0–3	1
1: Sensorless vector control (SVC)			
P02-00	Operation command source 1	0–3	N
0: Digital operator (keypad operator) 1: External control terminal (Di) 2: RS485 communication 3: Main frequency command (except frequency command 0)			
P10-13	IM1 rated line voltage	230: 100–250.0V 460: 200–500.0V	N
P10-14	IM1 rated line current	25.0–135.0%	N
P10-15	IM1 rated frequency	10.00–150.00Hz	N
P10-16	IM1 rated speed	0–9000rpm	N
P10-17	IM1 rated capacity	0.1–1000.0HP	N
P10-18	IM1 pole number	2–48P	N
P10-36	M1-Mechanical constant	0–30000	N
The recommended setting value is between 700 and 1000. When the motor rotor is small or the load is light, this value can be appropriately lowered.			
P01-07	Motor-Auto tuning parameter	0–3	2
2: With operation-electrical parameter detection			

Note: N is according to different needs, specifications, capacity for different of related settings.

IM; FOCPG (induction motor; closed loop vector control).

NO.	Item	Range	N
P01-03	Motor selection	0–3	0
0: IM1 Induction motor			
P01-09	Parameter detection-acceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-10	Parameter detection-deceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-31	Encoder type	0–6	N
0: No feedback 1: ABZ 2: PG-5012B 3: PG-4096-A 4: Reserved 5: AB phase, A: pulse wave, B: direction (2 times resolution) 6: AB phase, A: pulse wave, B: direction (1 times resolution)			
P01-32	Encoder pulse number/revolution	1–16384 p/rev	N
P01-04	IM1 control mode setting	0–3	3
3: Vector + PG control (FOCPG)			
P02-00	Operation command source 1	0–3	N
0: Digital operator (keypad operator) 1: External control terminal (Di) 2: RS485 communication 3: Main frequency command (except frequency command 0)			
P10-13	IM1 rated line voltage	230: 100–250.0V 460: 200–500.0V	N
P10-14	IM1 rated line current	25.0–135.0%	N
P10-15	IM1 rated frequency	10.00–150.00Hz	N
P10-16	IM1 rated speed	0–9000rpm	N
P10-17	IM1 rated capacity	0.1–1000.0HP	N
P10-18	IM1 pole number	2–48P	N
P10-36	M1-Mechanical constant	0–30000	N
The recommended setting value is between 700 and 1000. When the motor rotor is small or the load is light, this value can be appropriately lowered.			
P01-07	Motor-Auto tuning parameter	0–3	2
2: With operation-electrical parameter detection			

Note: N is according to different needs, specifications, capacity for different of related settings.

PM/SRM; FOCPG (synchronous motor; closed loop vector control).

NO.	Item	Range	N
P01-03	Motor selection	0–3	1, 2
1: PM (BLDC) Synchronous motor 2: SRM synchronous reluctance motor 3: PMA-SRM magnetic reluctance motor			
P01-09	Parameter detection-acceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-10	Parameter detection-deceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-31	Encoder type	0–6	N
0: No feedback 1: ABZ 2: PG-5012B 3: PG-4096-A 4: Reserved 5: AB phase, A: pulse wave, B: direction (2 times resolution) 6: AB phase, A: pulse wave, B: direction (1 times resolution)			
P01-32	Encoder pulse number/revolution	1–16384 p/rev	N
P01-06	PM/SRM control mode setting	0–1	1
1: Vector + PG control (FOCPG-PM/SRM)			
P02-00	Operation command source 1	0–3	N
0: Digital operator (keypad operator) 1: External control terminal (Di) 2: RS485 communication 3: Main frequency command (except frequency command 0)			
P12-01	PM/SRM rated line voltage	220: 50–250.0V 460: 100–500.0V	N
P12-02	PM/SRM rated line current	25.0–135.0%	N
P12-03	PM/SRM rated speed	0–10000rpm	N
P12-04	PM/SRM rated capacity	0.1–1000.0HP	N
P12-05	PM/SRM pole number	2–60P	N
P10-36	M1-Mechanical constant	0–30000	N
The recommended setting value is between 700 and 1000. When the motor rotor is small or the load is light, this value can be appropriately lowered.			
P01-07	Motor-Auto tuning parameter	0–3	2
2: With operation-electrical parameter detection			

Note: N is according to different needs, specifications, capacity for different of related settings.

PM/SRM; SVC (synchronous motor; Sensorless vector control)

NO.	Item	Range	N
P01-03	Motor selection	0–3	1, 2
1: PM (BLDC) Synchronous motor 2: SRM synchronous reluctance motor 3: PMA-SRM magnetic reluctance motor			
P01-09	Parameter detection-acceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-10	Parameter detection-deceleration time (0.0–6000.0)	0.00–600.00sec	N
P01-06	PM/SRM control mode setting	0–1	0
0: Sensorless vector control (SVC-PM/SRM)			
P02-00	Operation command source 1	0–3	N
0: Digital operator (keypad operator) 1: External control terminal (Di) 2: RS485 communication 3: Main frequency command (except frequency command 0)			
P12-01	PM/SRM rated line voltage	220: 50–250.0V 460: 100–500.0V	N
P12-02	PM/SRM rated line current	25.0–135.0%	N
P12-03	PM/SRM rated speed	0–10000rpm	N
P12-04	PM/SRM rated capacity	0.1–1000.0HP	N
P12-05	PM/SRM pole number	2–60P	N
P10-36	M1-Mechanical constant	0–30000	N
The recommended setting value is between 700 and 1000. When the motor rotor is small or the load is light, this value can be appropriately lowered.			
P01-07	Motor-Auto tuning parameter	0–3	2
2: With operation-electrical parameter detection			

Note: N is according to different needs, specifications, capacity for different of related settings.

Auto tuning steps

1. First set the above auto tuning related parameter settings.
2. **P01-07 = 1 (No operation (static)-electrical parameter detection):**
   a. The motor will have a static excitation test for about 1 minute.
   b. After running, the digital operator will display “donE” 

   P01-07 = 2 (with operation-electrical parameter detection):
   a. The motor will have a static excitation test for about 1 minute.
   b. Then perform motor operation type to detect inductance, leakage inductance, mutual inductance, induced voltage, etc.
   c. After the detection is completed, the digital operator will display “donE” 

   With PG card (encoder)
   P01-07 = 3 (Mechanical parameter detection (only vector + PG control is valid)):
   a. Execute the program with P01-07 = 1 or 2 first.
   b. Execute P01-07 = 3 again.
   c. The motor starts to run automatically.
   d. After the detection is completed, the digital operator will display “donE” 

3. Give a run command.
4. P01-11, according to the selected motor (IM1, IM2, PM), will display that the detection is complete.
5. After completion, parameter P01-07 will automatically change to 0.

🕮 When auto tuning is executed for the first time, parameter P01-07 cannot execute mode 3 first, it needs to be executed first 2 and then execute 3, otherwise it will show fault code 39.
🕮 Except for the V/F control mode, it can be operated without the auto-tuning program. The other modes the auto-tuning procedure must be done for all modes, otherwise it will trip fault code 39.
🕮 When the auto-tuning has been executed correctly, the calculated motor parameters will be stored in the parameter group among P10, 11, 12 (motor parameters).
🕮 During auto-tuning, you can press the STOP button to stop the automatic adjustment program at any time.
🕮 When the auto-tuning failure occurs, there will be the following situations:
   ◊ Trip to fault code 39. nAut 

   ◊ P01-07 will not change to 0.
   ◊ P01-11 (parameter detection completion flag), the display is not completed.

Chapter 7 Parameter Description

7.1 Parameter Group

Group	Parameter items description
P00-00 to 02	●Boot display selection ●Monitor content selection
P00-03 to 04	●Unitless display setting
P01-00 to 01	●Inverter current display ●R. S. T (L1. L2. L3) input voltage
P01-02 to 03	●Parameters lock/reset ●Motor (IM, PM/SRM) setting
P01-04 to 10	●(IM, PM/SRM) Control mode setting ●Motor electrical parameter detection
P01-11 to 14	●Parameter detection completion flag ●IM magnetic field control
P01-15 to 17	●IM efficiency mode ●V/F oscillation suppression
P01-21 to 27	●UVW output phase sequence setting ●Carrier frequency, PWM modulation
P01-28 to 35	●Current bandwidth ●PG parameter setting
P02-00 to 08	●Operation command source setting ●Start method
P02-11 to 17	●Stop mode
P03-00 to 04	●Frequency command source setting ●Restriction of running direction
P03-05 to 23	●Upper and lower frequency limit ●Multi-speed instruction
P03-24 to 28	●Inching instructions ●Jump frequency
P03-29 to 32	●Disturbance jump ●Low load-high speed function
P04-00 to 15	●Acceleration and deceleration time ●S curve time
P04-16 to 18	●Automatic switching between acceleration and deceleration ●Stop speed selection
P05-00 to 34	●Analog signal input ●Analog signal output
P05-16 to 27	●AUX function setting ●Output function setting
P06-00 to 17	●Pulse (RP) input ●Pulse (MP) output
P07-00 to 17	●Digital input terminal ●Input function setting
P07-18 to 23	●Source of mechanical origin ●Return to origin position mode
P08-00 to 14	●Digital output terminal ●Output function setting
P09-00 to 06	●Automatic voltage regulator AVR ●Prevention of acceleration and deceleration stall
P09-07 to 16	●Motor overload protection ●Low torque and over torque detection
P09-17 to 21	●Instant restart ●Speed tracking
P09-22 to 26	●Current limit ●Over temperature protection
P09-28 to 30	●Fan start method ●PG disconnection detection
P09-31 to 36	●Over speed action ●Speed deviation

Group	Parameter items description
P10-00 to 12	•IM1-V/F curve setting •Output voltage limit
P10-13 to 31	•Motor rated parameters •Magnetic flux, Vector speed estimator
P10-32 to 35	•Slip gain •IM1 vector switching V/F control
P10-36 to 59	•IM, PM/SRM speed PI control (ASR) •Torque current (limit & control)
P11-00 to 12	•IM2-V/F curve setting •Output voltage limit
P11-13 to 31	•Motor rated parameters •Magnetic flux, Speed estimator
P11-32 to 35	•Slip gain •IM2 vector switching V/F control
P11-36 to 59	•IM2 speed PI control (ASR) •Torque current limit
P12-00 to 23	•PM motor rated parameters •Electrical angle detection
P12-24 to 29	•PM (PG) excitation current •Sensor-less low speed excitation current
P12-30 to 31	•Vector magnetic flux estimator •Vector speed estimator
P13-00 to 34	•Positioning mode •16-point positioning instruction
P13-35 to 47	•Communication positioning instructions •Positioning instructions, follow-up, time
P14-00 to 03	•PID control mode •PID feedback, differential feedback
P14-05 to 06	•Command acceleration and deceleration time •Feedback filter time
P14-07 to 18	•PID gain setting •Output upper and lower limits
P14-21 to 22	•PID output inversion selection •Output acceleration and deceleration time
P14-23 to 40	•PID Feedback signal loss, over-value detection •Flow/Pressure-automatic switching mode
P15-00 to 03	•Pump function •Sleep detection
P15-04 to 12	•Sleep standby •Low water pressure detection
P16-00 to 20	•Automatic program operation (Such as PLC programming) •16-segment operation programming
P17-00 to 10	•Abnormal restart •Abnormal (8 times) record
P17-11 to 31	•History when abnormal •In case of failure, cumulative operating hours
P18-00 to 02	•Transmission rate •ASCII, Modbus RTU communication settings
P18-03 to 12	•Out time processing mode •Communication monitoring content
P19-00 to 13	•Memory operation parameters before power off •Electrical angle, time, location
P20-00 to 13	•Load mode-HD, ND setting •Ex-factory setting parameters
P21-00 to 45	•Reserved area for parameter function
P22-00 to 32	•User modify settings or define parameters (Ur)

7.2 Parameter List Table

★: Indicates that it can be written during operation.

P00 Display parameter group			
NO./Hex	Description	Range	Default
P00-00 000H	Boot display screen selection	0–7	0
0: Enter frequency setting (F) 1: Enter the parameter setting mode (P) 2: Display operating frequency (H) 3: Display output voltage (E) 4: Display operating current (A) 5: Display monitoring content (P00-01) 6: Display PID monitoring value 7: Display user setting parameters (Ur), only for P22-32 Bit 0 = 1			
P00-01 001H/★	Monitoring operation content selection	0–57	0

Signed Numbers (–32768 to 32767), not marked as (0–65535)

No	Content	RS485	HEX
–	–	Abnormal warning code	2100
–	–	Operating status	2101
–	–	Setting frequency (0.01Hz)	2102
–	–	Output frequency (0.01Hz)	2103
–	–	Output voltage (0.1V)	2104
–	–	Output current (0.1A)	2105
00	DC Bus bar voltage (U) (0.1V)		2106
01	Input terminal status (I)		2107
02	Output terminal status (o)		2108
03	The knob on the AV digital operator (0.01%)	(Signed Numbers)	2109
04	AVI analog input command (0.01%)	(Signed Numbers)	210a
05	ACI analog input command (0.01%)	(Signed Numbers)	210b
06	AUX analog input command (0.01%)	(Signed Numbers)	210c
07	Ao1 analog output (0.01%)	(Signed Numbers)	210d
08	Ao2 analog output (0.01%)		210e
09	Pulse input (0.01%)	(Signed Numbers)	210f
10	Pulse output (0.01%)		2110
11	Display temperature (0.1°C)		2111
12	Display unitless 1 (reference frequency) (U)		2112
13	Display unitless 2 (actual speed) (U)		2113
14	Encoder speed (rpm)	(Signed Numbers)	2114
15	Estimated speed (rpm)	(Signed Numbers)	2115
16	PID command/feedback value display (P14-32, P12-33)		–
17	PID command amount display value (P14-34, P14-35)	(Signed Numbers)	2117
18	PID feedback amount display value (P14-34, P14-35)	(Signed Numbers)	2118

No	Content	HEX
19	PID error display value (P14-34, 14-35) (Signed Numbers)	2119
20	PID control output amount (0.01%) (Signed Numbers)	211a
21	U phase operating current (0.1A)	211b
22	V phase operating current (0.1A)	211c
23	W phase operating current (0.1A)	211d
24	Output power for motor (0.01%) (Signed Numbers)	211e
25	Automatic program operation (xxxx times . xx section)	211f
26	Di pulse wave input count value (c)	2120
27	PT100 temperature (0.1°C)	2121
28	Encoder Z count	2122
29	Encoder AB count	2123
30	Reading value of resolver 5012B	2124
31	Encoder Z pulse number	2125
32	Motor (mechanical) origin angle ((31) – P13-44)	2126
33	Positioning point command value (revolution)	2127
34	Positioning point command value (pulse wave)	2128
35	Positioning point feedback value (revolution)	2129
36	Positioning point feedback value (pulse wave)	212a
37	Inverter model code display (L: 200V/H: 400V)	212b
38	Inverter rated current display (0.1A)	212c
39	Running motor display (0: PM/SRM; 1: IM1; 2: IM2)	212d
40	Parameter detection completion flag	212e
41	Positioning completed flag	212f
42	Torque current command (0.01% for Inv) (Signed Numbers)	2130
43	Torque current (0.01% for Inv) (Signed Numbers)	2131
44	PM electrical angle (0.1 degree)	2132
45	PM/SRM excitation angle (0.1 degree)	2133
46	Unitless display 3 (set frequency)	2134
47	Length integer (L _ xxxx cm)	2135
48	Length mantissa (l_ _ 0.xx cm)	2136
49	Length (L xxxx.x cm)	2137
50	Average speed (rpm): Calculation cycle (P21-16)	2138
51	Software version (**113.12**)	2139
52	Communication monitoring variable 1	213a
53	Communication monitoring variable 2	213b
54	Communication monitoring variable 3	213c
55	Communication monitoring variable 4	213d
56	Communication monitoring variable 5	213e
57	Communication monitoring variable 6	213f

58–70: Reserved

NO./Hex	Description	Range	Default
P00-02 002H/★	Monitoring content filtering time	0–13	6
P00-03 003H/★	Unitless display corresponding value	1–60000	18000
P00-04 004H/★	Unitless display decimal point	0–3	1

★: Indicates that it can be written during operation.

P01 Basic control parameter group			
NO./Hex	Description	Range	Default
P01-00 005H	Inverter rated current display (Read only)	2.0–2000.0A	#####
P01-01 006H	RST Input voltage	230V: 150–250V 460V: 300–500V	220.0 440.0
P01-02 007H	Parameter lock/Reset settings	0–19	0

Item	Display
00: Read/write mode of all parameter values	–
01: All parameter values are read only mode	–
02: Reset all parameters to 2-wire type, but the motor parameter group is not called back	dEF_02 donE
03: Reset all parameters to 3-wire type, but the motor parameter group is not called back	dEF_03 donE
04: Reset all parameters to 2-wire 220/440V	dEF_04 donE
05: Reset all parameters to 3-wire 220/440V	dEF_05 donE
06: Reset all parameters to 2-wire 200/415V	dEF_06 donE
07: Reset all parameters to 3-wire 200/415V	dEF_07 donE
08: Reset all parameters to 2-wire 200/380V	dEF_08 donE
09: Reset all parameters to 3-wire 200/380V	dEF_09 donE
10: Copy parameters from the digital operator EEPROM 0 to the control board EEPROM	LoAd0 donE
11: Save all parameters to the digital operator EEPROM 0	CoPY0 donE
12: Save all parameters to the EEPROM of the control board	CoPY donE
13: Clear abnormal history	–
14: Copy parameters from the digital operator EEPROM 1 to the control board EEPROM	LoAd1 donE
15: Save all parameters to the digital operator EEPROM 1	CoPY1 donE
16: Copy parameters from the digital operator EEPROM 2 to the control board EEPROM	LoAd2 donE
17: Save all parameters to the digital operator EEPROM 2	CoPY2 donE
18: Copy parameters from the digital operator EEPROM 3 to the control board EEPROM	LoAd3 donE
19: Save all parameters to the digital operator EEPROM 3	CoPY3 donE
20: Copy all parameters to the control board EEPROM 1	LoAd4 donE
21: Store all parameters to the control board EEPROM 1	CoPY4 donE

NO./Hex	Description	Range	Default
P01-03 008H	Motor selection	0–3	0
0: IM1 induction motor 1: PM (BLDC) synchronous motor 2: SRM synchronous reluctance motor 3: PMA-SRM magnetic reluctance motor			
P01-04 009H	IM1 control mode setting	0–3	0
0: V/F control (V/F) 1: Sensorless vector control (SVC) 2: V/F + PG control (V/FPG) 3: Vector + PG control (FOCPG)			
P01-05 00AH	IM2 control mode setting	0–1	0
0: V/F control (V/F) 1: Sensorless vector control (SVC)			
P01-06 00BH	PM/SRM control mode setting	0–1	0
0: Sensorless vector control (SVC-PM/SRM) 1: Vector + PG control (FOCPG-PM/SRM)			
P01-07 00CH	Motor parameter auto tuning function	0–3	0

Item	Display
0: No auto tuning function	–
1: Static operation-electrical parameter auto tuning	Auto1 End
2: Dynamic operation-electrical parameter auto tuning	Auto2 End
3: Mechanical parameter auto tuning (Only vector + PG control is valid)	donE

NO./Hex	Description	Range	Default
P01-08 00DH	Mechanical parameter detection current setting	0.250–1.000pu	0.400
P01-09 00EH/★	Parameter detection-acceleration time ※P04-00	0.00–6000.0sec	10.0
P01-10 00FH/★	Parameter detection-deceleration time ※P04-00	0.00–6000.0sec	10.0
P01-11 010H	Parameter detection complete flag	0–7	0
P01-12 011H	IM magnetic field loop bandwidth	10.0–200.0 rad/s	25.0
P01-13 012H	IM magnetic field control start frequency	0.001–1.000pu	0.050
P01-14 013H	Magnetic braking energy setting during IM deceleration	0.0–60.0%	0.0
P01-15 014H	IM energy saving efficiency control mode	0–2	0
0: Invalid 1: Effective 2: Enable by external terminal			

NO./Hex	Description	Range	Default
P01-16 015H	IM efficiency control allowable level	40.0–100.0%	100.0
P01-17 016H/★	IM V/F oscillation suppression factor	0.0–100.0%	15.0
P01-18 017H	IM V/F fe < fe0 voltage output mode	0–3	2
0: No output 1: Ratio output 2: Output with V0 (Set V0 according to parameter P10-10, P11-10) 3: Perform DC braking (P02-13)			
P01-19 018H/★	IM V/F torque compensation gain	0.00–100.00%	5.00
P01-20 019H	IM V/F Set voltage gain	0–5	0
0: Invalid 1: AV The knob on the digital operator (AV) 2: AVI analog signal –10 to 10V input 3: ACI analog signal 4–20mA/0–10V input 4: AUX analog isolation signal –10 to 10V input 5: Pulse input (P06-00)			
P01-21 01AH	UVW output phase sequence setting	0–1	0
0: UVW 1: UWV			
P01-22 01BH	Carrier frequency upper limit	1000–15000Hz	#####
P01-23 01CH	Carrier frequency upper limit turning point	0.00–400.00Hz	60.00
P01-24 01DH	Carrier frequency lower limit	1000–15000Hz	#####
P01-25 01EH	Carrier frequency lower limit turning point	0.00 to P01-23 Hz	0.00
P01-26 01FH	PWM Overvoltage modulation	100.0–105.0%	100.0
P01-27 020H	PWM Modulation mode	0–2	0
0: Three-phase modulation 1: Two-phase modulation (6) 2: Two-phase modulation (12)			
P01-28 021H	Current loop bandwidth	0.0–1500.0 rad/s	1000.0
P01-29 022H	Current prediction compensation	0–1	1
0: Invalid 1: Effective			
P01-30 023H	Speed PI controller allowable saturation depth	0.00–50.00%	5.00

NO./Hex	Description	Range	Default
P01-31 024H	Encoder type	0–6	0
0: No feedback 1: ABZ 2: PG-5012B 3: PG-4096-A 4: Reserved 5: AB phase, A: pulse wave, B: direction (2 times resolution) 6: AB phase, A: pulse wave, B: direction (1 times resolution)			
P01-32 025H	Encoder-pulse number/revolution	1–16384 p/rev	1024
P01-33 026H	Encoder-direction setting	0–1	0
0: A leads B 1: B leads A			
P01-34 027H	Encoder-number of molecular gear ※V/F + PG	0–60000	0
P01-35 028H	Encoder-denominator gear ※V/F + PG	0–60000	0

★: Indicates that it can be written during operation.

P02 Control operation command source parameter group			
NO./Hex	Description	Range	Default
P02-00 029H	Operation command source 1	0–3	0
0: Digital operator (keypad operator) 1: External control terminal (Di) 2: RS485 communication 3: Main frequency command (except frequency command 0)			
P02-01 02AH	Operation command source 2	0–3	1
0: Digital operator (keypad operator) 1: External control terminal (Di) 2: RS485 communication 3: Main frequency command (except frequency command 0)			
P02-02 02BH	Keypad operator STOP button selection	0–1	1
0: The keyboard STOP key is invalid 1: The keyboard STOP key is valid			
P02-03 02CH	Start terminal operation command lock	0–1	0
0: Operable 1: Not working			
P02-04 02DH	Activate method	0–1	0
0: Start from 0Hz 1: Flying Re-start activation			
P02-05 02EH	DC braking time at start	0.00–120.00sec	0.00
P02-06 02FH/★	Brake current before starting	0.00–100.00%	30.00
P02-07 030H	When starting-dwell speed	0.00–400.00Hz	0.00
P02-08 031H	At start-dwell speed retention time	0.00–120.00sec	0.00
P02-09 032H/★	Positioning steady-state damping gain 1 (position)	10.00–100.00%	70.00
P02-10 033H/★	Positioning steady-state damping gain 2 (speed)	10.00–100.00%	70.00
P02-11 034H	Stop mode	0–3	0
0: Decelerate to stop 1: Free running stop 2: DC braking stops in all areas 3: Free running stop with timing function			
P02-12 035H	When stopping-DC braking time	0.00–120.00sec	0.00
P02-13 036H/★	Braking current before stopping	0.00–100.00%	30.00
P02-14 037H	Braking start frequency when stopping ※V/F	0.00–60.00Hz	0.00

NO./Hex	Description	Range	Default
P02-15 038H	When stopping-dwell speed	0.00–400.00Hz	0.00
P02-16 039H	When stopping-dwell speed retention time	0.00–120.00sec	0.00
P02-17 03AH	Current decrease time at shutdown (100%) ※P02-11= 0	0.00–10.00sec	0.00
P02-18 03BH	Reserved	0.00–120.00sec	0.30
P02-19 03CH	Main frequency command running level	0.00–100.00%	5.00

★: Indicates that it can be written during operation.

P03 Frequency (speed) command source parameter group			
NO./Hex	Description	Range	Default
P03-00 03DH	Frequency command source 1	0–8	0
0: Main speed calculator input S1 1: Main speed calculator input S2 2: Main speed calculator addition S1 + S2 3: Main speed calculator subtraction S1 – S2 4: Main speed calculator multiplication S1 × S2 5: Maximum value of main speed calculator Max {S1, S2} 6: Minimum value of main speed calculator Min {S1, S2} 7: AVI/ACI/AUX input (Choose 1 from 3, specify Di) 8: When the encoder is used as a frequency command (P21-38 = 1, Sensorless vector control)			
P03-01 03EH	Frequency command source 2	0–8	1
Same as P03-00.			
P03-02 03FH	Main speed calculator input S1	0–5	0
0: Frequency command 0 (P03-08) 1: Analog signal on AV digital operator 2: AVI analog signal (–10 to 10V) 3: ACI analog signal (4–20mA/0–10V) 4: AUX analog isolation signal (0–10V) 5: Pulse wave signal input (P06-00)			
P03-03 040H	Main speed calculator input S2	0–5	1
Same as P03-02.			
P03-04 041H	Rotation direction restriction	0–3	0
0: Forward and Reversed 1: Only forward 2: Only reversed 3: Negative bias can be reversed			
P03-05 042H	Output frequency lower limit setting * (fe4) (P10-01, P11-01)	0.00–100.00%	0.00
P03-06 043H	Output frequency upper limit setting * (fe4) (P10-01, P11-01)	0.00–100.00%	100.00
P03-07 044H	Start frequency	0.00–400.00Hz	0.00
P03-08 045H/★	Frequency command 0	0.00–400.00Hz	60.00
P03-09 046H/★	Frequency command 1	0.00–400.00Hz	0.00
P03-10 047H/★	Frequency command 2	0.00–400.00Hz	0.00
P03-11 048H/★	Frequency command 3	0.00–400.00Hz	0.00
P03-12 049H/★	Frequency command 4	0.00–400.00Hz	0.00

NO./Hex	Description	Range	Default
P03-13 04AH/★	Frequency command 5	0.00–400.00Hz	0.00
P03-14 04BH/★	Frequency command 6	0.00–400.00Hz	0.00
P03-15 04CH/★	Frequency command 7	0.00–400.00Hz	0.00
P03-16 04DH/★	Frequency command 8	0.00–400.00Hz	0.00
P03-17 04EH/★	Frequency command 9	0.00–400.00Hz	0.00
P03-18 04FH/★	Frequency command 10	0.00–400.00Hz	0.00
P03-19 050H/★	Frequency command 11	0.00–400.00Hz	0.00
P03-20 051H/★	Frequency command 12	0.00–400.00Hz	0.00
P03-21 052H/★	Frequency command 13	0.00–400.00Hz	0.00
P03-22 053H/★	Frequency command 14	0.00–400.00Hz	0.00
P03-23 054H/★	Frequency command 15	0.00–400.00Hz	0.00
P03-24 055H/★	Jogging frequency command	0.00–400.00Hz	6.00
P03-25 056H	Frequency skip 1	0.00–400.00Hz	0.00
P03-26 057H	Frequency skip 2	0.00–400.00Hz	0.00
P03-27 058H	Frequency skip 3	0.00–400.00Hz	0.00
P03-28 059H	Frequency skip width	0.00–10.00Hz	0.00
P03-29 05AH	Disturbance skipping frequency	0.00–400.00Hz	0.00
P03-30 05BH	Disturbance frequency width	0.00–10.00Hz	0.00
P03-31 05CH	Low load-high speed function ※P03-09	1.000–4.000	0.000
P03-32 05DH	Low load current level ※P01-00	0.00–100.00%	50.00

★: Indicates that it can be written during operation.

P04 Acceleration and deceleration time parameter group			
NO./Hex	Description	Range	Default
P04-00 05EH	Acceleration and deceleration time unit	0–1	1
0: 0.01sec 1: 0.1sec			
P04-01 05FH/★	Acceleration time 0 ※P04-00	0.00–6000.0sec	10.0
P04-02 060H/★	Deceleration time 0 ※P04-00	0.00–6000.0sec	10.0
P04-03 061H/★	Acceleration time 1 ※P04-00	0.00–6000.0sec	10.0
P04-04 062H/★	Deceleration time 1 ※P04-00	0.00–6000.0sec	10.0
P04-05 063H/★	Acceleration time 2 ※P04-00	0.00–6000.0sec	10.0
P04-06 064H/★	Deceleration time 2 ※P04-00	0.00–6000.0sec	10.0
P04-07 065H/★	Acceleration time 3 ※P04-00	0.00–6000.0sec	10.0
P04-08 066H/★	Deceleration time 3 ※P04-00	0.00–6000.0sec	10.0
P04-09 067H/★	Jogging, Return to origin acceleration time ※P04-00	0.00–6000.0sec	5.0
P04-10 068H/★	Emergency stop, Jogging, Return to origin deceleration time ※P04-00	0.00–6000.0sec	2.0
P04-11 069H	Multi-speed-acceleration and deceleration configuration	0–2	0
0: All internal configuration 1: Half of internal configuration (0–7), half of external terminals (8–15) 2: All external terminals (Di control)			
P04-12 06AH	S curve time at the start of acceleration	0.00–10.00sec	0.00
P04-13 06BH	S curve time at the end of acceleration	0.00–10.00sec	0.00
P04-14 06CH	S curve time at the start of deceleration	0.00–10.00sec	0.00
P04-15 06DH	S curve time at the end of deceleration	0.00–10.00sec	0.00
P04-16 06EH	Acceleration and deceleration time 3-switching frequency	0.00–400.00Hz	0.00
P04-17 06FH	Stop speed selection ※1 (P03-09) to 15 (P03-23)	1–15	0
P04-18 070H/★	Stop speed deceleration time ※P04-00	0.00–6000.0sec	10.0
P04-19 071H/★	Current stall deceleration time ※P04-00 ※P09-03, 04, 06	0.00–6000.0sec	3.0

★: Indicates that it can be written during operation.

P05 Analog signal input parameter group			
NO./Hex	Description	Range	Default
P05-00 072H	Keypad operator AV: 0V input	–300.00 to 300.00%	0.00
P05-01 073H	Keypad operator AV: 5V input	–300.00 to 300.00%	100.00
P05-02 074H	AVI –10V input	–300.00 to 300.00%	–100.00
P05-03 075H	AVI 10V input	–300.00 to 300.00%	100.00
P05-04 076H	AVI input dead band	0.00–85.00%	1.00
P05-05 077H	AVI output zero point	0.00–50.00%	0.00
P05-06 078H	AVI output maximum	0.00–100.00%	100.00
P05-07 079H	AVI filter time	0.000–3.000sec	0.200
P05-08 07AH	ACI input mode	0–3	0
0: 4–20mA ；1: 0–10V ⇨ sample rate: 1KHz 2: 4–20mA (fast) ；3: 0–10V (fast) ⇨ sample rate: 5KHz			
P05-09 07BH	ACI 0V/4mA input	–300.00 to 300.00%	0.00
P05-10 07CH	ACI 10V/20mA input	–300.00 to 300.00%	100.00
P05-11 07DH	ACI input dead band	0.00–85.00%	1.00
P05-12 07EH	ACI output zero point	0.00–50.00%	0.00
P05-13 07FH	ACI output maximum	0.00–100.00%	100.00
P05-14 080H	ACI filter time	0.000–3.000sec	0.200
P05-15 081H	ACI disconnection detection	0–3	0
0: No detection 1: Free run to stop 2: Decelerate to stop 3: Keep running at the frequency before disconnection			
P05-16 082H	AUX function selection	0–9	0
0: No function 1: Output frequency upper limit (10.0–100.0%) 2: Output voltage bias ※V/F 3: Acceleration and deceleration time shortening factor (0.10–1.00) 4: DC braking current (0.0–100.0%) 5: Over torque detection level (30.0–200.0%) 6: Stall prevention level during operation (30.0–200.0%)			

NO./Hex	Description	Range	Default
7: Lower limit of frequency command 8: PT100 temperature protection input (OH3) 9: Torque control speed limit (P10-58, P11-58)			
P05-17 083H	AUX –10V input gain setup	–300.00 to 300.00%	–100.00
P05-18 084H	AUX 10V input gain setup	–300.00 to 300.00%	100.00
P05-19 085H	AUX input dead band	0.00–85.00%	1.00
P05-20 086H	AUX output zero point	0.00–50.00%	0.00
P05-21 087H	AUX output maximum limit	0.00–100.00%	100.00
P05-22 088H	AUX filter time	0.000–3.000sec	0.200
P05-23 089H/★	PT100 zero point correction	–10.0 to 10.0°C	0.0
P05-24 08AH/★	PT100 gain correction	90.00–110.00%	100.00
P05-25 08BH	Reserved	0–65535	0
P05 Analog signal output parameter group			
P05-26 08CH	AO1 output form	0–3	0
0: –10 to 10V 1: 0 to 10V (Absolute value) 2: 0 to 10V (Negative is 0V) 3: –10 to 0V (Positive is 0V)			
P05-27 08DH/★	AO1 function selection	0–30	1
00: Frequency command (Frequency upper limit) 01: Reference output frequency (Frequency upper limit) 02: Output frequency (Upper limit of frequency) 03: Encoder speed (Upper limit of frequency) 04: Estimated speed (Upper limit of frequency) 05: DC voltage (200V = 500Vdc/400V = 1000Vdc) 06: Output voltage (2 times RST input voltage rms) 07: Excitation voltage (2 times RST input voltage rms) 08: Torque voltage (2 times RST input voltage rms) 09: Output current (2 times the rated current of the drive) 10: Excitation current command (2 times motor rated current) 11: Torque current command (2 times motor rated current) 12: Excitation current (2 times the rated current of the motor) 13: Torque current (2 times the rated current of the motor) 14: Output power (Rated power of motor) 15: AV (100.00%) 16: AVI (100.00%) 17: ACI (100.00%) 18: AUX (100.00%)			

NO./Hex	Description	Range	Default
19: Pulse signal input (100.00%) 20: PID feedback amount (100.00%) 21: PID error amount (100.00%) 22: PID control output (100.00%) 23: Communication command for output (Write to communication address: AO1 = 2002h; AO2 = 2003h) 24–30: Reserved			
P05-28 08EH/★	AO1 output zero point	–1.000 to 1.000V	0.000
P05-29 08FH/★	AO1 output positive gain	0.00–300.00%	100.00
P05-30 090H/★	AO1 output negative gain	0.00–300.00%	100.00
P05-31 091H	AO2 output form	0–5	0
0: 0–10V (Absolute value) 1: 0–10V (Negative is 0V) 2: 0–20mA (Absolute value) 3: 0–20mA (Negative is 0mA) 4: 4–20mA (Absolute value) 5: 4–20mA (Negative is 4mA)			
P05-32 092H/★	AO2 function selection	0–30	9
Same as P05-27.			
P05-33 093H/★	AO2 output zero point	–1.000 to 1.000V	0.000
P05-34 094H/★	AO2 output positive gain	0.00–300.00%	100.00
P05-35 095H	Reserved	0–65535	0

★: Indicates that it can be written during operation.

P06 Pulse (RP) signal input parameter group			
NO./Hex	Description	Range	Default
P06-00 096H	Pulse (RP) input type	0–1	0
0: Frequency type 1: Pulse width type			
P06-01 097H	Frequency type x = 0% corresponding frequency	1–30000Hz	100
P06-02 098H	Frequency type x = 100% corresponding frequency	1–30000Hz	10000
P06-03 099H	Pulse width type x = 0% corresponds to duty	1.00–99.00%	5.00
P06-04 09AH	Pulse width type x = 100% corresponds to duty	1.00–99.00%	95.00
P06-05 09BH	Pulse input x = 0% corresponds	–300.00 to 300.00%	0.00
P06-06 09CH	Pulse input x = 100% corresponding	–300.00 to 300.00%	100.00
P06-07 09DH	Pulse input filter time	0.000–3.000sec	0.500
P06-08 09EH	Reserved	0–65535	0
P06-09 09FH	Reserved	0–65535	0
P06-10 0A0H	Reserved	0–65535	0
P06 Pulse (MP) signal output parameter group			
P06-11 0A1H	Pulse wave (MP) output type	0–1	0
0: Frequency type 1: Pulse width type			
P06-12 0A2H/★	Pulse output selection	0–30	1
00: Frequency command (Frequency upper limit) 01: Reference output frequency (Frequency upper limit) 02: Output frequency (Upper limit of frequency) 03: Encoder speed (Upper limit of frequency) 04: Estimated speed (Upper limit of frequency) 05: DC voltage (200V = 500Vdc/400V = 1000Vdc) 06: Output voltage (2 times RST input voltage rms) 07: Excitation voltage (2 times RST input voltage rms) 08: Torque voltage (2 times RST input voltage rms) 09: Output current (2 times the rated current of the drive) 10: Excitation current command (2 times the rated current of the motor) 11: Torque current command (2 times the rated current of the motor) 12: Excitation current (2 times the rated current of the motor) 13: Torque current (2 times the rated current of the motor) 14: Output power (Rated power of motor)			

NO./Hex	Description	Range	Default
15: AV (100.00%) 16: AVI (100.00%) 17: ACI (100.00%) 18: AUX (100.00%) 19: Pulse signal input (100.00%) 20: PID feedback amount (100.00%) 21: PID error amount (100.00%) 22: PID control output amount (100.00%) 23: Communication command as output (Write communication address = 2004h) 24–28: Reserved 29: Feedback at zero speed (NO) 30: Feedback at zero speed (NC)			
P06-13 0A3H	Frequency type 0% corresponds to frequency	1–30000Hz	100
P06-14 0A4H	Frequency type 100% corresponding frequency	1–30000Hz	10000
P06-15 0A5H	Pulse width type 0% corresponds to duty	1.00–99.00%	5.00
P06-16 0A6H	Pulse width type 100% corresponding to duty	1.00–99.00%	95.00
P06-17 0A7H	Pulse width type fundamental frequency (P06-15, P06-16)	1–30000Hz	2000
P06-18 0A8H	The range of feedback rotation speed at zero speed	0–20rpm	2
P06-19 0A9H	Reserved	0–65535	0
P06-20 0AAH	Reserved	0–65535	0

★: Indicates that it can be written during operation.

P07 Multifunction digit (Di) input parameter group			
NO./Hex	Description	Range	Default
P07-00 0ABH	Digital input terminal scan time	1–1000ms	2
P07-01 0ACH	Digital input Di10 to Di1 logic setting	0–1023	0
P07-02 0ADH	Di1, Di2 settings	0–4	0
0: Di1: Forward/stop; Di2: Reverse/stop 1: Di1: Run/stop; Di2: Forward/Reverse 2: Three-wire type: Di1 (Run), Di2 (Stop), Di3 (Reverse/Forward) 3: Di1: Forward/stop; Di2: General function 4: Di1: General function; Di2: General function			
P07-03 0AEH	Di1 general function setting	0–60	0
P07-04 0AFH	Di2 general function setting	0–60	0
P07-05 0B0H	Di3 settings	0–60	22
P07-06 0B1H	Di4 settings	0–60	2
P07-07 0B2H	Di5 settings	0–60	3
P07-08 0B3H	Di6 settings	0–60	4
P07-09 0B4H	Di7 settings	0–60	9
P07-10 0B5H	Virtual Di8 setting (Driven by virtual Do2 output)	0–60	0
P07-11 0B6H	Virtual Di9 setting (Driven by virtual Do3 output)	0–60	0
P07-12 0B7H	Virtual Di10 setting (Driven by virtual Do4 output)	0–60	0
00: No function 01: Operation permit 02: Abnormal reset 03: Multi-stage speed command 1/Multi-stage position command 1 04: Multi-stage speed command 2/Multi-stage position command 2 05: Multi-stage speed command 3/Multi-stage position command 3 06: Multi-stage speed command 4/Multi-stage position command 4 07: Jogging Forward ※P02-00 = 1 or P02-01 = 1 08: Jogging Reversal ※P02-00 = 1 or P02-01 = 1 09: Jogging 10: Free run stop 11: Emergency stop 12: External blocking b.b. (Inverter base interruption) 13: Zero servo (Execute zero speed before the operation command comes in) 14: Acceleration and deceleration time selection 1			

NO./Hex	Description	Range	Default
15: Acceleration and deceleration time selection 2 16: Acceleration and deceleration prohibition command 17: External fault (Detect at any time, decelerate to stop) 18: External fault (Detect at any time, free stop) 19: External fault (Detected at any time, emergency shutdown) 20: External fault (Detect at any time, warning) 21: External fault (Operation detected, a deceleration stop) 22: External fault (Operation detected, free to stop) 23: External fault (Operation detected, emergency stop) 24: External fault (Operation detected, warning) 25: Enable length control mode 26: Flying re-start 27 : Inverter overheating warning (OH1) 28: Incremental frequency command 0 ※P03-08 29: Decremental frequency command 0 ※P03-08 30: Turn on the keypad digital operator for operation control 31: Turn on operation command source 2 (P02-01) and frequency command source 2 (P03-01) 32: Turn on frequency command source 2 (P03-01) 33: Parameter lock 34: Turn on the second group of PID parameters 35: PID integral value reset 36: Timer function input 37: Automatic operation (Keyboard STOP key is valid, priority > 38) 38: Click to trigger automatic operation (The keyboard STOP key is valid) 39: Pause automatic operation 40: Switch from vector mode to V/F mode (Priority > P10-34, P11-34) 41: Turn on energy-saving efficiency control ※P01-15 42: Clear pulse input or Z input count value 43: Battery operation (According to P07-13, limit the motor running frequency and not detect low voltage) 44: Switch IM2 (Motor 2) (It can only be switched during shutdown) 45: Multi-stage speed/Multi-stage position terminal function switching 46: Start positioning point control 47: External mechanical origin input (ORG) 48: Return to the original point to enable (Priority < Jogging) 49: Incremental position command cumulative return to zero (The zero reset action must be used when stopping) 50: Forward limit switch (Fbb) 51: Reverse limit switch (rbb) 52: AVI ON/OFF 53: ACI ON/OFF 54: AUX ON/OFF 55: Pressure control switch permission (Flow/Pressure mode) 56: Reserved 57: Reserved			

NO./Hex	Description	Range	Default
58: Correction electrical angle of PM Encoder (Electrical angle = 90 degrees, current setting: P12-36) 59: Length calculation returns to zero (rising edge returns to zero) 60: Counter signal input (0–2KHz, Di7 special use)			
P07-13 0B8H	Battery voltage	0.0–400.0V	0.0
P07-14 0B9H	Timer function ON delay time	0.0–6000.0sec	0.0
P07-15 0BAH	Timer function OFF delay time	0.0–6000.0sec	0.0
P07-16 0BBH	Pulse wave or Z input count value cycle	1–60000 Pulse	1000
P07-17 0BCH	Pulse or Z input comparison count value	0–60000 Pulse	500
P07-18 0BDH	Source of mechanical origin	0–2	0
0: Di input 1: Forward side limit switch (Fbb) + encoder Z signal 2: Reverse side limit switch (rbb) + encoder Z signal			
P07-19 0BEH	Z pulse number from limiter switch to mechanical origin	1–60000 Z Pulse	1
P07-20 0BFH	Return to Origin Mode	0–7	0
● Cooperate with P13-00 = 0, 1 (Encoder Z input) mode. 0. Turn forward to find Z, then return to the origin with the shortest distance. 1. Same as 0, if Z has appeared, go directly to the origin. 2. Turn forward to find Z, then turn forward to return to the origin. 3. Same as 2, if Z has appeared, directly forward rotate back to the origin. 4. Reverse to find Z, then return to the origin with the shortest distance. 5. Same as 4, if Z has appeared, go directly to the origin. 6. Reverse to find Z, then reverse to the origin. 7. Same as 6, if Z has appeared, directly reverse to the origin. ● Cooperate with P13-00 = 2, 3, 4, 5 (Origin Di input) 0. First find the mechanical origin, then return to the origin. 1. Same as 0, if the origin has appeared, go back to the origin directly. 2. Same as 1. 3. Same as 1. 4. Same as 1. 5. Same as 1. 6. Same as 1. 7. Find the mechanical origin first, then find the limiter of forward and reverse rotation, and then return to the origin.			

NO./Hex	Description	Range	Default
P07-21 0C0H	Search origin frequency	0.00–400.00Hz	10.00
P07-22 0C1H	Determine the limiter torque current	0.00–200.00%	20.00
P07-23 0C2H	Multi-stage speed/Multi-stage position control is specified by communication	0–1	0
0: This function ineffective 1: This function is effective			

★: Indicates that it can be written during operation.

P08 Multifunction digital (Do) output parameter group			
NO./Hex	Description	Range	Default
P08-00 0C3H	RL1 settings	0–42	10
P08-01 0C4H	RL2 settings	0–42	0
P08-02 0C5H	Do1 settings	0–42	1
P08-03 0C6H	Virtual Do2 setting function driver (Virtual Di8 setting function)	0–42	6
P08-04 0C7H	Virtual Do3 setting function driver (Virtual Di9 setting function)	0–42	0
P08-05 0C8H	Virtual Do4 setting function driver (Virtual Di10 setting function)	0–42	0

00: In operation
01: Zero speed
02: Set frequency reached (P08-06)
03: Arbitrary frequency arrival (P08-07) (P08-09)
04: Output frequency detection 1 (Signal positive output) (P08-07 to P08-09)
05: Output frequency detection 2 (Signal reverse output) (P08-07 to P08-09)
06: Operation preparation completed
07: Low voltage detection (Lv) (Vdc < P09-01)
08: External interruption (b.b.) N.O.
09: External interruption (b.b.) N.C.
10: Abnormal detection
11: Over torque (OL2) N.O. (P09-15, 16)
12: Over torque (OL2) N.C. (P09-15, 16)
13: Operating command source-digital keypad operator
14: Frequency command source-digital keypad operator
15: Indication in reverse
16: Frequency command losing
17: Pulse wave, Z counter output (P07-16, P07-17, P08-14)
18: Timing output function (P07-14, 15)
19: Low voltage warning (Vdc < P09-01 + 10V)
20: Restarting abnormally (P17-00)
21: Motor overload (oL1) electronic thermal relay action
22: Overheating (oHx)
23: Inverter overload (oL) (Current > (P01-00) × 150%, time > 60sec)
24: RS485 communication is abnormal
25: PID target value is equal to the detected value (< 3.0%)
26: Non-zero speed in
27: The mechanical brake is engaged (P02-12, P08-11)
28: The mechanical brake is disengaging (P02-05, P08-10)
29: Frequency counter pulse wave (P08-12, Do1 exclusive)
30: Switch to motor 1
31: Switch to motor 2
32: Positioning completed

NO./Hex	Description	Range	Default
33: Forward and reverse limit reached 34: Digital input Di1 (H/L) signal 35: Digital input Di2 (H/L) signal 36: Digital input Di3 (H/L) signal 37: Digital input Di4 (H/L) signal 38: Digital input Di5 (H/L) signal 39: Digital input Di6 (H/L) signal 40: Digital input Di7 (H/L) signal 41:(H/L) output by communication command (Write communication address = 2001h) 42: Length arrival (Di = 25)			
P08-06 0C9H	Consistent frequency width (For Do = 02 function)	0.00–10.00Hz	1.00
P08-07 0CAH	Any frequency detection level during acceleration	0.00–400.00Hz	60.00
P08-08 0CBH	Any frequency detection level during deceleration	0.00–400.00Hz	60.00
P08-09 0CCH	Frequency reaches the hysteresis width (For Do = 03, 04, 05 function)	0.00–10.00Hz	1.00
P08-10 0CDH	Mechanical brake release delay time	0.00–600.00sec	0.00
P08-11 0CEH	Mechanical brake engagement delay time	0.00–600.00sec	0.00
P08-12 0CFH	Frequency counter pulse multiplier (Depending on the output frequency, the base is up to 2KHz and Do1 is exclusive)	1–16 (fold)	1
P08-13 0D0H	Positioning completion level	1–400 Pulse	40
P08-14 0D1H	Pulse output source	0–1	0
0: Pulse input 1: Encoder Z input			

★: Indicates that it can be written during operation.

P09 Running protection function parameter group			
NO./Hex	Description	Range	Default
P09-00 0D2H	Automatic voltage regulator output (AVR)	0–3	1
0: Turn on the AVR function 1: Turn off the AVR function 2: Stopping-turn off the AVR function 3: Decelerating-turn off the AVR function			
P09-01 0D3H	Low voltage detection level	220V: 150.0–210.0 440V: 300.0–420.0	190.0Vdc 380.0Vdc
P09-02 0D4H	Brake voltage detection level	220V: 350.0–410.0 440V: 700.0–820.0	370.0Vdc 740.0Vdc
P09-03 0D5H	Overcurrent detection level during acceleration ※P04-19	20.0–200.0%	170.0
P09-04 0D6H	Overcurrent detection action during acceleration ※P04-19	0–1	0
0: Constant velocity 1: Slow down			
P09-05 0D7H	Stall prevention voltage level during deceleration	220V: 330.0–410.0 440V: 660.0–820.0	380.0Vdc 760.0Vdc
P09-06 0D8H	Overcurrent detection level in constant speed ※P04-19	20.0–200.0%	160.0
P09-07 0D9H	Electronic thermal relay selection (oL1)	0–4	1
0: Invalid 1: Coaxial air-cooled motor (self-cooling), cold engine start (P09-08, 1.00 * P09-10) 2: Coaxial air-cooled motor (self-cooling), hot engine start (P09-08, 0.64 * P09-10) 3: Forced air-cooled motor, cold engine start (P09-08, 1.00 * P09-10) 4: Forced air-cooled motor, hot engine start (P09-08, 0.64 * P09-10)			
P09-08 0DAH	Thermal relay current level	120.0–250.0%	150.0
P09-09 0DBH	Thermal relay starts to integrate current level	80.0–120.0%	100.0
P09-10 0DCH	Thermal relay action time	10.0–120.0sec	60.0
P09-11 0DDH	Low torque detection function selection (38. LL)	0–4	0
0: Over torque is not detected 1: Low torque detection at constant speed, continue to run after detection 2: Low torque detection at constant speed, stop running after detection 3: Detection of too low torque during operation, continue to run after detection 4: Detection of too low torque during operation, stop running after detection			
P09-12 0DEH	Low torque detection level	0.0–100.0%	20.0
P09-13 0DFH	Low torque detection time	0.01–10.00sec	3.00
P09-14 0E0H	Over torque detection function selection (08. oL2)	0–4	0

NO./Hex	Description	Range	Default
0: Over torque is not detected 1: Over torque detection in constant speed, continue to run after detection 2: Over torque detection in constant speed, stop running after detection 3: Over torque detection during operation, continue to run after detection 4: Over torque detection during running, stop running after detection			
P09-15 0E1H	Over torque detection level	20.0–250.0%	160.0
P09-16 0E2H	Over torque detection time	0.01–10.00sec	3.00
P09-17 0E3H	Momentary power failure operation selection	0–1	0
0: No operation 1: Speed tracking operation			
P09-18 0E4H	Maximum allowable time for instantaneous power failure	0.30–5.00sec	2.00
P09-19 0E5H	Speed tracking b.b. time	0.50–25.00sec	0.50
P09-20 0E6H	Speed tracking mode	0–2	0
0: One way search method 1: Two way search method 2: Maximum current method			
P09-21 0E7H	Speed tracking maximum current setting	5.0–200.0%	100.0
P09-22 0E8H	Current imbalance detection level	20.0–100.0%	0.0
P09-23 0E9H	Output current limit	1.0–250.0%	180.0
P09-24 0EAH	Current limit controller gain	50.0–400.0%	200.0
P09-25 0EBH	Inverter over temperature protection setting	60.0–95.0°C	88.0
P09-26 0ECH	PT100 over temperature protection (AUX)	0.1–260.0°C	0.0
P09-27 0EDH	Cooling fan start method	0–3	0
0: After stopping, the operation will stop for one minute 1: Run/stop with the inverter 2: Always run 3: Start temperature control operation			
P09-28 0EEH	Fan start temperature setting	40.0–60.0°C	45.0
P09-29 0EFH	PG disconnection detection selection	0–3	1
0: Free to stop 1: Decelerate to stop 2: Emergency stop 3: Continue to run (Display PGo)			

NO./Hex	Description	Range	Default
P09-30 0F0H	PG disconnection detection delay time	0.01–10.00sec	3.00
P09-31 0F1H	Overspeed action selection	0–3	1
0: Free stop 1: Decelerate to stop 2: Emergency stop 3: Continue to run (Display oS)			
P09-32 0F2H	Overspeed level	0.0–120.0%	115.0
P09-33 0F3H	Overspeed delay detection time	0.00–2.00sec	0.50
P09-34 0F4H	Speed deviation too large selection	0–4	3
0: Free to stop 1: Decelerate to stop 2: Emergency stop 3: Continue to run (Display oES) 4: Invalid			
P09-35 0F5H	Speed deviation is too large	0.0–50.0%	20.0
P09-36 0F6H	If the speed deviation is too large, the detection time will be delayed	0.00–10.00sec	0.50
P09-37 0F7H	Input power is out of phase or voltage too low	0–1	1
0: No detection 1: Fault detection (40. PF)			
P09-38 0F8H	Reserved	0–65535	0
P09-39 0F9H	Vector mode output voltage limit	50.0–100.0%	100.0
P09-40 0FAH	The output voltage limits the controller gain	50.0–400.0%	100.0

★: Indicates that it can be written during operation.

P10 V/F curve, IM1 motor rated nameplate parameter group			
NO./Hex	Description	Range	Default
P10-00 0FBH	IM1-V/F curve selection	0–15	15
P10-01 0FCH	IM1-Maximum output frequency/fe4 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P10-02 0FDH	IM1-Maximum output voltage/V4	230V: 0.0–250.0 460V: 0.0–500.0	220.0V 440.0V
P10-03 0FEH	IM1-Intermediate Frequency 2/fe3 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P10-04 0FFH	IM1-Intermediate voltage 2/V3	230V: 0.0–250.0 460V: 0.0–500.0	220.0V 440.0V
P10-05 100H	IM1-Basic frequency/fe2 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P10-06 101H	IM1-Basic voltage/V2	230V: 0.0–250.0 460V: 0.0–500.0	220.0V 440.0V
P10-07 102H	IM1-Intermediate frequency 1/fe1 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	3.00
P10-08 103H	IM1-Intermediate Voltage 1/V1	230V: 0.0–250.0 460V: 0.0–500.0	16.5V 33.0V
P10-09 104H	IM1-Minimum frequency/fe0 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	1.50
P10-10 105H	IM1-Minimum voltage/V0	230V: 0.0–250.0 460V: 0.0–500.0	9.9V 19.8V
P10-11 106H	IM1-Curvature between free curve fe0 and fe2 (fe1, V1 are invalid)	0.0–3.0	0.0
0.0: This function is invalid 1.0: A curve (Straight line) 2.0: Quadratic curve (Suitable for fan or pump load) 3.0: Cubic curve (Suitable for fan or pump load)			
P10-12 107H	IM1 output voltage limit	0–1	1
0: Output voltage without limitation 1: Output voltage is limited ※V/F			
P10-13 108H	IM1-Rated line voltage	230V: 100.0–250.0 460V: 200.0–500.0	220.0V 440.0V
P10-14 109H	IM1-Rated line current ※P01-00 × P10-14	25.0–135.0%	100.0
P10-15 10AH	IM1-Rated frequency	10.00–150.00Hz	60.00
P10-16 10BH	IM1-Rated speed	0–9000rpm	1710
P10-17 10CH	IM1-Rated capacity	0.1–1000.0HP	1.0
P10-18 10DH	IM1-Pole number	2–48P	4
P10-19 10EH	IM1-Stator resistance (Q17)	500–60000	10000

NO./Hex	Description	Range	Default
P10-20 10FH	IM1-Rotor resistance (Q17)	500–60000	8000
P10-21 110H	IM1-Stator leakage inductance (Q12)	0–5000	250
P10-22 111H	IM1-Mutual inductance 1 (1.00pu) (Q12)	3250–60000	9000
P10-23 112H	IM1-Mutual inductance 2 (0.85pu) (Q12)	3250–60000	9250
P10-24 113H	IM1-Mutual inductance 3 (0.70pu) (Q12)	3250–60000	9500
P10-25 114H	IM1-No-load current ※P10-14 × P10-25	0.0–99.0%	30.0
P10-26 115H	IM1-Magnetic field amplification factor in low speed zone	50.00–200.00%	140.0
P10-27 116H	IM1-Low-speed zone frequency point setting	0.000–0.100pu	0.000
P10-28 117H/★	IM1-Sensorless forward rotation low-speed torque current	–1.000 to 1.000pu	0.000
P10-29 118H/★	IM1-Sensorless reverse low-speed zone torque current	–1.000 to 1.000pu	0.000
P10-30 119H	IM1-Flux estimator bandwidth	0.000–0.600pu	0.075
P10-31 11AH	IM1-Speed estimator bandwidth	0.010–0.600pu	0.300
P10-32 11BH	IM1-V/F slip compensation gain	0.00–200.00%	20.00
P10-33 11CH	IM1-Sensorless slip compensation gain	0.00–200.00%	80.00
P10-34 11DH	IM1-Vector control switch to V/F control frequency point setting	0.00–400.00Hz	0.00
P10-35 11EH/★	IM1 senseless control out of low-speed zone power difference (Q15)	0–1000	100
P10 IM1, PM/SRM speed (ASR) controller parameter group P10-36 to P10-59 are IM1, PM/SRM speed (ASR) controller parameter group. M1 represents IM1, PM/SRM.			
P10-36 11FH	M1-Mechanical constant	0–30000	800
P10-37 120H	M1-Closed loop vector control zero-speed positioning	0–3	1
0: Do not start 1: Zero-speed positioning 2: Zero speed shutdown 3: Zero-speed shutdown (Invalid during shutdown)			
P10-38 121H	M1-positioning P gain	0.00–100.00%	15.00
P10-39 122H	M1-positioning I gain	0.00–100.00%	15.00
P10-40 123H	M1-zero-speed positioning frequency compensation limit	0.00–50.00%	20.00

NO./Hex	Description	Range	Default
P10-41 124H	M1-ASR high speed proportional gain	0.00–300.00%	10.00
P10-42 125H	M1-ASR high speed integral gain	0.00–100.00%	10.00
P10-43 126H	M1-ASR low speed proportional gain	0.00–300.00%	15.00
P10-44 127H	M1-ASR low speed integral gain	0.00–100.00%	20.00
P10-45 128H	M1-ASR α parameter setting	0.400–1.000	1.000
P10-46 129H	M1-Integral action selection in acceleration and deceleration	0–1	1
0: Invalid 1: Valid			
P10-47 12AH	M1-Automatically switch high-speed point gain	0.00–400.00Hz	3.00
P10-48 12BH/★	M1-Forward electric torque current limit	0.00–200.00%	150.00
P10-49 12CH/★	M1-Reverse electric torque current limit	0.00–200.00%	150.00
P10-50 12DH/★	M1-Forward regenerative torque current limit	0.00–200.00%	150.00
P10-51 12EH/★	M1-Reverse regenerative torque current limit	0.00–200.00%	150.00
P10-52 12FH/★	M1-Forward rotation start torque current limit	0.00–200.00%	150.00
P10-53 130H	M1-Forward rotation start torque limit release time	0.00–10.00sec	0.00
P10-54 131H	M1-ASR output delay time	0.000–0.500sec	0.000
P10-55 132H	M1-Torque control mode	0–1	0
0: Torque current limit 1: Torque current command (Speed limit); V/F or (Vector + PG) valid			
P10-56 133H/★	M1-Torque current command	0.00–200.00%	100.00
P10-57 134H	M1-Torque current limit source	0–6	0
0: Invalid 1: AV (Keypad operator knob) 2: AVI (–10 to 10V) 3: ACI (4–20mA) 4: AUX 5: Pulse input 6: PID			
P10-58 135H	M1-Torque control-Speed limit P05-16 = 9, AUX × P10-58	0.00–400.00Hz	60.00
P10-59 136H	M1-Start torque limit and free run stop detection time	0.50–20.00sec	2.00

★: Indicates that it can be written during operation.

P11 V/F curve, IM2 motor rated nameplate parameter group			
NO./Hex	Description	Range	Default
P11-00 137H	IM2-V/F curve selection	0–15	15
P11-01 138H	IM2-Maximum output frequency/fe4 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P11-02 139H	IM2-Maximum output voltage/V4	230V: 0.0–250.0 460V: 0.0–500.0	220.0V 440.0V
P11-03 13AH	IM2-intermediate frequency 2/fe3 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P11-04 13BH	IM2-intermediate voltage 2/V3	230V: 0.0–250.0 460V: 0.0–500.0	220.0V 440.0V
P11-05 13CH	IM2-Basic frequency/fe2 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P11-06 13DH	IM2-Basic voltage/V2	230V: 0.0–250.0 460V: 0.0–500.0	220.0V 440.0V
P11-07 13EH	IM2-Intermediate frequency 1/fe1 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	3.00
P11-08 13FH	IM2-Intermediate voltage 1/V1	230V: 0.0–250.0 460V: 0.0–500.0	16.5V 33.0V
P11-09 140H	IM2-Lowest frequency/fe0 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	1.50
P11-10 141H	IM2-Lowest voltage/V0	230V: 0.0–250.0 460V: 0.0–500.0	9.9V 19.8V
P11-11 142H	IM2-Free curve fe0, fe2 curvature (fe1, V1 is invalid)	0.0–3.0	0.0
0.0: This function is invalid 1.0: A curve (Straight line) 2.0: Quadratic curve (Suitable for fan or pump load) 3.0: Cubic curve (Suitable for fan or pump load)			
P11-12 143H	IM2-Output voltage limit	0–1	1
0: Output voltage without limitation 1: Output voltage is limited ※V/F			
P11-13 144H	IM2-Rated line voltage	230V: 100.0–250.0 460V: 200.0–500.0	220.0V 440.0V
P11-14 145H	IM2-Rated line current ※P01-00 × P11-14	25.0–135.0%	100.0
P11-15 146H	IM2-Rated frequency	10.00–150.00Hz	60.00
P11-16 147H	IM2-Rated speed	0–9000rpm	1710
P11-17 148H	IM2-Rated capacity	0.1–1000.0HP	1.0
P11-18 149H	IM2-Pole number	2–48P	4
P11-19 14AH	IM2-Stator resistance (Ω17)	500–60000	10000

NO./Hex	Description	Range	Default
P11-20 14BH	IM2-Rotor resistance (Q17)	500–60000	8000
P11-21 14CH	IM2-Stator leakage inductance (Q12)	0–5000	250
P11-22 14DH	IM2-Mutual inductance 1 (1.00pu) (Q12)	3250–60000	9000
P11-23 14EH	IM2-Mutual inductance 2 (0.85pu) (Q12)	3250–60000	9250
P11-24 14FH	IM2-Mutual inductance 3 (0.70pu) (Q12)	3250–60000	9500
P11-25 150H	IM2-No load current ※P11-14 × P11-25	0.0–99.0%	30.0
P11-26 151H	IM2-Low-speed area magnetic field amplification factor	50.00–200.00%	140.0
P11-27 152H	IM2-Low speed zone frequency point setting	0.000–0.100pu	0.000
P11-28 153H/★	IM2-Sensorless control forward torque current in low speed zone	–1.000 to 1.000pu	0.000
P11-29 154H/★	IM2-Sensorless control reverse torque current in low speed zone	–1.000 to 1.000 pu	0.000
P11-30 155H	IM2-Magnetic flux estimator bandwidth	0.000–0.600pu	0.075
P11-31 156H	IM2-Speed estimator bandwidth	0.010–0.600pu	0.300
P11-32 157H/★	IM2-V/F slip compensation gain	0.00–200.00%	20.00
P11-33 158H/★	IM2-Sensorless slip compensation gain	0.00–200.00%	80.00
P11-34 159H	IM2-Vector control switch to V/F control frequency point setting	0.00–400.00Hz	0.00
P11-35 15AH/★	IM2-Sensorless power difference out of low speed zone (Q15)	0–1000	100
P11 IM2 Speed (ASR) controller parameter group P11-36 to P11-59 are IM2 speed (ASR) controller parameter group. M2 represents IM2.			
P11-36 15BH	M2-Mechanical constant	0–30000	800
P11-37 15CH	Reserved	0–65535	0
P11-38 15DH	Reserved	0–65535	0
P11-39 15EH	Reserved	0–65535	0
P11-40 15FH	Reserved	0–65535	0
P11-41 160H	M2-ASR high speed proportional gain	0.00–300.00%	10.00
P11-42 161H	M2-ASR high speed integral gain	0.00–100.00%	10.00
P11-43 162H	M2-ASR low speed proportional gain	0.00–300.00%	15.00

NO./Hex	Description	Range	Default
P11-44 163H	M2-ASR low speed integral gain	0.00–100.00%	20.00
P11-45 164H	M2-ASR α parameter setting	0.400–1.000	1.000
P11-46 165H	M2-Integral action selection in acceleration and deceleration	0–1	1
0: Invalid 1: Valid			
P11-47 166H	M2-Automatic switches high speed point gain	0.00–400.00Hz	3.00
P11-48 167H/★	M2-Forward electric torque current limit	0.00–200.00%	150.00
P11-49 168H/★	M2-Reverse electric torque current limit	0.00–200.00%	150.00
P11-50 169H/★	M2-Forward regenerative torque current limit	0.00–200.00%	150.00
P11-51 16AH/★	M2-Reverse regenerative torque current limit	0.00–200.00%	150.00
P11-52 16BH/★	M2-Forward rotation start torque current limit	0.00–200.00%	150.00
P11-53 16CH	M2-Forward rotation start torque limit release time	0.00–10.00sec	0.00
P11-54 16DH	M2-ASR output delay time	0.000–0.500sec	0.000
P11-55 16EH	M2-Torque control mode	0–1	0
0: Torque current limi 1: Torque current command (Speed limit); V/F valid			
P11-56 16FH/★	M2-Torque current command	0.00–200.00%	100.00
P11-57 170H	M2-Torque current limiting source	0–6	0
0: Invalid 1: AV (Keypad operator knob) 2: AVI (–10 to 10V) 3: ACI (4–20mA)) 4: AUX 5: Pulse input 6: PID			
P11-58 171H	M2-Torque control-Speed limit P05-16 = 9, AUX × P11-58	0.00–400.00Hz	60.00
P11-59 172H	M2-Start torque limit and free stop detection time	0.50–20.00sec	2.00

★: Indicates that it can be written during operation.

P12 PM/SRM motor rated nameplate, excitation current parameter group			
NO./Hex	Description	Range	Default
P12-00 173H	PM/SRM-Maximum speed (P12-03)	0.00–200.00%	100.00
P12-01 174H	PM/SRM-Rated line voltage	220: 50.0–250.0V 460: 100.0–500.0V	220.0
P12-02 175H	PM/SRM-Rated line current ※P01-00 × P12-02	25.0–135.0%	5.5A
P12-03 176H	PM/SRM-Rated speed	20–15000rpm	2000
P12-04 177H	PM/SRM-Rated capacity	0.1–1000.0HP	1.5
P12-05 178H	PM/SRM-Pole number	2–60P	8
P12-06 179H	PM/SRM-Stator resistance (PU: Q17)	500–60000	8000
P12-07 17AH	PM/SRM: d-axis inductance (PU: Q12)	0–60000	1000
P12-08 17BH	PM/SRM: q-axis inductance (PU: Q12)	0–60000	1000
P12-09 17CH	PM/SRM-Rated induced voltage 0 (Id = 0.00pu)	220V: 0.0–250.0 460V: 0.0–500.0	200.0
P12-10 17DH	PM/SRM-Rated induced voltage 1 (Id = – 0.25pu)	220V: 0.0–250.0 460V: 0.0–500.0	190.0
P12-11 17EH	PM/SRM-Rated induced voltage 2 (Id = +0.25pu)	220V: 0.0–250.0 460V: 0.0–500.0	210.0
P12-12 17FH	Z point ≥ motor electrical angle	0.0–359.9 degrees	90.0
P12-13 180H	5012B Origin ≥ Motor electrical angle	0.0–359.9 degrees	90.0
P12-14 181H	SRM rated magnetizing current	0.000–1.000pu	0.500
P12-15 182H	Reserved	0–65535	0
P12-16 183H	Reserved	0–65535	0
P12-17 184H	Magnetic poles inlead current (P01-00)	0.00–100.00%	40.00
P12-18 185H	The rise time of the current inlead by the magnetic pole	0.00–5.00sec	0.50
P12-19 186H	The inlead time of the magnetic pole inlead current	0.00–5.00sec	0.30
P12-20 187H	PM/SRM: Sensorless starting angle detection method	0–4	1
0: Start from the last stop position 1: Only start the search the first time after booting 2: Every search at startup 3: Start magnetic pole inlead for the first time after booting 4: Magnetic pole inlead for each start			
P12-21 188H	PM/SRM (ABZ Encoder)-Starting angle detection method	0–4	1

NO./Hex	Description	Range	Default
0: Start from the last stop position 1: Only start the search the first time after booting 2: Every search at startup 3: Start magnetic pole inlead for the first time after booting 4: Magnetic pole inlead for each start			
P12-22 189H	PM/SRM: Starting angle detection-voltage setting (P12-01 × P12-22)	5.00–40.00%	25.00
P12-23 18AH	PM/SRM: Starting angle detection-current setting (P12-02 × P12-23)	0.250–1.500	0.800
P12-24 18BH	PM/SRM-Magnetic field magnification setting	40.0–150.0%	100.0
P12-25 18CH	PM/SRM (PG)-Magnetic field control start frequency (f0)	0.001–1.000pu	0.000
P12-26 18DH/★	M/SRM (PG) fe ≤ f0 Exciting current (Id0)	0.0–100.0%	10.0
P12-27 18EH	PM/SRM: Sensorless low-speed frequency point (f1)	0.010–0.150pu	0.080
P12-28 18FH/★	PM/SRM: Sensorless low-speed magnetizing current (Id1)	10.0–100.0%	35.0
P12-29 190H/★	PM/SRM non-sensing non-low-speed magnetizing current (Id2)	10.0–100.0%	25.0
P12-30 191H	PM/SRM-Sensorless flux estimator bandwidth	0.005–0.600pu	0.075
P12-31 192H	PM/SRM: Sensorless speed estimator bandwidth	0.010–0.600pu	0.300
P12-32 193H/★	PM/SRM: Excitation current control mode	0.0–75.0 degrees	0.0
P12-33 194H	PM/SRM-Excitation angle control cycle	1–2000ms	5
P12-34 195H	PM/SRM-Efficiency control excitation angle correction amplitude	0.0–30.0 degrees	0.0
P12-35 196H	PM/SRM: The ratio of the magnetic flux estimator bandwidth without PG	10.00–100.00%	25.00
P12-36 197H/★	PM Encoder calibration-current setting (P12-02)	0.00–100.00%	45.00

★: Indicates that it can be written during operation.

P13 IM, PM/SRM positioning point control command parameter group			
NO./Hex	Description	Range	Default
P13-00 198H	Multi-stage position control form	0–5	0
0: Absolute position (Encoder Z) 1: Communication absolute position (Encoder Z) 2: Absolute position (Mechanical origin Di input) 3: Communication absolute position (Mechanical origin Di input) 4: Incremental position (Mechanical origin Di input) 5: Communication incremental position (Mechanical origin Di input)			
P13-01 199H	Multi-stage position direction setting H byte	0–255	0
P13-02 19AH	Multi-stage position direction setting L byte	0–255	0
P13-03 19BH/★	Multi-stage position command 0 (Revolution)	0–60000 Rev.	0
P13-04 19CH/★	Multi-stage position command 0 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-05 19DH/★	Multi-stage position command 1 (Revolution)	0–60000 Rev.	0
P13-06 19EH/★	Multi-stage position command 1 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-07 19FH/★	Multi-stage position command 2 (Revolution)	0–60000 Rev.	0
P13-08 1A0H/★	Multi-stage position command 2 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-09 1A1H/★	Multi-stage position command 3 (Revolution)	0–60000 Rev.	0
P13-10 1A2H/★	Multi-stage position command 3 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-11 1A3H/★	Multi-stage position command 4 (Revolution)	0–60000 Rev.	0
P13-12 1A4H/★	Multi-stage position command 4 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-13 1A5H/★	Multi-stage position command 5 (Revolution)	0–60000 Rev.	0
P13-14 1A6H/★	Multi-stage position command 5 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-15 1A7H/★	Multi-stage position command 6 (Revolution)	0–60000 Rev.	0
P13-16 1A8H/★	Multi-stage position command 6 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-17 1A9H/★	Multi-stage position command 7 (Revolution)	0–60000 Rev.	0
P13-18 1AAH/★	Multi-stage position command 7 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-19 1ABH/★	Multi-stage position command 8 (Revolution)	0–60000 Rev.	0
P13-20 1ACH/★	Multi-stage position command 8 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse

NO./Hex	Description	Range	Default
P13-21 1ADH/★	Multi-stage position command 9 (Revolution)	0–60000 Rev.	0
P13-22 1AEH/★	Multi-stage position command 9 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-23 1AFH/★	Multi-stage position command 10 (Revolution)	0–60000 Rev.	0
P13-24 1B0H/★	Multi-stage position command 10 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-25 1B1H/★	Multi-stage position command 11 (Revolution)	0–60000 Rev.	0
P13-26 1B2H/★	Multi-stage position command 11 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-27 1B3H/★	Multi-stage position command 12 (Revolution)	0–60000 Rev.	0
P13-28 1B4H/★	Multi-stage position command 12 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-29 1B5H/★	Multi-stage position command 13 (Revolution)	0–60000 Rev.	0
P13-30 1B6H/★	Multi-stage position command 13 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-31 1B7H/★	Multi-stage position command 14 (Revolution)	0–60000 Rev.	0
P13-32 1B8H/★	Multi-stage position command 14 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-33 1B9H/★	Multi-stage position command 15 (Revolution)	0–60000 Rev.	0
P13-34 1BAH/★	Multi-stage position command 15 (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-35 1BBH/★	Communication positioning point direction setting	0–1	0
0: Forward 1: Reverse			
P13-36 1BCH/★	Communication positioning point instruction (Revolution)	0–60000 Rev.	0
P13-37 1BDH/★	Communication positioning point instruction (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-38 1BEH	Software left limit (Revolution)	0–60000 Rev.	0
P13-39 1BFH	Software left limit (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-40 1C0H	Software right limit (Revolution)	0–60000 Rev.	0
P13-41 1C1H	Software right limit (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-42 1C2H	The software has a positive or negative sign on the left and right limits	0–2	1
0: Left negative/right negative 1: Left negative/right positive 2: Left positive/right positive			
P13-43 1C3H	Software left and right limit enable	0–3	0

NO./Hex	Description	Range	Default
P13-44 1C4H	Manually set the offset angle of the mechanical Z point (Pulse)	0 to (4 × P01-32) – 1	0 Pulse
P13-45 1C5H	Positioning point control frequency command	0.00 to P13-46 Hz	10.00
P13-46 1C6H	Positioning and following start frequency	0.00–400.00Hz.	30.00
P13-47 1C7H/★	Positioning point-acceleration and deceleration time	0.00–100.00sec	5.00

★: Indicates that it can be written during operation.

P14 PID Control parameter group			
NO./Hex	Description	Range	Default
P14-00 1C8H	PID mode	0–6	0
0: Disable PID 1: PID output 1 (Deviation value as D input) 2: PID output 2 (Feedback value is D input) 3: Frequency command + PID output 1 4: Frequency command + PID output 2 5: Flow (Frequency command)/Pressure (PID output 1) automatic switching mode 6: PID output 1 (the error value is D input) but does not execute the frequency command			
P14-01 1C9H	PID command point selection (P14-34, P14-35)	0–9	0
0: P14-04 1: AV (Digital Operator Knob) 2: AVI (–10 to 10V input) 3: ACI (4–20mA input) 4: AUX (0–10V input) 5: Pulse input 6: RAMP output 7: Output current (2.00pu) 8: Torque current (2.00pu) 9: Encoder feedback value			
P14-02 1CAH	PID feedback point selection	0–9	3
Same as P14-01. 2: AVI (0–10V)			
P14-03 1CBH	PID differential feedback point selection	0–9	0
0: None 1: AV (Digital Operator Knob) 2: AVI (0–10V input) 3: ACI (4–20mA input) 4: AUX (0–10V input) 5: Pulse input 6: RAMP output 7: Output current 8: Torque current 9: Encoder feedback value			
P14-04 1CCH	PID setting value	0 to P14-34, P14-35	0
P14-05 1CDH/★	PID command acceleration and deceleration time	0.00–600.00sec	0.05
P14-06 1CEH/★	Feedback input filter time	0.00–10.00sec	0.05
P14-07 1CFH/★	Group 1-proportional gain	0.0–500.0%	100.0

NO./Hex	Description	Range	Default
P14-08 1D0H/★	Group 1-Integration time (H)	0.01–99.99sec	0.50
P14-09 1D1H/★	Group 1-Integration time (L)	0.01–99.99sec	0.25
P14-10 1D2H/★	Group 1-Differential time	0.00–10.00sec	0.00
P14-11 1D3H/★	Group 2-Proportional gain	0.0–500.0%	100.0
P14-12 1D4H/★	Group 2-Integration time (H)	0.01–99.99sec	0.80
P14-13 1D5H/★	Group 2-Integration time (L)	0.01–99.99sec	0.50
P14-14 1D6H/★	Group 2-Differential time	0.00–10.00sec	0.00
P14-15 1D7H	PID Deviation limit	0.00–600.00%	300.00
P14-16 1D8H	PID Input characteristic selection	0–1	0
0: Positive characteristics (command value – feedback value) 1: Negative characteristics (–command value + feedback value)			
P14-17 1D9H	PID output upper limit (P03-06 × P14-17)	0.00–100.00%	100.0
P14-18 1DAH	PID output lower limit (P03-06 × P14-18)	–100.00 to 100.00%	0.00
P14-19 1DBH	PID output characteristic selection	0–1	0
0: The output is not inverted 1: Output inversion (P14-21 = 1)			
P14-20 1DCH	PID output offset (P03-06 × P14-20)	–100.00 to 100.00%	0.00
P14-21 1DDH	PID output reverse selection	0–1	0
0: Reversal is invalid 1: Reverse effective			
P14-22 1DEH	PID output acceleration and deceleration time	0.00–600.00sec	1.50
P14-23 1DFH	PID feedback signal lost detection level (P14-34, P14-35) × P14-23	0.00–100.00%	18.00
P14-24 1E0H	PID feedback signal lost detection time	0.00–30.00sec	5.00
P14-25 1E1H	PID feedback signal lost processing method	0–2	0
0: No detection 1: Fault detection (Continue to run when a minor fault occurs) 2: Fault detection (Stop output when fault occurs)			
P14-26 1E2H	PID feedback out-range detection value (P14-34, P14-35) × P14-26	0.00–100.00%	100.00
P14-27 1E3H	PID feedback out-range detection time	0.00–30.00sec	2.00

NO./Hex	Description	Range	Default
P14-28 1E4H	PID feedback out-range detection processing method	0–2	0
0: No detection 1: Fault detection (Continue to run when a minor fault occurs) 2: Fault detection (Stop output when fault occurs)			
P14-29 1E5H	PID deviation out-range detection value (P14-34, P14-35) × P14-29	0.00–100.00%	20.00
P14-30 1E6H	PID deviation out-range detection time	0.00–30.00sec	5.00
P14-31 1E7H	PID deviation out-range detection processing method	0–2	0
0: No detection 1: Fault detection (Continue to run when a minor fault occurs) 2: Fault detection (Stop output when fault occurs)			
P14-32 1E8H	PID 100% monitor display value (for P00-01=16)	1–999	100
P14-33 1E9H	PID monitor display value decimal point position	0–2	1
P14-34 1EAH	Pressure Sensor rating setting (P00-01 = 17, 18, 19)	0–60000	1000
P14-35 1EBH	Pressure Sensor decimal point position	0–4	1
P14-36 1ECH	Pressure mode threshold 1 (Frequency command) (P03-00, P03-01)	0.00–100.00%	0.00
P14-37 1EDH	Pressure mode threshold 2 (PID command)	0.00–100.00%	20.00
P14-38 1EEH	PID reaches the deviation detection level	0.00–50.00%	2.00
P14-39 1EFH	PID arrival detection time	0.00–30.00sec	0.10
P14-40 1F0H	PID stop deceleration time	0.00–600.00sec	5.00

★: Indicates that it can be written during operation.

P15 PID Pump sleep control parameter group			
NO./Hex	Description	Range	Default
P15-00 1F1H	Water pump function	0–1	0
0: Do not start 1: Start			
P15-01 1F2H	Sleep detection interval	5–30000sec	30
P15-02 1F3H	Sleep level	0.00–100.00%	55.00
P15-03 1F4H	Wake-up deviation	0.00–100.00%	4.00
P15-04 1F5H	Sleep standby time	0–30000sec	900
P15-05 1F6H	Sleep standby operation time	0–30000sec	60
P15-06 1F7H	Sleep standby operation frequency	0.00–400.00Hz	0.00
P15-07 1F8H	Low water pressure detection level (P14-34, 35)	0.00–100.00%	6.00
P15-08 1F9H	Low water pressure detection time	0–12000sec	60
P15-09 1FAH	Low water pressure detection standby time	0–30000sec	1200
P15-10 1FBH	Low water pressure detection recovery times	0–1000 times	10
P15-11 1FCH	Sleep detection mode	0–1	0
0: Constant pressure pump-down mode 1: Constant pressure pump-boost mode			
P15-12 1FDH	Pressure test allowable time	0–60sec	6
P15-13 1FEH	Reserved	0–65535	0

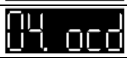
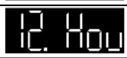
★: Indicates that it can be written during operation.

P16 Programmable operating parameters automatically edit group			
NO./Hex	Description	Range	Default
P16-00 1FFH	Program operation mode selection	0–8	0
0. Automatic operation mode is invalid **Speed control mode:** 1. Automatically run for N cycles and then stop 2. Automatic operation cycle operation 3. Automatically run for N cycles and then stop (as deceleration interval) 4. Automatic operation cycle operation (as deceleration interval) **Position control mode:** 5. Automatically run for N cycles and then stop 6. Automatic operation and cyclic operation 7. Automatically run for N cycles and then stop (The time will be counted when you reach the designated point) 8. Automatic operation and cyclic operation (The time will be counted when you reach the designated point)			
P16-01 200H	Restart mode after abnormal programming operation	0–1	0
0: Restart 1: Continue the last speed and time			
P16-02 201H	Program running direction setting H byte	0–255	0
P16-03 202H	Program running direction setting L byte	0–255	0
P16-04 203H	Running time unit	0–1	0
0: 0.1sec 1: 1.0sec			
P16-05 204H	0th stage running time setting	0.0–60000sec	0.0
P16-06 205H	1st stage run time setting	0.0–60000sec	0.0
P16-07 206H	2nd stage run time setting	0.0–60000sec	0.0
P16-08 207H	3rd stage run time setting	0.0–60000sec	0.0
P16-09 208H	4th stage run time setting	0.0–60000sec	0.0
P16-10 209H	5th stage run time setting	0.0–60000sec	0.0
P16-11 20AH	6th stage run time setting	0.0–60000sec	0.0
P16-12 20BH	7th stage run time setting	0.0–60000sec	0.0
P16-13 20CH	8th stage run time setting	0.0–60000sec	0.0
P16-14 20DH	9th stage run time setting	0.0–60000sec	0.0

NO./Hex	Description	Range	Default
P16-15 20EH	10th stage run time setting	0.0–60000sec	0.0
P16-16 20FH	11th stage run time setting	0.0–60000sec	0.0
P16-17 210H	12th stage run time setting	0.0–60000sec	0.0
P16-18 211H	13th stage run time setting	0.0–60000sec	0.0
P16-19 212H	14th stage run time setting	0.0–60000sec	0.0
P16-20 213H	15th stage run time setting	0.0–60000sec	0.0
P16-21 214H	Position arrival timing selection	0–1	0
0: Position command reached 1: Position feedback reached			
P16-22 215H	Automatic operation cycle number setting	1–9999	1

★: Indicates that it can be written during operation.

P17 Abnormality record parameter group			
NO./Hex	Description	Range	Default
P17-00 216H	Number of abnormal restarts	0–10 times	0
P17-01 217H	Abnormal restart waiting time	0.00–60.00sec	5.00
P17-02 218H	Abnormal restart method	0–1	0
0: Start from 0Hz 1: Flying re-start			
P17-03 219H	Latest abnormality record	0–60	0
P17-04 21AH	Last abnormality record	0–60	0
P17-05 21BH	Last 2 abnormality record	0–60	0
P17-06 21CH	Last 3 abnormality record	0–60	0
P17-07 21DH	Last 4 abnormality record	0–60	0
P17-08 21EH	Last 5 abnormality record	0–60	0
P17-09 21FH	Last 6 abnormality record	0–60	0
P17-10 220H	Last 7 abnormality record	0–60	0

Display		Abnormal content
00.**0**	–	No abnormality
01. **rLEr**		Before operation, the DC voltage is too low
02. **Lu**		DC voltage is too low (Vdc < P09-01)
03. **ocA**		Overcurrent during acceleration, more than twice the rated current value
04. **ocd**		Overcurrent during deceleration, more than twice the rated current value
05. **ocn**		Over current in constant speed, more than twice the rated current value
06. **oL**		Inverter overload: HD (current > 150%, time > 60sec) ND (current > 120%, time > 60sec)
07. **oL1**		Motor overload 1 (electronic thermal relay action)
08. **oL2**		Motor overload 2 (current > P09-15, and time > P09-16)
09. **Hoc1**		Three-phase output detects overcurrent
10. **Hoc2**		Reserved
11. **Hoc3**		IPM/Sc detection over current protection
12. **Hou**		Vdc detection over voltage
13. **EF**		External abnormal
14. **ocbE**		Three-phase output current unbalance > P09-22, and time > 32/fe

NO./Hex	Description	Range	Default

Display	Abnormal content
15. **AutF**	Automatic parameter detection failed
16. **ct1E**	U-phase output side abnormal or CT failure
17. **ct2E**	V-phase output side abnormal or CT failure
18. **ct3E**	W-phase output side abnormal or CT failure
19. **ErP0**	Parameter reading is abnormal
20. **ErP1**	Parameter setting error 1 (P07-03 to 12, Di repeated setting)
21. **ErP2**	Parameter setting error 2 (P10-02, 04, 06, 08, 10 setting error)
22. **ErP3**	Parameter setting error 3 (P11-02, 04, 06, 08, 10 setting error)
23. **conF**	RS485 transmission abnormal
24. **Acio**	ACI (4–20mA) disconnected
25. **tPEr**	Parameters cannot be copied for different models
26. **PGE**	PG setting error (P01-31 to P01-33)
27. **PGo**	PG disconnection detection.
28. **oS**	Over speed (P09-31 to P09-33)
29. **oES**	Speed deviation is too large (P09-34 to P09-36)
30. **oH0**	Inverter overheating forecast (internal temperature > (P09-25 – 5.0°C))
31. **oH1**	External overheat detection (Di input terminal overheat detection)
32. **oH2**	Inverter overheating (internal heat sink temperature > P09-25)
33. **oH3**	PT100 overheating (AUX input terminal P09-26)
34. **FbF**	Lost of PID feedback signal (P14-23 to P14-25)
35. **Fbu**	PID feedback over-value detection (P14-26 to P14-28)
36. **FbEF**	PID deviation over-value detection (P14-29 to P14-31)
37. **oS1**	Torque control overspeed trip
38. **LL**	Low torque detection (P09-11 to P09-13)
39. **nAut**	Motor electrical parameters are not detected and vector control cannot be performed
40. **PF**	Input power is out of phase or voltage too low
41. **EPE0**	Memory read error (EEPROM read error)
42. **EPE1**	Memory write error (EEPROM write error)
43. **ouA**	Overvoltage during acceleration: Vdc > (410/820V)
44. **oud**	Overvoltage during deceleration: Vdc > (410/820V)
45. **oun**	Overvoltage at constant speed: Vdc > (410/820V)
46. **ErP4**	Parameter setting error 4 (P13-38 to P13-42 positioning limit setting error)
47. **LP**	Abnormality was detected at low water pressure

NO./Hex	Description	Range	Default

※The following are warnings and not abnormal		
Display		Abnormal content
48. **StoP**	48.StoP	Long press the "STOP" button for more than 5 seconds (StoP)
49. **Fbb**	Fbb	Forward limit
50. **rbb**	rbb	Reversal limit
51. **dnE**	dnE	Operation prohibited
52. **HErr**	HErr	Home not found
53. **FErr**	FErr	Forward limit error
54. **rErr**	rErr	Reverse limit error
55.	–	Reserved
56.	–	Reserved
57.	–	Reserved
58.	–	Reserved
59.	–	Reserved
60.	–	Reserved

NO./Hex	Description	Range	Default
P17-11 221H	Speed command in the event of a failure	0.00–400.00Hz	0.00
P17-12 222H	Output frequency in the event of a failure	0.00–400.00Hz	0.00
P17-13 223H	Motor speed in the event of a fault	–30000 to 30000rpm	0
P17-14 224H	Output voltage in the event of a fault	0.0–1000.0V	0.0
P17-15 225H	Output current in the event of a fault	0.0–3000.0A	0.0
P17-16 226H	DC voltage in the event of a fault	0.0–1000.0V	0.0
P17-17 227H	q-axis current command in the event of a fault	–500.0 to 500.0%	0.0
P17-18 228H	q-axis current in the event of a fault	–500.0 to 500.0%	0.0
P17-19 229H	d-axis current command in the event of a fault	–500.0 to 500.0%	0.0
P17-20 22AH	d-axis current in the event of a fault	–500.0 to 500.0%	0.0
P17-21 22BH	Input terminal status in the event of a fault (Di-Di10, Di9, Di8, Di7, Di6, Di5, Di4, Di3, Di2, Di1)	0–1023	0
P17-22 22CH	Output terminal status in the event of a fault (Do-BK, MC, Fan, Do4, Do3, Do2, Do1, RL2, RL1)	0–511	0
P17-23 22DH	Inverter temperature in the event of a fault	–50.0 to 150.0°C	0.0
P17-24 22EH	Cumulative of runtimes in the event of a failure	0–65535hr	0
P17-25 22FH	Cumulative running hours at the previous failure	0–65535hr	0

NO./Hex	Description	Range	Default
P17-26 230H	Cumulative running hours for the first 2 failures	0–65535hr	0
P17-27 231H	Cumulative running hours for the first 3 failures	0–65535hr	0
P17-28 232H	Cumulative running hours for the first 4 failures	0–65535hr	0
P17-29 233H	Cumulative running hours for the first 5 failures	0–65535hr	0
P17-30 234H	Cumulative running hours for the first 6 failures	0–65535hr	0
P17-31 235H	Cumulative running hours for the first 7 failures	0–65535hr	0
P17-32 236H	AD value of OC when the fault occurs	0–65535	0
P17-33 237H	AD value of VDC when the fault occurs	0–65535	0
P17-34 238H	Reserved	0–65535	0
P17-35 239H	Reserved	0–65535	0

★: Indicates that it can be written during operation.

P18 RS485 communication parameters group			
NO./Hex	Description	Range	Default
P18-00 23AH	Inverter communication address	1–254	1
P18-01 23BH	PC transfer rate	1.0–115.2 Kbps	9.6
P18-02 23CH	Communication data format	0–6	4
0: Modbus ASCII mode, data format <7, N, 2> 1: Modbus ASCII mode, data format <7, E, 1> 2: Modbus ASCII mode, data format <7, O, 1> 3: Modbus RTU mode, data format <8, N, 2> 4: Modbus RTU mode, data format <8, N, 1> 5: Modbus RTU mode, data format <8, E, 1> 6: Modbus RTU mode, data format <8, O, 1>			
P18-03 23DH	Inverter response time	3–50ms	5
P18-04 23EH	Transmission time-out detected	0.1–120.0sec	0.0
P18-05 23FH	Time-out detection processing method	0–3	3
0: Free to stop 1: Decelerate to stop 2: Emergency stop 3: Continue to run (Only display conF)			
P18-06 240H	Receive a failed response code	0–7	0
0: None 1: The address code is wrong 2: Function code error 3: CRC/LRC code error 4: ASCII end code error 5: Parameter address error 6: The parameter value is wrong 7: Write non-modifiable parameters			
P18-07 241H/★	Communication monitoring content 1 selection	0–57	3
P18-08 242H/★	Communication monitoring content 2 selection	0–57	4
P18-09 243H/★	Communication monitoring content 3 selection	0–57	5
P18-10 244H/★	Communication monitoring content 4 selection	0–57	6
P18-11 245H/★	Communication monitoring content 5 selection	0–57	20
P18-12 246H/★	Communication monitoring content 6 selection	0–57	38

NO./Hex	Description	Range	Default
	03H: Read inverter to display parameters (03 21) HEX / content 2100 Abnormal warning code 2101 Operating status 2102 Setting frequency (0.01Hz) 2103 Output frequency (0.01Hz) 2104 Output voltage (0.1V) 2105 Output current (0.1A) Refer to P00-01 for the content of other display parameters.		
P18-13 247H	Reserved	0–65535	0
P18-14 248H	Reserved	0–65535	0

★: Indicates that it can be written during operation.

P19 Memory operating parameter group before power off			
NO./Hex	Description	Range	Default
P19-00 249H	Number of automatic operation cycles at the last shutdown	1–9999	0
P19-01 24AH	Number of automatic running segments at shutdown	–1 to 15	–1
P19-02 24BH	Remaining time of the number of automatic running segments at shutdown	0–60000sec	0
P19-03 24CH	PM last stop position (Qe: Q12)	0–25736	0
P19-04 24DH	PM last stop position (Pulse)	0–65535 Pulse	0
P19-05 24EH	Cumulative boot time (Hours)	0–65535hr	0
P19-06 24FH	Cumulative boot time (Seconds)	0–3599sec	0
P19-07 250H	Cumulative running time (Hours)	0–65535hr	0
P19-08 251H	Cumulative running time (Seconds)	0–3599sec	0
P19-09 252H	Monitor variable also selection backup	0–70	0
P19-10 253H	Position of anchor point at last stop (Direction)	0–1	0
0: Positive 1: Negative			
P19-11 254H	Position of last stop anchor point (Revolution)	0–60000 Rev.	0
P19-12 255H	Position of last stop location (Pulse)	0–65535 Pulse	0
P19-13 256H	Shutdown storage and setting frequency selection	0–1	1
0: Do not remember the frequency before power off 1: Memory frequency before power off			
P19-14 257H	Reserved	0–65535	0
P19-15 258H	Reserved	0–65535	0

★: Indicates that it can be written during operation.

P20 Load mode operating parameter group			
NO./Hex	Description	Range	Default
P20-00 259H	Inverter model display Model (200V/L, 400V/H), Horsepower (HP)	100–299	0
P20-01 25AH	Inverter load mode	0–1	0
0: Heavy duty type, HD (OL: 150% / 60sec) 1: Light load type, ND (OL: 120% / 60sec)			
P20-02 25BH	Reserved	0–65535	0
to P20-11 (264H) Reserved.			
P20-12 265H	High frequency mode	0–1	0
0: 400.00Hz 1: 1200.0Hz (IM: dedicated for high-frequency V/F) (Specified parameters before leaving the factory)			
P20-13 266H	Reserved	0–65535	0
to P20-16 (269H) Reserved.			
P20-17 26AH	Bit 0: Current zero correction during operation Bit 1: Current feedback bandpass filter Bit 2: Estimated flux bandpass filter	0–7	0
P20-18 26BH	Reserved	0–65535	0
P20-19 26CH	Reserved	0–65535	0

★: Indicates that it can be written during operation.

P21 Reserved area for parameter function			
NO./Hex	Description	Range	Default
P21-00 26DH	The flow pattern enters the articulation zone pressure point	0.00–100.00%	0.00
P21-01 26EH	Articulation zone deceleration time	0.00–600.00sec	0.50
P21-02 26FH	The frequency point at which the articulation zone enters the pressure mode.	–20.00 to 100.00%	50.00
P21-03 270H	PID maximum attenuation coefficient in pressure mode	0.00–100.00%	100.00
P21-04 271H	Reserved		
P21-05 272H	Reserved		
P21-06 273H	Corresponding error of PID correction magnification 0	0.00 to P21-08	0.00
P21-07 274H	PID gain correction magnification 0	5.00–100.00%	100.00
P21-08 275H	PID correction magnification 1 corresponding error	0.00–100.00%	100.00
P21-09 276H	PID gain correction magnification 1	5.00–100.00%	100.00
P21-10 277H	Reserved		
P21-11 278H/★	Target length command (integer)	0–6000cm	200
P21-12 279H/★	Target length instruction (mantissa)	0.00–0.99cm	0.00
P21-13 27AH	Encoder-rotation corresponding length	0.00–200.00cm	20.00
P21-14 27BH	Length control mode frequency command 1 switching point	0.0–100.0%	95.0
P21-15 27CH	Length control mode frequency command 2 switching point	0.0–100.0%	98.0
P21-16 27DH	P00-01= 50 (average speed) calculation cycle	0–13	6
P21-17 27EH	Reserved		
P21-18 27FH	Reserved		
P21-19 280H	Reserved		
P21-20 281H	Reserved		

NO./Hex	Description	Range	Default
P21-21 282H/★	PM/SRM magnetic field control KP gain	0.00–100.00%	10.00
P21-22 283H/★	PM/SRM magnetic field controls KI gain	0.00–100.00%	25.00
P21-23 284H	Reserved		
P21-24 285H	Reserved		
P21-25 286H	Reserved		
P21-26 287H	Reserved		
P21-27 288H	Reserved		
P21-28 289H	Reserved		
P21-29 28AH	Reserved		
P21-30 28BH	Reserved		
P21-31 28CH	IM V/F torque limit	0–1	0
0: Invalid 1: Valid			
P21-32 28DH	IM V/F Acceleration and deceleration time when torque limit changes	0.00–100.00sec	2.00
P21-33 28EH/★	IM V/F Torque limit control gain	0.00–100.00%	50.00
P21-34 28FH	IM motor electrical parameter detection mode	0–1	1
0: V/F mode 1: I/F mode			
P21-35 290H	IM1 Closed loop control initial slip limit	0.00–20.00Hz	0.00
P21-36 291H	Reserved		
P21-37 292H	Positioning point correction mode setting	0–1000 Pulse	0
P21-38 293H	Encoder as frequency command	0–1	0
0: Invalid 1: Valid			
P21-39 294H	I/f & SensorLess control interval (encoder is used as frequency command)	0–1200rpm	200
P21-40 295H	I/f & SensorLess control interval (current)	0.00–100.00%	30.00

NO./Hex	Description	Range	Default
P21-41 296H	Positioning point control deceleration mode setting	0–1	0
0: Ramp straight line 1: Sline curve			
P21-42 297H	Synchronous axis current filter setting	0.00–100.00%	0.00
P21-43 298H	Braking current build-up time	0.00–5.00sec	0.10
P21-44 299H	Random PWM dispersion width	0–2000Hz	0
P21-45 29AH	Frequency setting unit selection	0–3	0
0: 0.01Hz 1: 0.01% 2: 1rpm 3: Unitless (P00-03, P00-04)			

★: Indicates that it can be written during operation.
Application Parameters (User Defined) – 00 to 31

P22 User modify settings or define parameters (Ur)			
NO./Hex	Description	Range	Default
P22-00 29BH	– 00	P00-00 to P21-45	0
P22-01 29CH	– 01	P00-00 to P21-45	0
P22-02 29DH	– 02	P00-00 to P21-45	0
P22-03 29EH	– 03	P00-00 to P21-45	0
P22-04 29FH	– 04	P00-00 to P21-45	0
P22-05 2A0H	– 05	P00-00 to P21-45	0
P22-06 2A1H	– 06	P00-00 to P21-45	0
P22-07 2A2H	– 07	P00-00 to P21-45	0
P22-08 2A3H	– 08	P00-00 to P21-45	0
P22-09 2A4H	– 09	P00-00 to P21-45	0
P22-10 2A5H	– 10	P00-00 to P21-45	0
P22-11 2A6H	– 11	P00-00 to P21-45	0
P22-12 2A7H	– 12	P00-00 to P21-45	0
P22-13 2A8H	– 13	P00-00 to P21-45	0
P22-14 2A9H	– 14	P00-00 to P21-45	0
P22-15 2AAH	– 15	P00-00 to P21-45	0
P22-16 2ABH	– 16	P00-00 to P21-45	0
P22-17 2ACH	– 17	P00-00 to P21-45	0
P22-18 2ADH	– 18	P00-00 to P21-45	0
P22-19 2AEH	– 19	P00-00 to P21-45	0
P22-20 2AFH	– 20	P00-00 to P21-45	0
P22-21 2B0H	– 21	P00-00 to P21-45	0
P22-22 2B1H	– 22	P00-00 to P21-45	0
P22-23 2B2H	– 23	P00-00 to P21-45	0
P22-24 2B3H	– 24	P00-00 to P21-45	0

NO./Hex	Description	Range	Default
P22-25 2B4H	– 25	P00-00 to P21-45	0
P22-26 2B5H	– 26	P00-00 to P21-45	0
P22-27 2B6H	– 27	P00-00 to P21-45	0
P22-28 2B7H	– 28	P00-00 to P21-45	0
P22-29 2B8H	– 29	P00-00 to P21-45	0
P22-30 2B9H	– 30	P00-00 to P21-45	0
P22-31 2BAH	– 31	P00-00 to P21-45	0
P22-32 2BBH	User modify settings or define parameter setting mode	0–7	3
Bit 0: 1 ⇨ (P00-00 = 7: display modified setting parameters); 0 ⇨ (Not display) Bit 1: 1 ⇨ (Update and modify the setting parameters); 0 ⇨ (Do not update) Bit 2: 1 ⇨ (Display xx.xx.xx); 0 ⇨ (Urxx.xx)			

Chapter 8 Detailed description of parameters

P00 Display parameter group			
NO./Hex	Item	Range	Default
P00-00 000H	Boot display screen selection	0–7	0

◎ When powering on, the set value is displayed for the start-up item. Use the FUN key as a cycle selection display of 0 to 7.
◎ Refer to 5.3 Digital Operator operating procedures.

0	Enter the frequency setting (F)

🕮 Into the digital operator set target frequency.
🕮 P03-02, P03-03 = 0 (Frequency command 0).

1	Enter the parameter setting mode (P)

Into the parameter group setting mode.

2	Display the operating frequency (H)

Display the current operating frequency.

3	Display output voltage (E)

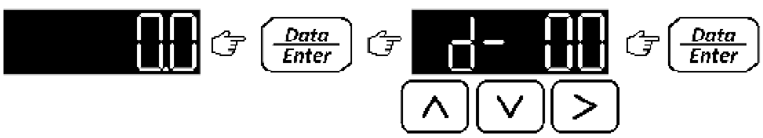
Display output to the motor operating voltage.

4	Display operating current (A)

Display output to the operating current of the motor.

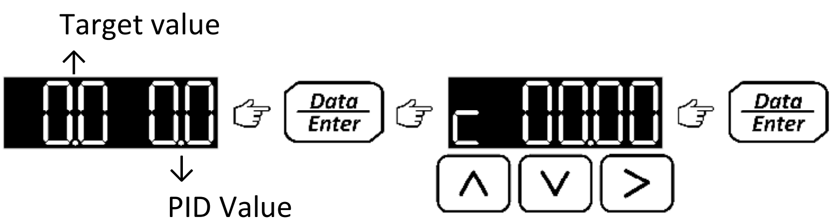
5	Display monitoring content (P00-01)

Press DATA key to change P00-01 (monitoring operation content selection) for display.



6	Display PID monitoring value

🕮 Press the DATA key to change the set target value.
🕮 P14-00 ≠ 0.



7	Display user setting parameters (Ur)

📖 Displays the 32 parameters that the user has changed recently, so that you can query and set parameters quickly.

📖 Only for P22-32 bit 0 = 1, please refer to the description of parameter group P22 for details.

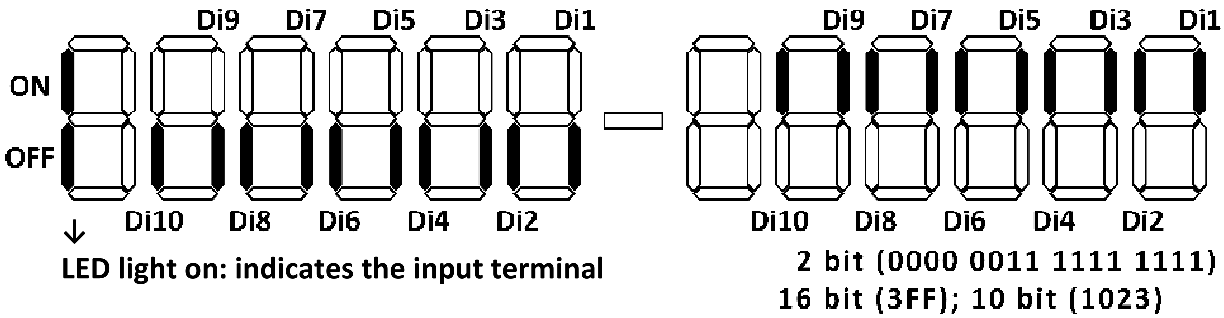
NO./Hex	Item	Range	Default
P00-01 001H/★	Monitoring operation content selection	0–57	0

◎ User-defined multi-function display selection, cooperate with P00-00 = 5: display monitoring content.

▲: There are numbers (–32768 to 32767), not marked as (0–65535)

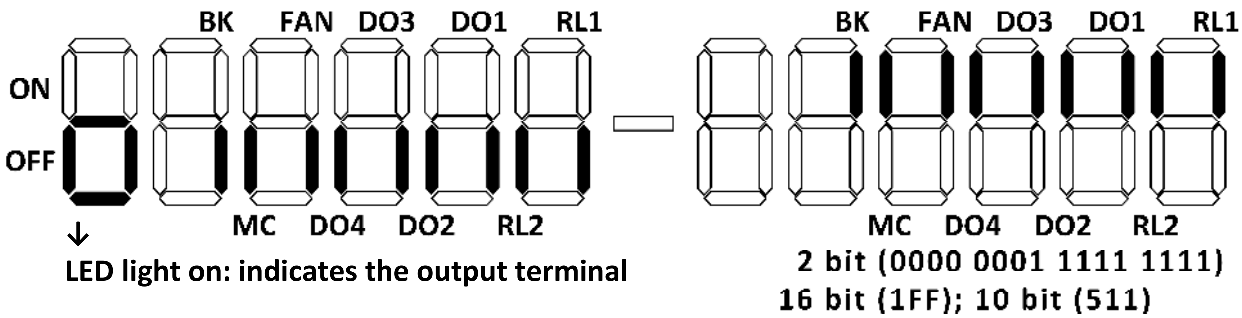
No.	Hex/▲	Content
–	2100	Abnormal warning code
P17-03, Latest abnormality record.		
–	2101	Operating status
Function code 03H (read inverter to display parameters).		
–	2102	Setting frequency (0.01Hz)
–	2103	Output frequency (0.01Hz)
–	2104	Output voltage (0.1V)
–	2105	Output current (0.1A)
00	2106	DC Bus bar voltage (U) (0.1V)
Display the DC voltage value on the capacitor.		
01	2107	Input terminal status (I)

Di (Di10–Di1)

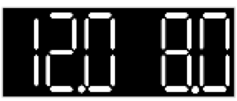


No.	Hex/▲	Content
02	2108	Output terminal status (O)

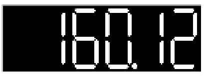
Do (BK (brake), MC (relay), Fan, Do4, Do3, Do2, Do1, RL2, RL1).



▲: There are numbers (–32768 to 32767), not marked as (0–65535)

<table>
<tr><th>No.</th><th>Hex/▲</th><th>Content</th></tr>
<tr><td>03</td><td>2109/▲</td><td>The knob on the AV digital operator (0.01%)</td></tr>
<tr><td colspan="3">Display analog input voltage value. </td></tr>
<tr><td>04</td><td>210a/▲</td><td>AVI analog input command (0.01%)</td></tr>
<tr><td colspan="3">Display AVI analog input terminal of the signal value.</td></tr>
<tr><td>05</td><td>210b/▲</td><td>ACI analog input command (0.01%)</td></tr>
<tr><td colspan="3">Display the signal value of ACI analog input terminal.</td></tr>
<tr><td>06</td><td>210c/▲</td><td>AUX analog input command (0.01%)</td></tr>
<tr><td colspan="3">Display the signal value of AUX analog input terminal.</td></tr>
<tr><td>07</td><td>210d/▲</td><td>Ao1 analog output (0.01%)</td></tr>
<tr><td colspan="3">Display analog output voltage value.</td></tr>
<tr><td>08</td><td>210e</td><td>Ao2 analog output (0.01%)</td></tr>
<tr><td colspan="3">Display analog output voltage value.</td></tr>
<tr><td>09</td><td>210f/▲</td><td>Pulse input (0.01%)</td></tr>
<tr><td colspan="3">Pulse wave input percentage.</td></tr>
<tr><td>10</td><td>2110</td><td>Pulse output (0.01%)</td></tr>
<tr><td colspan="3">Percentage of pulse output.</td></tr>
<tr><td>11</td><td>2111</td><td>Display temperature (0.1°C)</td></tr>
<tr><td colspan="3">Displays the temperature of the heat sink inside the drive.</td></tr>
<tr><td>12</td><td>2112</td><td>Display unitless 1 (reference frequency) (U)</td></tr>
<tr><td colspan="3">🕮 To the frequency up limit as the benchmark, set to mechanical operation unitless percentage or speed ratio output display, can be P00-03, P00-04 as a proportion set.
🕮 The digital operator is displayed in forward rotation (U) and reversed in display (–).</td></tr>
<tr><td>13</td><td>2113</td><td>Display unitless 2 (actual speed) (U)</td></tr>
<tr><td colspan="3">🕮 Displays the actual motor speed (frequency command-slip) percentage or speed, which can be set proportionally by P00-03 and P00-04.
🕮 Unitless display 1 > unitless display 2, the opposite is true when the motor has compensation
🕮 The digital operator is displayed in forward rotation (U) and reversed in display (–).</td></tr>
<tr><td>14</td><td>2114/▲</td><td>Encoder speed (rpm)</td></tr>
<tr><td colspan="3">Displays the speed value of Motor Encoder.</td></tr>
<tr><td>15</td><td>2115/▲</td><td>Estimated speed (rpm)</td></tr>
<tr><td colspan="3">🕮 Displays the estimated speed value at the sensorless vector control.
🕮 rpm = 120 × f / Pole number (IM1: P10-18), (IM2: P11-18), (PM/SRM: P12-05)</td></tr>
<tr><td>16</td><td>–</td><td>PID command/feedback value display (P14-32, P14-33)</td></tr>
<tr><td colspan="3">
P14-32, P14-33 PID feedback value</td></tr>
<tr><td>17</td><td>2117/▲</td><td>PID command amount display value</td></tr>
<tr><td colspan="3">Displays the target value of the system. (P14-34, 14-35)</td></tr>
</table>

▲: There are numbers (–32768 to 32767), not marked as (0–65535)

<table>
<tr><th>No.</th><th>Hex/▲</th><th>Content</th></tr>
<tr><td>18</td><td>2118/▲</td><td>PID feedback amount display value</td></tr>
<tr><td colspan="3">Displays the feedback value of the system. (P14-34, 14-35)</td></tr>
<tr><td>19</td><td>2119/▲</td><td>PID error display value (P14-34, 14-35)</td></tr>
<tr><td colspan="3">Error display value = PID command amount (17) – PID feedback amount (18)</td></tr>
<tr><td>20</td><td>211a/▲</td><td>PID control output amount (0.01%)</td></tr>
<tr><td colspan="3">Displays the PID output of the system (%).</td></tr>
<tr><td>21</td><td>211b</td><td>U phase operating current (0.1A)</td></tr>
<tr><td colspan="3">Run the display Driving Motor U-PHASE Current value.</td></tr>
<tr><td>22</td><td>211c</td><td>V phase operating current (0.1A)</td></tr>
<tr><td colspan="3">Run the display Driving Motor V-PHASE Current value.</td></tr>
<tr><td>23</td><td>211d</td><td>W phase operating current (0.1A)</td></tr>
<tr><td colspan="3">Run the display Driving Motor W-PHASE Current value</td></tr>
<tr><td>24</td><td>211e/▲</td><td>Output power (0.01%) for motor</td></tr>
<tr><td colspan="3">Displays the percentage of drive motor power.</td></tr>
<tr><td>25</td><td>211f</td><td>Automatic program operation (xxxx times . xx section) (0.01)</td></tr>
<tr><td colspan="3">🕮 Displays the automatic mode of operation, the number of cycles currently performed, the number of segments of the trip (with the parameter group P16).
🕮 (Number of cycles 0–9999) xxxx times. xx (Segment speed 0–15), display mode.
For example: Circulate 160 times, run 12 steps, as shown below.

</td></tr>
<tr><td>26</td><td>2120</td><td>Di pulse wave input count value (c)</td></tr>
<tr><td colspan="3">Display the count value (Di = 60: counter signal input), after the accumulated value is full (P07-16) set value, return to zero and count again.</td></tr>
<tr><td>27</td><td>2121</td><td>PT100 temperature (t) (0.1°C)</td></tr>
<tr><td colspan="3">🕮 The temperature value of the positive temperature sensor (PT100) built into the motor or system is displayed.
🕮 Expansion card-HMOD03-A1, HMOD04-A1. (Option to buy)</td></tr>
<tr><td>28</td><td>2122</td><td>Encoder Z count</td></tr>
<tr><td colspan="3">🕮 Display encoder Z pulse wave count value.
🕮 Feedback board (Option to buy).</td></tr>
<tr><td>29</td><td>2123</td><td>Encoder AB count</td></tr>
<tr><td colspan="3">🕮 With Encoders AB pulse wave quadruple count, zero-counting after full.
🕮 Feedback board (Option to buy).</td></tr>
<tr><td>30</td><td>2124</td><td>Reading value of resolver 5012B</td></tr>
<tr><td colspan="3">🕮 The reading value of the resolver is correct only when it is stopped.
🕮 Feedback board (Option to buy).</td></tr>
<tr><td>31</td><td>2125</td><td>Encoder Z pulse number</td></tr>
<tr><td colspan="3">🕮 Displays the pulse number of encoder Z.
🕮 Feedback board (Option to buy).</td></tr>
<tr><td>32</td><td>2126</td><td>Motor (mechanical) origin angle (Z pulse (31) – P13-44 (pulse wave))</td></tr>
<tr><td colspan="3">The display parameter (P13-44) sets the Z-phase offset angle, which is the number of the origin pulse waves of the motor or machine.</td></tr>
</table>

▲: There are numbers (–32768 to 32767), not marked as (0–65535)

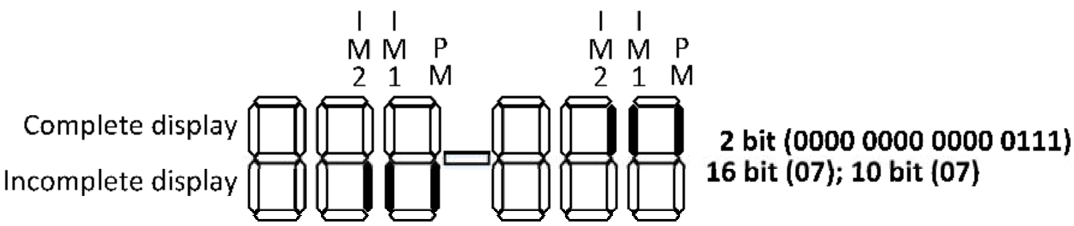
No.	Hex/▲	Content
33	2127	Positioning point command value (revolution)
Display the command value of the positioning point (rev).		
34	2128	Positioning point command value (pulse wave)
Display positioning point command value (pulse).		
35	2129	Positioning point feedback value (revolution)
The feedback value (revolution) of the positioning point is displayed.		
36	212a	Positioning point feedback value (pulse wave)
The feedback value (pulse wave) of the positioning point is displayed.		
37	212b	Inverter model code display

🕮 Show the model code of the drive (L: 200V / H: 400V)
🕮 Communication code reading value (1: 200V / 2: 400V)

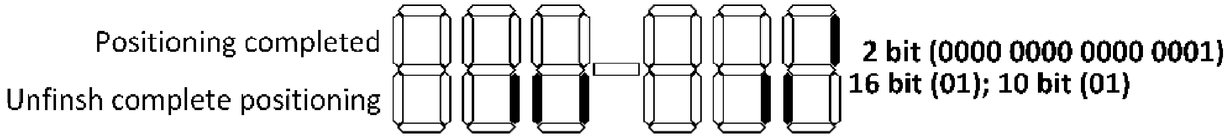
L	**1**00	**1**01	**1**02	**1**03	**1**04	**1**05	**1**06	**1**07	**1**08	**1**09	**1**10	**1**11	**1**12	**1**13	**1**14
H	**2**00	**2**01	–	**2**02	**2**03	**2**04	**2**05	**2**06	**2**07	**2**08	**2**09	**2**10	**2**11	**2**12	**2**13
HP	0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.5	10	15	20	25	30	40	50
L	**1**15	**1**16	**1**17	**1**18	**1**19	**1**20	**1**21	**1**22	**1**23	–	–	–			
H	**2**14	**2**15	**2**16	**2**17	**2**18	**2**19	**2**20	**2**21	**2**22	**2**23	**2**24	**2**25			
HP	60	75	100	125	150	175	215	250	300	375	420	475			

For example:
220V/2HP, the digital operator displays L2.0, and the communication code reads 103.

No.	Hex/▲	Content
38	212c	Inverter rated current display (0.1A)
Display rated current of the inverter.		
39	212d	Running motor display
The currently controlled motor type is displayed. 0: PM/SRM 1: IM1 2: IM2		
40	212e	Parameter detection completion flag
The motor parameter auto-tuning completion flag is displayed.		



▲: There are numbers (–32768 to 32767), not marked as (0–65535)

No.	Hex/▲	Content
41	212f	Positioning completed flag
Using the positioning point method (P13-00), the positioning completion flag.  		
42	2130/▲	Torque current command (0.01% for Inv)
Percentage of torque current command to control the motor.		
43	2131/▲	Torque current (0.01% for Inv)
Display torque current of the motor output control percentage.		
44	2132	PM electrical angle (0.1 degree)
Displays the electrical angle of the PM motor.		
45	2133	PM/SRM excitation angle (0.1 degree)
Display the excitation angle of PM/SRM motor.		
46	2134	Unitless display 3 (set frequency) (U)
Setting frequency (P00-03, P00-04).		
47	2135	Length integer (L _ xxxx cm)
Length control mode displays length integers.		
48	2136	Length mantissa (l_ _ 0.xx cm)
Length control mode displays the length in decimals.		
49	2137	Length (L xxxx.x cm)
Length control mode displays the length.		
50	2138/▲	Average speed (rpm): Calculation cycle (P21-16)
Displays the average calculation cycle speed value of the motor Encoder.		
51	2139	Software version (0.01)
Display inverter software version (**113.12**)		
52	213a	Communication monitoring variable 1 (P18-07)
53	213b	Communication monitoring variable 2 (P18-08)
54	213c	Communication monitoring variable 3 (P18-09)
55	213d	Communication monitoring variable 4 (P18-10)
56	213e	Communication monitoring variable 5 (P18-11)
57	213f	Communication monitoring variable 6 (P18-12)
After setting parameters P18-07 (52) to P18-12 (57), the communication contents from 2100h (0) to 2139h (57) will be displayed.		
58		Reserved
59		Reserved
60–79: Reserved		

NO./Hex	Item	Range	Default
P00-02 002H/★	Monitoring content filtering time	0–13	6

◎ Filter time to filter out the display value of low bit.

NO./Hex	Item	Range	Default
P00-03 003H/★	Unitless display corresponding value	1–60000	18000
P00-04 004H/★	Unitless display decimal point	0–3	1

◎ Set a magnification value, which can display the output value of the final machine actual speed (rpm) after linear speed, feed speed or motor speed is reduced by the reduction ratio.

For example:

If the output frequency of the conveyor belt is 60.0Hz, the conveying speed is 920.0 m/min, then set P00-03 = 9200, P00-04 = 1.

When the output of the inverter is from 0.0 to 60.0Hz, the conveying speed of the conveyor belt is from 0.0 to 920.0 m/min.

P01 Basic control parameter group			
NO./Hex	Item	Range	Default
P01-00 005H	Inverter rated current display	2.0–2000.0A	#####

◎ Display the rated current value of the inverter (read only).

NO./Hex	Item	Range	Default
P01-01 006H	RST Input voltage	230V:150.0–250.0 460V:300.0–500.0	220.0 440.0

◎ Please set the input voltage of the system and confirm the rated input voltage level of the inverter.

NO./Hex	Item	Range	Default
P01-02 007H	Parameter lock/Reset settings	0–19	0

◎ Users can reset the inverter to the original factory setting value in the following way.
◎ 2-wire: P07-02 = 0, 1, 3, 4
3-wire: P07-02 = 2

00	Read/write mode of all parameter values
01	All parameter values are read only mode
This function can lock the parameter content, which can only be displayed but cannot be changed.	
02	Reset all parameters to 2-wire type (Note 1), but the motor parameter group is not called back (Note 2)
	
03	Reset all parameters to 3-wire type (Note 1), but the motor parameter group is not called back (Note 2)
	

Note 1:
The parameters are not called back (P01-01, P01-11, P01-31 to P01-33, P10-01 to P10-10, P10-13 to P10-25, P10-36, P11-01 to P11-10, P11-13 to P11-25, P11-36, P12-01 to P12-13)

04	Reset all parameters to 2-wire 220/440V

05	Reset all parameters to 3-wire 220/440V

06	Reset all parameters to 2-wire 200/415V

07	Reset all parameters to 3-wire 200/415V

08	Reset all parameters to 2-wire 200/380V

09	Reset all parameters to 3-wire 200/380V

◎ Select the reset item according to the input voltage.
◎ After resetting, modify the V/F curves of IM1 (P10) and IM2 (P11) according to the situation.

After reset project		4, 5	6, 7	8, 9
P01-01	RST Input voltage	220/440V	200/415V	200/380V
P10-02	IM1-Maximum output voltage/V4	220/440V	200/415V	200/380V
P10-04	IM1-Intermediate voltage 2/V3	220/440V	200/415V	200/380V
P10-06	IM1-Basic voltage/V2	220/440V	200/415V	200/380V
P10-13	IM1-Rated line voltage	220/440V	200/415V	200/380V
P11-02	IM2-Maximum output voltage/V4	220/440V	200/415V	200/380V
P11-04	IM2-intermediate voltage 2/V3	220/440V	200/415V	200/380V
P11-06	IM2-Basic voltage/V2	220/440V	200/415V	200/380V
P11-13	IM2-Rated line voltage	220/440V	200/415V	200/380V
P12-01	PM/SRM-Rated line voltage	220/440V	200/415V	200/380V

10	Copy parameters from the digital operator EEPROM 0 to the control board EEPROM (Note 3)

11	Save all parameters to the digital operator EEPROM 0 (Note 3)

12 Save all parameters to the EEPROM of the control board

When the inverter parameters are written by the communication mode, the communication code can be divided into stored in EEPROM or not stored. When the communication code not stored in EEPROM is used, the parameters are not memorized after the inverter is powered off. The memory parameter is set before power off.

13 Clear abnormal history

When the inverter is running, abnormal phenomena will be recorded, and setting this parameter will clear all abnormal contents stored in the memory.

14 Copy parameters from the digital operator EEPROM 1 to the control board EEPROM (Note 3)

15 Save all parameters to the digital operator EEPROM 1 (Note 3)

16 Copy parameters from the digital operator EEPROM 2 to the control board EEPROM (Note 3)

17 Save all parameters to the digital operator EEPROM 2 (Note 3)

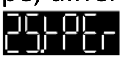
18 Copy parameters from the digital operator EEPROM 3 to the control board EEPROM (Note 1)

19 Save all parameters to the digital operator EEPROM 3 (Note 3)

20 Copy all parameters to the control board EEPROM 1

21 Store all parameters to the control board EEPROM 1

◎ To copy the parameters, you must first save the (11, 15, 17, 19) parameters to the digital operator, and then use the (10, 14, 16, 18) digital operator to copy the EEPROM of the control board of the same model.

◎ Must be of the same type, different models cannot be duplication parameter (so fault code: 25. tPEr ). ※P20-00

◎ P19-14 = 8888, instruction 21 will be displayed.

◎ The parameters are stored in the control board EEPROM 1 by command 21, and the parameter values can be called back by command 20.

NO./Hex	Item	Range	Default
P01-03 008H	Motor selection	0–3	0

0	IM1 induction motor
1	PM (BLDC) synchronous motor
2	SRM synchronous reluctance motor
3	PMA-SRM magnetic reluctance motor

NO./Hex	Item	Range	Default
P01-04 009H	IM1 control mode setting	0–3	0

◎ When using PG control, P01-31 ≠ 0, otherwise it will not be displayed even if parameter 2 and 3 are set.

◎ When auto-tuning needs to be executed, please execute it first and then run, otherwise it will trip abnormal 39. nAut 

◎ P10 control parameter group.

0	V/F control (V/F)
	🕮 Not attached PG of the V/F pattern (Open loop), a drive motor is generally no need to adjust the parameters of the motor case. 🕮 This mode is used for all variable speed control that does not require fast response and precise speed control, and the use of one inverter to connect multiple motors. 🕮 Zero speed torque setting P01-18 = 3, Braking current before stopping (P01-00 × P02-13).
1	Sensorless vector control (SVC)
	🕮 When using sensorless vector control, please execute (Motor operation) parameter auto-tuning function adjustment. 🕮 This control mode is used for applications requiring high speed control accuracy. Even if the feedback signal of the motor is not used, the torque response is fast, and a large torque can be obtained when the low-speed motor is running. 🕮 Zero speed torque setting P10-26, P10-27.
2	V/F + PG control (V/FPG)
	🕮 V/F control with PG, with speed compensation, simple closed-loop speed control, its accuracy is higher than V/F mode. 🕮 This control mode is used for applications that do not require fast speed response, but require high speed control accuracy. 🕮 Zero speed torque setting P01-18 = 3, Braking current before stopping (P01-00 × P02-13). 🕮 Feedback board. (Option to buy)
3	Vector + PG control (FOCPG)
	🕮 When using closed loop vector control, please execute (Motor operation) parameter auto-tuning function adjustment. 🕮 The closed loop current vector control with PG has the characteristics of fast torque response and high precision speed control. 🕮 Zero speed torque setting P10-37. 🕮 Feedback board. (Option to buy)

NO./Hex	Item	Range	Default
P01-05 00AH	IM2 control mode setting	0–1	0

◎ With parameter P07-×× Di-44: cutover IM2, to start control IM2 motor and (P11-××) control parameter group.

0	V/F control (V/F)
Same as P01-04.	
1	Sensorless vector control (SVC)
Same as P01-04, Zero speed torque setting P11-26, P11-27.	

NO./Hex	Item	Range	Default
P01-06 00BH	PM/SRM control mode setting	0–1	0

◎ Please execute (Motor running) parameter auto tuning function., otherwise it will trip abnormal 39. nAut 
◎ P10, P12 control parameter group.

0	Sensorless vector control (SVC-PM/SRM)
🕮 This control mode is used for general variable speed control applications that do not require high responsiveness and precise speed control. The inverter can control the IPM motor, SPM motor or SRM motor within the speed control range of 1 : 20. 🕮 Zero speed torque setting P12-26, P12-28.	
1	Vector + PG control (FOCPG-PM/SRM)
🕮 This control mode requires a constant torque for high-precision control when used in PM/SRM motors, as well as all variable speed controls for speed, torque response and high performance torque control. The speed control range is 1 : 1500 a speed feedback signal from the motor is required. 🕮 Zero speed torque setting P10-37. 🕮 Feedback board. (Option to buy)	

NO./Hex	Item	Range	Default
P01-07 00CH	Motor parameter auto tuning function	0–3	0

◎ After the electrical parameter auto-tuning is completed, if the rated parameters of the motor nameplate are modified and set, electrical parameter auto-tuning shall be performed again.
◎ After the detection of electrical parameters 1 to 3 is completed, the set value automatically becomes 0.
◎ The display failure detection failure code 15. AutF 
◎ P21-34, detection mode selection.

0	No auto tuning function
1	Static operation-electrical parameter auto tuning
🕮 This parameter is automatically tuned by the internal static (motor does not run) parameter, which can automatically measure the electrical characteristics of the motor and store the motor parameters in the electrical parameter group. 🕮 Without running measurement, the motor no-load power must be input stream P10-25 (Motor 1) / P11-25 (Motor 2). 	

2	Dynamic operation-electrical parameter auto tuning

🕮 This parameter is automatically tuned by internal static parameters and automatically tuned by dynamic (Motor operation) parameters, which can be detected by motor parameters without load or under 50% load. The motor electrical characteristics can be automatically measured and the motor parameters are stored in the electrical parameters.

Note: When this parameter is automatically detected, the motor will run, please pay attention to safety.

🕮 After execution, please check the following parameter groups:

Motor	Reference number
IM1	P10-19 to P10-25, P10-36
IM2	P11-19 to P11-25, P11-36
PM/SRM	P12-01, P12-06 to P12-13, P10-36

3	Mechanical parameter auto tuning (Only vector + PG control is valid)

🕮 Perform this test when there is an encoder, assort with P01-08 (Setting of mechanical parameter detection current).

🕮 Feedback board (Option to buy)

Note: When this parameter is automatically detected, the motor will run, please pay attention to safety.

NO./Hex	Item	Range	Default
P01-08 00DH	Mechanical parameter detection current setting	0.250–1.000pu	0.400

◎ When the mechanical parameters are automatically detected, this parameter gives a starting torque current value to start the motor and detect the mechanical inertia of the motor.

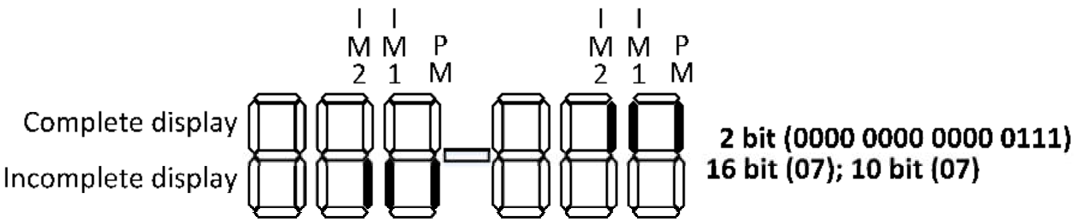
◎ The set value can be the original factory set value, if you need to adjust it, please do not set it too large.

NO./Hex	Item	Range	Default
P01-09 00EH/★	Parameter detection-acceleration time ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P01-10 00FH/★	Parameter detection-deceleration time ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0

◎ Dynamic parameter detection-acceleration/deceleration time setting, please set the acceleration /deceleration time according to the motor capacity, load and regenerator energy.

NO./Hex	Item	Range	Default
P01-11 010H	Parameter detection complete flag	0–7	0

◎ After the static and dynamic parameters are automatically tuned, they will be displayed as a flag.



NO./Hex	Item	Range	Default
P01-12 011H	IM magnetic field loop bandwidth	10.0–200.0 rad/s	25.0

◎ This parameter controls the responsivity of the magnetic field. A small bandwidth will result in a slow response; a large bandwidth will result in a fast response. If the bandwidth is set too large, the magnetic field will diverge and the speed response will be poor.

NO./Hex	Item	Range	Default
P01-13 012H	IM magnetic field control start frequency	0.001–1.000pu	0.050

◎ Turn on the magnetic field control mode above the starting frequency point. (0.000: invalid)

For example:

Motor rated frequency 60.0Hz × 0.100 = 6.0Hz is the starting frequency of magnetic field control.

NO./Hex	Item	Range	Default
P01-14 013H	Magnetic braking energy setting during IM deceleration	0.0–60.0%	0.0

◎ IM control mode (P01-04, P01-05) are all valid.

◎ When inertia is generated during deceleration, increase the modulating amount of the output magnetic field to increase the loss of the motor end and shorten the deceleration time without braking resistor.

◎ With parameter P09-05, the stall prevention voltage level setting during deceleration (350 to 370V) can effectively shorten the deceleration time.

NO./Hex	Item	Range	Default
P01-15 014H	IM energy saving efficiency control mode	0–2	0

0	Invalid
1	Effective
By the parameter set valid.	
2	Enable by external terminal
Controlled by external terminal (Di) input.	

NO./Hex	Item	Range	Default
P01-16 015H	IM efficiency control allowable level	40.0–100.0%	100.0

◎ When the energy-saving efficiency control mode is turned on, operate in normal mode during acceleration and deceleration; use no-load current and torque current during constant speed operation to automatically adjust the magnetic field to reduce the current, and the minimum allowable current is 40% of the no-load current (P01-16). When 100% is set, it will not start.

◎ This function is not suitable for frequent load changes, or close to the rated load of the motor during operation.

◎ Please set the minimum allowable level according to the motor load rate. If the motor vibrates, please adjust the allowable level upwards.

NO./Hex	Item	Range	Default
P01-17 016H/★	IM V/F oscillation suppression factor	0.0–100.0%	15.0

◎ The suppressor motor will have current oscillations in a particular area (Do not adjust the large).

NO./Hex	Item	Range	Default
P01-18 017H	IM V/F fe < fe0 voltage output mode	0–3	2

◎ fe: output frequency, fe0: P10-09, P11-09.

0	No output
fe < fe0, and the voltage is not output.	
1	Ratio output
fe < fe0, and output as a ratio from V/F curve.	
2	Output with V0
fe < fe0, the voltage value set with V0 (P10-10, P11-10) is output.	
3	Perform DC braking (P02-13)
Output current = P01-00 (Inverter rated current) × P02-13 (Braking current before stopping)	

NO./Hex	Item	Range	Default
P01-19 018H/★	IM V/F torque compensation gain	0.00–100.00%	5.00

◎ When the control mode is IM V/F mode, it is the post torque compensation gain controller of V/F curve (P10-01 to 10, P11-01 to 10). Do not set too large, so as to avoid overcurrent compensation to the motor. In the high frequency (1200.0Hz) mode, it is invalid.

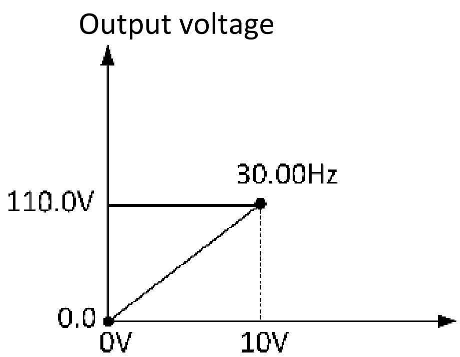
NO./Hex	Item	Range	Default
P01-20 019H	IM V/F Set voltage gain	0–5	0

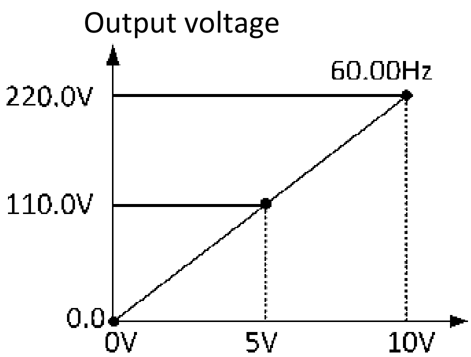
◎ When the output frequency is fixed, the output voltage is proportional to the setting of the following parameters.

0	Invalid
1	AV The knob on the digital operator (AV)
2	AVI analog signal –10 to 10V input
3	ACI analog signal 4–20mA/0–10V input
4	AUX analog isolation signal –10 to 10V input
5	Pulse input (P06-00)

For example:

When the output frequency is 30.00Hz, the output voltage varies from 0 (0.0V) to 10 (110.0V).
When the output frequency is 60.00Hz, the output voltage varies from 0 (0.0V) to 10 (220.0V).





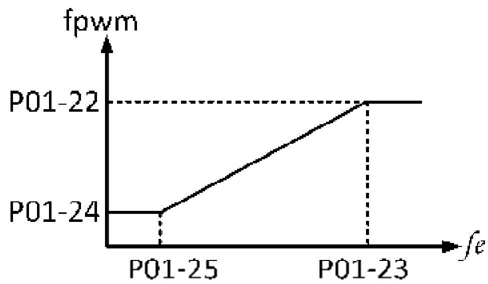
NO./Hex	Item	Range	Default
P01-21 01AH	UVW output phase sequence setting	0–1	0

◎ This parameter setting changes the direction of the motor operation without adjusting the positive/reverse signal or changing the UVW sequence of the output line for switching.

0	UVW
1	UWV

NO./Hex	Item	Range	Default
P01-22 01BH	Carrier frequency upper limit	1000–15000Hz	****
P01-23 01CH	Carrier frequency upper limit turning point	0.00–400.00Hz	60.00
P01-24 01DH	Carrier frequency lower limit	1000–15000Hz	****
P01-25 01EH	Carrier frequency lower limit turning point	0.00 to P01-23 Hz	0.00

◎ The higher the carrier frequency, the smaller the mechanical noise of the motor, but the greater the leakage current of the motor, and the greater the noise generated by the inverter.
◎ The higher the carrier frequency, the more energy the inverter consumes and the higher the temperature rise of the inverter.
◎ In the system using inverter, if mechanical resonance occurs, the setting value of carrier frequency can also be adjusted to improve.
◎ The setting value of carrier frequency should be more than 8 times of the target frequency.



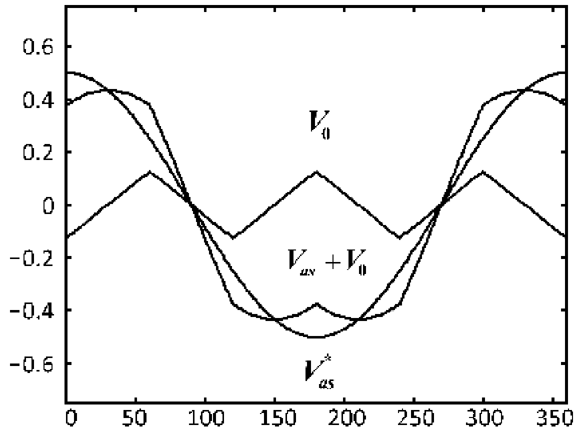
Phenomenon	Countermeasure
Large speed deviation or torque deviation at low speed	Reduce carrier frequency
When the noise generated by the inverter affects the surrounding machines	
The The leakage current generated by the inverter is large	
Long wiring distance between inverter and motor	
The electromagnetic noise generated by the motor is large	Increase carrier frequency P21-44

NO./Hex	Item	Range	Default
P01-26 01FH	PWM Overvoltage modulation	100.0–105.0%	100.0

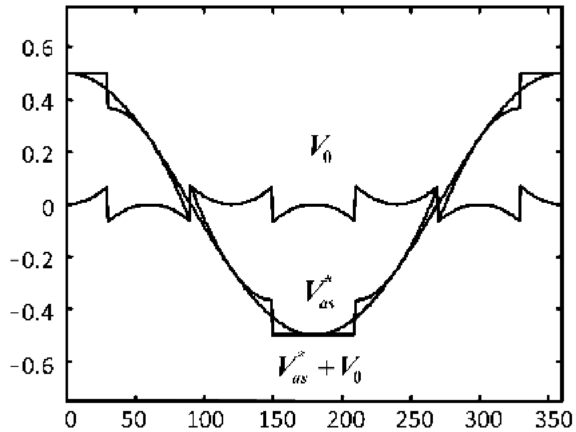
◎ Compensate (U. V. W) output voltage to obtain higher output voltage gain. The voltage values of P10-06, P10-04 and P10-02 must be enlarged and set at the same time.

NO./Hex	Item	Range	Default
P01-27 020H	PWM Modulation mode	0–2	0

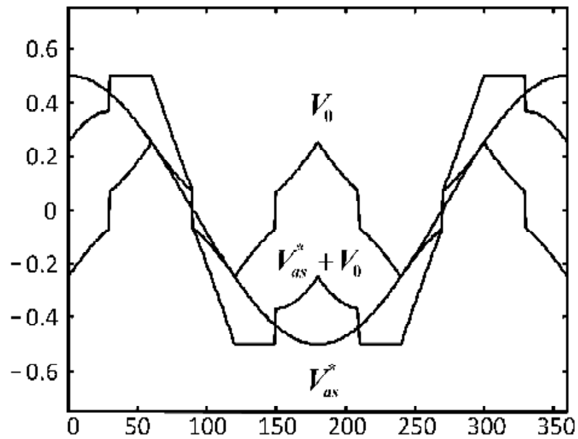
0	Three-phase modulation
The use of three-phase modulation drive motor can obtain the smoothest current output and quieter operation, with low noise and large switching loss.	



1	Two-phase modulation (6)
The application of two-phase modulation technology can reduce the number of IGBT switches and reduce the switching loss of the cutover.	



2	Two-phase modulation (12)
The application of two-phase modulation technology can reduce the number of IGBT switches and reduce the switching loss of the cutover.	



NO./Hex	Item	Range	Default
P01-28 021H	Current loop bandwidth	0.0–1500.0 rad/s	1000.0

◎ Vector control mode is effective.

◎ This parameter is the current bandwidth controller, which adjusts the current to respond quickly and slowly.

NO./Hex	Item	Range	Default
P01-29 022H	Current prediction compensation	0–1	1

0	Invalid
1	Effective

NO./Hex	Item	Range	Default
P01-30 023H	Speed PI controller allowable saturation depth	0.00–50.00%	5.00

◎ The speed PI controller oscillates when the torque is saturated, the allowable saturation depth can be set to ease the oscillation of the torque saturation.

NO./Hex	Item	Range	Default
P01-31 024H	Encoder type	0–6	0

◎ Feedback board. (Option to buy)

0	No feedback
1	ABZ
2	PG-5012B
Special encoder, pulse number 4096.	
3	PG-4096-A
Special encoder, the pulse number needs to be selected and burned before leaving the factory.	
4	Reserved
5	AB phase, A: pulse wave, B: direction (2 times resolution)
6	AB phase, A: pulse wave, B: direction (1 times resolution)

NO./Hex	Item	Range	Default
P01-32 025H	Encoder-pulse number/revolution	1–16384 p/rev	1024

◎ Set the encoder pulse rate per revolution p/rev.

NO./Hex	Item	Range	Default
P01-33 026H	Encoder-direction setting	0–1	0

0	A leads B
A/B phase pulse column, A-phase ahead b phase 90 degrees positive turn (Positive and negative edge trigger) (4 octave frequency).	
1	B leads A
A/B phase pulse wave column, B phase leads A phase 90 degrees is reverse (Positive and negative edge trigger) (4 times frequency).	

※ When the motor parameters are Auto-tuning, the encoder A/B phase sequence direction can be automatically measured.

NO./Hex	Item	Range	Default
P01-34 027H	Encoder-number of molecular gear (load side)	0–60000	0
P01-35 028H	Encoder-denominator gear (motor side)	0–60000	0

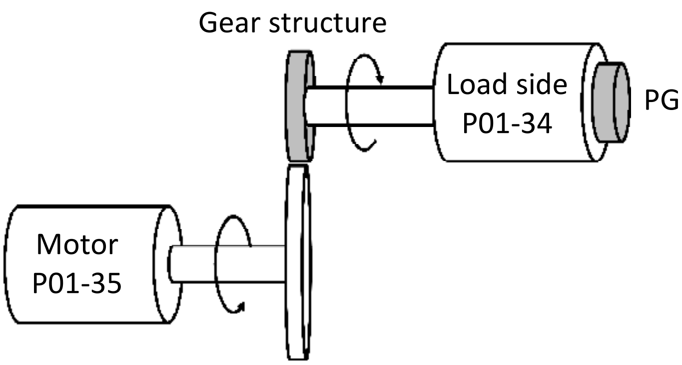
◎ Only V/F + PG control effective.
◎ When the encoder and motor shaft are connected by gears.
◎ Setting motor and PG gear ratio between the number (Speed reduction ratio). P01-35 are the gear ratios on the motor side, and P01-34 are the gear ratios on the mechanical side. When setting the ratio, use the following formula inside the inverter to control the speed feedback calculation of the motor speed.

Motor speed [min] =

$$\frac{(PG\ input\ pulse\ number \times 60)}{PG\ pulse\ number} \times \frac{Load\ side\ gear}{motor\ side\ gear\ number}$$

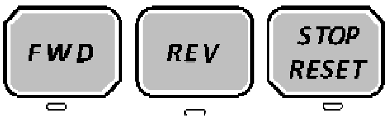
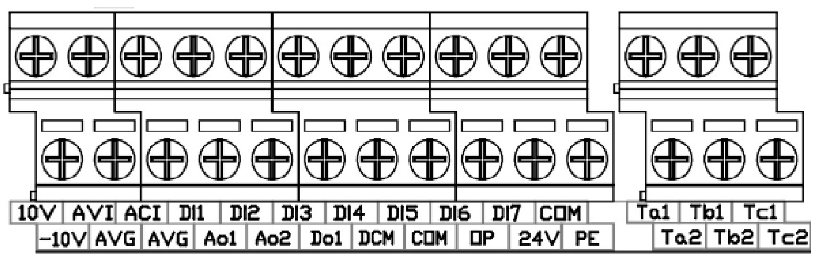
∗When either side is set to "0", the gear reduction ratio = 1

Encoder gear number conversion:



P02 Control operation command source parameter group			
NO./Hex	Item	Range	Default
P02-00 029H	Operation command source 1	0–3	0

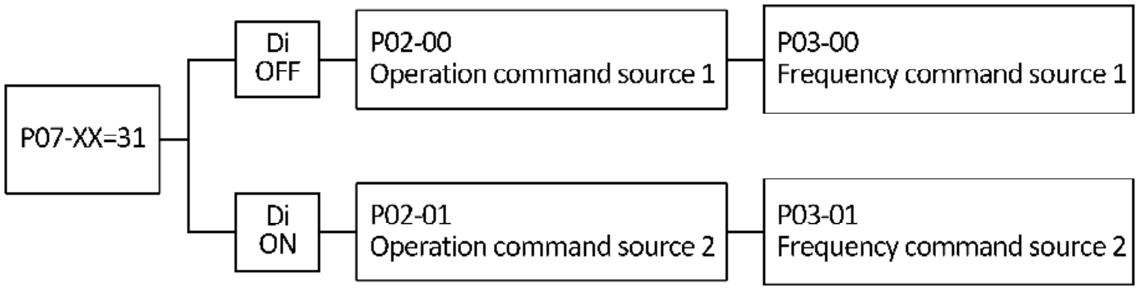
◎ Select the operation command mode of the inverter, and determine the source of the control start operation signal.

<table>
<tr><td>0</td><td>Digital operator (keypad operator)</td></tr>
<tr><td colspan="2">The inverter starts to run, forward, reverse, and stop running are controlled by the keypad operator. 
</td></tr>
<tr><td>1</td><td>External control terminal (Di)</td></tr>
<tr><td colspan="2">The inverter starts to run, forward, reverse and stop are controlled by digital input Di terminal.

</td></tr>
<tr><td>2</td><td>RS485 communication</td></tr>
<tr><td colspan="2">Input control commands through RS485 communication control mode. Refer to the description of parameter group P18 for related command codes and wiring.</td></tr>
<tr><td>3</td><td>Main frequency command (except frequency command 0)</td></tr>
<tr><td colspan="2">1. P03-02 or P03-03 ≠ 0.
2. When the absolute value of the frequency command > P02-19, it enters the RUN state, and the running direction is determined by the sign of the frequency command. (P03-04 = 3: Negative bias can be reversed)
3. When the absolute value of the frequency command ≤ P02-19, enter the STOP state.
4. When P02-02 = 1, press the STOP key on the manipulator during operation to enter the STOP state. When returning to the control right, adjust the absolute value of the frequency command to < P02-19 and keep it for more than 0.1 seconds before returning to normal control.
5. When P02-03 = 1, if the absolute value of the frequency command > P02-19 when starting up, it will not enter the RUN state. It is necessary to adjust the absolute value of the frequency command to < P02-19 and keep it for more than 0.1 seconds before returning to normal control.
6. When an abnormality occurs, just adjust the absolute value of the frequency command to < P02-19 and keep it for more than 1.0 seconds, then the abnormal state will be automatically released and normal control will resume. Please "be careful of the automatic release of abnormal functions" and pay attention to safety.</td></tr>
</table>

NO./Hex	Item	Range	Default
P02-01 02AH	Operation command source 2	0–3	1

◎ The operation instructions are the same as P02-00.

◎ Description of the cutover of operation command source 1 and 2 (Switching control by digital input Di terminal).



NO./Hex	Item	Range	Default
P02-02 **02BH**	Keypad operator STOP button selection	0–1	1

◎ When the running command is input from terminal or communication, this parameter can enable or disable the stop key of the digital operator.

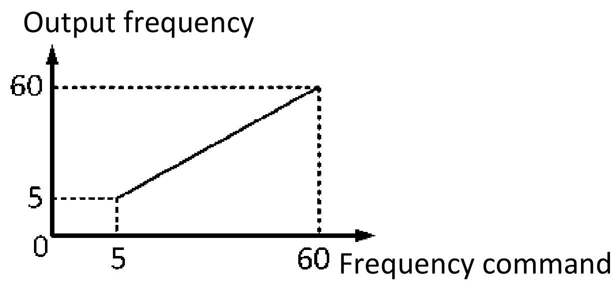
0	The keyboard STOP key is invalid
When the operation command is input from the terminal or by communication, the stop key of the keypad operator is invalid.	
1	The keyboard STOP key is valid
Stop key is valid at any time.	

NO./Hex	Item	Range	Default
P02-03 **02CH**	Start terminal operation command lock	0–1	0

0	Operable
The power is turned on, if the operation command exists, the drive will execute the operation.	
1	Not working
When the power is turned on, if the operation command exists, the drive does not perform the operation, and the operation command must be executed again.	

NO./Hex	Item	Range	Default
P02-04 **02DH**	Activite method	0–1	0

0	Start from 0Hz
Frequency command ≥ P03-07, output frequency. **For example:** P03-07 = 5.00Hz, when the frequency command ≥ 5.00Hz, output frequency.	



0	Flying Re-start activation

- 🕮 It means that the inverter detects the motor speed frequency from the idling motor, and then puts it into operation from this frequency point. This method can reduce the reverse impact of the motor regeneration current at startup.
- 🕮 It is suitable for punches, fans and other inertia loads. For example, the punch machine usually has a flywheel with a large inertia. The general stop method, such as the free running stop, if you want to start again at this time, you must wait for 2 to 5 minutes or more before the flywheel will stop, so apply this parameter function , No need to wait for the flywheel to stop, it can detect the motor speed frequency and execute the operation to start the flywheel.
- 🕮 Display bb 

NO./Hex	Item	Range	Default
P02-05 02EH	DC braking time at start	0.00–120.00sec	0.00
P02-06 02FH/★	Brake current before starting	0.00–100.00%	30.00

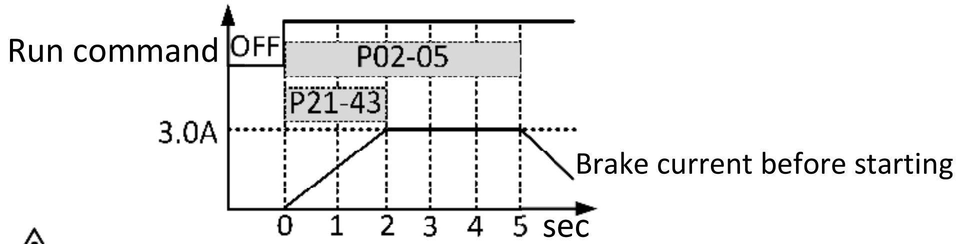
◎ P02-04 = 1 Invalid.

◎ Brake current before starting, limited to 1.25 times the rated motor current. (P01-00 × P02-06)

◎ P21-43 (Braking current build-up time).

For example: P01-00 = 10.0, P02-05 = 5.00, P02-06 = 30.00, P21-43 = 2.00

3.0A = 10.0 × 30.00



WARNING

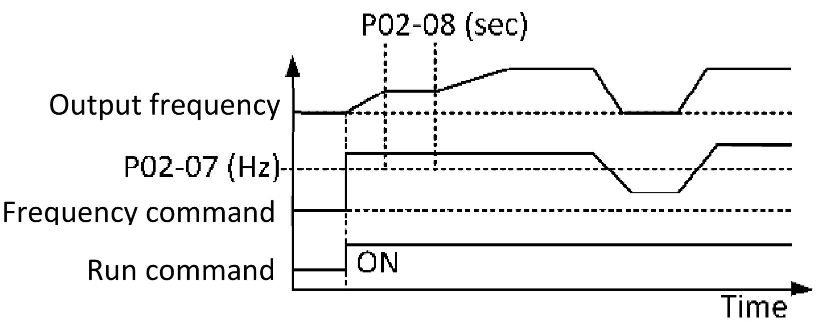
Please do not use the DC brake of the drive as a mechanical hold, which may cause injury.

NO./Hex	Item	Range	Default
P02-07 030H	When starting-dwell speed	0.00–400.00Hz	0.00
P02-08 031H	At start-dwell speed retention time	0.00–120.00sec	0.00

◎ P02-04 = 1 Invalid. It works only when the operation command is input again after each stop.

◎ During acceleration, when accelerating to the frequency set by P02-07, keep the frequency at the time set by P02-08, and then continue to accelerate to the target frequency value.

◎ When decelerating, it can cooperate with the setting of P02-15 and P02-16.



NO./Hex	Item	Range	Default
P02-09 032H/★	Positioning steady-state damping gain 1 (position)	10.00–100.00%	70.00

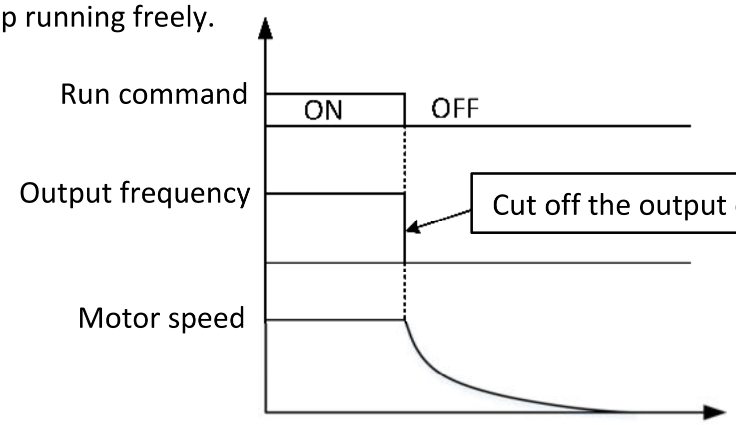
◎ P10-38, 39 × P02-09, to suppress the vibration of the motor after positioning. (P13 group)

NO./Hex	Item	Range	Default
P02-10 033H/★	Positioning steady-state damping gain 2 (speed)	10.00–100.00%	70.00

◎ P10-43, 44 × P02-10, to suppress the vibration after the motor stops. (P13 group)

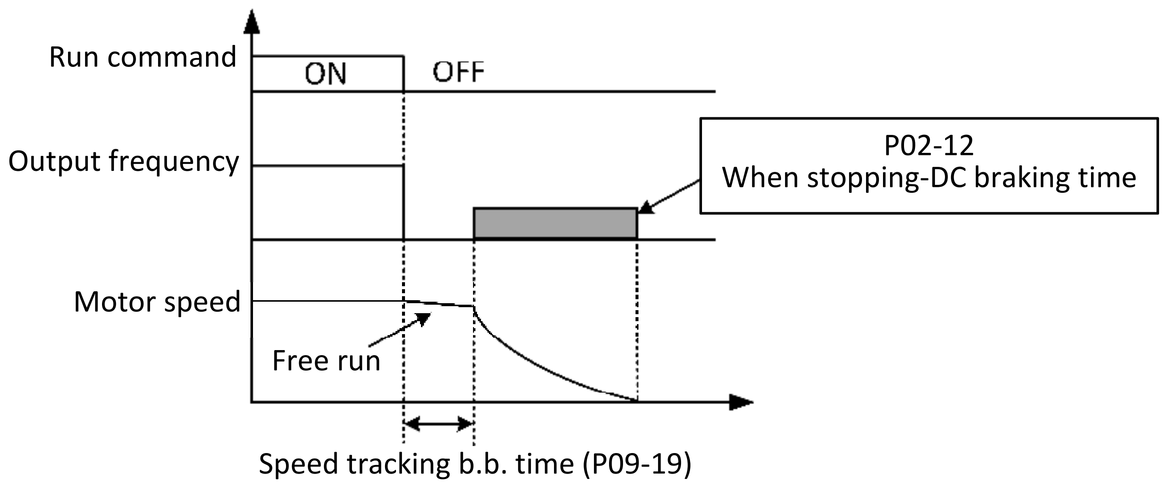
NO./Hex	Item	Range	Default
P02-11 034H	Stop mode	0–3	0

0	Decelerate to stop
Decelerate and stop the motor according to the rate of deceleration time.	
1	Free running stop
When the stop command (run command off) is input, the inverter cuts off the output. Inertia of the motor and load and mechanical friction resistance, the determined deceleration rate makes it stop running freely.	



2	DC braking stops in all areas

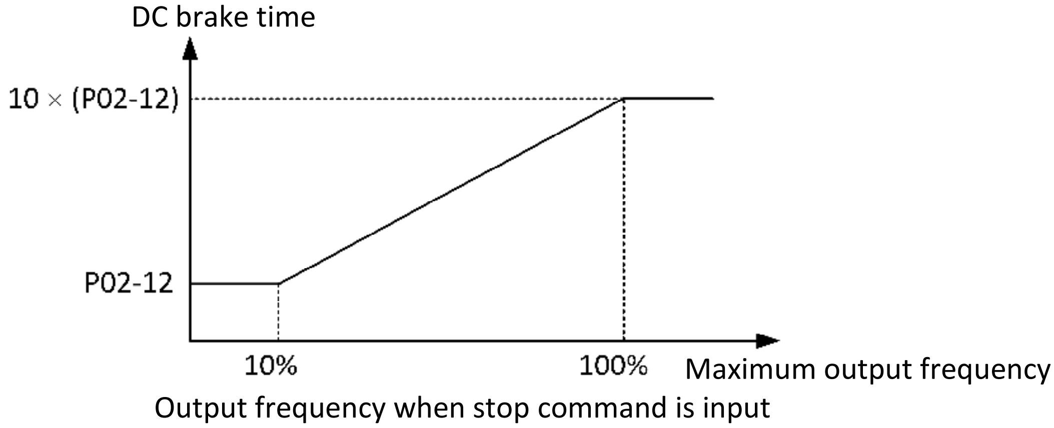
🕮 When the stop command (Run command off) is input, after the time set in P09-19 (Speed tracking b.b. time), the current set in P02-13 (Braking current before stopping) is applied to the motor to perform DC braking stop. Compared with the free running stop, the DC brake stop time is shorter in all areas.



📖 The DC brake time, determined by the then output frequency and the setting of P02-12 (When stopping-DC braking time), is determined by the stop command being entered, as follows.

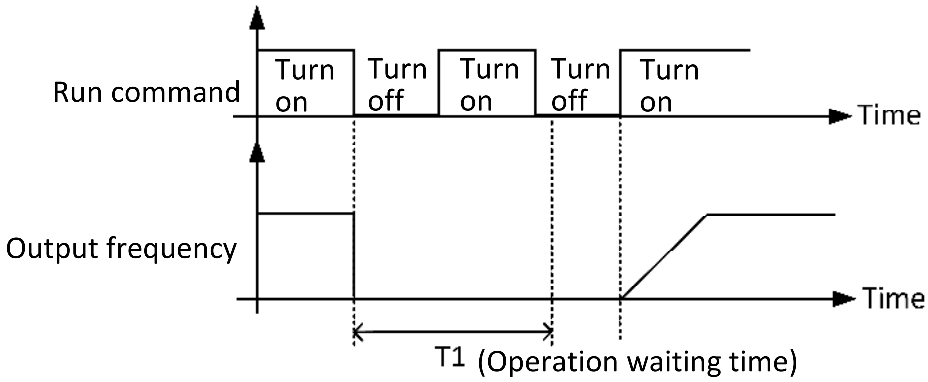
$$\text{DC braking time} = \frac{\text{(P02-12)} \times 10 \times \text{Output frequency}}{\text{Maximum output frequency}}$$

📖 Input when the DC braking is stopped when an overcurrent occurs, please P09-19 (Speed tracking b.b. time) is set to extend.

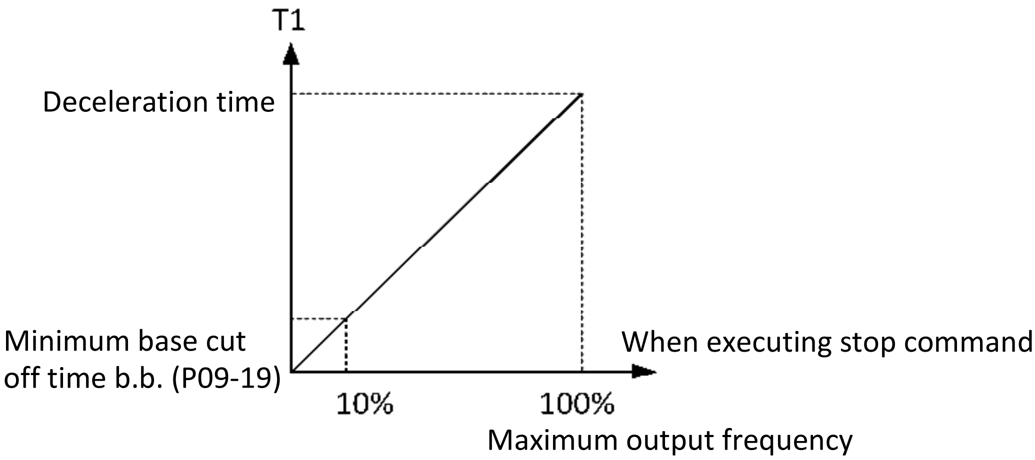


3	Free running stop with timing function

📖 When the operation command is disconnected, the inverter will cut off the base and the motor will stop freely. If the run command is activated before the run waiting time is reached, the inverter will not execute the run and the run command will be ignored.



📖 When the running command is disconnected, the running waiting time (T1) is determined by the deceleration time (P04-02, P04-04, P04-06, P04-08) and the output frequency.



NO./Hex	Item	Range	Default
P02-12 035H	When stopping-DC braking time	0.00–120.00sec	0.00
P02-13 036H/★	Braking current before stopping	0.00–100.00%	30.00
P02-14 037H	Braking start frequency when stopping ※V/F	0.00–60.00Hz	0.00

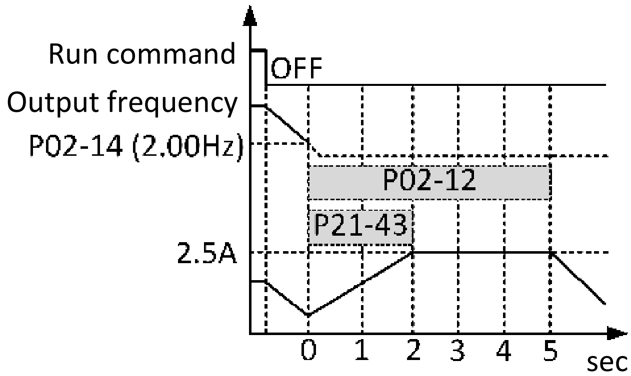
◎ When decelerating to the frequency set by P02-14, DC braking will start. (V/F control is effective)

◎ Braking current before stopping, limited to 1.25 times the rated motor current. (P01-00 × P02-13)

◎ P21-43 (Braking current build-up time).

For example: P01-00 = 10.0, P02-12 = 5.00, P02-13 = 25.00, P21-43 = 2.00, P02-14 = 2.00

2.5A = 10.0 × 25.00



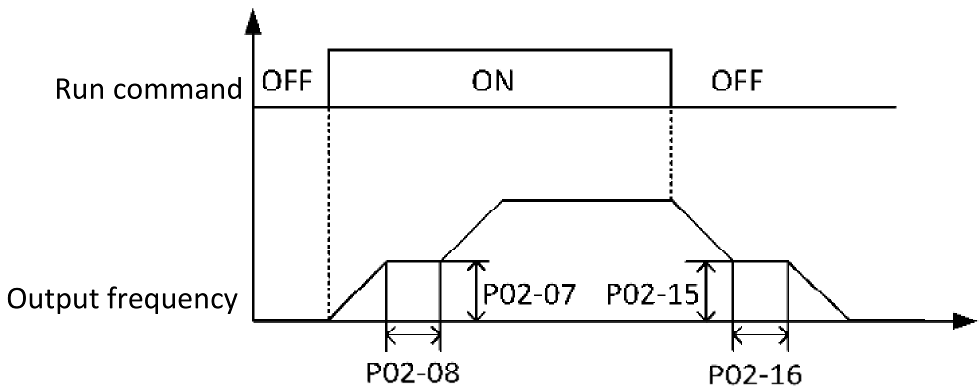
NO./Hex	Item	Range	Default
P02-15 038H	When stopping-dwell speed	0.00–400.00Hz	0.00
P02-16 039H	When stopping-dwell speed retention time	0.00–120.00sec	0.00

◎ When decelerating to the frequency set by P02-15 during deceleration, keep the frequency at the time set by P02-16, and then continue decelerating.

◎ When accelerating, it can cooperate with the setting of P02-07 and P02-08.

◎ When using the DWELL function when stopping, please set P02-11 (Stop method selection) to 0 (Deceleration stop).

◎ When starting or stopping under heavy load, temporarily maintain the set output frequency to prevent the motor from falling into a stall state. In addition, in driving PM when the motor is accelerating, the oscillation state can be suppressed by pausing. The action of the DWELL function is shown in the figure below:



NO./Hex	Item	Range	Default
P02-17 03AH	Current decrease time at shutdown (100%)	0.00–10.00sec	0.00

◎ When decelerating to stop, the motor will have exciting current and there is noise, setting this parameter can extend the stopping time to reach the exciting current subside.

◎ P02-11 = 0 is valid, IM and PM/SRM are applicable.

NO./Hex	Item	Range	Default
P02-18 03BH	Reserved	0.00–120.00sec	0.30

NO./Hex	Item	Range	Default
P02-19 03CH	Main frequency command running level	0.00–100.00%	5.00

◎ P02-00, P02-01 = 3.

P03 Frequency (speed) command source parameter group			
NO./Hex	Item	Range	Default
P03-00 03DH	Frequency command source 1	0–8	0

◎ Parameter P03-00 is the source of the speed command of the inverter drive motor. According to the requirements of the control system, the main speed calculator function can be selected and set with P03-02 and P03-03. The maximum output frequency is based on the setting of P03-06 (Upper limit of output frequency).

◎ When set to 2–6 and P03-02 = 0, P03-03 = 0 function items, if you want to set the frequency, it cannot be operated by the digital operator keyboard.

0	Main speed calculator input S1
Set by the option of P03-02 main speed calculator S1 as the source of frequency command.	
1	Main speed calculator input S2
Set by the option of P03-03 main speed calculator S2, as the source of frequency command.	
2	Main speed calculator addition S1 + S2
Set by the options of S1 (P03-02) and S2 (P03-03), according to percentage (%) used an adder to do calculations as the source of the frequency command.	
3	Main speed calculator subtraction S1 – S2
🕮 Set by the options of S1 (P03-02) and S2 (P03-03), according to percentage (%) used a subtractor to do calculations as the source of the frequency command. 🕮 Calculation is negative, if set P03-04 = 3 (Negative bias can be reversed), it will run at reverse speed. Please refer to P03-04 = 3.	
4	Main speed calculator multiplication S1 × S2
Set by the options of S1 (P03-02) and S2 (P03-03), the percentage (%) is used as the source of the frequency command for multiplication calculation.	
5	Maximum value of main speed calculator Max {S1, S2}
Set by the options of S1 (P03-02) and S2 (P03-03), the maximum value is the source of the frequency command.	
6	Minimum value of main speed calculator Min {S1, S2}
Set by the options of S1 (P03-02) and S2 (P03-03), the minimum value is the source of the frequency command.	
7	AVI/ACI/AUX input (Choose 1 from 3, specify Di)
🕮 AUX is isolated analog signal input (Option to buy). 🕮 Switch AVI, ACI, AUX (P07-XX = 52, 53, 54) as the source of frequency command by external Di input. When two or more Di commands are turned on at the same time, it will be invalid and no action.	

8	When the encoder is used as a frequency command (P21-38 = 1, Sensorless vector control)

🕮 Auto-tuning must be performed, P21-38 = 1, otherwise an exception error (PGE) will occur.
🕮 When the encoder speed ≤ P21-39, the Pulse change of the encoder will be used as the change of the motor's electrical angle command.
- The Mechanical Handwheel is connected to the encoder to adjust the pulse to the command value to change the forward angle of the motor.
- Torque current: (P10-14 or P11-14) × P21-40

🕮 When the encoder speed > P21-39, the encoder speed will be used as the speed command.
- It is the speed mode of sensorless vector control.
- Low speed zone torque compensation P10-26 or P11-26.

🕮 A feedback card and control line must be installed.
🕮 P01-31 (Encoder type) = 1: ABZ
🕮 P01-32 (Encoder-pulse number/revolution) defines how many pulses the motor needs to make one revolution.
🕮 P01-33 (Encoder-direction setting).
🕮 Applicable to Mechanical Handwheel (A, A –; B, B–).

NO./Hex	Item	Range	Default
P03-01 03EH	Frequency command source 2	0–8	1

◎ The parameter function is the same as P03-00.
◎ Frequency command source 2-switched by external terminal Di, ON: P03-01 / OFF: P03-00.

NO./Hex	Item	Range	Default
P03-02 03FH	Main speed calculator input S1	0–5	0

◎ When RS485 is used as the frequency command source, the parameter is P03-02, P03-03 = 0, and the frequency parameter position P03-08 is written.

0	Frequency command 0 (P03-08)
Controlled by the increment and decrement keys of the operator, the modified frequency will be stored in parameter P03-08.	
1	Analog signal on AV digital operator
Controlled by the potentiometer (V.R) signal DC 0–5V on the operator.	
2	AVI analog signal (–10 to 10V)
Controlled by analog input terminal AVI input analog voltage signal DC –10 to 10V.	
3	ACI analog signal (4–20mA/0–10V)
Controlled by analog input terminal ACI input analog current signal DC 4–20mA or DC 0–10V.	
4	AUX analog isolation signal (0–10V)
🕮 Controlled by analog input terminal AUX input analog voltage signal DC 0–10V. 🕮 AUX board. (Optional to buy).	
5	Pulse wave signal input (P06-00)
🕮 A pulse sequence signal of up to 30KHz can be accepted into the input terminal RP. As a frequency command (P06-00). 🕮 Pulse wave signal board. (Optional to buy).	

NO./Hex	Item	Range	Default
P03-03 040H	Main speed calculator input S2	0–5	1

◎ The parameter function is the same as P03-02.

NO./Hex	Item	Range	Default
P03-04 041H	Rotation direction restriction	0–3	0

0	Forward and Reversed
1	Only forward
The motor decelerates to stop when the reversed rotation command is issued.	
2	Only reversed
The motor decelerates to stop when the forward rotation command is issued.	
3	Negative bias can be reversed
When the analog input signal value is working in the negative bias frequency region, the motor is in reverse rotation, and when working in the positive frequency region, the motor is in forward rotation. at this time, the forward and reverse commands are used as operation commands without direction control.	

NO./Hex	Item	Range	Default
P03-05 042H	Output frequency lower limit setting × (fe4)	0.00–100.00%	0.00
P03-06 043H	Output frequency upper limit setting × (fe4)	0.00–100.00%	100.00

◎ **fe4 illustrate:**

IM1: fe4 = P10-01; P01-03 = 0 (IM)
IM2: fe4 = P11-01; P07-03 to P07-12 = 44, Di (ON)

PM/SRM:

$$fe4 = \frac{P12\text{-}05 \times P12\text{-}03}{120} \times \frac{P12\text{-}00}{100.00\%}$$; P01-03 = 1 to 3 (PM/SRM)

◎ Output frequency lower limit = fe4 × P03-05
◎ Output frequency upper limit = fe4 × P03-06
◎ Increase P10-01, P11-01, P12-00 can increase the upper limit value.

NO./Hex	Item	Range	Default
P03-07 044H	Start frequency	0.00–400.00Hz	0.00

◎ With P02-04 = 0, the frequency command ≥ P03-07 when the frequency inverter is output.
◎ P21-45 (Frequency setting unit selection), only the digital operator displays the unit change.

NO./Hex	Item	Range	Default
P03-08 045H/★	Frequency command 0	0.00–400.00Hz	60.00
P03-09 046H/★	Frequency command 1	0.00–400.00Hz	0.00
P03-10 047H/★	Frequency command 2	0.00–400.00Hz	0.00
P03-11 048H/★	Frequency command 3	0.00–400.00Hz	0.00
P03-12 049H/★	Frequency command 4	0.00–400.00Hz	0.00
P03-13 04AH/★	Frequency command 5	0.00–400.00Hz	0.00
P03-14 04BH/★	Frequency command 6	0.00–400.00Hz	0.00
P03-15 04CH/★	Frequency command 7	0.00–400.00Hz	0.00
P03-16 04DH/★	Frequency command 8	0.00–400.00Hz	0.00
P03-17 04EH/★	Frequency command 9	0.00–400.00Hz	0.00
P03-18 04FH/★	Frequency command 10	0.00–400.00Hz	0.00
P03-19 050H/★	Frequency command 11	0.00–400.00Hz	0.00
P03-20 051H/★	Frequency command 12	0.00–400.00Hz	0.00
P03-21 052H/★	Frequency command 13	0.00–400.00Hz	0.00
P03-22 053H/★	Frequency command 14	0.00–400.00Hz	0.00
P03-23 054H/★	Frequency command 15	0.00–400.00Hz	0.00
P03-24 055H/★	Jogging frequency command	0.00–400.00Hz	6.00

◎ The inverter can switch speeds of up to 17 speeds through 16 frequency commands and 1 inching frequency command.

◎ Through the frequency command of the multi-function input terminal, the jog frequency command takes precedence over other frequency commands NO. 0–15.

◎ Multi-function contact input terminal Di setting: P07-03 to P07-12 = 3–9.

◎ Refer to P04-01 to P04-08 and P04-11 for the acceleration and deceleration time corresponding to the frequency command.

◎ P21-45 (Frequency setting unit selection), only the digital operator displays the unit change.

◎ The following table shows the switching relationship between multi-speed frequency and digital input terminal Di.

Speed	Di settings					Frequency command	NO.
	9	6	5	4	3		
	Jogging	Speed 4	Speed 3	Speed 2	Speed 1		
0	0	0	0	0	0	command 0	P03-08
1	0	0	0	0	1	command 1	P03-09
2	0	0	0	1	0	command 2	P03-10
3	0	0	0	1	1	command 3	P03-11
4	0	0	1	0	0	command 4	P03-12
5	0	0	1	0	1	command 5	P03-13
6	0	0	1	1	0	command 6	P03-14
7	0	0	1	1	1	command 7	P03-15
8	0	1	0	0	0	command 8	P03-16
9	0	1	0	0	1	command 9	P03-17
10	0	1	0	1	0	command 10	P03-18
11	0	1	0	1	1	command 11	P03-19
12	0	1	1	0	0	command 12	P03-20
13	0	1	1	0	1	command 13	P03-21
14	0	1	1	1	0	command 14	P03-22
15	0	1	1	1	1	command 15	P03-23
16	1	0	0	0	0	Jogging command	P03-24

0: OFF, 1: ON,

NO./Hex	Item	Range	Default
P03-25 056H	Frequency skip 1	0.00–400.00Hz	0.00
P03-26 057H	Frequency skip 2	0.00–400.00Hz	0.00
P03-27 058H	Frequency skip 3	0.00–400.00Hz	0.00
P03-28 059H	Frequency skip width	0.00–10.00Hz	0.00

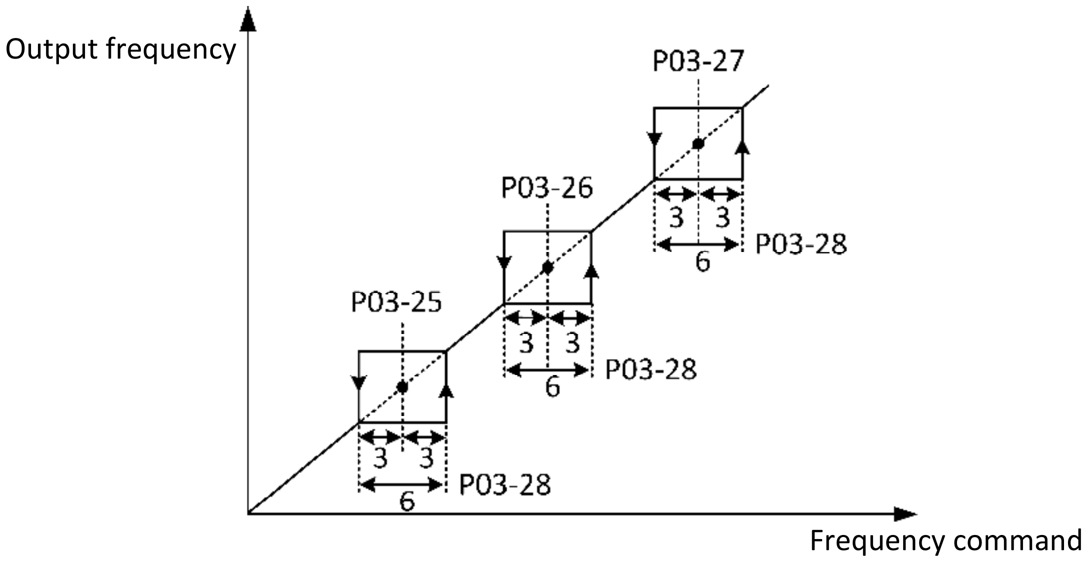
◎ Jump frequency and jump frequency width, this function is specifically designed to avoid in certain frequencies, mechanical systems or motors will occur coshocky vibration, in the increase and subtraction speed, it is bound to pass, but prohibited to stay in this area of operation.

◎ If the jump frequency width is set to 0.00Hz, all jump frequency points have no effect.

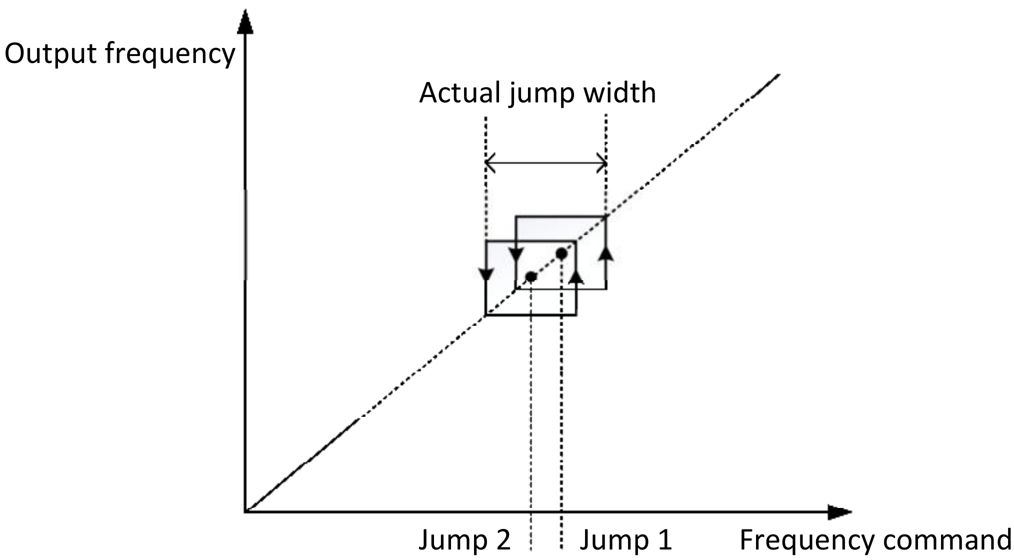
◎ The condition of jumping frequency must matching P03-25 ≤ P03-26 ≤ P03-27, must be set and operated in order.

◎ P21-45 (Frequency setting unit selection), only the digital operator displays the unit change.

Frequency skip width = 1/2 (P03-28) ⇦ Frequency skip ⇨ 1/2 (P03-28)



The frequency points of the hopping frequencies 1, 2 and 3 can also be overlapped in part or all areas to increase the bandwidth of different sections, and as a one-point or two-point hop frequency area.



Jump frequency overlap area

NO./Hex	Item	Range	Default
P03-29 05AH	Disturbance skipping frequency	0.00–400.00Hz	0.00
P03-30 05BH	Disturbance frequency width	0.00–10.00Hz	0.00

◎ When these two parameters are set, the drive will operate in the frequency change mode as shown in the figure below. While these two parameters are specific to textile machinery application.

◎ The vertex frequency of the triangular wave Fup = (Main frequency F) + (P03-29) + (P03-30).

◎ Valley frequency of triangular wave Fdown = (Main frequency F) – (P03-29) – (P03-30).

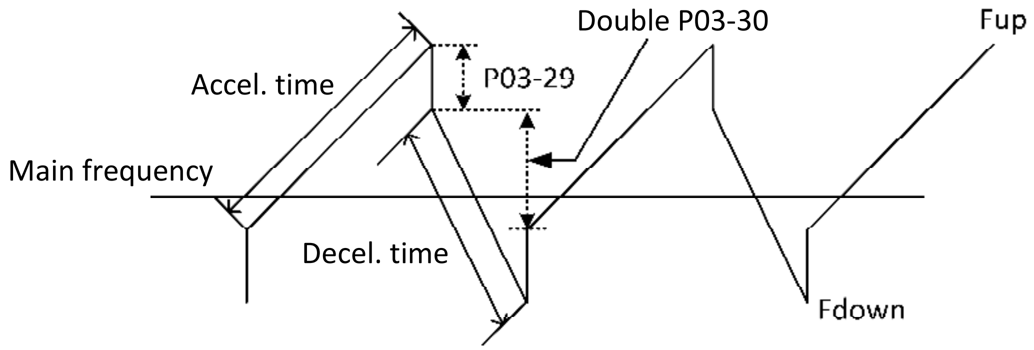
◎ P21-45 (Frequency setting unit selection), only the digital operator displays the unit change.

For example :

Main frequency = 30.0Hz, P03-29 = 10.0Hz, P03-30 = 6.0Hz

The vertex frequency of the triangular wave Fup = 30.0 + 10.0 + 6.0 = 46.0Hz

Valley frequency of triangular wave Fdown = 30.0 – 10.0 – 6.0 = 14.0Hz



NO./Hex	Item	Range	Default
P03-31 05CH	Low load-high speed function ※P03-09	0.000–4.000	0.000
P03-32 05DH	Low load current level ※P01-00	0.00–100.00%	50.00

◎ Apply to cable car system of the main crane, the size of the car, the low-load high-speed function application.

◎ P03-31 = 0.000: invalid, only valid when P03-09 (Frequency command 1) is activated.

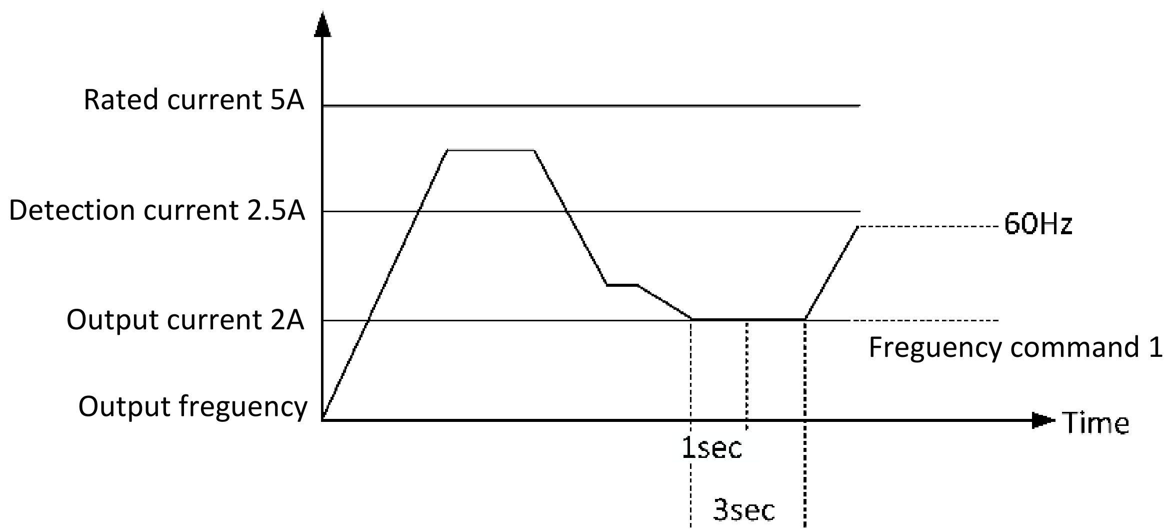
◎ When P03-31 > 0, execute (Frequency command 1) within the first 3 seconds after the constant speed, there will be a continuous 1 second output current < P01-00 × P03-32, at this time frequency command = Frequency command 1 × P03-31.

For example:

When the motor load current ≤ P01-00 × P03-32 low load current level, the high-speed function frequency = P03-09 × P03-31, and the upper limit frequency of P03-06 must be ≥ high-speed function frequency.

For example:

P01-00 (inverter rated current) = 5A; P03-31 = 2.000; P03-32 = 50%; P03-09 (Frequency command 1) = 30.00Hz, When executing (Frequency command 1), the output current is 2A < (5 × 50% = 2.5A) for 1 second continuously, at this time frequency command = 30 × 2 = 60Hz



P04 Acceleration and deceleration time parameter group			
NO./Hex	Item	Range	Default
P04-00 05EH	Acceleration and deceleration time unit	0–1	1

◎ Set the decimal point of the time unit.

0	0.01sec (0.00–600.00)
1	0.1sec (0.0–6000.0)

NO./Hex	Item	Range	Default
P04-01 05FH/★	Acceleration time 0 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-02 060H/★	Deceleration time 0 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-03 061H/★	Acceleration time 1 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-04 062H/★	Deceleration time 1 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-05 063H/★	Acceleration time 2 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-06 064H/★	Deceleration time 2 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-07 065H/★	Acceleration time 3 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0
P04-08 066H/★	Deceleration time 3 ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0

◎ It is used to set the acceleration and deceleration time of the motor. P10-01, P11-01, P12-00 (Maximum output frequency) is the reference frequency time.

◎ Refer to P04-11 for the relationship between acceleration and deceleration time and frequency command.

NO./Hex	Item	Range	Default
P04-09 067H/★	Jogging, Return to origin acceleration time ※P04-00	0.0–6000.0sec 0.00–600.00sec	5.0

◎ The acceleration time of Jog speed control.

◎ P07-21 Search the acceleration time of the origin frequency.

NO./Hex	Item	Range	Default
P04-10 068H/★	Emergency stop, Jogging, Return to origin deceleration time ※P04-00	0.0–6000.0sec 0.00–600.00sec	2.0

◎ In addition, when “emergency stop” is selected as the stop method at the time of fault detection, it is used as the deceleration time after the fault is detected.

◎ Use the deceleration time when entering the forward rotation limit (Fbb) and reverse rotation limit (rbb) warning.

◎ P07-21 Search the deceleration time of the origin frequency.

◎ The deceleration time of Jog speed control.

NO./Hex	Item	Range	Default
P04-11 069H	Multi-speed-acceleration and deceleration configuration	0–2	0

0	All internal configuration

Acceleration/Deceleration time is internally fixed configuration mode, which is configured for 16-segment speed.

(Accel.), (Decel.) time X	P03-xx Frequency command (**X**)
P04-01 (Accel.), P04-02 (Decel.) time 0	P03-08 (**0**), P03-12 (**4**), P03-16 (**8**), P03-20 (**12**)
P04-03 (Accel.), P04-04 (Decel.) time 1	P03-09 (**1**), P03-13 (**5**), P03-17 (**9**), P03-21 (**13**)
P04-05 (Accel.), P04-06 (Decel.) time 2	P03-10 (**2**), P03-14 (**6**), P03-18 (**10**), P03-22 (**14**)
P04-07 (Accel.), P04-08 (Decel.) time 3	P03-11 (**3**), P03-15 (**7**), P03-19 (**11**), P03-23 (**15**)

1	Half of internal configuration (0–7), half of external terminals (8–15)

Internal configuration (0–7).

(Accel.), (Decel.) time X	P03-xx Frequency command (**X**)
P04-01 (Accel.), P04-02 (Decel.) time 0	P03-08 (**0**), P03-12 (**4**)
P04-03 (Accel.), P04-04 (Decel.) time 1	P03-09 (**1**), P03-13 (**5**)
P04-05 (Accel.), P04-06 (Decel.) time 2	P03-10 (**2**), P03-14 (**6**)
P04-07 (Accel.), P04-08 (Decel.) time 3	P03-11 (**3**), P03-15 (**7**)

Half external terminals (8–15), (P07-XX = 14, 15)

P03-xx Frequency command (**X**)	Acceleration and deceleration time
P03-16 (**8**), P03-20 (**12**)	Selection by digital input terminal Di Contact input status reference (Table A)
P03-17 (**9**), P03-21 (**13**)	
P03-18 (**10**), P03-22 (**14**)	
P03-19 (**11**), P03-23 (**15**)	

2	All external terminals (Di control)

The 16-step speed Acceleration/Deceleration time are all controlled by the multi-function input terminal Di. (P07-XX = 14, 15)

P03-xx Frequency command (**X**)	Acceleration and deceleration time
P03-08 (**0**), P03-12 (**4**), P03-16 (**8**), P03-20 (**12**)	Selection by digital input terminal Di Contact input status reference (Table A)
P03-09 (**1**), P03-13 (**5**), P03-17 (**9**), P03-21 (**13**)	
P03-10 (**2**), P03-14 (**6**), P03-18 (**10**), P03-22 (**14**)	
P03-11 (**3**), P03-15 (**7**), P03-19 (**11**), P03-23 (**15**)	

Table A: Digital input terminal Di time selection switching comparison table Acceleration and deceleration time selection (Di = 14, Di = 15)		
Di = 15	Di = 14	(Accel.), (Decel.) time X
0	0	P04-01 (Accel.), P04-02 (Decel.) time 0
0	1	P04-03 (Accel.), P04-04 (Decel.) time 1
1	0	P04-05 (Accel.), P04-06 (Decel.) time 2
1	1	P04-07 (Accel.), P04-08 (Decel.) time 3

0 : OFF, 1 : ON,

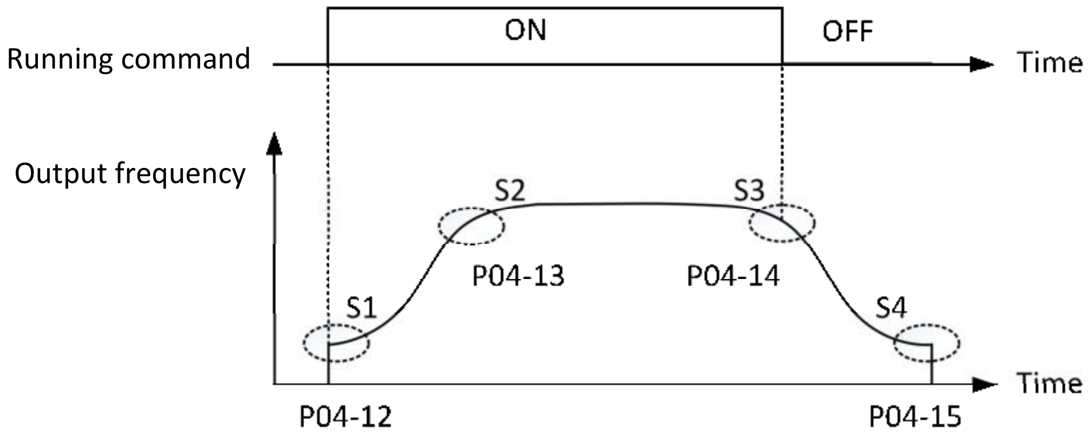
NO./Hex	Item	Range	Default
P04-12 06AH	S curve time at the start of acceleration	0.00–10.00sec	0.00
P04-13 06BH	S curve time at the end of acceleration	0.00–10.00sec	0.00
P04-14 06CH	S curve time at the start of deceleration	0.00–10.00sec	0.00
P04-15 06DH	S curve time at the end of deceleration	0.00–10.00sec	0.00

◎ S-curve characteristics are used for acceleration and deceleration, which can reduce the mechanical impact of the load when starting or stopping.

◎ After setting the S curve time, the acceleration and deceleration time will be lengthened as follows;

$$\text{Actual acceleration time} = \text{set acceleration time} + \frac{\text{P04-12} + \text{P04-13}}{2}$$

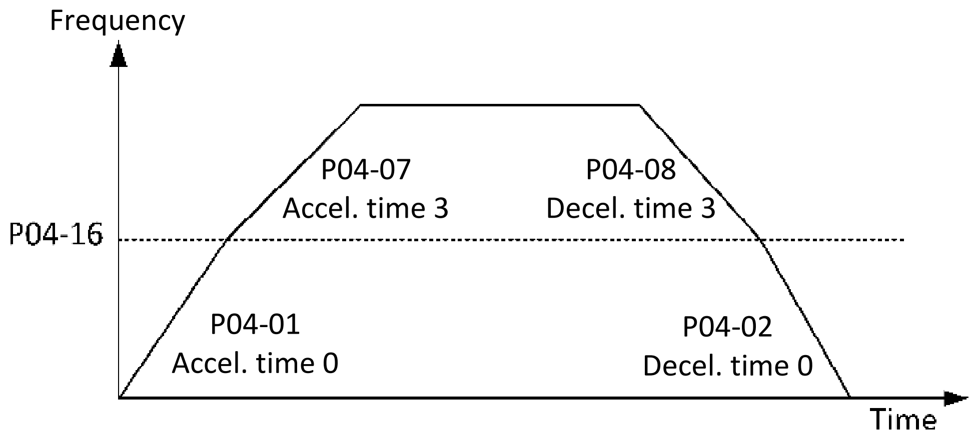
$$\text{Actual deceleration time} = \text{set deceleration time} + \frac{\text{P04-14} + \text{P04-15}}{2}$$



NO./Hex	Item	Range	Default
P04-16 06EH	Acceleration and deceleration time 3-switching frequency	0.00–400.00Hz	0.00

◎ 0.00: Automatic cutover does not start.

◎ This function does not require external terminal switching. It automatically switches to the acceleration/deceleration time 3 according to the switching frequency point set by this parameter. If the acceleration/deceleration time is selected and controlled by the external terminal input, the switching frequency point set by this parameter is still switched to Acceleration and deceleration time 3.



NO./Hex	Item	Range	Default
P04-17 **06FH**	Stop speed selection	0–15	0

◎ In conjunction with P04-18.

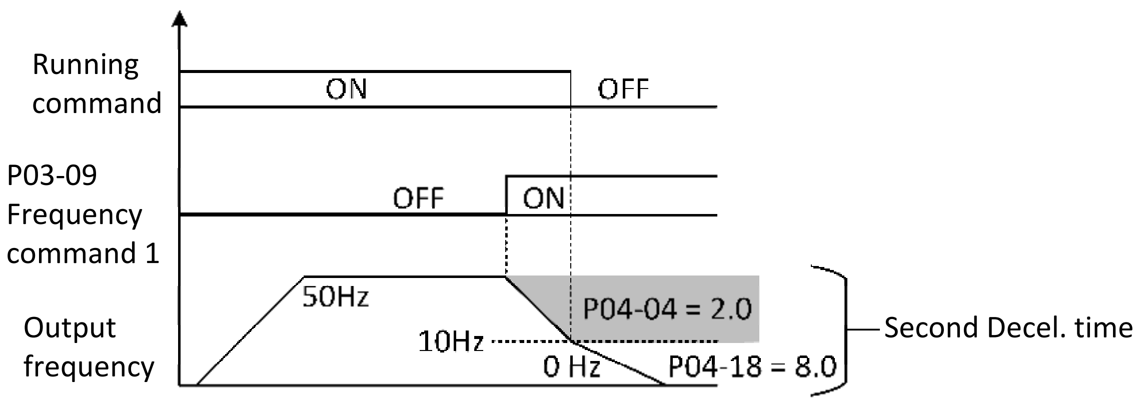
0	Invalid	**8**	P03-16 (frequency command 8)
1	P03-09 (frequency command 1)	**9**	P03-17 (frequency command 9)
2	P03-10 (frequency command 2)	**10**	P03-18 (frequency command 10)
3	P03-11 (frequency command 3)	**11**	P03-19 (frequency command 11)
4	P03-12 (frequency command 4)	**12**	P03-20 (frequency command 12)
5	P03-13 (frequency command 5)	**13**	P03-21 (frequency command 13)
6	P03-14 (frequency command 6)	**14**	P03-22 (frequency command 14)
7	P03-15 (frequency command 7)	**15**	P03-23 (frequency command 15)

NO./Hex	Item	Range	Default
P04-18 **070H/★**	Stop speed deceleration time ※P04-00	0.0–6000.0sec 0.00–600.00sec	10.0

◎The inverter stops at the step speed, and in conjunction with the step speed selected by P04-17, the deceleration time at this time has two modes :
1. Output frequency > Step speed frequency --> P04-01 to P04-08 deceleration time.
2. Output frequency ≤ Step speed frequency --> P04-18 deceleration time.

◎When stopping at the main speed, if the output frequency is lower than the step speed frequency and the step speed command is input again, the machine will stop according to the deceleration time of P04-01 to P04-08.

For example:
Main operating frequency = 50.0Hz
P03-09 (frequency command 1) = 10.0Hz
P04-04 (deceleration time 1) = 2.0 seconds
P04-17 (stop speed selection) = 1 (P03-09)
P04-18 (stop speed deceleration time) = 8.0 seconds
When the main speed is running at 50.0Hz, the multi-speed command 1 is executed by the digital input terminal Di. At this time, it will decelerate to 10.0Hz in 2.0 seconds. At this time, **if the operation command is disconnected, it will** decelerate to stop in 8.0 seconds.

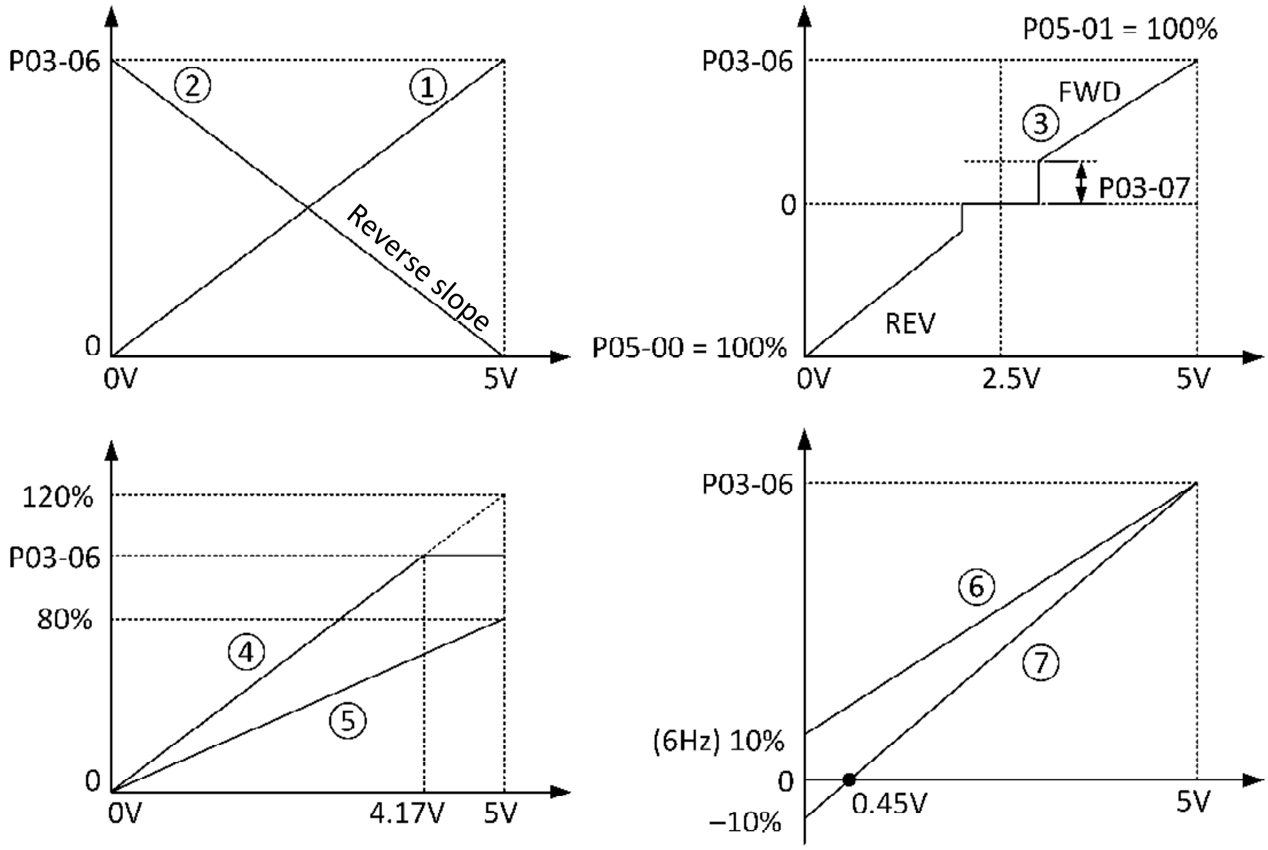


NO./Hex	Item	Range	Default
P04-19 **071H**	Current stall deceleration time	0.0–6000.0sec 0.00–600.00sec	3.0

◎ In conjunction with P09-03, P09-04, P09-06, deceleration time of stall current action.

P05 Analog signal input parameter group			
NO./Hex	Item	Range	Default
P05-00 **072H**	Keypad operator AV: 0V input	–300.00 to 300.00%	0.00
P05-01 **073H**	Keypad operator AV: 5V input	–300.00 to 300.00%	100.00

◎ The bias ratio of parameter P05-00/0V can be set to a set of negative bias voltage to avoid noise interference at 0V or other control applications; parameter P05-01/5V is the gain frequency, and the maximum output value is affected by P03-06 Upper frequency limit. (Please refer to the following curve example)



●: Negative bias Reversible

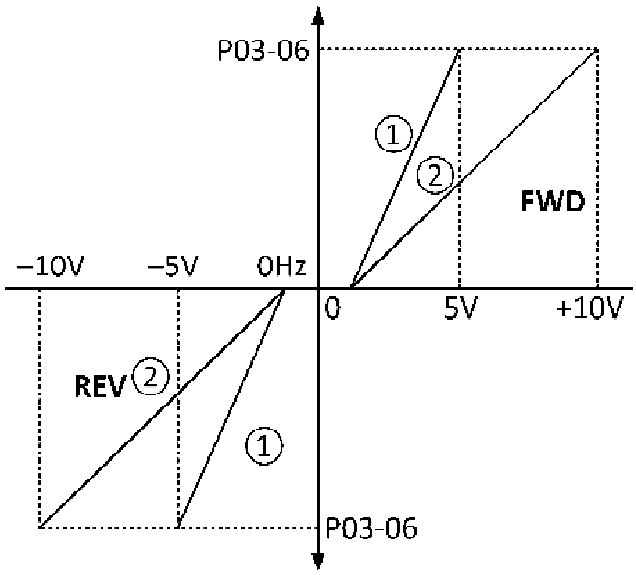
Curved line	①	②	③	④	⑤	⑥	⑦
Frequency command	AV/5V						
Upper limit frequency	Forward only		●	Forward only			
Upper limit frequency	60Hz	60Hz	60Hz	60Hz	60Hz	60Hz	60Hz
Activation frequency	0Hz	0Hz	3Hz	0Hz	0Hz	0Hz	0Hz
P05-00%	0.00	100.00	–100.00	0.00	0.00	10.00	–10.00
P05-01%	100.00	0.00	100.00	120.00	80.00	100.00	100.00

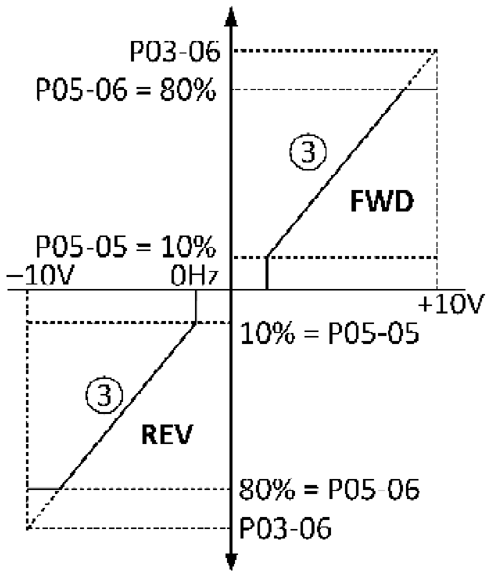
◎ Frequency positive bias value = P03-06 (Upper limit frequency) × P05-00 (Bias ratio).
For example: Curve ⑥= 60Hz × 10% = 6Hz

◎ Negative bias voltage value = 〔5V (AV) ÷ (P05-00 + P05-01)〕× P05-00
For example: Curve ⑦= / [5V ÷ (10% + 100%)] × 10% / = 0.45V

NO./Hex	Item	Range	Default
P05-02 074H	AVI –10V input	–300.00 to 300.00%	–100.00
P05-03 075H	AVI +10V input	–300.00 to 300.00%	100.00
P05-04 076H	AVI input dead band	0.00–85.00%	1.00
P05-05 077H	AVI output zero point	0.00–50.00%	0.00
P05-06 078H	AVI output maximum	0.00–100.00%	100.00
P05-07 079H	AVI filter time	0.00–10.00sec	0.20

◎ Analog input terminal AVI (–10 to 10V) of the application parameters.
◎ AVI input dead-band, to prevent operation of 0V when a result of receiving the interference noise and the voltage jump, made into a motor for the Forward and Reverse swing operation.
◎ Dead-band voltage = ± 10Vdc × P05-04
◎ Zero point output gain = P03-06 (Upper limit frequency) × P05-05
◎ Maximum output limit = P03-06 (Upper limit frequency) × P05-06





Curved line	①	②	③
Frequency command	AVI/±10V		
Rotation direction control	Negative bias can be reversed		
Upper limit frequency	60Hz	60Hz	60Hz
–10V: negative bias ratio	–200%	–100%	–100%
10V: gain ratio	200%	100%	100%
Dead-band voltage	10%	10%	10%
Zero point output gain	0.0%	0.0%	10%
Maximum output limit	100%	100%	80%

NO./Hex	Item	Range	Default
P05-08 07AH	ACI input mode	0–3	0

◎ Set board (J10) JUMP (See 4.3 control circuit terminal configuration), selected from the select input is a current or voltage signal.
◎ P05-15.

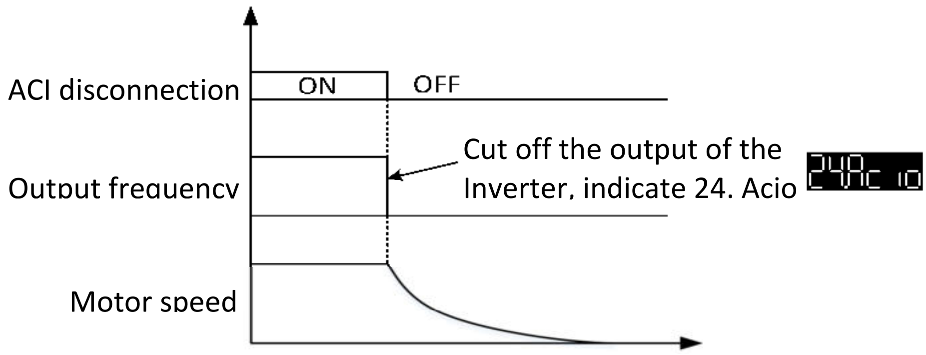
0	4–20mA (sample rate: 1KHz)
1	0–10V (sample rate: 1KHz)
2	4–20mA (fast) (sample rate: 5KHz)
3	0–10V (fast) (sample rate: 5KHz)

NO./Hex	Item	Range	Default
P05-09 07BH	ACI 0V/4mA input	–300.00 to 300.00%	0.00
P05-10 07CH	ACI 10V/20mA input	–300.00 to 300.00%	100.00
P05-11 07DH	ACI input dead band	0.00–85.00%	1.00
P05-12 07EH	ACI output zero point	0.00–50.00%	0.00
P05-13 07FH	ACI output maximum	0.00–100.00%	100.00
P05-14 080H	ACI filter time	0.000–3.000sec	0.200

◎ The input of analog signal, through the input bias ratio (P05-09), gain ratio (P05-10) and dead-band voltage (P05-11) and other parameters, can fully respond to different control needs for parameter settings, and through A/D converter controls the output parameters, which can set the output value of the zero point (P05-12) and the maximum output limit (P05-13).

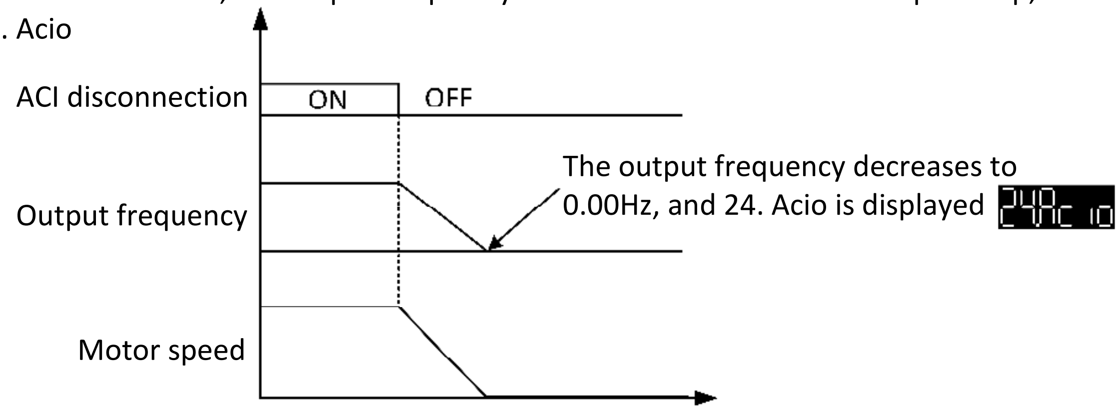
NO./Hex	Item	Range	Default
P05-15 081H	ACI disconnection detection	0–3	0

0	No detection
Does not detect the function of ACI disconnection signal.	
1	Free run to stop
ACI is disconnected, the inverter immediately shuts down the output signal to make the inverter and the motor open, and the motor will stop after natural idling stop, and displays 24. Acio	



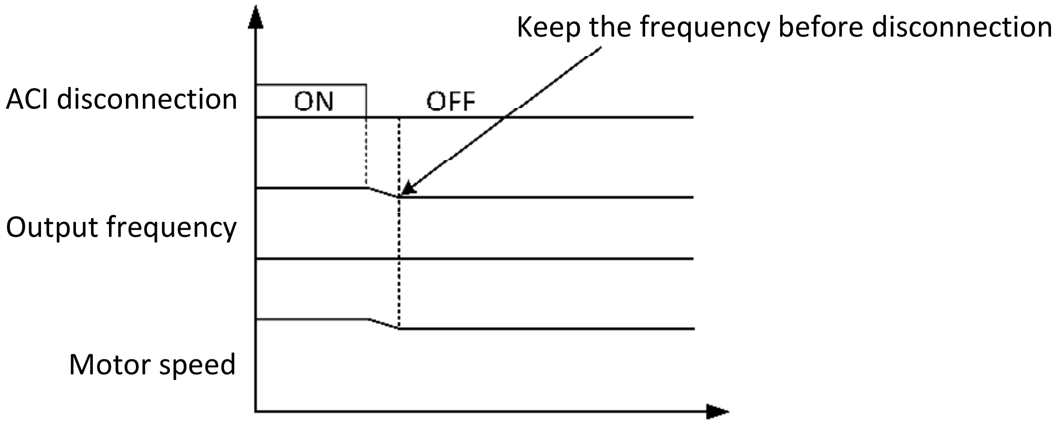
2	Decelerate to stop

ACI is disconnected, the output frequency will decrease to 0.00Hz and trip to stop, and displays 24. Acio



3	Keep running at the frequency before disconnection

ACI detects disconnection, the inverter will keep running at the frequency before disconnection.



NO./Hex	Item	Range	Default
P05-16 **082H**	AUX function selection	0–9	0

◎ AUX board. (Option to buy)

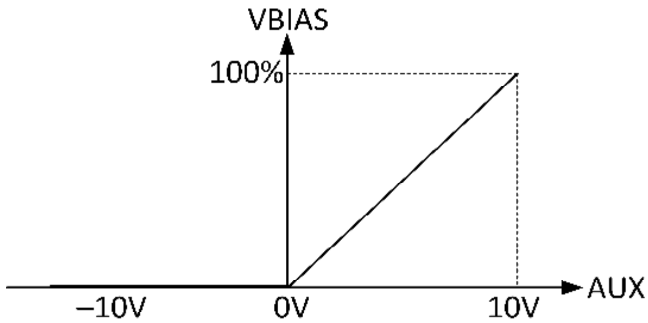
0	No function
1	Output frequency upper limit (10.0–100.0%)

Multi-function AUX analog input to adjust (P03-06) output frequency upper limit setting.

2	Output voltage bias (only V/F control is valid)

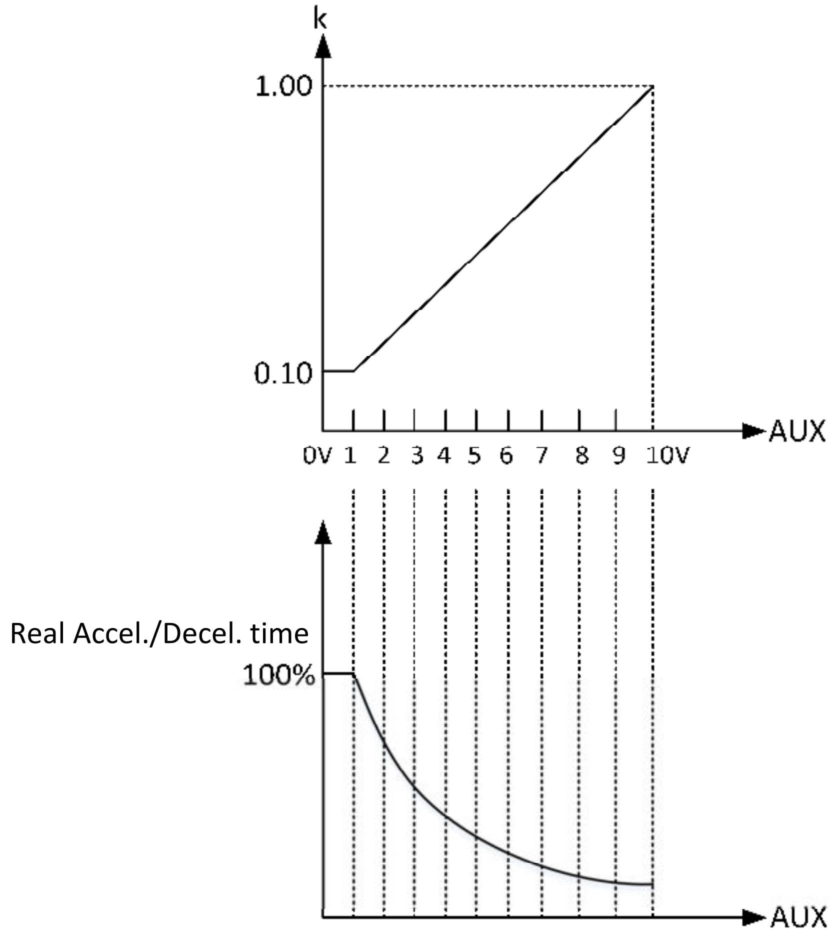
🕮 Multi-function AUX analog input to adjust (U. V. W) output voltage.

🕮 The total output voltage of the inverter is the sum of the boosted V/F curve and VBIAS, which is set when the bias signal of the output voltage is increased.



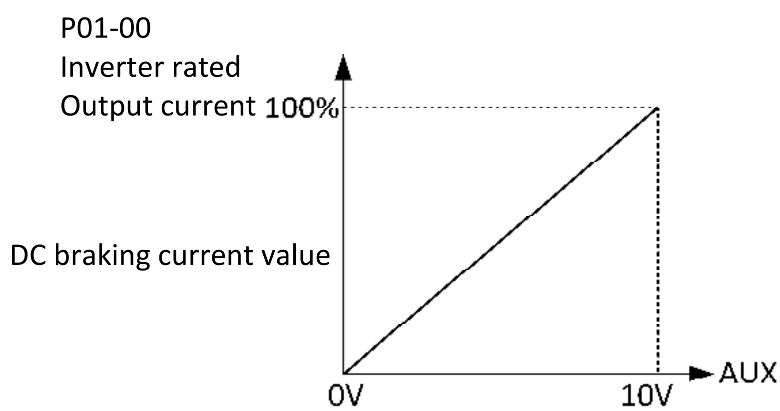
3	Acceleration and deceleration time shortening factor (0.10–1.00)

🕮 Actual acceleration and deceleration time =
(acceleration and deceleration time) × (k = 0.10–1.00)



4	DC braking current (0.0–100.0%)

🕮 DC braking current value, the braking torque can be adjusted by analog input value.
🕮 When the voltage input is 10V, it is 100% of the rated output current of the inverter.
🕮 P02-05 or P02-12 > 0.0sec.

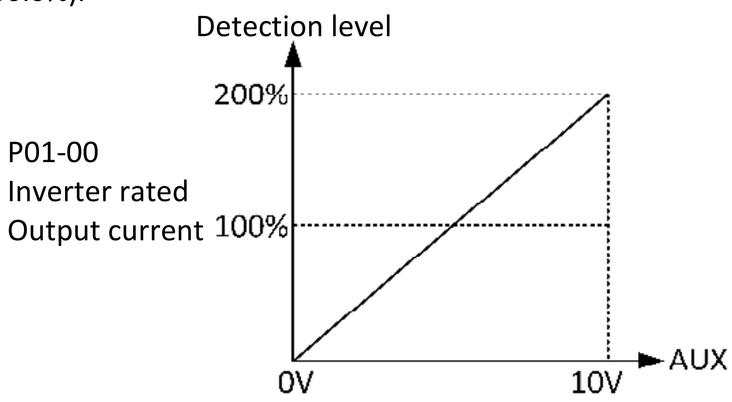


5	Over torque detection level (30.0–200.0%)

🕮 When the multi-function analog AUX input is used to adjust the over-torque detection level, the internal over-torque detection level (P09-15) setting is automatically invalid.

🕮 Input voltage 0–10V corresponds to the rated current of the inverter (P01-00 × 30.0 to 200.0%).

🕮 P09-14 ≠ 0.

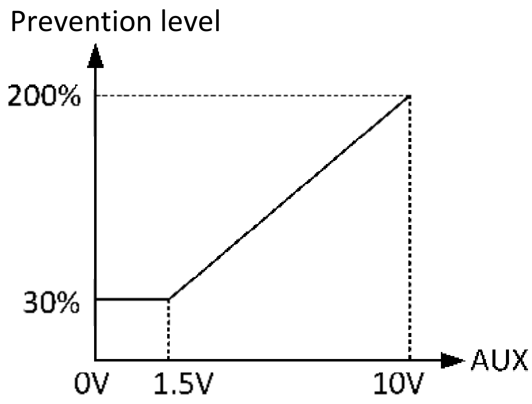


6	Stall prevention level during operation (30.0–200.0%)

🕮 Use multi-function analog input AUX to adjust the stall prevention level during operation.

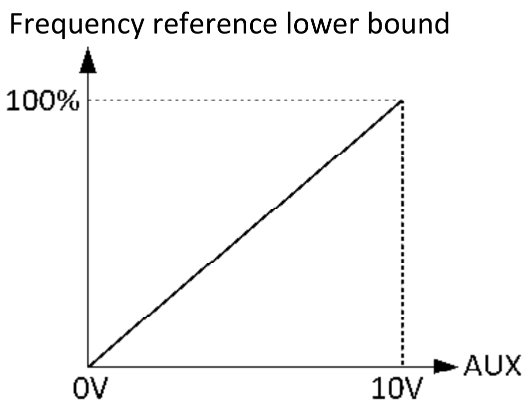
🕮 P09-03, P09-06. (P01-00 × 30.0 to 200.0%)

Example: When the motor capacity is less than the inverter capacity, the level can be lowered to prevent motor damage.

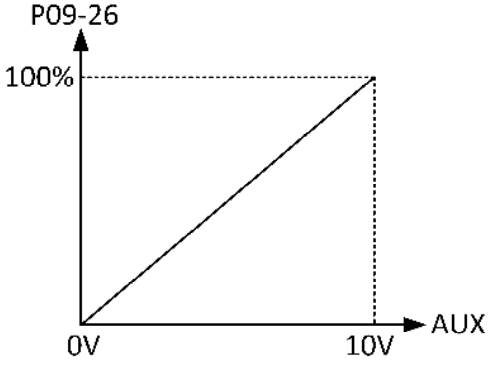


7	Lower limit of frequency command

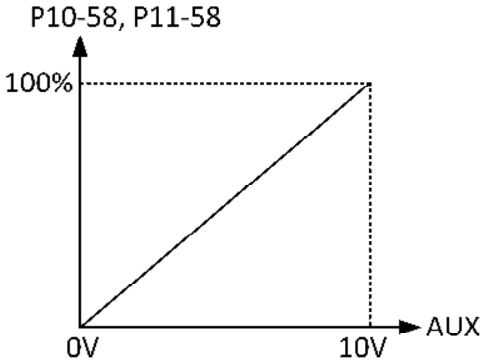
The lower limit of the output frequency can be adjusted by the analog input value of the input terminal. (P03-05)



8	PT100 temperature protection input (OH3)
	Positive temperature coefficient thermistor (PTC) setting value, 0–10V corresponds to P09-26 (PT100 over temperature protection point (AUX) maximum value).



9	Torque control speed limit (P10-58, P11-58)
	Use the multi-function analog input AUX to adjust the torque control speed limit frequency.



NO./Hex	Item	Range	Default
P05-17 083H	AUX –10V input gain setup	–300.00 to 300.00%	–100.00
P05-18 084H	AUX 10V input gain setup	–300.00 to 300.00%	100.00
P05-19 085H	AUX input dead band	0.00–85.00%	1.00
P05-20 086H	AUX output zero point	0.00–50.00%	0.00
P05-21 087H	AUX output maximum limit	0.00–100.00%	100.00
P05-22 088H	AUX filter time	0.000–3.000sec	0.200
P05-23 089H/★	PT100 zero point correction	–10.0 to 10.0°C	0.0
P05-24 08AH/★	PT100 gain correction	90.00–110.00%	100.00
P05-25 08BH	Reserved	0–65535	0

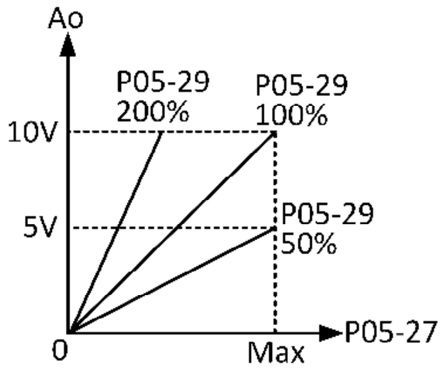
P05 Analog signal output parameter group			
NO./Hex	Item	Range	Default
P05-26 08CH	AO1 output form	0–3	0

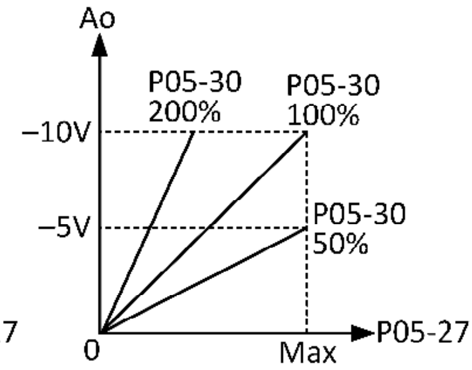
0	–10 to 10V

Positive temperature coefficient thermistor (PTC), 0–10V corresponds to P09-26 (PT100 over-temperature protection point (AUX) maximum value).

🕮 Forward rotation is 0–10V output. (P05-29)

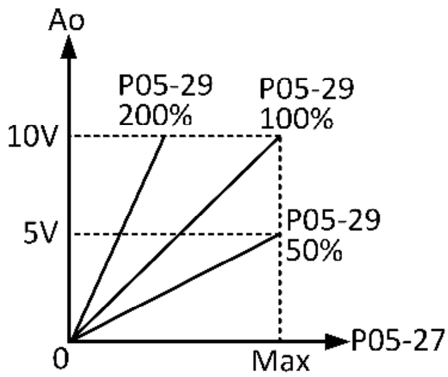
🕮 Reverse rotation is 0 to (–10V) output. (P05-30)





1	0 to 10V (Absolute value)

Forward and Reverse are output in the form of 0–10V absolute value. (P05-29)



2	0 to 10V (Negative is 0V)

Forward rotation is 0–10V output, Reverse rotation is 0V and without output.

3	–10 to 0V (Positively 0V)

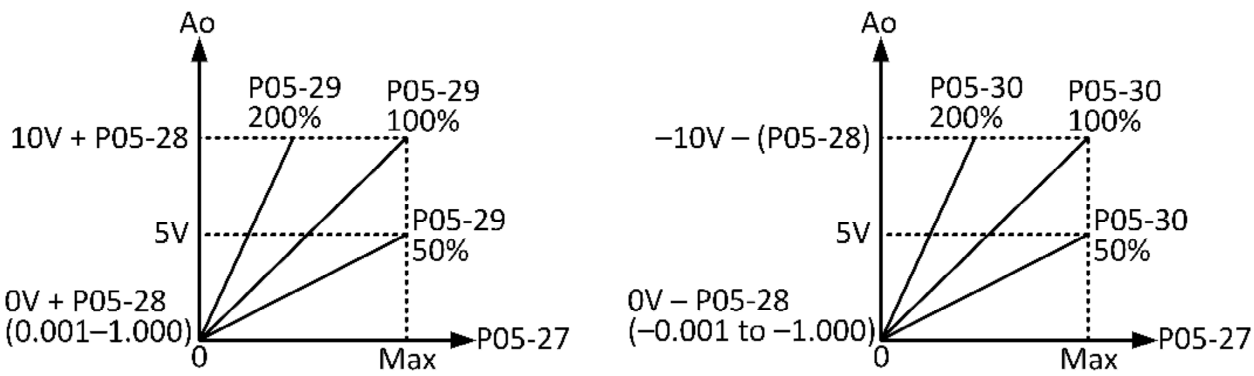
Forward rotation is 0V without output, and Reverse rotation is 0 to (–10V) output.

NO./Hex	Item	Range	Default
P05-27 08DH/★	AO1 function selection	0–30	1

00	Frequency command (Frequency upper limit)
Displays the frequency command value. (Upper limit of frequency: 10V).	
01	Reference output frequency (Frequency upper limit)
Displays the output frequency value. (Upper limit of frequency: 10V)	
02	Output frequency (Upper limit of frequency)
Displays the output frequency value. (Including slip frequency) (Upper limit of frequency: 10V)	
03	Encoder speed (Upper limit of frequency)
Displays the speed value of Encoder. (Upper frequency limit: 10V)	
04	Estimated speed (Upper limit of frequency)
Display the estimated speed value of sensorless vector control. (Upper limit of frequency: 10V)	
05	DC voltage (200V = 500Vdc/400V = 1000Vdc)
Display DC voltage value. (200V = 0 to 500 (Vdc: 10V)/400V = 0 to 1000 (Vdc: 10V))	
06	Output voltage (2 times RST input voltage rms)
Displays the output voltage value. (2 times (P01-01) input voltage: 10V)	
07	Excitation voltage (2 times RST input voltage rms)
Display the internal excitation voltage value during vector control. (2 times (P01-01) input voltage: 10V)	
08	Torque voltage (2 times RST input voltage rms)
Display the internal torque voltage value during vector control. (2 times (P01-01) input voltage: 10V)	
09	Output current (2 times the rated current of the drive)
Display the output current value. (2 times (P01-00) the rated current of the inverter: 10V)	
10	Excitation current command (2 times motor rated current)
Display the internal excitation current command value in vector control.(2 times the motor rated current: 10V)	
11	Torque current command (2 times motor rated current)
Display the internal torque current command value in vector control. (2 times the motor rated current: 10V)	
12	Excitation current (2 times the rated current of the motor)
Display the internal excitation current value during vector control. (2 times the motor rated current: 10V)	
13	Torque current (2 times the rated current of the motor)
Display the internal torque current value in vector control. (2 times the motor rated current: 10V)	
14	Output power (Rated power of motor)
Display output power value. (Motor rated power P10-17, P11-17, P12-04: 10V)	
15	AV (100.00%)
Display analog AV input voltage value. (100.0% = 10V)	
16	AVI (100.00%)
Display analog AVI input voltage value. (100.0% = 10V)	
17	ACI (100.00%)
Display analog ACI input voltage value. (100.0% = 10V)	

18	AUX (100.00%)
Display analog AUX input voltage value. (100.0% = 10V)	
19	Pulse signal input (100.00%)
Display the input pulse signal (P06-00 to P06-06). (100% = Maximum output frequency = 10V)	
20	PID feedback amount (100.00%)
Display the feedback amount in PID control. (100% = Maximum output frequency = 10V)	
21	PID error amount (100.00%)
Display the error amount of PID control. (100% = Maximum output frequency = 10V)	
22	PID control output (100.00%)
Display PID control output value. (100% = Maximum output frequency = 10V)	
23	Communication command for output (Write to communication address: AO1 = 2002h; AO2 = 2003h)
Please refer to page P18 for the detailed description of RS485 communication parameter group. The output voltage range is determined by the communication code.	
24	Reserved
25	Reserved
26	Reserved
27	Reserved
28	Reserved
29	Reserved
30	Reserved

NO./Hex	Item	Range	Default
P05-28 08EH/★	AO1 output zero point	–1.000 to 1.000V	0.000
P05-29 08FH/★	AO1 output positive gain	0.00–300.00%	100.00
P05-30 090H/★	AO1 output negative gain	0.00–300.00%	100.00



NO./Hex	Item	Range	Default
P05-31 091H	AO2 output form	0–5	0

0	0–10V (Absolute value)
Forward and Reverse are output in the form of 0–10V absolute value.	
1	0–10V (Negative is 0V)
Forward rotation is 0–10V output, reverse rotation is 0V and without output.	
2	0–20mA (Absolute value)
Forward and Reverse are output as absolute value of 0–20mA.	
3	0–20mA (Negative is 0mA)
Forward rotation is 0–20mA output, reverse rotation is 0mA without output.	
4	4–20mA (Absolute value)
Forward and Reverse are output in the mode of 4–20mA absolute value.	
5	4–20mA (Negative is 4mA)
Forward to 4–20mA output, reverse to 4mA output.	

NO./Hex	Item	Range	Default
P05-32 092H/★	AO2 function selection	0–30	9

◎ Same as P05-27 parameter function.

NO./Hex	Item	Range	Default
P05-33 093H/★	AO2 output zero point	–1.000 to 1.000V	0.000
P05-34 094H/★	AO2 output positive gain	0.00–300.00%	100.00
P05-35 095H	Reserved	0–65535	0

P06 Pulse (RP) signal input parameter group			
NO./Hex	Item	Range	Default
P06-00 096H	Pulse (RP) input type	0–1	0

◎ Pulse input board. (Optional to buy)

0	Frequency type (1–30000Hz)
With Hz as the unit, set the frequency of 100%.	
1	Pulse width type (PWM) (1.00–99.00%)
Take the duty cycle signal with High as ON as the unit, set the duty cycle of 100% frequency.	

NO./Hex	Item	Range	Default
P06-01 097H	Frequency type x = 0% corresponding frequency	1–30000Hz	100

◎ Set the input pulse number signal, corresponding to the lowest 0% frequency. (Lower frequency limit)

NO./Hex	Item	Range	Default
P06-02 098H	Frequency type x = 100% corresponding frequency	1–30000Hz	10000

◎ Set the input pulse number signal, corresponding to the highest 100% frequency. (Upper frequency limit)

NO./Hex	Item	Range	Default
P06-03 099H	Pulse width type x = 0% corresponds to duty	1.00–99.00%	5.00

◎ Set the pulse width (PWM) duty signal, the lowest frequency corresponding to 0%. (Lower frequency limit)

NO./Hex	Item	Range	Default
P06-04 09AH	Pulse width type x = 100% corresponds to duty	1.00–99.00%	95.00

◎ Set the pulse width (PWM) duty signal, corresponding to the highest 100% frequency. (Upper frequency limit)

NO./Hex	Item	Range	Default
P06-05 09BH	Pulse input x = 0% corresponds	–300.00 to 300.00%	0.00

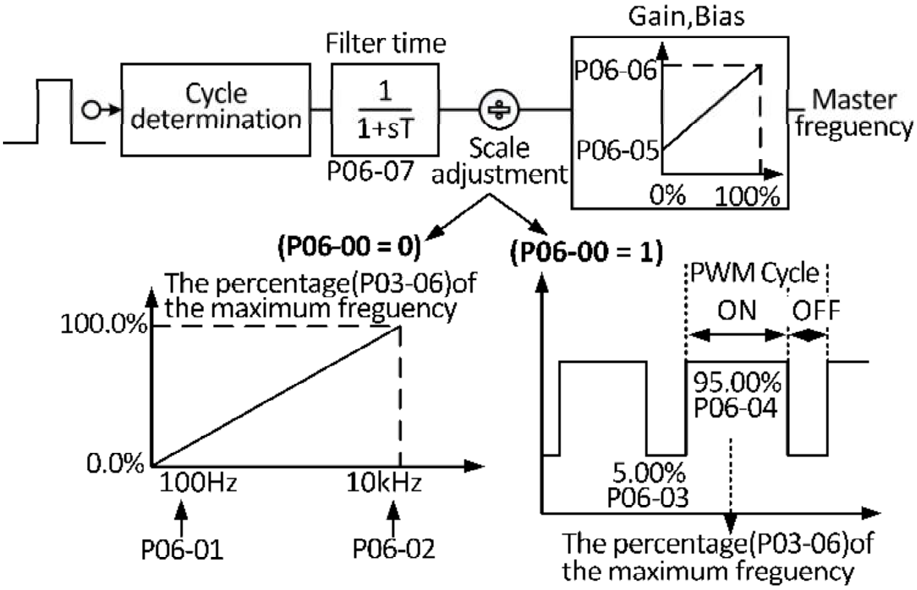
◎ Set the pulse wave type and pulse width type signal input to the terminal (RP), the amount of bias command at 0%.

NO./Hex	Item	Range	Default
P06-06 09CH	Pulse input x = 100% corresponding	–300.00 to 300.00%	100.00

◎ Set the pulse wave type and pulse width type signal input to the terminal (RP), the gain command amount at 100%.

NO./Hex	Item	Range	Default
P06-07 09DH	Pulse input filter time	0.000–3.000sec	0.500

◎ Set the filter time for pulse (Frequency type, pulse width type) input in seconds.



NO./Hex	Item	Range	Default
P06-08 09EH	Reserved	0–65535	0

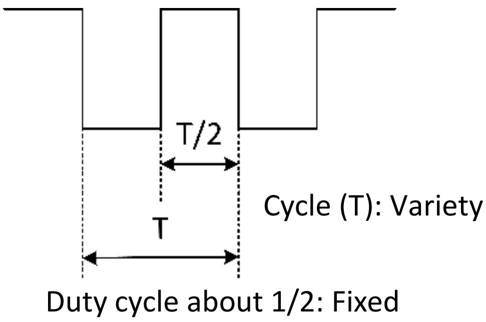
NO./Hex	Item	Range	Default
P06-09 09FH	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P06-10 0A0H	Reserved	0–65535	0

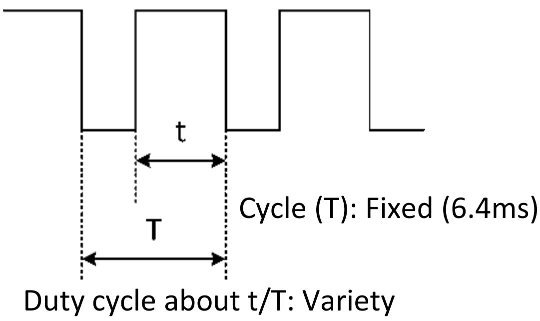
P06 Pulse (MP) signal output parameter group			
NO./Hex	Item	Range	Default
P06-11 **0A1H**	Pulse wave (MP) output type	0–1	0

◎ MP output terminal function, 0: frequency output with periodic change, 1: PWM output with duty cycle change.

0	Frequency type



1	Pulse width type



NO./Hex	Item	Range	Default
P06-12 **0A2H/★**	Pulse output selection	0–30	1

00	Frequency command (Frequency upper limit)
According to frequency command value, output pulse signal.	
01	Reference output frequency (Frequency upper limit)
According to the output frequency value, output pulse signal.	
02	Output frequency (Upper limit of frequency)
According to the actual output frequency, output pulse signal. (Including slip frequency)	
03	Encoder speed (Upper limit of frequency)
According to the encoder speed value, output pulse signal.	
04	Estimated speed (Upper limit of frequency)
According to the estimated speed value, output pulse signal.	
05	DC voltage (200V = 500Vdc/400V = 1000Vdc)
According to the DC voltage value, output pulse signal (200V= 0–500Vdc/400V= 0–1000Vdc)	
06	Output voltage (2 times RST input voltage rms)
According to 2 times RST input voltage level, output pulse signal.	

07	Excitation voltage (2 times RST input voltage rms)
According to 2 times RST input voltage level, output pulse signal.	
08	Torque voltage (2 times RST input voltage rms)
According to 2 times RST input voltage level, output pulse signal.	
09	Output current (2 times the rated current of the drive)
According to 2 times the rated current of the drive, output pulse signal.	
10	Excitation current command (2 times the rated current of the motor)
2 times the rated current of the motor (P10-14, P11-14, P12-02), output pulse signal.	
11	Torque current command (2 times the rated current of the motor)
2 times the rated current of the motor (P10-14, P11-14, P12-02), output pulse signal.	
12	Excitation current (2 times the rated current of the motor)
2 times the rated current of the motor (P10-14, P11-14, P12-02), output pulse signal.	
13	Torque current (2 times the rated current of the motor)
2 times the rated current of the motor (P10-14, P11-14, P12-02), output pulse signal.	
14	Output power (Rated power of motor)
Motor rated power (P10-17, P11-17, P12-04), output pulse signal.	
15	AV (100.00%)
According to analog AV input voltage value, output pulse signal. (100.0% = 10V)	
16	AVI (100.00%)
According to analog AVI input voltage value, output pulse signal. (100.0% = 10V)	
17	ACI (100.00%)
According to analog ACI input voltage value, output pulse signal. (100.0% = 10V)	
18	AUX (100.00%)
According to analog AUX input voltage value, output pulse signal. (100.0% = 10V)	
19	Pulse signal input (100.00%)
According to the pulse wave input signal, it is transformed into an output pulse wave signal. (100.0% = 10V)	
20	PID feedback amount (100.00%)
According to the PID feedback amount, output pulse signal. (100.0% = 10V)	
21	PID error amount (100.00%)
According to PID error, output pulse signal. (100.0% = 10V)	
22	PID control output amount (100.00%)
According to PID control output amount, output pulse signal. (100.0% = 10V)	
23	Communication command as output (Write communication address = 2004h)
Please refer to page P18 for the detailed description of RS485 communication parameter group. The pulse signal range is determined by the communication code.	
24	Reserved
25	Reserved
26	Reserved
27	Reserved
28	Reserved

29	Feedback at zero speed (NO)
Encoder feedback speed ≥ P06-18, output pulse signal.	
30	Feedback at zero speed (NC)
Encoder feedback speed ≤ P06-18, output pulse signal.	

NO./Hex	Item	Range	Default
P06-13 0A3H	Frequency type 0% corresponds to frequency	1–30000Hz	100

◎ Set the minimum frequency of frequency type output, corresponding to the lowest 0% frequency.

NO./Hex	Item	Range	Default
P06-14 0A4H	Frequency type 100% corresponding frequency	1–30000Hz	10000

◎ Set the maximum output frequency of the frequency type, corresponding to the highest 100% frequency.

NO./Hex	Item	Range	Default
P06-15 0A5H	Pulse width type 0% corresponds to duty	1.00–99.00%	5.00

◎ Set the minimum pulse width of the pulse width (PWM) output, corresponding to the lowest 0% frequency.

NO./Hex	Item	Range	Default
P06-16 0A6H	Pulse width type 100% corresponding to duty	1.00–99.00%	95.00

◎ Set the maximum pulse width of the pulse width (PWM) output, corresponding to the highest 100% frequency.

NO./Hex	Item	Range	Default
P06-17 0A7H	Pulse width type fundamental frequency	1–30000Hz	2000

◎ Define pulse width type fundamental frequency P06-15, P06-16.

NO./Hex	Item	Range	Default
P06-18 0A8H	The range of feedback rotation speed at zero speed	0–20rpm	2

◎ Define P06-12 = 29, 30 action range.

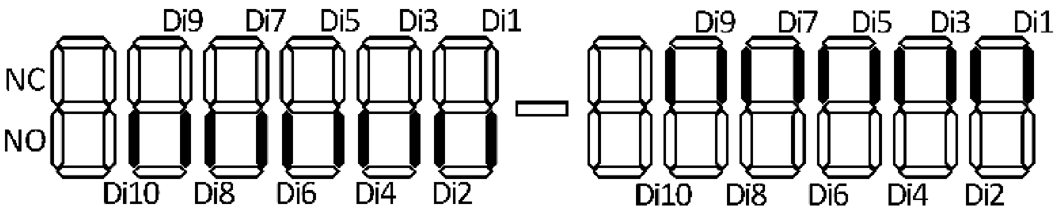
NO./Hex	Item	Range	Default
P06-19 0A9H	Reserved	0–65535	0
P06-20 0AAH	Reserved	0–65535	0

P07 Multifunction digit (Di) input parameter group			
NO./Hex	Item	Range	Default
P07-00 0ABH	Digital input terminal scan time	1–1000ms	2

◎ This function can filter out multi-function input terminals, which may cause CPU malfunction due to noise interference or switch bounce.
◎ The scanning time of this function will affect the response time of the multi-function input terminal. Users can make appropriate settings according to their needs.

NO./Hex	Item	Range	Default
P07-01 0ACH	Digital input Di10 to Di1 logic setting	0–1023	0

◎ With the seven-segment LED display setting on the operator, the normally open contact (NO) or normally closed contact (NC) can be individually set to match the signal input contacts from the peripheral equipment.



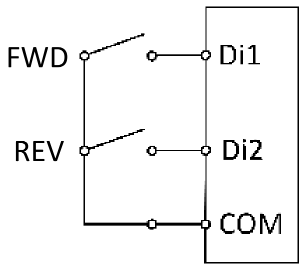
2 bit : 0000 0011 1111 1111
10 bit : 1023
16 bit : 03FF

NO./Hex	Item	Range	Default
P07-02 0ADH	Di1, Di2 settings	0–4	0

0	Di1: Forward/stop; Di2: Reverse/stop

This mode is the most commonly used two-wire mode. The Di1 and Di2 terminal commands determine the forward and reverse of the motor.

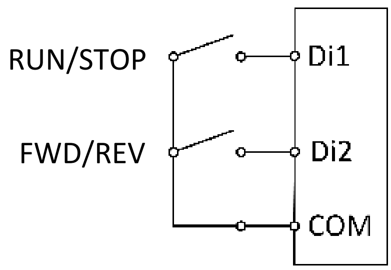
Run command	Di1	Di2
STOP	0	0
FWD	1	0
REV	0	1
STOP	1	1



1	Di1: Run/Stop; Di2: Forward/Reverse

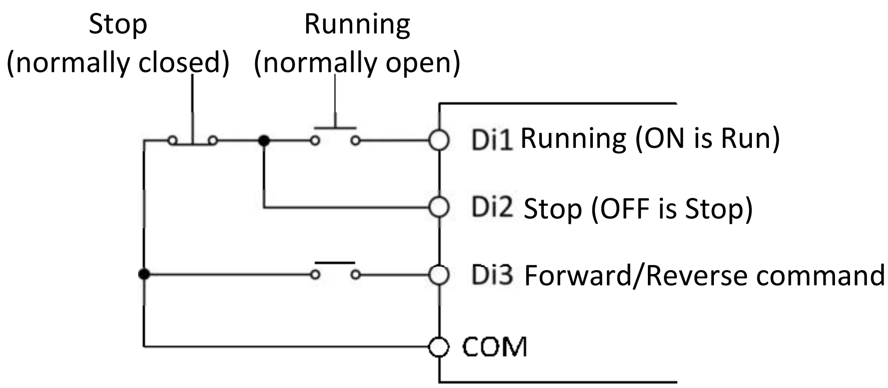
This mode Di1 is the Run/Stop enable terminal, and the running direction is determined by the state of Di2.

Run command	Di1	Di2
STOP	0	–
FWD	1	0
REV	1	1



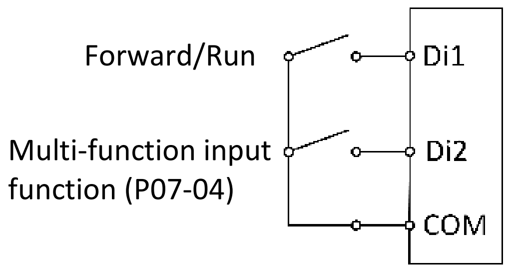
2	Three-wire type: Di1 (Run), Di2 (Stop), Di3 (Reverse/Forward)

- 🕮 When setting the three-wire sequential control, terminal Di3 becomes the input terminal for the Forward and Reverse commands.
- 🕮 When terminal Di1 is set as a run command, and the input duration is above the set value of P07-00 terminal scan time and is closed, the inverter drives the motor to run.
- 🕮 Terminal Di2 is (Stop command), the input is disconnected for an instant, the inverter will decelerate and stop immediately.
- 🕮 When terminal Di3 is in the open state, the inverter always rotates forward; when it is in the closed state, it performs reverse.



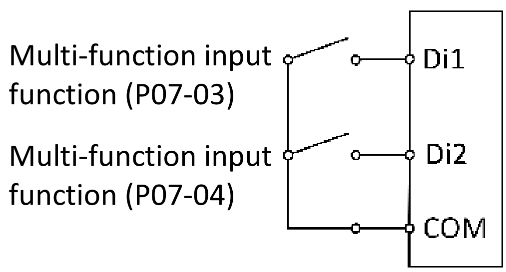
3	Di1: Forward/Stop; Di2: General function

- 🕮 In this mode, Di1 is run enable and forward direction terminal control.
- 🕮 Di2 is a multi-function (0–60) input function setting terminal.



4	Di1: General function; Di2: General function

- 🕮 Di1 is the multi-function (0–60) input function setting terminal.
- 🕮 Di2 is the multi-function (0–60) input function setting terminal.

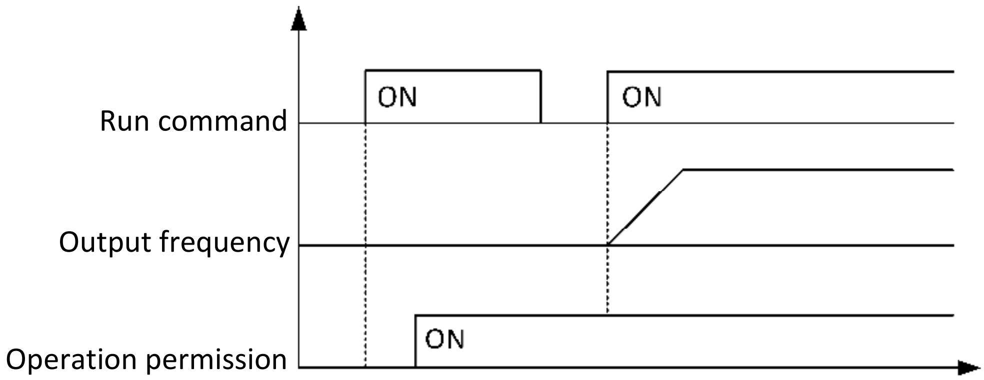


NO./Hex	Item	Range	Default
P07-03 0AEH	Di1 general function setting	0–60	0
P07-04 0AFH	Di2 general function setting	0–60	0
P07-05 0B0H	Di3 settings	0–60	22
P07-06 0B1H	Di4 settings	0–60	2
P07-07 0B2H	Di5 settings	0–60	3
P07-08 0B3H	Di6 settings	0–60	4
P07-09 0B4H	Di7 settings	0–60	9
P07-10 0B5H	Virtual Di8 setting (Driven by virtual Do2 output)	0–60	0
P07-11 0B6H	Virtual Di9 setting (Driven by virtual Do3 output)	0–60	0
P07-12 0B7H	Virtual Di10 setting (Driven by virtual Do4 output)	0–60	0

◎ When Di1, Di2 is used as multi-function input setting, please refer to P07-02 setting description.
◎ P07-10 to 12 (Virtual Di terminal, for related description, please refer to Chapter 11.3 Notes on virtual Di and Do).

00	No function
01	Operation permit

🕮 When the operation permission terminal is disconnected, “dnE” will be displayed on the operator, and the inverter will not accept the operation command.
🕮 When you want to make the inverter run, first close the run permission terminal, and then execute the run command.
🕮 When the running command is turned on first, and then the running permission terminal is closed, the inverter will not run, and the running command needs to be executed again to start running.
🕮 When the operation permission input of the inverter is disconnected during operation, it will stop according to the mode set by P02-11 (Stop mode).



02	Abnormal reset

When the inverter trips abnormally, the abnormal holding state can be released by the abnormal reset.

03	Multi-stage speed command 1/Multi-stage position command 1
04	Multi-stage speed command 2/Multi-stage position command 2
05	Multi-stage speed command 3/Multi-stage position command 3
06	Multi-stage speed command 4/Multi-stage position command 4

🕮 The choice of multi-stage speed and position control, please take the Di instruction (45: Multi-stage speed/Multi-stage position terminal function switching). OFF is multi-stage speed, ON is multi-stage position.

🕮 Multi-stage speed frequency Setting P03-08 to P03-23/Multi-stage position setting P13-03 to P13-34, the Di cutover position as given below.

0 : OFF, 1 : ON,

Di				No.	Multi-stage speed	Multi-stage position	
06 (4)	05 (3)	04 (2)	03 (1)			Revolution	Pulse
0	**0**	**0**	**0**	**0**	P03-08	P13-03	P13-04
0	**0**	**0**	**1**	**1**	P03-09	P13-05	P13-06
0	**0**	**1**	**0**	**2**	P03-10	P13-07	P13-08
0	**0**	**1**	**1**	**3**	P03-11	P13-09	P13-10
0	**1**	**0**	**0**	**4**	P03-12	P13-11	P13-12
0	**1**	**0**	**1**	**5**	P03-13	P13-13	P13-14
0	**1**	**1**	**0**	**6**	P03-14	P13-15	P13-16
0	**1**	**1**	**1**	**7**	P03-15	P13-17	P13-18
1	**0**	**0**	**0**	**8**	P03-16	P13-19	P13-20
1	**0**	**0**	**1**	**9**	P03-17	P13-21	P13-22
1	**0**	**1**	**0**	**10**	P03-18	P13-23	P13-24
1	**0**	**1**	**1**	**11**	P03-19	P13-25	P13-26
1	**1**	**0**	**0**	**12**	P03-20	P13-27	P13-28
1	**1**	**0**	**1**	**13**	P03-21	P13-29	P13-30
1	**1**	**1**	**0**	**14**	P03-22	P13-31	P13-32
1	**1**	**1**	**1**	**15**	P03-23	P13-33	P13-34

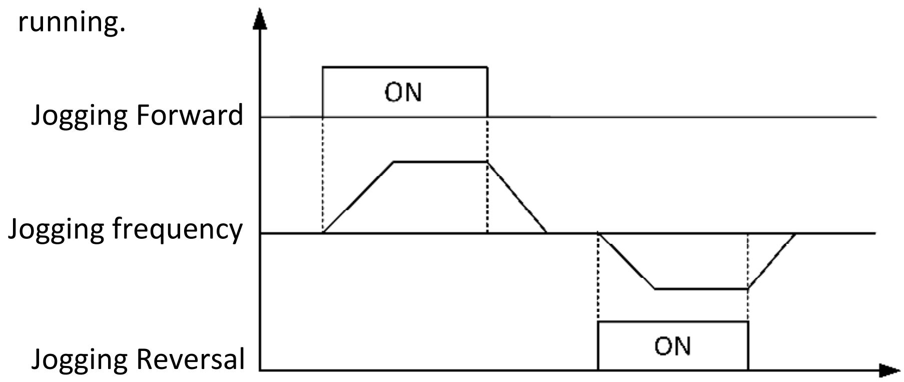
07	Jogging Forward
08	Jogging Reversal

🕮 Only valid when P02-00=1 or P02-01=1.

🕮 P03-24 is the Jog frequency setting, P04-09 (Accel.)/P04-10 (Decel.) time setting.

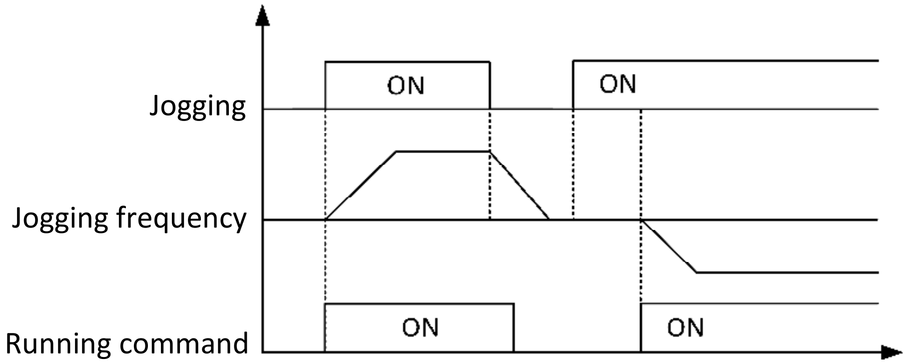
🕮 Jog forward and Jog reverse commands have priority over other frequency commands.

🕮 Jog forward and Jog reverse commands are activated at the same time, the inverter will stop running.



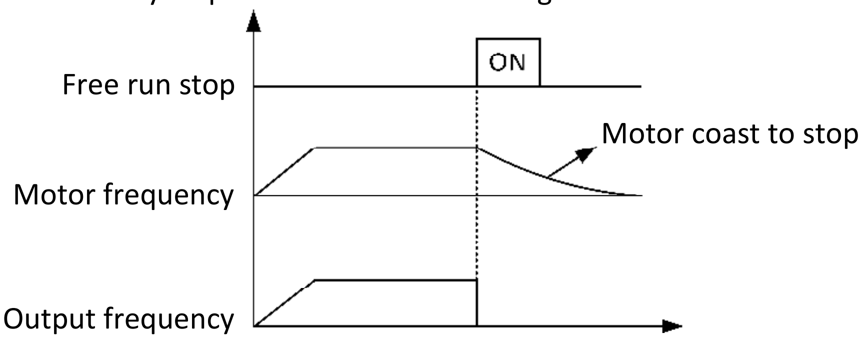
09 Jogging

🕮 Execute the jog frequency operation function, an operation command is required.
🕮 P03-24 is the Jog frequency setting, P04-09 (Accel.)/P04-10 (Decel.) time setting.
🕮 Inching commands have priority over other frequency commands.



10 Free run stop

When the terminal signal is input, the output of the inverter is cut off immediately, and the motor naturally stops after the motor is idling.

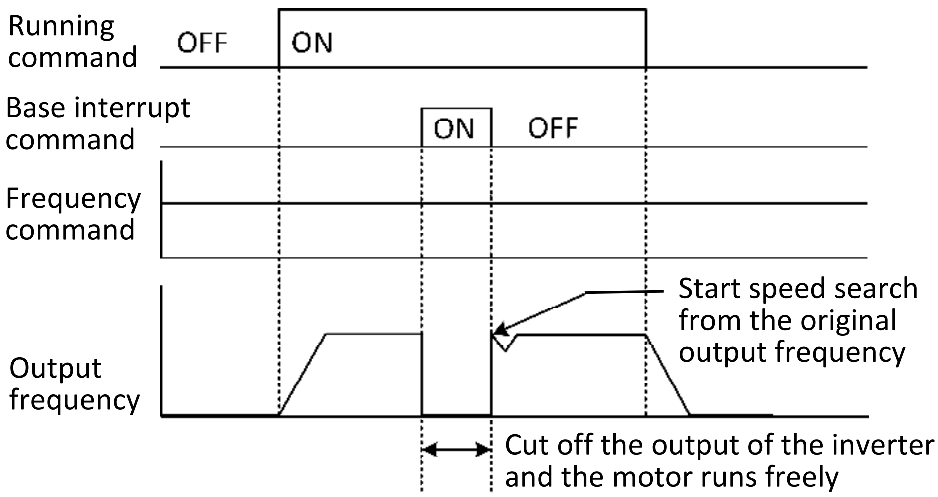


11 Emergency stop

According to the conditions set by the parameters P02-11 (Stop mode) and P04-10 (Emergency stop deceleration time), the drive will stop in emergency stop mode.

12 External blocking b.b. (inverter base interruption)

When the contact is ON, the output of the inverter will be cut off immediately. The motor is in a free-running state, and when the external interrupt command is released, it will restart to run through the speed search, the digital operator displays bb



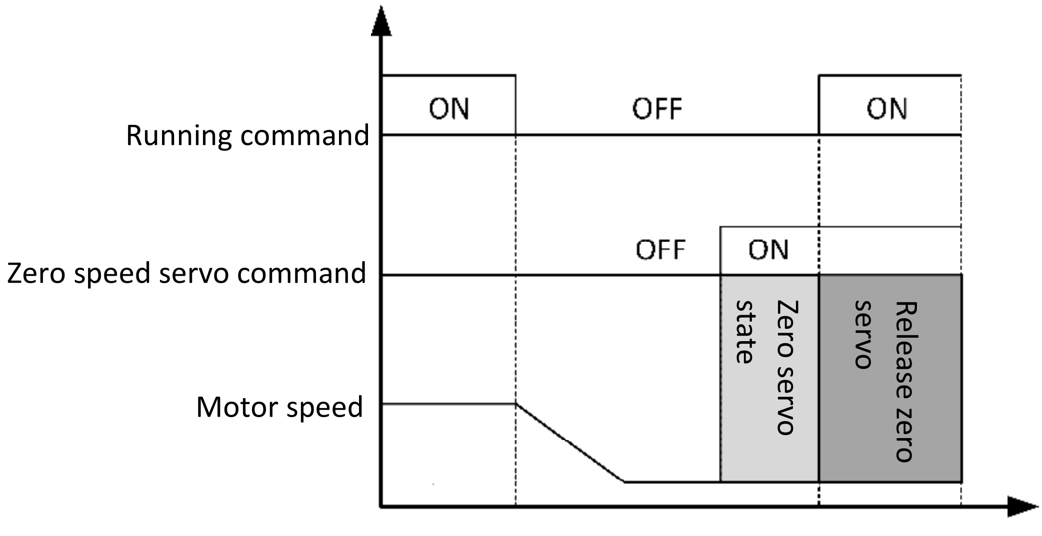
13	Zero servo

🕮 Execute zero speed before the operation command comes in. (At this time, the inverter status is running, please pay attention to this status when using Do output).

🕮 Zero servo torque setting:

IM1 control mode setting (P01-04)	Zero servo torque setting
0: V/F control (V/F)	P01-18 = 3, P02-13
1: Sensorless vector control (SVC)	P10-26
2: V/F + PG control (V/FPG)	P01-18 = 3, P02-13
3: Vector + PG control (FOCPG)	P10-26
IM2 control mode setting (P01-05)	Zero servo torque setting
0: V/F control (V/F)	P01-18 = 3, P02-13
1: Sensorless vector control (SVC)	P11-26
PM/SRM control mode setting (P01-06)	Zero servo torque setting
0: Sensorless vector control (SVC-PM/SRM)	P12-28
1: Vector + PG control (FOCPG-PM/SRM)	P10-37

🕮 In the zero-servo function, avoid the load where the servo locks 100% for a long time. Otherwise, it will cause the inverter to malfunction. When it is necessary to lock the servo for a long time, please keep the current in the servo lock below 50% of the rated output current of the inverter, or increase the capacity of the inverter.



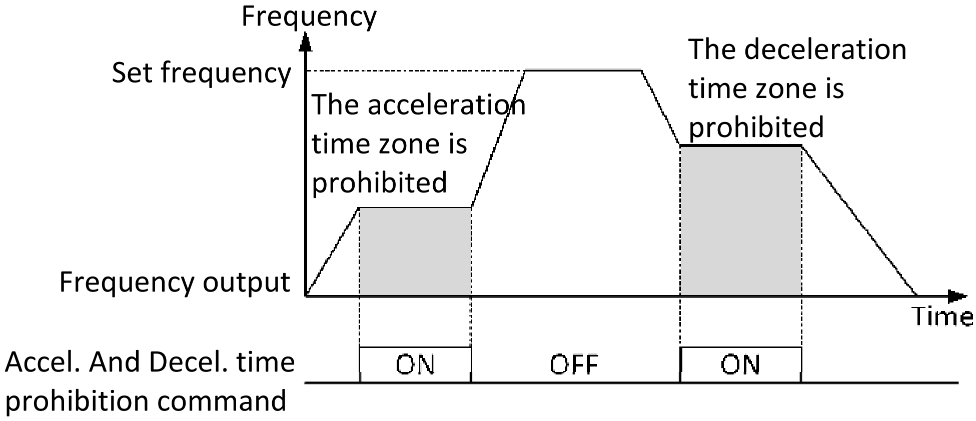
14	Acceleration and deceleration time selection 1
15	Acceleration and deceleration time selection 2

When any frequency is accelerating or decelerating, when different acceleration and deceleration gradient changes are required, the terminal function can be used for planning control. (Please refer to P04-11 description)

Di = 15	Di = 14	(Accel.), (Decel.) time X
0	0	P04-01 (Accel.), P04-02 (Decel.) time 0
0	1	P04-03 (Accel.), P04-04 (Decel.) time 1
1	0	P04-05 (Accel.), P04-06 (Decel.) time 2
1	1	P04-07 (Accel.), P04-08 (Decel.) time 3

16 Acceleration and deceleration prohibition command

When the acceleration/deceleration prohibition command is input, the inverter will suspend acceleration/deceleration and maintain the output frequency. When this command is released, the drive will continue to accelerate and decelerate from the prohibited point.



17 External fault (Detect at any time, decelerate to stop)

Error code 13. EF

18 External fault (Detect at any time, free stop)

Error code 13. EF

19 External fault (Detected at any time, emergency shutdown)

🕮 Error code 13. EF
🕮 P04-10 (Emergency stop deceleration time)

20 External fault (Detect at any time, warning)

🕮 Error code 13. EF
🕮 When the inverter receives the fault signal, it will still keep running, and the output terminal does not output abnormal signals. After the fault signal is removed, the digital operator will automatically return to the original display no need pressing the reset button.

21 External failure (Operation detected, a deceleration stop)

Error code 13. EF

22 External fault (Operation detected, free to stop)

Error code 13. EF

23 External fault (Operation detected, emergency stop)

🕮 Error code 13. EF
🕮 P04-10 (Emergency stop deceleration time)

24 External fault (Operation detected, warning)

🕮 Error code 13. EF
🕮 When the inverter receives the fault signal, it will still keep running, and the output terminal does not output abnormal signals. After the fault signal is removed, the digital operator will automatically return to the original display no need pressing the reset button.

25 Enable length control mode

Please refer to the description of P21-07 to P21-11.

26	Flying re-start

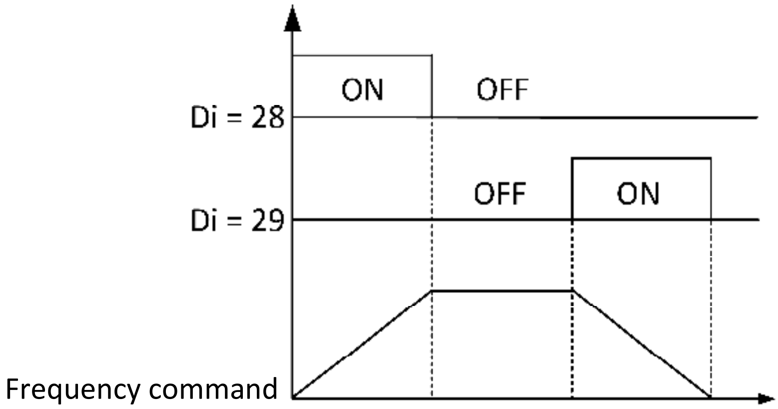
When the signal is input through the input terminal, the Flying Re-start function is executed. Please refer to the description of P02-04 (Starting method).

27	Inverter overheating warning (OH1)

- Error code 13. EF
- When the inverter receives the fault signal, it will still keep running, and the output terminal does not output abnormal signals. After the fault signal is removed, the digital operator will automatically return to the original display no need pressing the reset button.

28	Incremental frequency command 0 (P03-08)
29	Decremental frequency command 0 (P03-08)

- When you want to use the increment command and the decrement command to set the frequency. Please set the frequency source P03-02 and P03-03 to 0.
- When the increment and decrement commands are input at the same time, the frequency command increment and decrement actions are performed for the pause.



30	Turn on the keypad digital operator for operation control

When the signal is input through the input terminal, the operation control rights (FWD, REV, STOP) are controlled by the digital operator.

31	Turn on operation command source 2 (P02-01) and frequency command source 2 (P03-01)

- Through the open/close of the input terminal to switch, the inverter's operation control source and frequency command source. As shown in the table below;

Di	Content	
OFF	P02-00 (Operation command source 1)	P03-00 (Frequency command source 1)
ON	P02-01 (Operation command source 2)	P03-01 (Frequency command source 2)

- When switching the command right during operation, please confirm the compatibility of the control system, otherwise, switch the command right after stopping operation.

32	Turn on frequency command source 2 (P03-01)

Switch the frequency command source 2 of the inverter (P03-01) by opening/closing the input terminal.

Di	Frequency command source
OFF	P03-00 (Frequency command source 1)
ON	P03-01 (Frequency command source 2)

33	Parameter lock

When the input terminal is closed, the parameter lock is prohibited from writing, P00-01 is not subject to parameter locking.

34	Turn on the second group of PID parameters

Di	PID parameters
OFF	P14-07 to P14-10
ON	P14-11 to P14-14

35	PID integral value reset

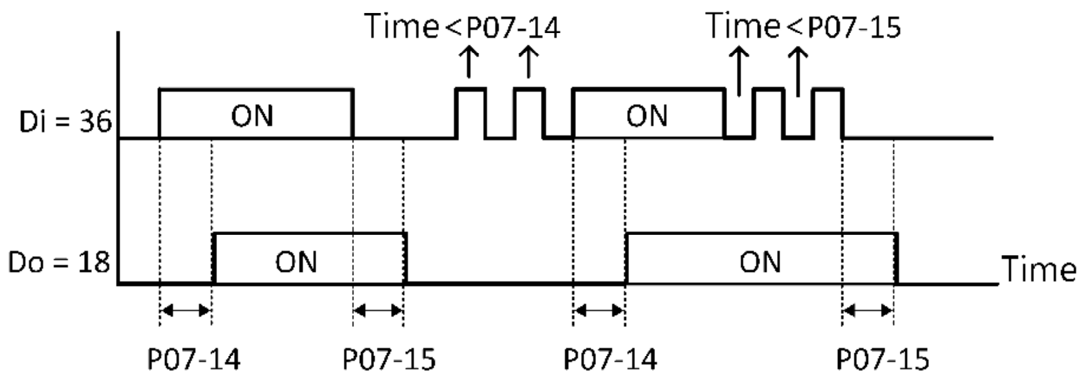
When the input terminal is closed, the integral value of PID control is reset to 0 and maintained. For details of this function, please refer to P14 PID control parameter group “PID Control Block Diagram”.

36	Timer function input (P07-14, P07-15)

🕮 Timing function input terminal, please use it with P08-00 to 05 = 18 (Timing output function). This function is independent of the internal timing function of the inverter. Use the multi-function contact input terminals Di1 to Di7 as the timing function input terminals, and the multi-function contact output terminals RL1, RL2, and DO1 as the timing function output terminals. Set the delay time on the ON side and OFF side respectively (P07-14, P07-15).

🕮 When the inverter stops running, when the timer function terminal is input, the function contact output can still be executed.

🕮 When the ON time of the timer function input ≥ P07-14, the timer function output is ON. When the OFF time of the timer function input ≥ P07-15, the timer function output is OFF. An example of timing action is shown in the figure below:



37	Automatic operation (Keyboard STOP key is valid, priority 37 > 38)
38	Click to trigger automatic operation (The keyboard STOP key is valid)
39	Pause automatic operation

🕮 37 to 39 Turn on the programmable and editable automatic operation mode of the inverter (P16-00 to P16-20).

🕮 After the function terminal is started, it starts to execute sequential operation according to the preset 16-speed frequency. During operation, 39: Pause automatic operation, the terminal temporarily interrupts the operation program, and continues to execute the operation program after the interruption is restored. If the automatic operation input terminal is turned off (37 or 38) and resumed, the operation program will be executed from the origin.

🕮 38: It is the PB trigger switch mode (Click once to trigger ON, then trigger again to OFF).

40	Switch from vector mode to V/F mode

📖 Priority > P10-34, P11-34, operation can be switched.

📖 When the vector mode is switched to VF mode, if the input terminal is closed, the vector control will be ignored and the V/F control will be executed. When the input terminal is disconnected, it will switch back to the vector control mode. (Can be switched during operation)

41	Turn on energy-saving efficiency control

Turn on the energy-saving efficiency control mode from the input terminal. Please refer to P01-15, 16 description.

42	Clear pulse input or Z input count value

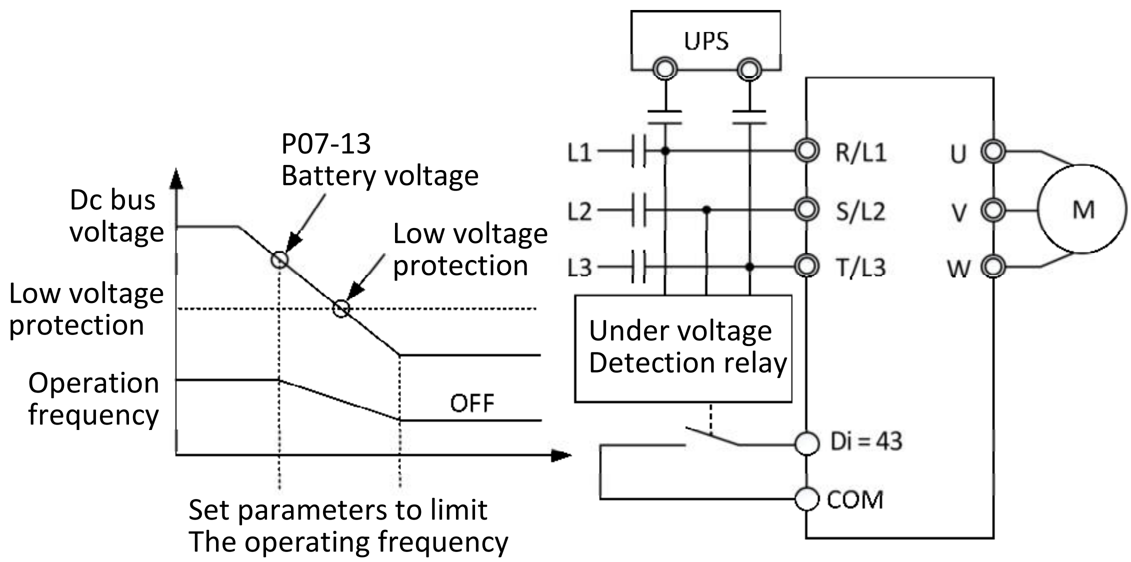
📖 When the terminal contact state of this function is ON, the display value of the current count will be cleared, and the display of "0" will be restored. Until this signal disappears, the drive can accept the trigger signal to count up.

📖 Clear (P07-09 = 60: Counter signal) count value or (P00-01 = 28: Encoder Z count value).

43	Battery operation

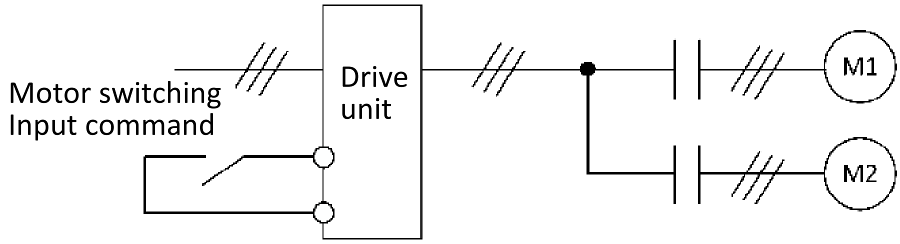
📖 According to P07-13, limit the motor running frequency and not detect low voltage.

📖 When using the input power supply for the battery, or other type of capacitive power supply, first set the P07-13 battery voltage, then start the function terminal at this time the inverter will not detect low voltage protection, the motor operating frequency will depend on the internal program of the drive set limit frequency, applied in the elevator constant electrical system, will not be due to the capacitive power supply is insufficient caused by the inverter jumper, and make the elevator stop running.



44	Switch IM2 (Motor 2) (It can only be switched during shutdown)

- Switching is invalid during operation.
- Can switch between 2 motors. As shown in the figure below, after switching, the IM2 parameter group (P11-XX) will be used internally in the inverter.
- When switching the motor control of the with PG, the waiting time is 500ms.



45	Multi-stage speed/Multi-stage position terminal function switching

Multi-stage speed/Multi-stage position terminal function switching, refer to operation manual P07-03 to 12 = 3 to 6.

Di	Description	Parameter
OFF	Multi-stage speed	P03-08 to P03-23
ON	Multi-stage position	P13-03 to P13-34

46	Start positioning point control

When the contact state is (ON), the inverter enters the positioning control mode.

47	External mechanical origin input (ORG)

External mechanical origin signal input.

48	Return to the original point to enable (Priority < Jogging)

- Multi-stage position control, when the return-to-origin switch is activated, return to the origin according to the setting of P07-20 return-to-origin mode.
- The search origin frequency is set by P07-21. Accel. (P04-09)/Decel. (P04-10) time.

49	Incremental position command cumulative return to zero

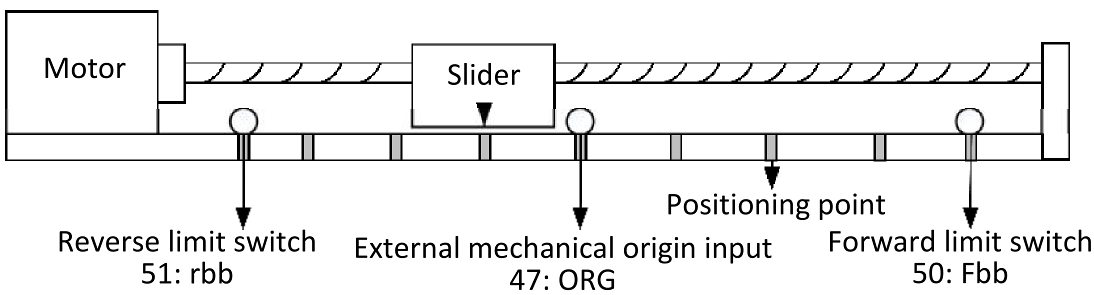
When P13-00 = 4 (Incremental position), the position command cumulative amount is reset to zero, and the zero reset action must be used when stopping.

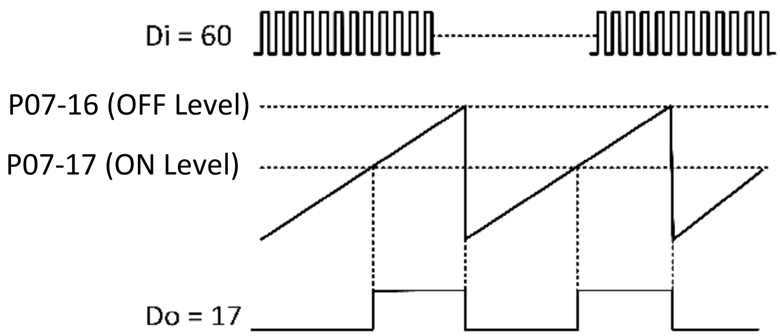
50	Forward limit switch (Fbb)

When the contact state is (ON), it will decelerate and stop according to P04-10 (Emergency stop deceleration time), the keypad operator will display Fbb, and the reverse operation will not be performed until the reverse signal is input.

51	Reverse limit switch (rbb)

When the contact state is (ON), decelerate and stop the operator according to P04-10 (Emergency stop deceleration time) to display rbb, and execute forward rotation until the forward rotation signal is input.



52	AVI ON/OFF
P03-00, P03-01 = 7, the input ACI and AUX cannot be turned on at the same time, and at the same time, it is invalid and no action.	
53	ACI ON/OFF
P03-00, P03-01 = 7, the input AVI and AUX cannot be turned on at the same time, and at the same time, it is invalid and no action.	
54	AUX ON/OFF
P03-00, P03-01 = 7, the input of AVI and ACI cannot be turned on at the same time, and at the same time, it is invalid and no action.	
55	Pressure control switch permission (Flow/Pressure mode)
🕮 Use functional terminals to switch the control mode, (OFF) is the flow mode, (ON) is the pressure mode. 🕮 P14-00 = 5.	
56	Reserved
57	Reserved
58	Correction electrical angle of PM Encoder
PM motor and encoder are used to adjust the angle, electrical angle = 90 degrees.	
59	Length calculation returns to zero (Rising edge returns to zero)
Please refer to the description of P21-11 to P21-15.	
60	Counter signal input
🕮 0–2KHz, Di7 special use. 🕮 When setting the terminal contact state (ON) of this function once, the count value displayed on the digital panel will increase (1). Or the Z pulse signal of the internal Encoder is the counting source. 🕮 P00-01 (Selection of monitoring operation content) = 26 (Di pulse input count value), 28 (Encoder Z count). 🕮 Do = 17: Pulse wave, Z counter output. 	

NO./Hex	Item	Range	Default
P07-13 0B8H	Battery voltage	0.0–400.0V	0.0

◎ 0.0: This function is invalid. (See Di = 43: battery operation)
◎ When using UPS uninterruptible power system, or other types of capacitor power supply, set according to the output voltage value of the system.

NO./Hex	Item	Range	Default
P07-14 0B9H	Timer function ON delay time	0.0–6000.0sec	0.0
P07-15 0BAH	Timer function OFF delay time	0.0–6000.0sec	0.0

◎ Description of ON and OFF delay time of timing function , please refer to Di = 36.

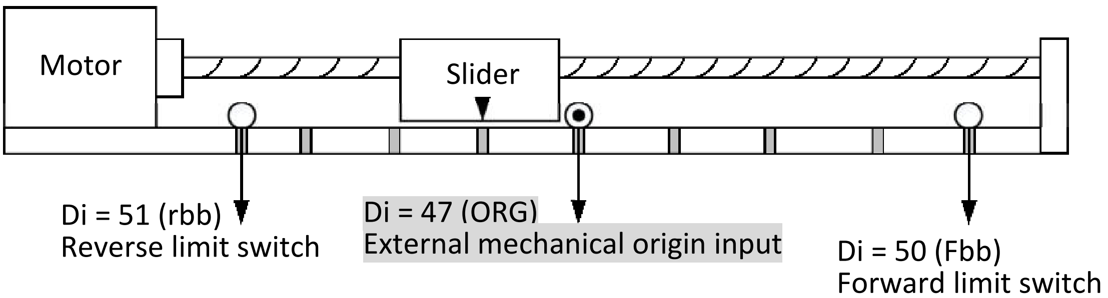
NO./Hex	Item	Range	Default
P07-16 0BBH	Pulse wave or Z input count value cycle	1–60000 Pulse	1000
P07-17 0BCH	Pulse or Z input comparison count value	0–60000 Pulse	500

◎ Please refer to Di = 60: Counter signal input, as explained in the chart on the previous page.

NO./Hex	Item	Range	Default
P07-18 0BDH	Source of mechanical origin	0–2	0

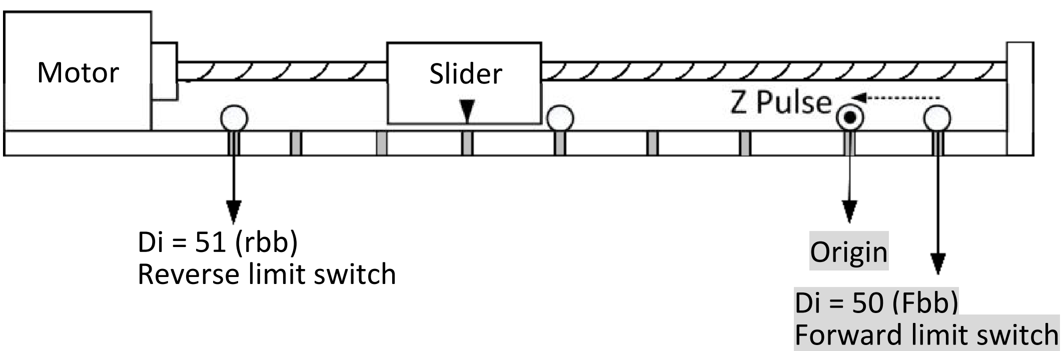
0	Di input

Mechanical origin signal, Di = 47: External mechanical origin input (ORG)



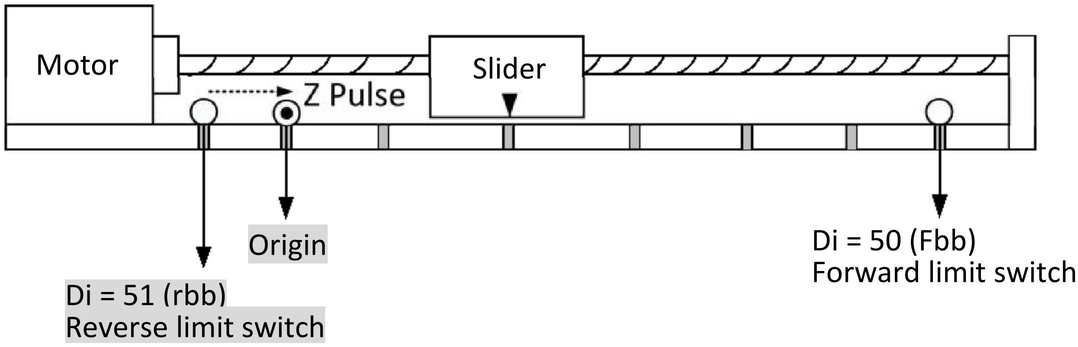
1	Forward side limit switch (Fbb) + encoder Z signal

Mechanical origin signal, Di = 50: Forward limit switch (Fbb) + P07-19.



2	Reverse side limit switch (rbb) + encoder Z signal

Mechanical origin signal, Di = 51: Reverse limit switch (rbb) + P07-19.



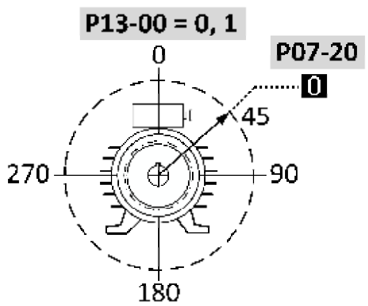
A. When the origin source is (0: Di input), due to the difference of the accuracy of each detector (Sensor), the error generated during operation will also be different. When high-precision origin positioning is required, please select setting mode 1 or 2. The Z pulse signal of the internal Encoder and the Z pulse number of the parameter (P07-19) are used as the origin positioning source.
B. P19-10 (Position of anchor point at last stop (Direction)) determines the direction of operation during origin search: (Read only)
   0: Positive, the motor rotates in reverse direction during searching.
   1: Negative, the motor rotates forward during searching.
C. P07-23 = 0, By the digital terminal (Di) is used to return to the origin.
D. P07-23 = 1, By the RS485 returns to the origin.
E. If there is a problem with returning to the origin, set P13-43 = 0 and re-power on, then execute the return to origin action.
F. If you want to change the mechanical origin or limit switch, please turn off the power to change it and then turn it on again to perform the origin search.

NO./Hex	Item	Range	Default
P07-19 0BEH	Z pulse number from limiter switch to mechanical origin	1–60000 Z Pulse	1

◎ Only for P07-18 = 1, 2.
◎ After searching the limiter switch, look for the Z pulse of the encoder, and count the Z pulse as the origin.

NO./Hex	Item	Range	Default
P07-20 **0BFH**	Return to Origin Mode	0–7	0

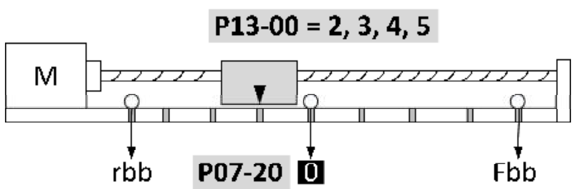
Cooperate with P13-00 = 0, 1 (Encoder Z input) mode.	
0	Turn forward to find Z, then return to the origin with the shortest distance.
1	Same as 0, if Z has appeared, go directly to the origin.
2	Turn forward to find Z, then turn forward to return to the origin.
3	Same as 2, if Z has appeared, directly forward rotate back to the origin.
4	Reverse to find Z, then return to the origin with the shortest distance.
5	Same as 4, if Z has appeared, go directly to the origin.
6	Reverse to find Z, then reverse to the origin.
7	Same as 6, if Z has appeared, directly reverse to the origin.



Cooperate with P13-00 = 2, 3, 4, 5 (Origin Di input)	
0	First find the mechanical origin, then return to the origin.
1	Same as 0, if the origin has appeared, go back to the origin directly.
2	Same as 1.
3	Same as 1.
4	Same as 1.
5	Same as 1.
6	Same as 1.
7	Find the mechanical origin first, then find the limiter of forward and reverse rotation, and then return to the origin.

🕮 Before returning to the origin, confirm in advance that P13-43 = 0.

🕮 P13-00 = 2, 3, 4, 5 + P07-20 = 7, when Di = 48 (Enable return to the origin), it will automatically measure the forward and reverse limit value of the mechanism, and save P13-38 to P13-41, and modify P13-42 = 1, P13-43 = 3 settings at the same time.



NO./Hex	Item	Range	Default
P07-21 0C0H	Search origin frequency	0 .00–400.00Hz	10.00

◎ Search the operating frequency of returning to the origin.
◎ P04-09 (Acceleration time), P04-10 (Deceleration time).

NO./Hex	Item	Range	Default
P07-22 0C1H	Determine the limiter torque current	0 .00–200.00%	20.00

◎ When performing the return to origin search, if there is no forward and reverse limiter switch, the block that will hit the edge of the mechanism during the search is regarded as the forward and reverse limiter value. Please slow down (P07-21) and use the current during load operation should be within 5.0% and set to the parameter value of (P07-22). Set carefully and evaluate to avoid damage to the equipment. If the current value exceeds this value, it will reverse the search and return to the origin after the search is completed.
◎ If the setting is too low, abnormalities may occur more easily when returning to the origin.
◎ P01-00 × P07-22

NO./Hex	Item	Range	Default
P07-23 0C2H	Multi-stage speed/Multi-stage position control is specified by communication	0–1	0

0	This function ineffective
0–15, multi-speed/multi-position control is switched by digital terminals.	
1	This function is effective
0–15, multi-speed/multi-position control is written by RS485 communication.	

Multi-stage speed		**P07-23 = 1**		**P07-23 = 0**			
No.	Parameter	FWD (HEX)	REV (HEX)	Di = 3 (1)	Di = 4 (2)	Di = 5 (3)	Di = 6 (4)
0	P03-08	12	22	–	–	–	–
1	P03-09	112	122	ON	–	–	–
2	P03-10	212	222	–	ON	–	–
3	P03-11	312	322	ON	ON	–	–
4	P03-12	412	422	–	–	ON	–
5	P03-13	512	522	ON	–	ON	–
6	P03-14	612	622	–	ON	ON	–
7	P03-15	712	722	ON	ON	ON	–
8	P03-16	812	822	–	–	–	ON
9	P03-17	912	922	ON	–	–	ON
10	P03-18	A12	A22	–	ON	–	ON
11	P03-19	B12	B22	ON	ON	–	ON
12	P03-20	C12	C22	–	–	ON	ON
13	P03-21	D12	D22	ON	–	ON	ON
14	P03-22	E12	E22	–	ON	ON	ON
15	P03-23	F12	F22	ON	ON	ON	ON

Multi-stage position				P07-23 = 1	P07-23 = 0			
No.	P13-01	P13-02	Revolution / Pulse	HEX	Di = 3 (1)	Di = 4 (2)	Di = 5 (3)	Di = 6 (4)
0	–	1	P13-03 / 04	4000	–	–	–	–
1	–	1	P13-05 / 06	4100	ON	–	–	–
2	–	1	P13-07 / 08	4200	–	ON	–	–
3	–	1	P13-09 / 10	4300	ON	ON	–	–
4	–	1	P13-11 / 12	4400	–	–	ON	–
5	–	1	P13-13 / 14	4500	ON	–	ON	–
6	–	1	P13-15 / 16	4600	–	ON	ON	–
7	–	1	P13-17 / 18	4700	ON	ON	ON	–
8	1	–	P13-19 / 20	4800	–	–	–	ON
9	1	–	P13-21 / 22	4900	ON	–	–	ON
10	1	–	P13-23 / 24	4A00	–	ON	–	ON
11	1	–	P13-25 / 26	4B00	ON	ON	–	ON
12	1	–	P13-27 / 28	4C00	–	–	ON	ON
13	1	–	P13-29/ 30	4D00	ON	–	ON	ON
14	1	–	P13-31 / 32	4E00	–	ON	ON	ON
15	1	–	P13-33 / 34	4F00	ON	ON	ON	ON

P07-23 = 1:

- HEX (2000): Incremental position command cumulative return to zero. (Di = 49)
- HEX (1000): Return to the original point to enable. (Di = 48)
- There must be a running signal , but it is not necessary to start “Start positioning point control”. (Di = 46)

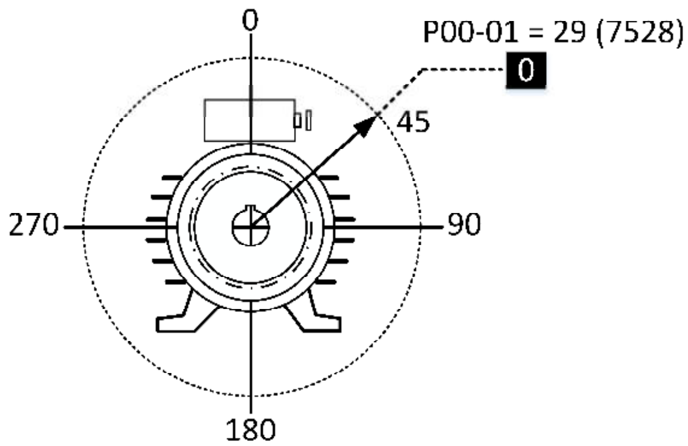
P07-20, Return to Origin Mode:

◎ P13-00 = 0, 1 (Encoder Z input) mode.

Return to origin description:

1. Assume that the motor shaft rotates to 45° as the preset origin.
2. After turning to 45°, read the inverter P00-01 = 29 reading, assuming it is 7528.
3. Write the read value to parameter P13-44 = 7528.
4. After writing, read the reading value of P00-01 = 32 from the frequency inverter. At this time, it reads 0, which means the origin definition is completed.
5. When the return-to-origin enablement is activated, the origin will be searched according to the setting of P07-20.

※ Steps 1 to 4 should be executed only if the position of the origin needs to be redefined. If the origin position remains unchanged and you want to search for the origin, just execute step 5.

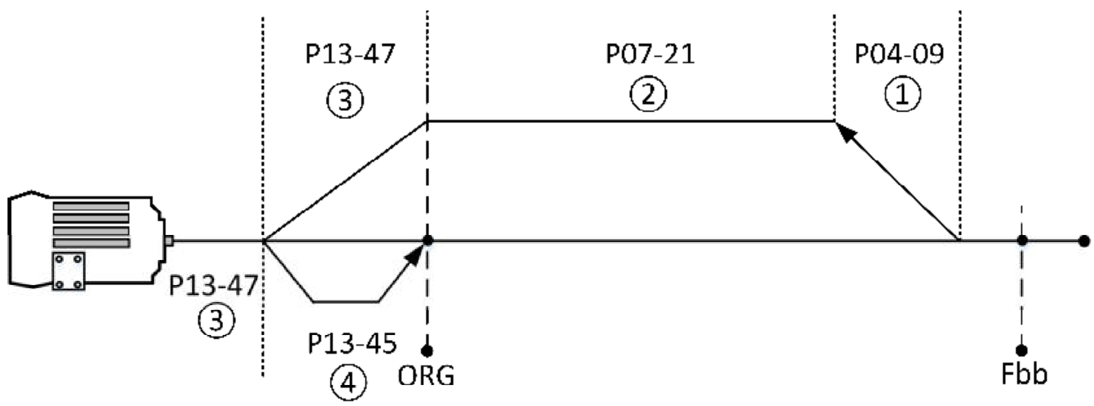


P07-20, Return to Origin Mode:

◎ Before returning to the origin, confirm in advance that P13-43 = 0.
◎ P13-00 = 2, 3, 4, 5 (Origin Di input) mode.

Return to origin description A:

P07-18	Source of mechanical origin	0
0: Di input		
P07-20	Return to Origin Mode	0
0: First find the mechanical origin, then return to the origin.		
P07-06 (Di4) = 47: External mechanical origin input (ORG) P07-07 (Di5) = 48: Return to the original point to enable P07-08 (Di6) = 50: Forward limit switch (Fbb)		
P07-22	Determine the limiter torque current	20.00
P13-46	Positioning and following start frequency	30.00
P04-10	Emergency stop, Jogging, Return to origin deceleration time	2.0
P04-09	Jogging, Return to origin acceleration time ①	5.0
P07-21	Search origin frequency ②	10.00
P13-47	Positioning point-acceleration and deceleration time ③	5.00
P13-45	Positioning point control frequency command ④	10.00

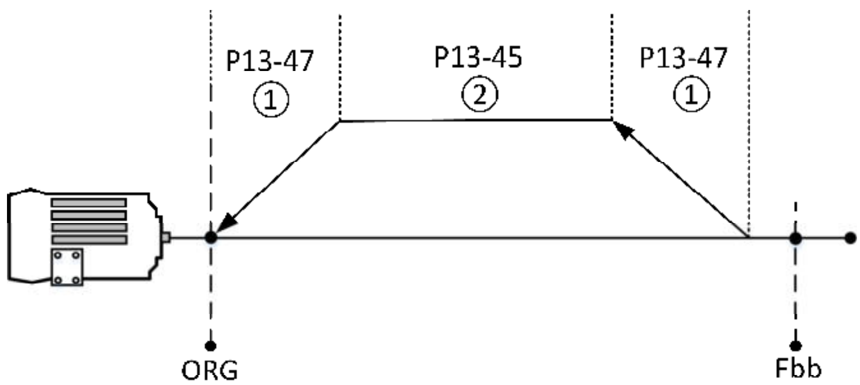


Return to origin description B:

P07-18	Source of mechanical origin	0
0: Di input		
P07-20	Return to Origin Mode	1–6
0: First find the mechanical origin, then return to the origin. 1: Same as 0, if the origin has appeared, go back to the origin directly. 2 to 6: Same as 1.		
P07-06 (Di4) = 47: External mechanical origin input (ORG) P07-07 (Di5) = 48: Return to the original point to enable P07-08 (Di6) = 50: Forward limit switch (Fbb)		
P04-09	Jogging, Return to origin acceleration time	5.0
P04-10	Emergency stop, Jogging, Return to origin deceleration time	2.0
P07-21	Search origin frequency	10.00
P07-22	Determine the limiter torque current	20.00
P13-46	Positioning and following start frequency	30.00
P13-47	Positioning point-acceleration and deceleration time ①	5.00
P13-45	Positioning point control frequency command ②	10.00

◎ When the inverter has not performed any return-to-origin action, since the internal memory has no origin position record, it will act according to (Return-to-origin description A) when it returns to the origin for the first time. The memory has a record of the origin position.

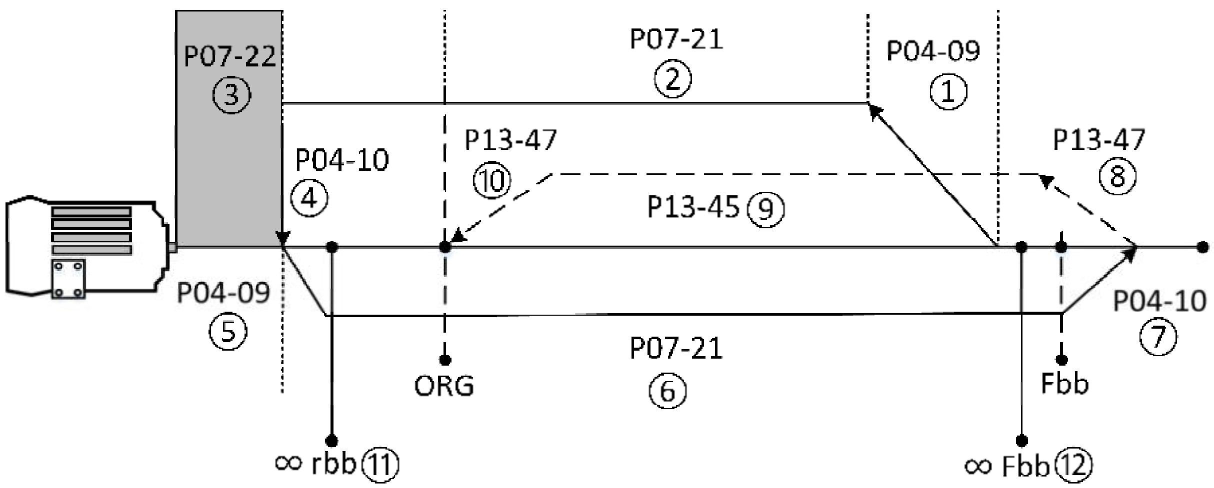
◎ Even if the mechanical work point is in any position, to perform the regression origin action, because the internal memory already has the origin location record, at this time can quickly return to the recordofed origin position, and no longer do the action of searching back to the origin (see below).



Return to origin description C:

P07-18	Source of mechanical origin	0
0: Di input		
P07-20	Return to Origin Mode	7
7: Find the mechanical origin first, then find the limiter of forward and reverse rotation, and then return to the origin.		
P07-06 (Di4) = 47: External mechanical origin input (ORG) P07-07 (Di5) = 48: Return to the original point to enable P07-08 (Di6) = 50: Forward limit switch (Fbb)		
P13-46	Positioning and following start frequency	30.00
P04-09	Jogging, Return to origin acceleration time ①, ⑤	5.0
P07-21	Search origin frequency ②, ⑥	10.00
P07-22	Determine the limiter torque current ③	20.00
P04-10	Emergency stop, Jogging, Return to origin deceleration time ④, ⑦	2.0
P13-47	Positioning point-acceleration and deceleration time ⑧, ⑩	5.00
P13-45	Positioning point control frequency command ⑨	10.00
⑪ Software left limit (rbb) (P13-38, P13-39) ⑫ Software right limit (Fbb) (P13-40, P13-41)		

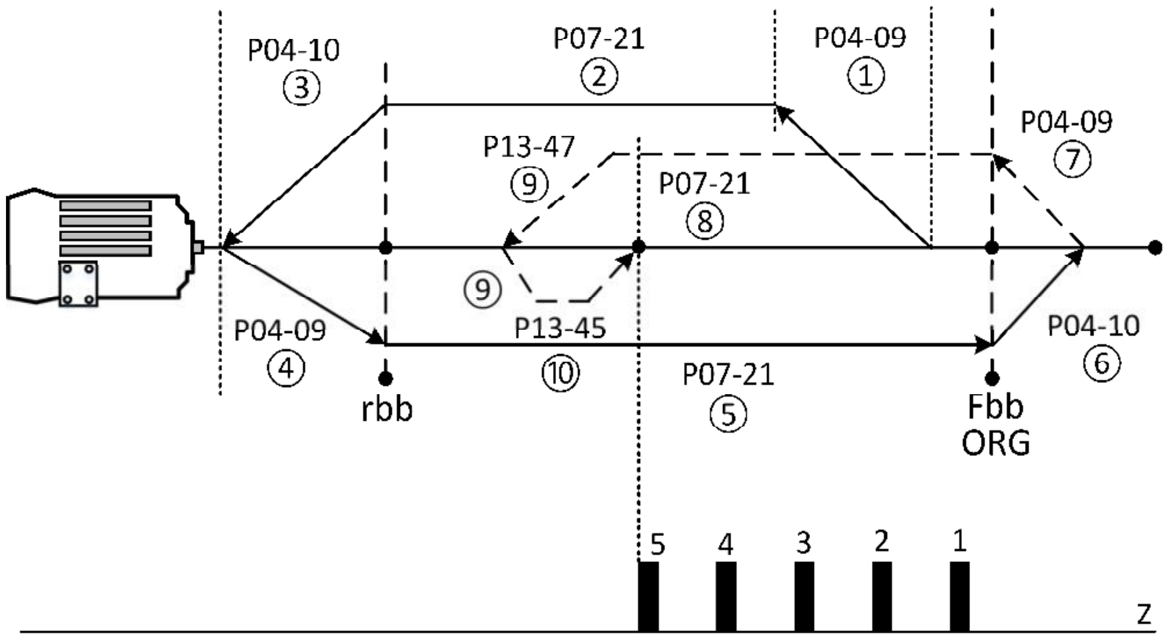
◎ When the return to origin is executed, the position of the forward and reverse limit switch is automatically measured. If the forward and reverse limit switch is not set, the block that will hit the edge of the mechanism during operation will be regarded as the positive and negative limit calculation value. Please slow down and use the current during no-load operation plus 5.0%, set to (P07-22) parameter value, set carefully and evaluate to avoid damage to the equipment, when the current value exceeds this value, it will run in the opposite direction. After returning to the origin, the measured value will be stored in the left and right limit parameter group of the software (P13-38 to P13-41), at the same time the inverter will automatically modify the parameters P13-42 = 1, P13-43 = 3.



Return to origin description D:

P07-18	Source of mechanical origin	1
1: Forward side limit switch (Fbb) + encoder Z signal		
P07-19	Z pulse number from limiter switch to mechanical origin	5
P07-20	Return to Origin Mode	0
0: First find the mechanical origin, then return to the origin.		
P07-07 (Di5) = 48: Return to the original point to enable P07-08 (Di6) = 50: Forward limit switch (Fbb) P07-09 (Di7) = 51: Reverse limit switch (rbb)		
P13-46	Positioning and following start frequency	30.00
P04-09	Jogging, Return to origin acceleration time ①, ④, ⑦	5.0
P07-21	Search origin frequency ②, ⑤, ⑧	10.00
P04-10	Emergency stop, Jogging, Return to origin deceleration time ③, ⑥	2.0
P13-47	Positioning point-acceleration and deceleration time ⑨	5.00
P13-45	Positioning point control frequency command ⑩	10.00

◎ When the limiter switch is touch, the emergency stop deceleration time (P04-10) should be set properly, too long will cause continuous running distance during deceleration away, can cause damage to the device.

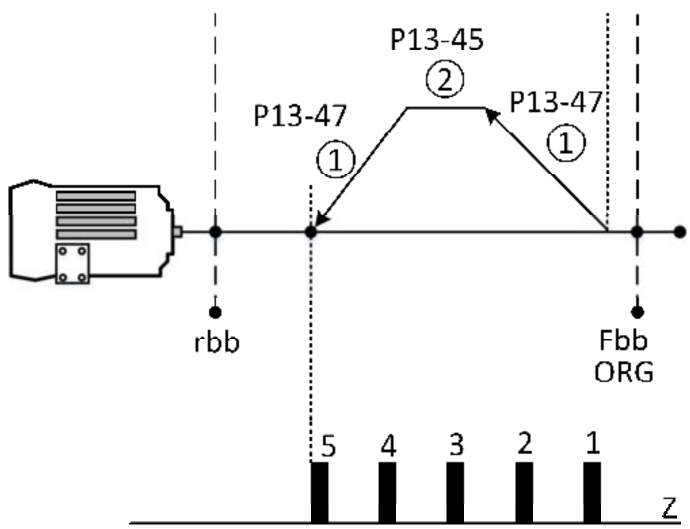


Return to origin explanation E:

P07-18	Source of mechanical origin	1
1: Forward side limit switch (Fbb) + encoder Z signal		
P07-19	Z pulse number from limiter switch to mechanical origin	5
P07-20	Return to Origin Mode	1
0: First find the mechanical origin, then return to the origin. 1: Same as 0, if the origin has appeared, go back to the origin directly. 2 to 6: Same as 1.		
P07-07 (Di5) = 48: Return to the original point to enable P07-08 (Di6) = 50: Forward limit switch (Fbb) P07-09 (Di7) = 51: Reverse limit switch (rbb)		
P04-09	Jogging, Return to origin acceleration time	5.0
P04-10	Emergency stop, Jogging, Return to origin deceleration time	2.0
P07-21	Search origin frequency	10.00
P13-46	Positioning and following start frequency	30.00
P13-47	Positioning point-acceleration and deceleration time ①	5.00
P13-45	Positioning point control frequency command ②	10.00

◎ When the inverter has not performed any return-to-origin action, since the internal memory has no origin position record, it will act according to (Return-to-origin description D) when it returns to the origin for the first time. The memory has a record of the origin position.

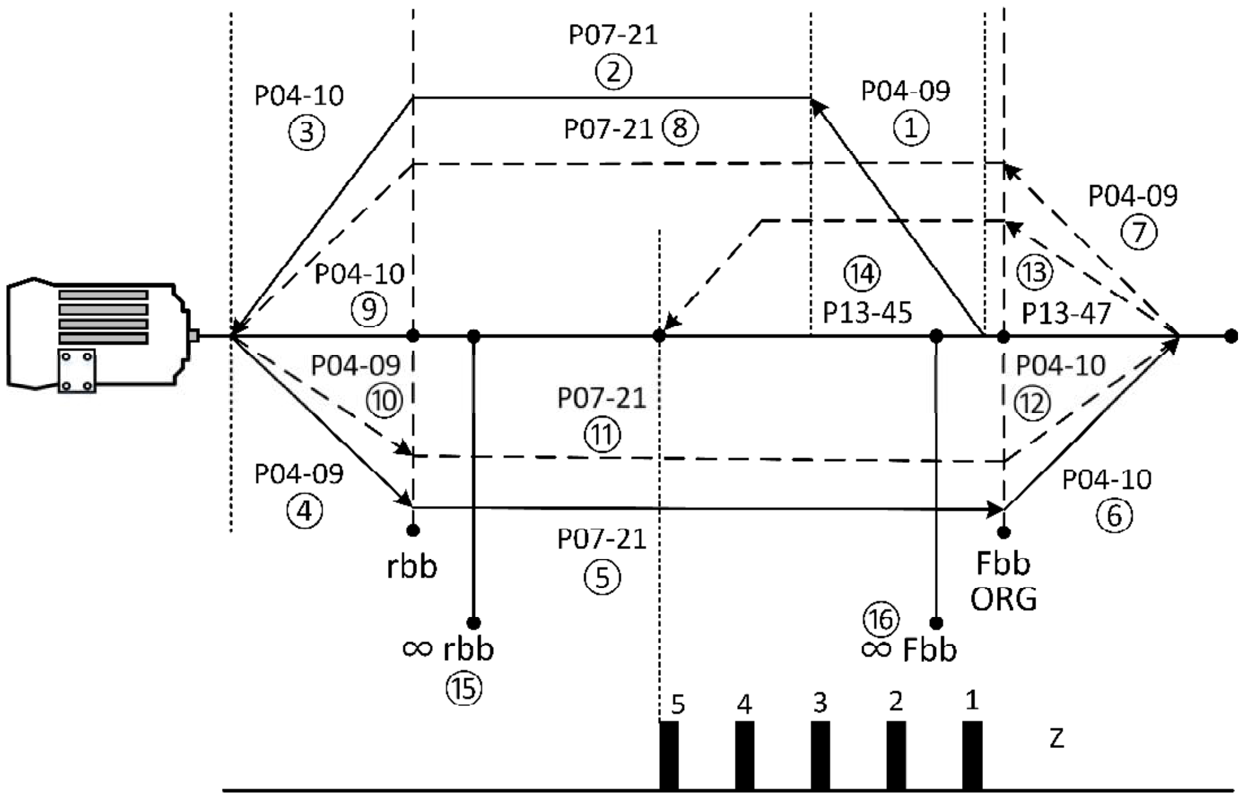
◎ Even if the working point of the machine is at any position in the future, it is necessary to perform the return to origin action, because the internal memory has the origin position record, at this time, it can quickly return to the recorded origin position instead of searching for the origin point. Action (as shown below).



Return to origin description F:

P07-18	Source of mechanical origin	1
1: Forward side limit switch (Fbb) + encoder Z signal		
P07-19	Z pulse number from limiter switch to mechanical origin	5
P07-20	Return to Origin Mode	7
7: Find the mechanical origin first, then find the limiter of forward and reverse rotation, and then return to the origin.		
P07-07 (Di5) = 48: Return to the original point to enable P07-08 (Di6) = 50: Forward limit switch (Fbb) P07-09 (Di7) = 51: Reverse limit switch (rbb)		
P13-46	Positioning and following start frequency	30.00
P04-09	Jogging, Return to origin acceleration time ①, ④, ⑦, ⑩	5.0
P07-21	Search origin frequency ②, ⑤, ⑧, ⑪	10.00
P04-10	Emergency stop, Jogging, Return to origin deceleration time ③, ⑥, ⑨, ⑫	2.0
P13-47	Positioning point-acceleration and deceleration time ⑬	5.00
P13-45	Positioning point control frequency command ⑭	10.00
⑮ Software left limit (rbb) (P13-38, P13-39) ⑯ Software right limit (Fbb) (P13-40, P13-41)		

◎ After returning to the origin, the measured value will be stored in the left and right limit parameter group (P13-38 to P13-41) of the software, and the inverter will automatically modify the parameters P13-42 = 1, P13-43 = 3.

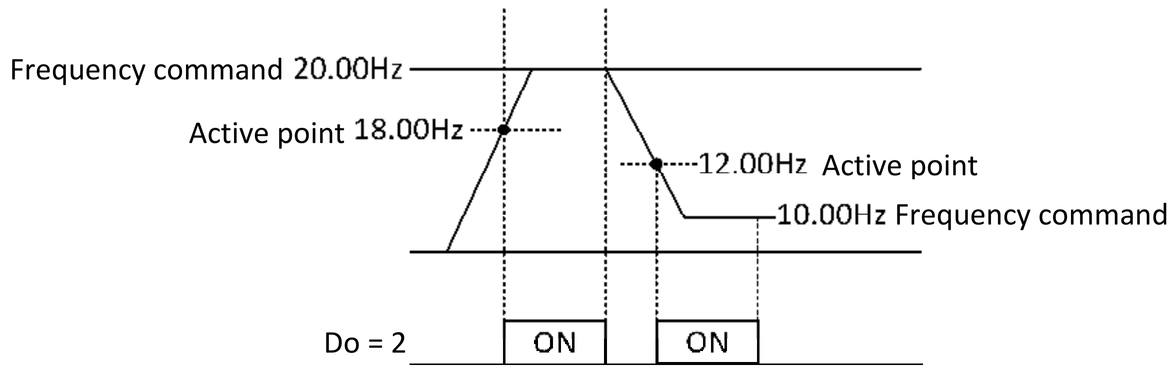


P08 Multifunction digital (Do) output parameter group			
NO./Hex	Item	Range	Default
P08-00 0C3H	RL1 setting	0–42	10
P08-01 0C4H	RL2 setting	0–42	0
P08-02 0C5H	Do1 settings	0–42	1
P08-03 0C6H	Virtual Do2 setting function driver (Virtual Di8 setting function)	0–42	6
P08-04 0C7H	Virtual Do3 setting function driver (Virtual Di9 setting function)	0–42	0
P08-05 0C8H	Virtual Do4 setting function driver (Virtual Di10 setting function)	0–42	0

◎ P08-03 to 05 (Virtual Do terminal, please refer to Chapter 11.3 Virtual Di, Do Precautions for related instructions).

00	In operation
As long as there is an operation command input, the contact "acts".	
01	Zero speed
In standby or operation, the frequency command is 0.00Hz, and the contact "acts".	
02	Set frequency reached (| frequency command – output frequency | ≤ P08-06)
Active when| (Frequency command) – (Output frequency) | ≤ P08-06 (Consistent frequency width).	

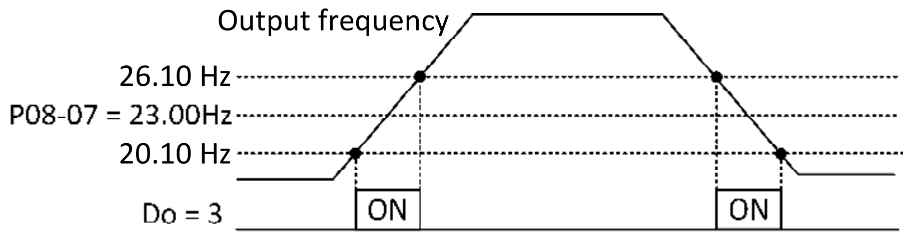
Example: P08-06 = 2.00Hz	Do = 02
|Frequency command 20.00Hz – Output frequency 18.00Hz| = |2.00Hz| ≤ 2.00Hz	ON
|Frequency command 10.00Hz – Output frequency 12.00Hz| = |–2.00Hz| ≤ 2.00Hz	ON



03	Arbitrary frequency arrival (| |fe| – P08-07 | < P08-09)

Active when | |Output frequency| – P08-07 (Any frequency detection level during acceleration)| < P08-09 (Frequency reaches the hysteresis width)

Example: P08-07 = 23.00Hz, P08-09 = 3.00Hz	Do = 03
|Output frequency (20.10Hz) – P08-07 (23.00Hz)| = |–2.90Hz| < 3.00Hz	ON
|Output frequency (26.10Hz) – P08-07 (23.00Hz)| = |3.10Hz| > 3.00Hz	OFF

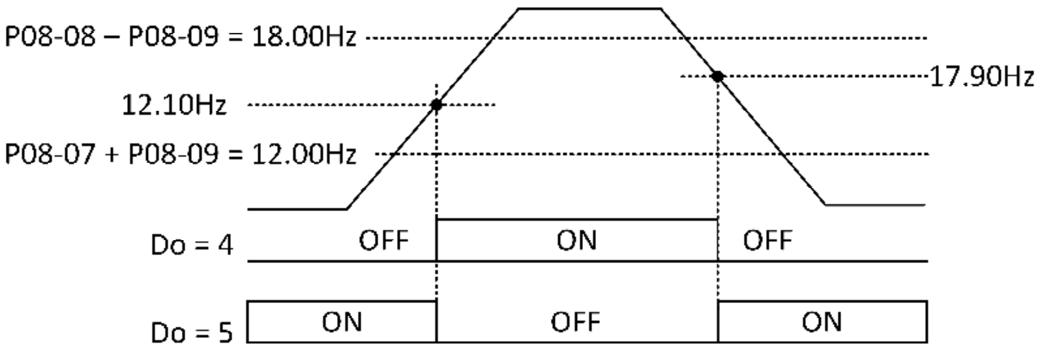


04	Output frequency detection 1 (Signal positive output)
05	Output frequency detection 2 (Signal reverse output)

- 🕮 Active when output frequency during acceleration > P08-07 (Any frequency detection level during acceleration) + P08-09 (Frequency reaches the hysteresis width).
- 🕮 Active when output frequency during deceleration < P08-08 (Any frequency detection level during deceleration) – P08-09 (Frequency reaches the hysteresis width).

Example: P08-07 = 10.00Hz, P08-08 = 20.00Hz, P08-09 = 2.00Hz

Output frequency	Do = 04	Do = 05
During acceleration > 10.00Hz + 2.00Hz = 12.00Hz	ON	OFF
During deceleration < 20.00Hz – 2.00Hz = 18.00Hz	OFF	ON



06	Operation preparation completed

Active when the drive is ON with no abnormality detected.

07	Low voltage detection (Lv)

Active when the main circuit voltage is lower than P09-01.

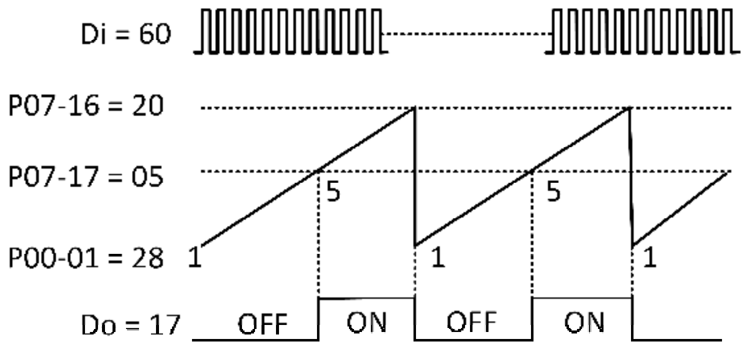
08	External interruption (b.b.) N.O.

When the input terminal Di = 12, after the external interruption signal is input, the output terminal is closed during the base interruption.

09	External interruption (b.b.) N.C.

When the input terminal Di = 12, after the external interruption signal is input, the output terminal is disconnected during the base interruption.

<table>
<tr><td>10</td><td>Abnormal detection</td></tr>
<tr><td colspan="2">Active when the inverter fails.</td></tr>
<tr><td>11</td><td>Over torque (OL2) N.O.</td></tr>
<tr><td colspan="2">📖 Active when the drive detects over-torque, and Do output is ON.
📖 P09-15 (Over torque detection level), P09-16 (Over torque detection time).</td></tr>
<tr><td>12</td><td>Over torque (OL2) N.C.</td></tr>
<tr><td colspan="2">📖 Active when the drive detects over-torque, and Do output is OFF.
📖 P09-15 (Over torque detection level), P09-16 (Over torque detection time).</td></tr>
<tr><td>13</td><td>Operating command source- digital keypad operator</td></tr>
<tr><td colspan="2">Active when the operation command source is P02-00, P02-01 = 0 (Digital operator).</td></tr>
<tr><td>14</td><td>Frequency command source-digital keypad operator</td></tr>
<tr><td colspan="2">Active when the frequency command source is P03-02, P03-03 = 0
(Frequency command 0 (P03-08)).</td></tr>
<tr><td>15</td><td>Indication in reverse</td></tr>
<tr><td colspan="2">Active when the operation direction is reverse and frequency command > 0.00Hz.</td></tr>
<tr><td>16</td><td>Frequency command lossing</td></tr>
<tr><td colspan="2">When in operation, if AVI or ACI is disconnected or the frequency command is 0.00Hz, the contact will “act”.</td></tr>
<tr><td>17</td><td>Pulse wave, Z counter output (P07-16, P07-17, P08-14)</td></tr>
<tr><td colspan="2">📖 P07-16 (Pulse wave or Z input count value cycle), P07-17 (Pulse or Z input comparison count value), P08-14 (Pulse output source).
📖 Di = 60: Counter signal input instructions.

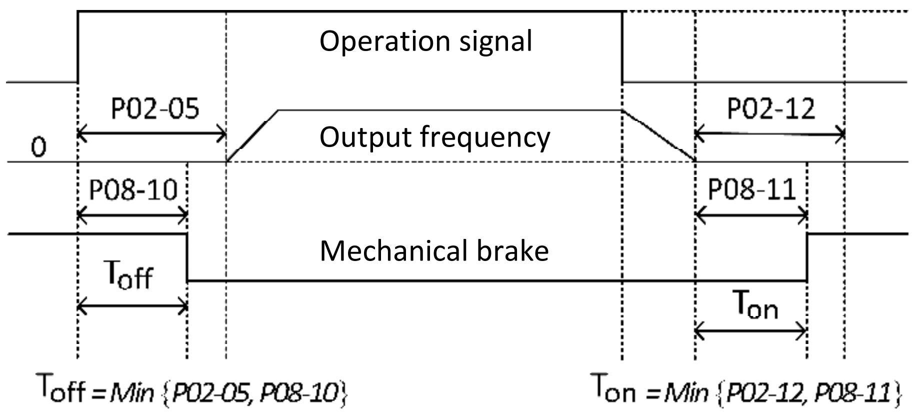
Example: P07-16 = 20, P07-17 = 5, P08-14 = 1 (Encoder Z input)
P00-01 = 28, counting to 5 is ON, counting to 20 is 1 cycle , and then counting 1 again, at this time the action is OFF.

</td></tr>
<tr><td>18</td><td>Timing output function (P07-14, 15)</td></tr>
<tr><td colspan="2">Please refer to Di = 36: Timing function input description.</td></tr>
<tr><td>19</td><td>Low voltage warning</td></tr>
<tr><td colspan="2">Active when the main circuit voltage is lower than P09-01 + 10V.</td></tr>
<tr><td>20</td><td>Restarting abnormally</td></tr>
<tr><td colspan="2">P17-00 > 0, Active when abnormal reset occurs.</td></tr>
<tr><td>21</td><td>Motor overload (oL1) electronic thermal relay action</td></tr>
<tr><td colspan="2">Active when the output current reaches the settings of P09-07 to P09-10.</td></tr>
<tr><td>22</td><td>Overheating (oHx)</td></tr>
<tr><td colspan="2">Active when the temperature of the inverter's heat sink reaches the value set by P09-25 (Inverter over-temperature protection setting).</td></tr>
</table>

23	Inverter overload (oL) (Current > (P01-00) × 150%, Time > 60sec)
Active when the output current of the inverter is greater than P01-00 × 150%, time > 60sec.	
24	RS485 communication is abnormal
🕮 Active when the communication abnormality, exceeding the time set by P18-04. 🕮 During shutdown , P18-04 = 0.0, and before each operation , there is no normal communication. The output terminal will not act when the above conditions occur. For example, the communication is disconnected before operation. At this time, if the operation command is issued, it will not act even if the RS485 transmission is abnormal.	
25	PID target value is equal to the detected value
🕮 P14-00 = 1–6. 🕮 Active when the PID feedback value ≥ P14-04 × 3.0%.	
26	Non-zero speed in
Active when the set frequency of the inverter is greater than the set value of the lowest starting frequency.	
27	The mechanical brake is engaged (P02-12, P08-11)

	Do = 27
On standby	ON
Operation command ON, time > P08-11	OFF
Operation command OFF, after deceleration to 0.00Hz, time > P08-11. ※ Can be used with P02-12 (When stopping-DC braking time).	ON

28	The mechanical brake is disengaging (P02-05, P08-10)

	Do = 28
On standby	OFF
Operation command ON, time > P08-10	ON
Operation command OFF, after deceleration to 0.00Hz, time > P08-10. ※ Can be used with P02-05 (DC braking time at start).	OFF



29	Frequency counter pulse wave (P08-12, Do1 exclusive)

Please refer to the description of P08-12.

30	Switch to motor 1
31	Switch to motor 2

Di = 44	Do = 30	Do = 31
OFF (motor 1)	ON	–
ON (motor 2)	–	ON

32	Positioning completed

- With the positioning control, the output terminal is closed when the position is reached.
- After the position is reached, the Z pulse number will change slightly due to the motor excitation correction, resulting in some closure and disconnection between the output terminals, and the accuracy of P08-13 can be increased to correct this situation.

33	Forward and reverse limit reached (Di = 50, 51)

Active when the forward and reverse limit switch action is detected.

34	Digital input Di1 (H/L) signal
35	Digital input Di2 (H/L) signal
36	Digital input Di3 (H/L) signal
37	Digital input Di4 (H/L) signal
38	Digital input Di5 (H/L) signal
39	Digital input Di6 (H/L) signal
40	Digital input Di7 (H/L) signal

Active when it is detected that the digital input terminals Di1 (34) to Di7 (40) are acting.

41	(H/L) output by communication command (Write communication address = 2001h)

Please refer to page P18 for the detailed description of RS485 communication parameter group.
The Do output is determined by the communication code.

Example: P08-00 (RL1)= 41

RS485	RL1
01. 06. 20. 01. 00. 01	ON
01. 06. 20. 01. 00. 00	OFF

42	Length arrival (Di = 25)

Please refer to the description of P21-11 to P21-15.

NO./Hex	Item	Range	Default
P08-06 0C9H	Consistent frequency width (for Do = 02 function)	0.00–10.00Hz	1.00

◎ Please refer to the description of Do = 02.

NO./Hex	Item	Range	Default
P08-07 0CAH	Any frequency detection level during acceleration	0.00–400.00Hz	60.00

◎ Please refer to the description of Do = 03, 04, 05.

NO./Hex	Item	Range	Default
P08-08 0CBH	Any frequency detection level during deceleration	0.00–400.00Hz	60.00

◎ Please refer to the description of Do = 03, 04, 05.

NO./Hex	Item	Range	Default
P08-09 0CCH	Frequency reaches the hysteresis width	0.00–10.00Hz	1.00

◎ Please refer to the description of Do = 03, 04, 05.

NO./Hex	Item	Range	Default
P08-10 0CDH	Mechanical brake release delay time	0.00–600.00sec	0.00

◎ Please refer to the description of Do = 28.

NO./Hex	Item	Range	Default
P08-11 0CEH	Mechanical brake engagement delay time	0.00–600.00sec	0.00

◎ Please refer to the description of Do = 27.

NO./Hex	Item	Range	Default
P08-12 0CFH	Frequency counter pulse multiplier	1–16 (fold)	1

◎ Based on the output frequency as the fundamental frequency, Max. up to 2KHz (Do1 exclusive).

For example:

When the output frequency is 42.0Hz, P08-12 = 10, and the pulse output of Do1 frequency counter = 42.0Hz × 10 = 420.0Hz.

NO./Hex	Item	Range	Default
P08-13 0D0H	Positioning completion level	1–400 Pulse	40

◎ Please refer to the description of Do = 32.

NO./Hex	Item	Range	Default
P08-14 0D1H	Pulse output source	0–1	0

◎ Please refer to the description of Do = 17.

0	Pulse input
The Di function terminal (60: counter signal input) is the source.	
1	Encoder Z input
The Z pulse signal of the internal Encoder is the counting source.	

P09 Running protection function parameter group			
NO./Hex	Item	Range	Default
P09-00 0D2H	Automatic voltage regulator output (AVR)	0–3	1

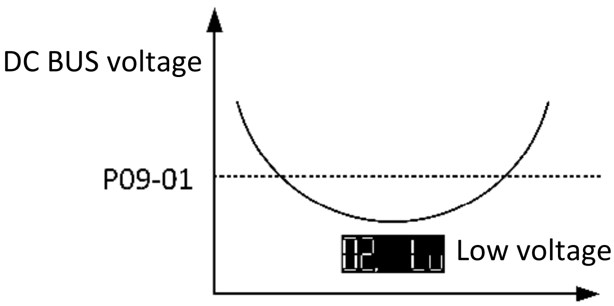
◎ Generally, the rated voltage input by the motor is nothing more than AC 220/200V, 60/50Hz; and the input voltage range of the inverter can be from AC 180 to 264V, 50/60Hz, so if the inverter Without AVR automatic voltage stabilization output function, if the input inverter power supply is AC 250V, the maximum voltage output to the motor is AC 250V, and the motor runs at a power source exceeding the rated voltage by 12 to 20%, which will cause the motor to malfunction. Increasing temperature rise, damage to insulation, and unstable torque output will shorten the life of the motor and cause losses in the long run.

◎ The automatic voltage stabilization output of the inverter can automatically stabilize the output power at the rated voltage of the motor when the input power exceeds the rated voltage of the motor. For example, the V/F curve is set to AC 200V/50Hz. When AC 200–264V, the maximum voltage output to the motor will automatically stabilize at AC 200V, and will never exceed the set voltage. If the input power supply varies from AC 180 to 200V, the voltage output to the motor will be proportional to the input power supply.

0	Turn on the AVR function
The inverter calculates the output voltage based on the actual DC BUS voltage value, and the maximum output voltage will stabilize within the set voltage value of parameters P10-02 and P11-02 (Maximum output voltage V4).	
1	Turn off the AVR function
The inverter calculates the output voltage based on the actual DC BUS voltage value. The output voltage value will fluctuate due to the drift of the DC BUS voltage, which may cause the output voltage to be too large or oscillate.	
2	Stopping-turn off the AVR function
The inverter cancels the automatic voltage stabilization function during deceleration to stop.	
3	Decelerating-turn off the AVR function
The inverter cancels automatic voltage regulation during deceleration. Turning off the automatic voltage stabilization function can shorten the deceleration time, and can decelerate and stop according to the deceleration time.	

NO./Hex	Item		Range	Default
P09-01 0D3H	Low voltage detection level	220V 440V	150.0–210.0Vdc 300.0–420.0Vdc	190.0 380.0

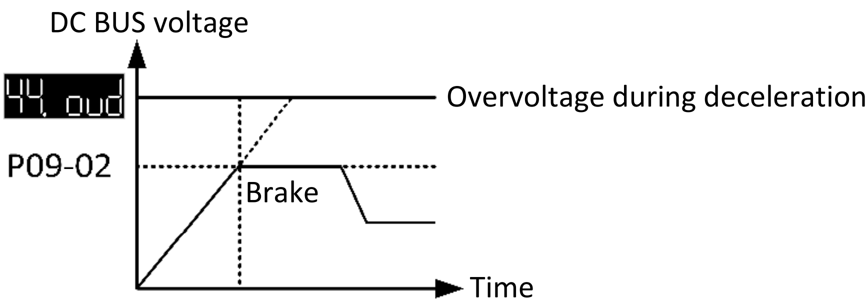
◎ This parameter is used to set the Lu discrimination level. When the inverter's DC side voltage is lower than the low voltage level, it will trigger a low voltage fault to stop output, and free stop, fault display 02. Lv 



NO./Hex	Item		Range	Default
P09-02 **0D4H**	Brake voltage detection level	220V 440V	350.0–410.0Vdc 700.0–820.0Vdc	370.0 740.0

◎ Set the brake voltage action level, suppress the overvoltage by external resistance, and convert the regenerative energy from the motor into heat energy for consumption.

◎ Please refer to Chapter 10.6 Braking Resistance Selection for the minimum resistance and BRD usage rate that can be connected for each model.



NO./Hex	Item	Range	Default
P09-03 **0D5H**	Overcurrent detection level during acceleration	20.0–200.0%	170.0

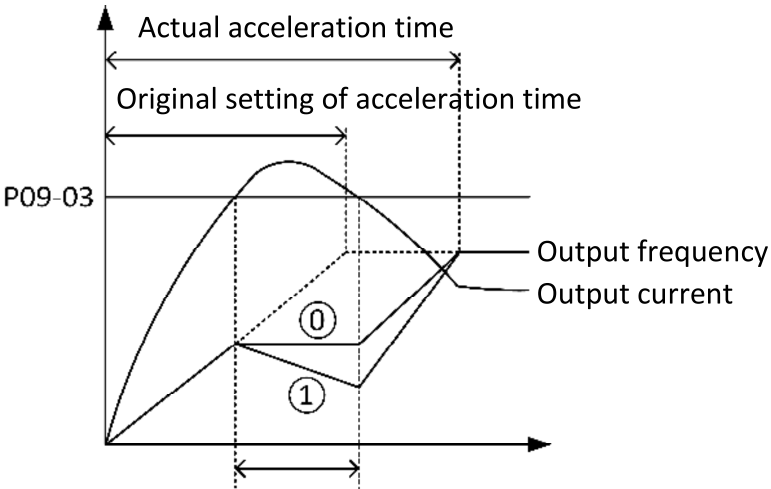
◎ 0.0: This function is invalid, overcurrent detection level (P01-00 × P09-03).

◎ If the output current of the inverter rises rapidly during acceleration and exceeds the parameter overcurrent stall prevention level setting value, the inverter will execute the detection action according to parameter P09-04, and continue the acceleration action after the output current decreases.

NO./Hex	Item	Range	Default
P09-04 **0D6H**	Overcurrent detection action during acceleration	0–1	0

◎ P04-19 (Current stall deceleration time).

0	Constant velocity
When the inverter output current > P09-03, the inverter stop acceleration. after the current decreases the inverter continue to accelerate.	
1	Slow down
When the inverter output current > P09-03, first decelerate and wait for the current to decrease before continuing to accelerate.	



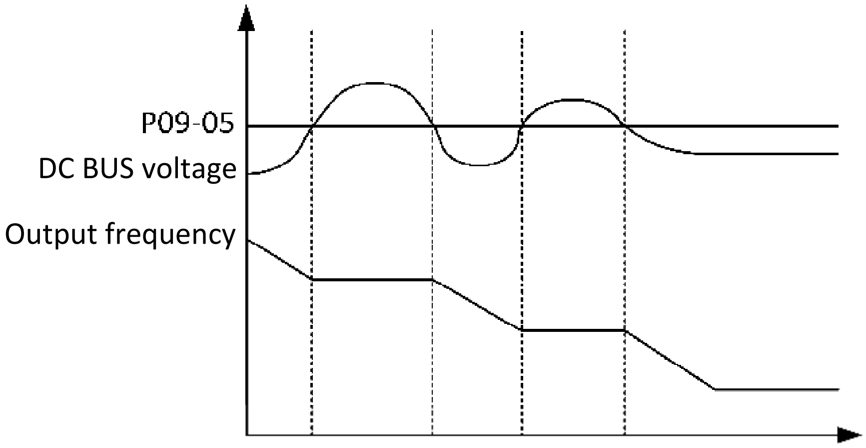
Overcurrent detection action during acceleration

NO./Hex	Item	Range	Default
P09-05 **0D7H**	Stall prevention voltage level during deceleration 220V 440V	 330.0–410.0Vdc 660.0–820.0Vdc	 380.0 760.0

◎ 0.0: This function is invalid.

◎ During deceleration, the DC voltage exceeds the stall prevention level, stop deceleration, and when the DC voltage is lower than the detection level, continue deceleration.

◎ Stall prevention function during deceleration, automatically extend the deceleration time according to the regenerative energy to prevent overvoltage during deceleration.

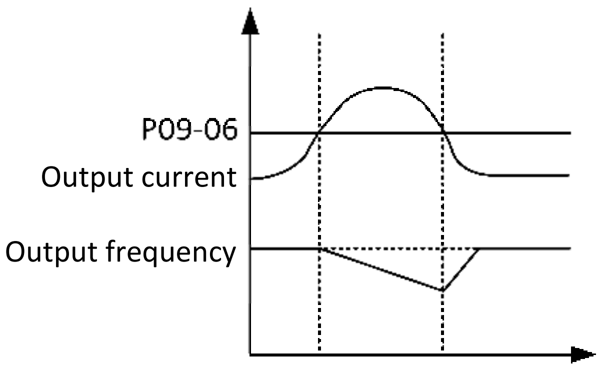


NO./Hex	Item	Range	Default
P09-06 **0D8H**	Overcurrent detection level in constant speed	20.0–200.0%	160.0

◎ P04-19 (Current stall deceleration time).

◎ 0.0: This function is invalid, overcurrent detection level (P01-00 × P09-06).

◎ When the inverter runs at a certain speed and overload occurs, the inverter will reduce the speed. When the output current is lower than the set detection level, it will accelerate to the target speed.



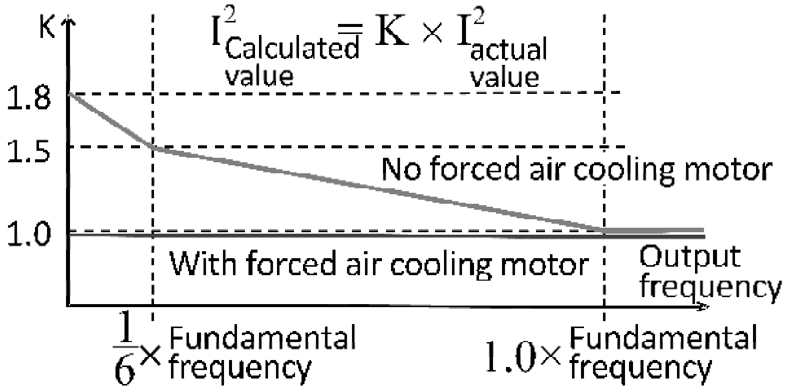
NO./Hex	Item	Range	Default
P09-07 0D9H	Electronic thermal relay selection (oL1)	0–4	1

◎ In order to prevent the self-cooling motor from overheating when the motor is running at low speed, the user can set the electronic thermal relay to limit the allowable output power of the driver.

◎ Current level: P10-14, P11-14, P12-02 (Motor rated current value) × P09-08, combined with parameter P09-10, sets the action time to protect the motor and avoid burning due to overheating of the motor. When the set action time is reached, the frequency converter will trip a fault, the motor will run freely, and the fault will display 07. oL1 07. oL

0	Invalid
1	Coaxial air-cooled motor (Self-cooling), cold engine start
Calculated as a set value for parameters (P09-08, 1.00 × P09-10).	
2	Coaxial air-cooled motor (Self-cooling), hot engine start
Calculated as a set value for parameters (P09-08, 0.64 × P09-10).	
3	Forced air-cooled motor, cold engine start
Calculated as a set value for parameters (P09-08, 1.00 × P09-10).	
4	Forced air-cooled motor, hot engine start
Calculated as a set value for parameters (P09-08, 0.64 × P09-10).	

NO./Hex	Item	Range	Default
P09-08 0DAH	Thermal relay current level (P10-14, P11-14, P12-02 × P09-08)	120.0–250.0%	150.0
P09-09 0DBH	Thermal relay starts to integrate current level (P10-14, P11-14, P12-02 × P09-09)	80.0–120.0%	100.0
P09-10 0DCH	Thermal relay action time	10.0–120.0sec	60.0



NO./Hex	Item	Range	Default
P09-11 0DDH	Low torque detection function selection (38. LL)	0–4	0

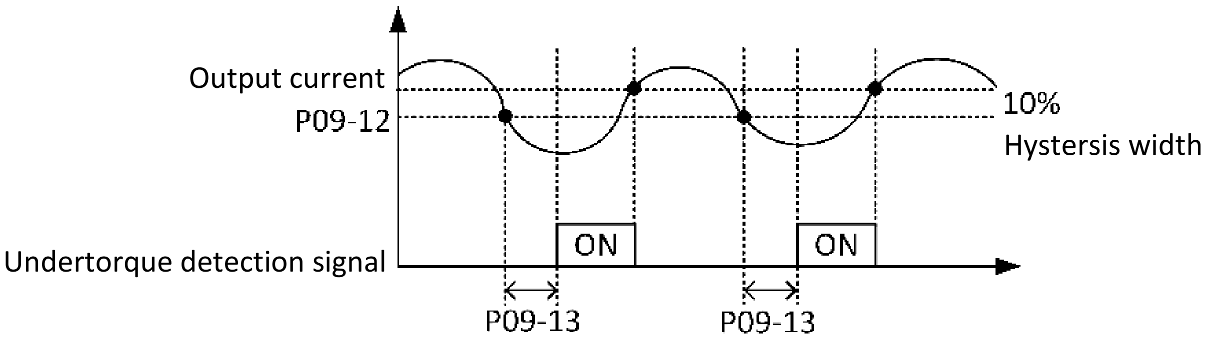
◎ Displayed when abnormal (38. LL 38. LL)

0	Over torque is not detected
1	Low torque detection at constant speed, continue to run after detection
2	Low torque detection at constant speed, stop running after detection
3	Detection of too low torque during operation, continue to run after detection
4	Detection of too low torque during operation, stop running after detection

NO./Hex	Item	Range	Default
P09-12 0DEH	Low torque detection level	0.0–100.0%	20.0
P09-13 0DFH	Low torque detection time	0.01–10.00sec	3.00

◎ Low torque detection level: P01-00 × P09-12.

Example:
When the mechanical load (eg belt break) is reduced, the inverter will continue to output or stop running.



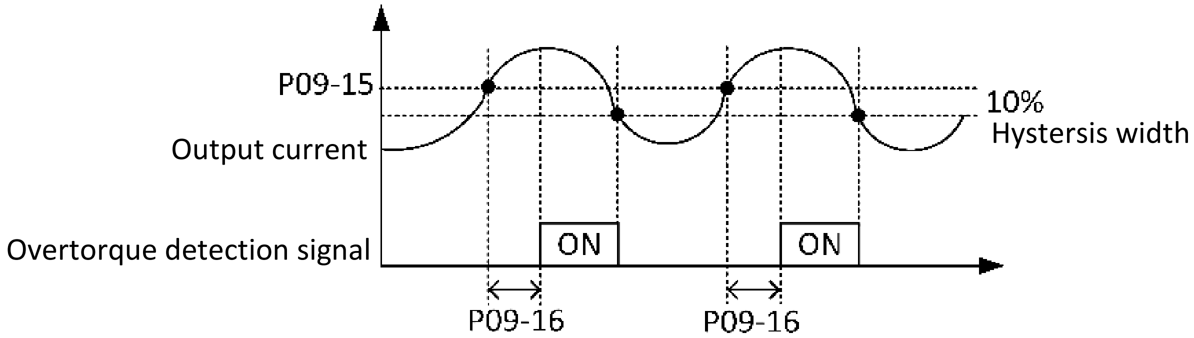
NO./Hex	Item	Range	Default
P09-14 0E0H	Over torque detection function selection (08. oL2)	0–4	0

◎ Display when abnormal (08. oL2 08. oL2)

0	Over torque is not detected
1	Over torque detection in constant speed, continue to run after detection
2	Over torque detection in constant speed, stop running after detection
3	Over torque detection during operation, continue to run after detection
4	Over torque detection during running, stop running after detection

NO./Hex	Item	Range	Default
P09-15 0E1H	Over torque detection level	20.0–250.0%	160.0
P09-16 0E2H	Over torque detection time	0.01–10.00sec	3.00

◎ Over torque detection level: P01-00 × P09-15.



NO./Hex	Item	Range	Default
P09-17 0E3H	Momentary power failure operation selection	0–1	0

0	No operation
1	Speed tracking operation
In the moment of power failure, the inverter will perform speed tracking operation after the power is restored, but the operation command must always exist. And according to the setting conditions of P09-18 to P09-21, speed tracking operation is performed.	

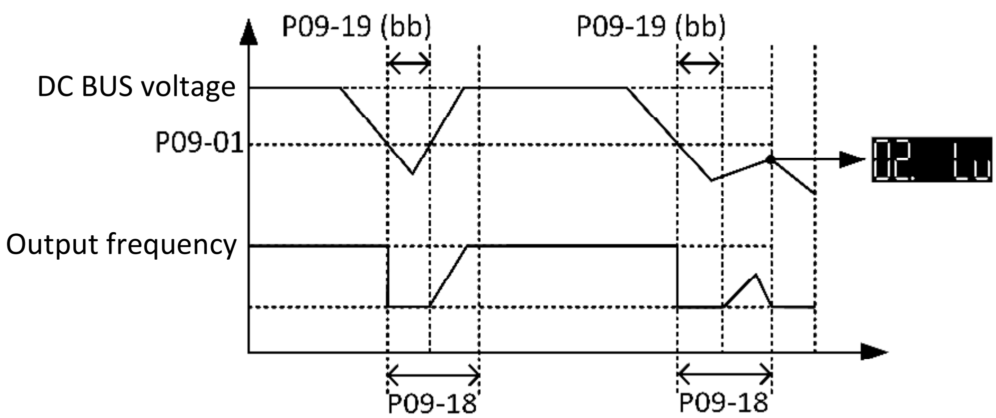
NO./Hex	Item	Range	Default
P09-18 0E4H	Maximum allowable time for instantaneous power failure	0.30–5.00sec	2.00

◎ DC voltage < P09-01 starts timing, when time > P09-18 Jump abnormality 02. Lv 02. Lv

NO./Hex	Item	Range	Default
P09-19 0E5H	Speed tracking b.b. time	0.50–25.00sec	0.50

◎ DC voltage < P09-01 starts timing and displays b.b. When time > P09-19 starts speed tracking operation.

◎ The speed tracking operation is abnormal, the P09-19 time setting can be extended.



NO./Hex	Item	Range	Default
P09-20 0E6H	Speed tracking mode	0–2	0

◎ The speed search function is used to find the actual speed and start smoothly from the detected speed. It is effective when power is restored after a momentary power failure and restarted after a fault.

0	One way search method
In a single direction, output the excitation current pulse wave to search for the detection speed.	
1	Two way search method
In the forward and reverse direction, output the excitation current pulse wave to search the detection speed.	
2	Maximum current method
The set value must be lower than the exciting current equal to the no-load current. If the no-load current is unknown, the speed tracking maximum current setting (P09-21) is recommended to be set from 20%. Excessive speed search current will cause inverter output saturation.	

NO./Hex	Item	Range	Default
P09-21 0E7H	Speed tracking maximum current setting	5.0–200.0%	100.0

◎ Limited to 2.5 times the rated current of the motor.

NO./Hex	Item	Range	Default
P09-22 0E8H	Current imbalance detection level	20.0–100.0%	0.0

◎ 0.0: This function is invalid. Current imbalance detection level: P01-00 × P09-22
◎ Detect the unbalanced amplitude of three-phase current output, when it exceeds the set percentage, abnormal fault (14.ocbE) is detected.

NO./Hex	Item	Range	Default
P09-23 0E9H	Output current limit	1.0–250.0%	180.0
P09-24 0EAH	Current limit controller gain	50.0–400.0%	200.0

◎ Output current limit level: P01-00 × P09-23
◎ When the output current value reaches the current limit value, the inverter will reduce the output voltage and frequency. If the output current value drops below the current limit value, the inverter will return to normal output voltage operation.
◎ P09-24 is P09-23 the response gain adjustment of the output current limiter, the gain is small, the response is slow; the gain is large, the response is fast, if you need to adjust, please do not set too large to avoid shock.

NO./Hex	Item	Range	Default
P09-25 0EBH	Inverter over temperature protection setting	60.0–95.0°C	88.0

◎ Detecting during operation, when the temperature of the internal heat sink of the inverter is greater than the set value (P09-25 – (5.0°C)), the forecast (30. oH0) is displayed and the motor continues to run.
◎ When the internal heat sink temperature is greater than the set value of P09-25, an abnormal fault is detected (32. oH2), and the motor freely stops.

NO./Hex	Item	Range	Default
P09-26 0ECH	PT100 over temperature protection (AUX)	0.0–260.0°C	0.0

◎ 0.0: This function is invalid.
◎ AUX is isolated analog signal input (Option to buy).
◎ Detecting during operation, when P05-16 = 8, when the AUX terminal input temperature is greater than the set value of P09-26, abnormal fault detection (33.oH3 ), the motor freely stops.

NO./Hex	Item	Range	Default
P09-27 0EDH	Cooling fan start method	0–3	0

0	After stopping, the operation will stop for one minute
1	Run/stop with the inverter
2	Always run
3	Start temperature control operation
Set P09-28 fan start temperature as the control condition.	

NO./Hex	Item	Range	Default
P09-28 0EEH	Fan start temperature setting	40.0–60.0°C	45.0

◎ When the temperature of the heat sink rises to the set value of the starting temperature, the fan starts, and when the temperature drops (set value – (5.0°C)), the fan stops running.

NO./Hex	Item	Range	Default
P09-29 0EFH	PG disconnection detection selection	0–3	1

◎ Only for closed loop control and length control.
◎ Closed-loop control: When the speed command > 1% of the rated motor frequency, if the change in the count value of encoder 1 < 4 Pulse and the time > P09-30, it is judged as PG disconnection.
◎ Length control: When the rotational speed command > 10% of the rated motor frequency, if the change in the count value of encoder 1 < 4 Pulse and the time > P09-30, it is judged that the PG is broken.
◎ Display 27. PGo 

0	Free to stop
Inverter cuts off the output, and the motor stops free running to stop.	
1	Decelerate to stop
The set deceleration time to make the inverter decelerate and stop.	
2	Emergency stop
The inverter will make emergency deceleration to stop according to the setting time of P04-10 (Emergency stop time).	
3	Continue to run (Display PGo)
The motor still continues to run. pay attention to the safety of the motor and machinery.	

NO./Hex	Item	Range	Default
P09-30 0F0H	PG disconnection detection delay time	0.01–10.00sec	3.00

NO./Hex	Item	Range	Default
P09-31 0F1H	Over-speed action selection	0–3	1

◎ When the motor speed exceeds the setting value of P09-32 and continues to P09-33, an overspeed abnormality (28. oS ) is detected.

◎ Overspeed level: P10-01, P11-01, P12-00 × P09-32. Effective with PG control.

0	Free to stop
Inverter cuts off the output, and the motor stops free running to stop.	
1	Decelerate to stop
The set deceleration time to make the inverter decelerate and stop.	
2	Emergency stop
The inverter will make emergency deceleration to stop according to the setting time of P04-10 (Emergency stop time).	
3	Continue to run (Display oS)
The motor still continues to run. pay attention to the safety of the motor and machinery.	

NO./Hex	Item	Range	Default
P09-32 0F2H	Overspeed level	0.0–120.0%	115.0
P09-33 0F3H	Overspeed delay detection time	0.00–2.00sec	0.50

NO./Hex	Item	Range	Default
P09-34 0F4H	Speed deviation too large selection	0–4	3

◎ When the deviation value between the frequency command and the actual speed of the motor exceeds the level of P09-35 and the time continues to exceed P09-36, the abnormal speed deviation (29. oES ) will be detected.

◎ Effective with PG control.

0	Free to stop
Inverter cuts off the output, and the motor stops free running to stop.	
1	Decelerate to stop
The set deceleration time to make the inverter decelerate and stop.	
2	Emergency stop
The inverter will make emergency deceleration to stop according to the setting time of P04-10 (Emergency stop time).	
3	Continue to run (Display oES)
The motor still continues to run. pay attention to the safety of the motor and machinery.	
4	Invalid

NO./Hex	Item	Range	Default
P09-35 **0F5H**	Speed deviation is too large	0.0–50.0%	20.0
P09-36 **0F6H**	If the speed deviation is too large, the detection time will be delayed	0.00–10.00sec	0.50

NO./Hex	Item	Range	Default
P09-37 **0F7H**	Input power is out of phase or voltage too low	0–1	1

0	No detection
1	Fault detection (40. PF )

NO./Hex	Item	Range	Default
P09-38 **0F8H**	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P09-39 **0F9H**	Vector mode output voltage limit	50.0–100.0%	100.0
P09-40 **0FAH**	The output voltage limits the controller gain	50.0–400.0%	100.0

◎ Set the input voltage (VRST) as a percentage, as the magnetic field regulation function of the rated speed output voltage limit of the (IM) vector control mode.

◎ When the output frequency command = IM motor base frequency, the output voltage limit value of P09-39 can be 100.0%.

◎ When the vector mode output frequency command > IM motor base frequency, please reduce the output voltage limit value of P09-39, the recommended value is 95.0–98.0%, which can increase the space for magnetic field regulation.

◎ P09-40 is P09-39 the response gain adjustment of the output voltage limiter, the gain is small, the response is slow; the gain is large, the response is fast, if you need to adjust, please do not set too large to avoid shock.

P10 V/F curve, IM1 motor rated nameplate parameter group			
NO./Hex	Item	Range	Default
P10-00 0FBH	IM1-V/F curve selection	0–15	15

◎ According to the set V/F curve, the inverter runs with appropriate output voltage in accordance with each frequency command. There are 15 curves of pre-set frequency output voltage (0–14: each set value is a fixed value and cannot be changed).
◎ When P10-00 (V/F curve selection) is set to 15 (any V/F curve), P10-01 to P10-10 are valid.
◎ If the selected V/F curve is not suitable, the motor torque may be insufficient, or the output current may increase due to over excitation.
◎ The types of V/F curve are as follows:

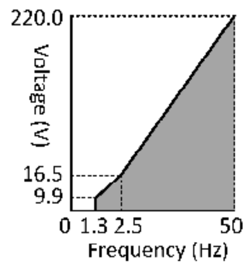
Setting	Specifications	Characteristics	Usage
0	50Hz	Constant torque	Suitable for general purpose curves. Such as linear motion conveying device, etc., regardless of the rotation speed, use this curve when the load torque is constant.
1	60Hz		
2	60Hz (With 50Hz base)		
3	72Hz (With 60Hz base)		
4	50Hz (Cubed decreasing)	Derated torque	For loads such as fans, pumps, etc., whose torque is proportional to the second or third power of the speed, use this curve.
5	50Hz (Quadratic decreasing)		
6	60Hz (Cubed decreasing)		
7	60Hz (Quadratic decreasing)		
8	50Hz (Mid starting torque)	High starting torque	Please select the V/F curve with high starting torque only in the following cases. ● The wiring distance between the inverter and the motor is long (about 150m or more). ● Larger torque is required when starting (lifts and other loads). ● AC reactor is connected to the output of the inverter.
9	50Hz (High starting torque)		
10	60Hz (Mid starting torque)		
11	60Hz (High starting torque)		
12	90Hz (With 60Hz base)	Fixed output operation	Curve when rotating at a frequency above 60Hz. When running at a frequency above 60Hz, a fixed voltage will be output.
13	120Hz (With 60Hz base)		
14	180Hz (With 60Hz base)		
15	The factory setting is 60Hz	Fixed torque characteristics	Factory setting specifications

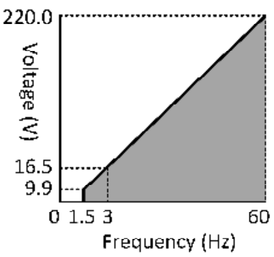
◎ 0–14: 15 kinds of fixed V/F curves, the characteristic diagram is shown below.

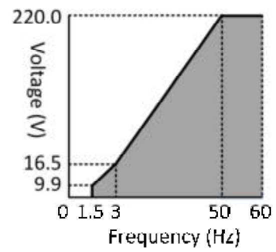
0.5 to 5.0 horsepower:

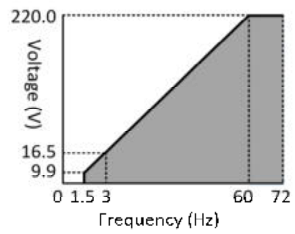
Constant torque characteristics (Setting values 0–3)

Set value 0	50Hz	Set value 1	60Hz	Set value 2	60Hz	Set value 3	72Hz



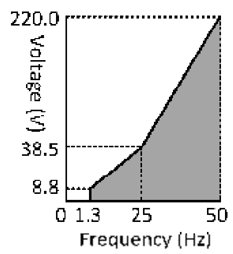


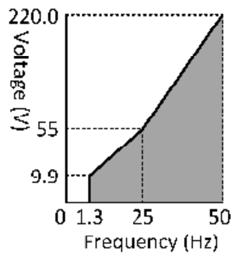


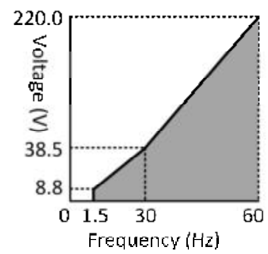


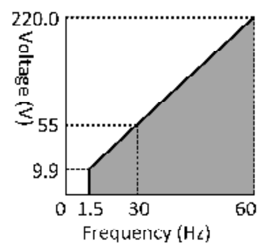
Decreasing torque characteristics (Setting values 4–7)

Set value 4	50Hz	Set value 5	50Hz	Set value 6	60Hz	Set value 7	60Hz



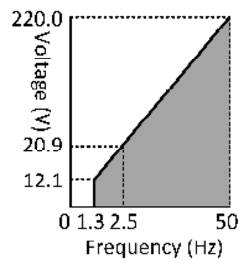


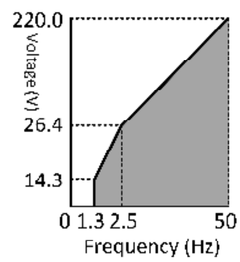


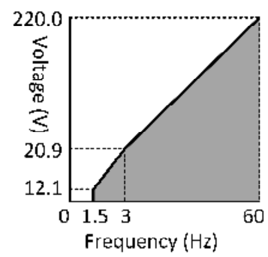


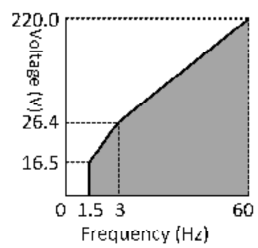
High starting torque (Setting value 8–11)

Set value 8	50Hz	Set value 9	50Hz	Set value 10	60Hz	Set value 11	60Hz



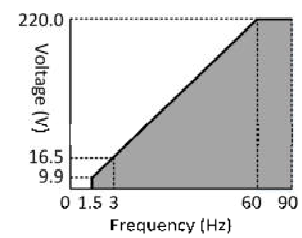


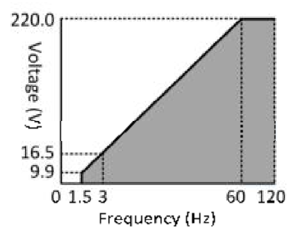


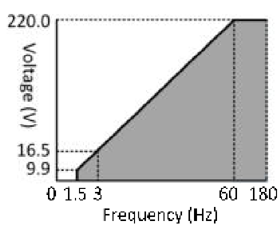


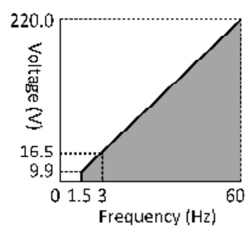
High starting torque (Setting value 12–15)

Set value 12	90Hz	Set value 13	120Hz	Set value 14	180Hz	Set value 15	60Hz





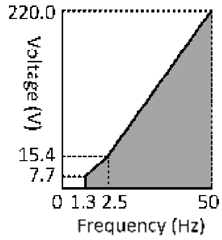


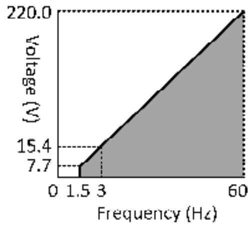


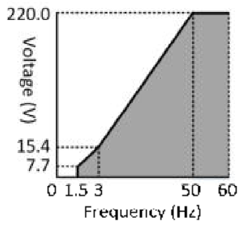
7.5 to 60.0 horsepower:

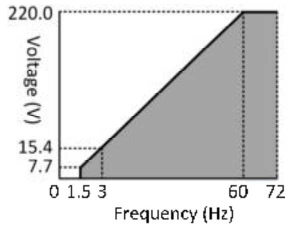
Constant torque characteristics (Setting values 0–3)

Set value 0	50Hz	Set value 1	60Hz	Set value 2	60Hz	Set value 3	72Hz



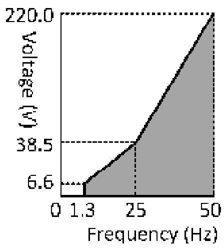


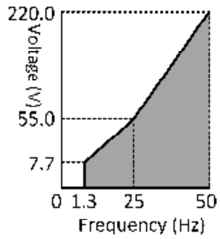


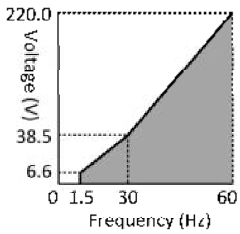


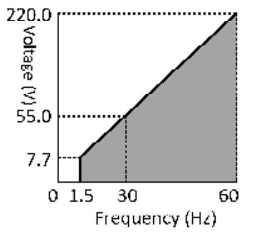
Decreasing torque characteristics (Setting values 4–7)

Set value 4	50Hz	Set value 5	50Hz	Set value 6	60Hz	Set value 7	60Hz



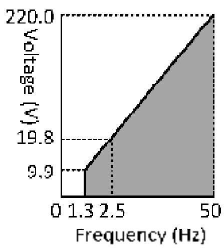


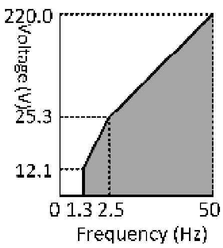


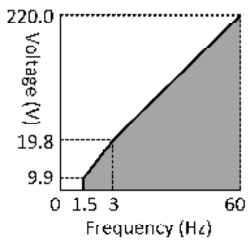


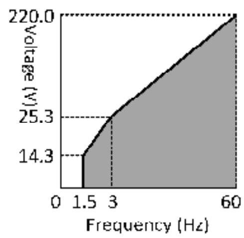
High starting torque (Setting value 8–11)

Set value 8	50Hz	Set value 9	50Hz	Set value 10	60Hz	Set value 11	60Hz



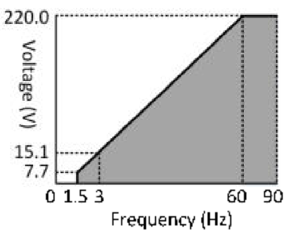


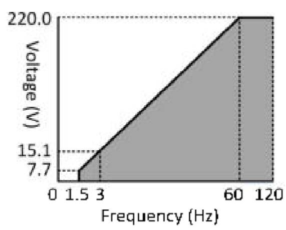


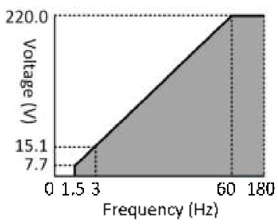


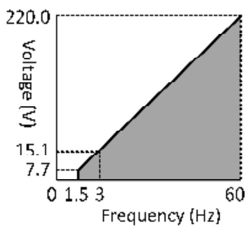
High starting torque (Setting value 12–15)

Set value 12	90Hz	Set value 13	120Hz	Set value 14	180Hz	Set value 15	60Hz





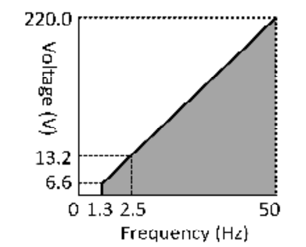


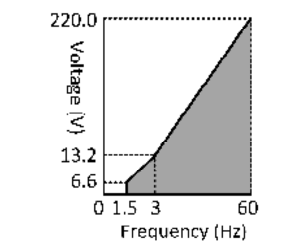


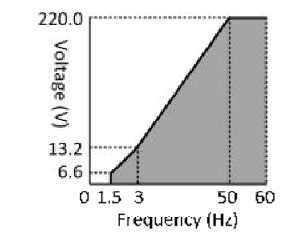
75.0 to 400.0 horsepower:

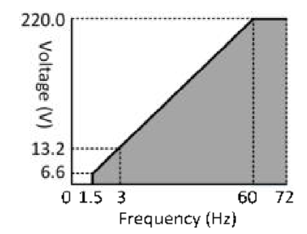
Constant torque characteristics (Setting values 0–3)

Set value 0	50Hz	Set value 1	60Hz	Set value 2	60Hz	Set value 3	72Hz



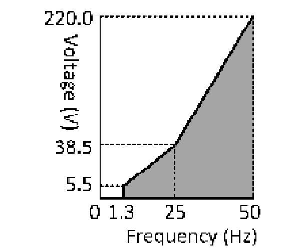


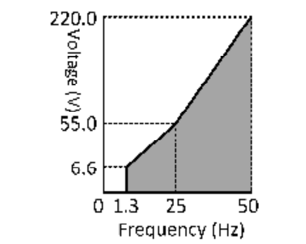


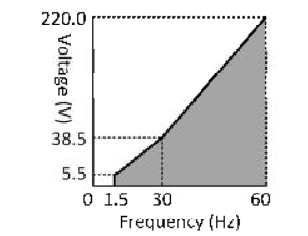


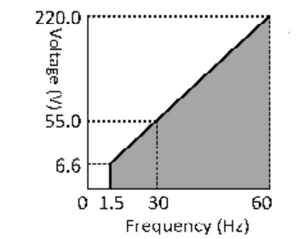
Decreasing torque characteristics (Setting values 4–7)

Set value 4	50Hz	Set value 5	50Hz	Set value 6	60Hz	Set value 7	60Hz



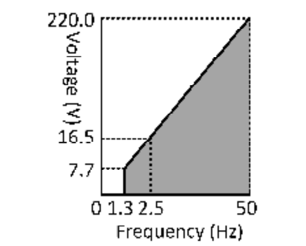


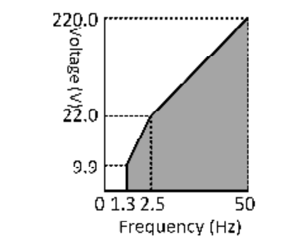


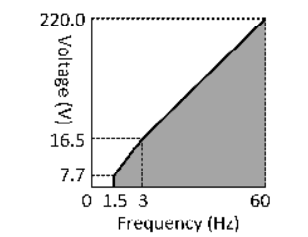


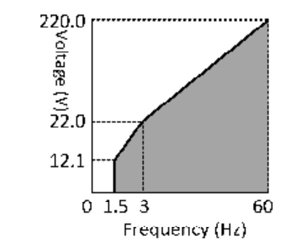
High starting torque (Setting value 8–11)

Set value 8	50Hz	Set value 9	50Hz	Set value 10	60Hz	Set value 11	60Hz



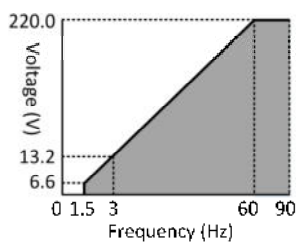


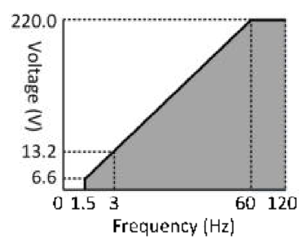


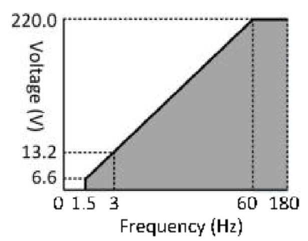


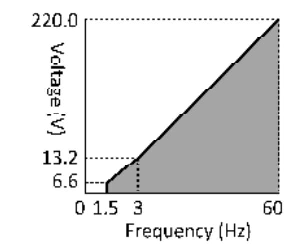
High starting torque (Setting value 12–15)

Set value 12	90Hz	Set value 13	120Hz	Set value 14	180Hz	Set value 15	60Hz





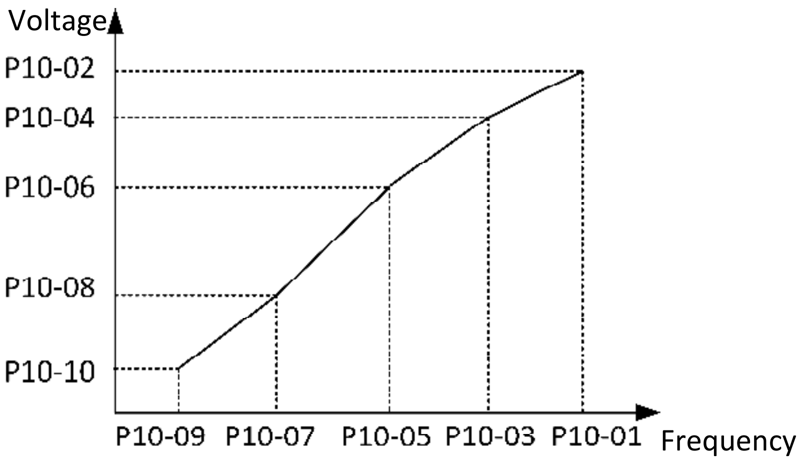




◎ When it is set to 15: any V/F curve, please make sure that the following conditions are satisfied. Error code 21. ErP2 is displayed when it is wrong.

P10-09 < P10-07 ≤ P10-05 ≤ P10-03 ≤ P10-01
P10-10 ≤ P10-08 ≤ P10-06 ≤ P10-04 ≤ P10-02

◎ P10-07 to P10-10 (Normally no need to set).
◎ Set P10-05 (Basic frequency) and P10-06 (Basic voltage) to the rated value of the IM motor, so that the output (Frequency, voltage) of the inverter can meet the rated value of the motor.
◎ When the motor has a special fundamental frequency voltage, the setting value of the V/F curve (P10-01 to P10-10) must be set at the same time.



NO./Hex	Item	Range	Default
P10-01 0FCH	IM1-Maximum output frequency/fe4 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P10-02 0FDH	IM1-Maximum output voltage/V4	230V: 0.0–250.0V 460V: 0.0–500.0V	220.0 440.0
P10-03 0FEH	IM1-Intermediate Frequency 2/fe3 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P10-04 0FFH	IM1-Intermediate voltage 2/V3	230V: 0.0–250.0V 460V: 0.0–500.0V	220.0 440.0
P10-05 100H	IM1-Basic frequency/fe2 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P10-06 101H	IM1-Basic voltage/V2	230V: 0.0–250.0V 460V: 0.0–500.0V	220.0 440.0
P10-07 102H	IM1-Intermediate frequency 1/fe1 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	3.00
P10-08 103H	IM1-Intermediate Voltage 1/V1	230V: 0.0–250.0V 460V: 0.0–500.0V	16.5 33.0
P10-09 104H	IM1-Minimum frequency/fe0 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	1.50
P10-10 105H	IM1-Minimum voltage/V0	230V: 0.0–250.0V 460V: 0.0–500.0V	9.9 19.8

NO./Hex	Item	Range	Default
P10-11 **106H**	IM1-Curvature between free curve fe0 and fe2 (fe1, V1 are invalid)	0.0–3.0	0.0

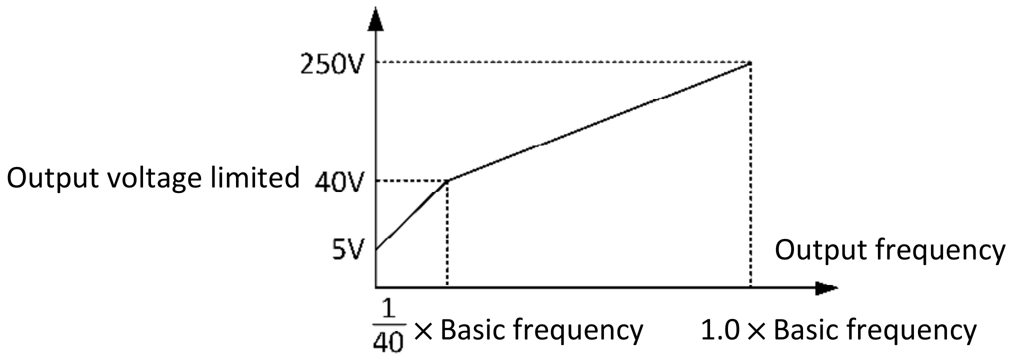
◎ The curve is composed of two points fe0 and fe2. There are 21 curve changes from 1.0 to 3.0.
◎ 0.0: This function is invalid.
◎ 1.0: A curve (Straight line).
◎ 2.0: Quadratic curve (Suitable for fan or pump load).
◎ 3.0: Cubic curve (Suitable for fan or pump load).
◎ If the load of the motor is a variable torque load (The load torque is proportional to the speed, such as a load such as a fan or a water pump), the load torque is lower when the speed is low, and the input voltage can be appropriately reduced to reduce the input current magnetic field. Reduce the magnetic flux loss and iron loss of the motor and improve the overall efficiency.
◎ When setting the V/F curve, the low frequency torque is low, and the inverter is not suitable for rapid acceleration and deceleration. If rapid acceleration and deceleration are required, it is recommended not to use this parameter.

NO./Hex	Item	Range	Default
P10-12 **107H**	IM1 output voltage limit	0–1	1

◎ When the V/F curve setting is abnormal, the current will increase at low speed. This function is limited to low speed operation and the voltage value is limited to a certain range.

0	Output voltage without limitation
1	Output voltage is limited ※V/F; P10-00 = 15; P10-10 > 40V

🕮 The minimum voltage is limited to 5V at 0.0Hz.
🕮 Minimum frequency: $\frac{1}{40}$ × P10-05 (Basic frequency), Output voltage limited 40V.
🕮 The output frequency reaches P10-07, it is output according to the set value curve.



NO./Hex	Item	Range	Default
P10-13 **108H**	IM1-Rated line voltage	230V: 100–250.0V 460V: 200–500.0V	220.0 440.0

◎ Set the rated voltage of the motor nameplate.
◎ When the motor has a special fundamental frequency voltage, the setting value of V/F curve (P10-01 to P10-10) must be set at the same time.

NO./Hex	Item	Range	Default
P10-14 **109H**	IM1-Rated line current	25.0–135.0%	100.0

◎ Use A (Ampere) as the unit to set the motor nameplate rated current. The set value is the reference value for motor protection and torque limit.
◎ Displayed as Amps, P01-00 × P10-14

For example: P01-00 = 6.2A, P10-14 = **1.6A** (6.2 × 25.0%) to **8.3A** (6.2 × 135.0%)

NO./Hex	Item	Range	Default
P10-15 **10AH**	IM1-Rated frequency	10.00–150.00Hz	60.00

◎ Set the motor nameplate frequency.
◎ When the motor has a special fundamental frequency voltage, the setting value of V/F curve (P10-01 to P10-10) must be set at the same time.

NO./Hex	Item	Range	Default
P10-16 **10BH**	IM1-Rated speed	0–9000rpm	1710
P10-17 **10CH**	IM1-Rated capacity	0.1–1000.0HP	1.0
P10-18 **10DH**	IM1-Pole number	2–48P	4

◎ Set the motor nameplate speed, capacity, poles.

NO./Hex	Item	Range	Default
P10-19 **10EH**	IM1-Stator resistance (Q17)	500–60000	10000
P10-20 **10FH**	IM1-Rotor resistance (Q17)	500–60000	8000
P10-21 **110H**	IM1-Stator leakage inductance (Q12)	0–5000	250
P10-22 **111H**	IM1-Mutual inductance 1 (1.00pu) (Q12)	3250–60000	9000
P10-23 **112H**	IM1-Mutual inductance 2 (0.85pu) (Q12)	3250–60000	9250
P10-24 **113H**	IM1-Mutual inductance 3 (0.70pu) (Q12)	3250–60000	9500

◎ P10-19 to P10-25 are the electrical parameters of IM1 motor, automatically learn (Auto-tuning) and detect the stored parameter group.

NO./Hex	Item	Range	Default
P10-25 **114H**	IM1-No-load current	0.0–99.0%	30.0

◎ When P01-07 (Motor parameter measurement) is set to 2 (with operation-electrical parameter detection), the value will be automatically detected and set during automatic adjustment.
◎ If P01-07 is set to 1, the correct no-load current value must be input first.
- ● No-load current value, when the inverter can drive the motor to run above 40.0Hz, the corresponding output no-load current value.

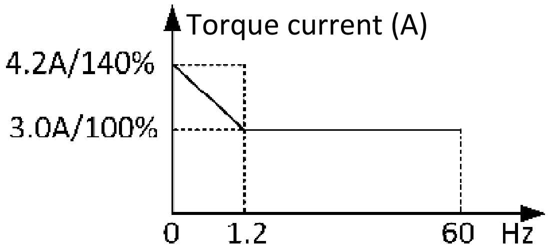
◎ When the output current is greater than the no-load current of the motor in V/F control mode, slip compensation is activated.
◎ Displayed as Amps, P010-14 × P10-25.

For example: P10-14 = 3.1A, P10-25 = **0.0A** (3.1 × 0.0%) to **3.0A** (3.1 × 99.0%)

NO./Hex	Item	Range	Default
P10-26 115H	IM1-Magnetic field amplification factor in low speed zone	50.00–200.00%	140.00
P10-27 116H	IM1-Low-speed zone frequency point setting	0.000–0.100pu	0.000

◎ Sensorless vector control (SVC) and vector + PG control (FOCPG) mode functions, suitable for equipment with low speed and high torque.
◎ P10-26 torque compensation is based on the motor no-load current, and P10-27 compensation cut-off frequency is based on the rated motor frequency.
◎ Please gradually increase the setting value of P10-26 and confirm the current increment at low speed, not exceeding the rated output current value of the motor and inverter.

For example:
P10-25 = 3.0A, P10-15 = 60Hz, P10-26 = 140%, P10-27 = 0.020
Calculation formula: 3.0A × 140% = 4.2A, 60Hz × 0.020= 1.2Hz



Note: P10-27 = low-speed zone compensation cut-off frequency.

NO./Hex	Item	Range	Default
P10-28 117H/★	IM1-Sensorless forward rotation low-speed torque current	–1.000 to 1.000pu	0.000
P10-29 118H/★	IM1-Sensorless reverse low-speed zone torque current	–1.000 to 1.000pu	0.000

◎ Sensorless vector control mode, torque current compensation when running in the low-speed zone of forward/reverse rotation, the compensation zone is below the set value of P10-27.
◎ When the crane (Main crane) is running in the forward direction and upward, please set the positive torque current. (P10-14 × P10-28)
◎ When the crane (Main crane) is running in the reverse direction and downwards, please set the negative torque current. (P10-14 × P10-29)

NO./Hex	Item	Range	Default
P10-30 119H	IM1-Flux estimator bandwidth	0.000–0.600pu	0.075

◎ 0.000: Current type magnetic flux estimator (Only valid for closed loop vector).
◎ 0.010–0.600pu hybrid magnetic flux estimator. (Sensorless vector control is effective).
◎ The bandwidth of the magnetic flux estimator is effective for sensorless vector control. It is recommended to use 0.050 as the center value adjust the settings.
◎ If the setting value is small, the low-speed torque is large, the speed error is relatively small, and the speed is easy to be unstable.
◎ When the setting value is large, the low-speed torque is small, the speed error is relatively large, and the speed is relatively stable.

NO./Hex	Item	Range	Default
P10-31 11AH	IM1-Speed estimator bandwidth	0.010–0.600pu	0.300

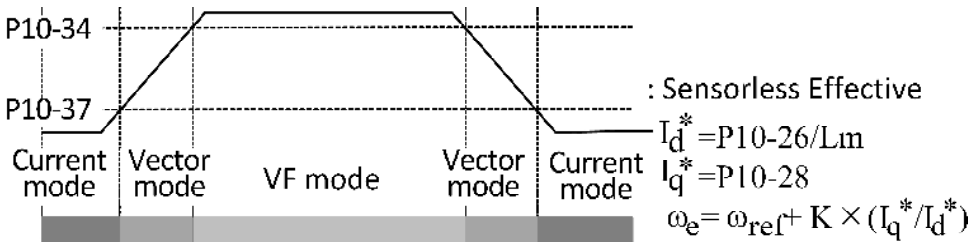
◎ This parameter is effective for sensorless vector control. Adjusting this parameter will affect the stability of motor operation and the accuracy of motor speed.
◎ If low frequency vibration occurs in the output frequency during operation (The output frequency waveform is similar to sin waveform vibration), adjust to the high frequency bandwidth. If high frequency vibration occurs (The output frequency waveform is severely jittered and the waveform is similar to burrs), adjust to the low frequency bandwidth.

NO./Hex	Item	Range	Default
P10-32 11BH	IM1-V/F slip compensation gain	0.00–200.00%	20.00
P10-33 11CH	IM1-Sensorless slip compensation gain	0.00–200.00%	80.00

◎ When the motor load increases, the motor slip will increase. The function of slip compensation gain is to make the motor running at the rated current closer to the synchronous speed when overcoming load changes, and it can also control the motor to maintain a constant speed.
◎ When the motor speed is lower than the target value, increase the set value, and when the speed is higher than the target value, decrease the set value.

NO./Hex	Item	Range	Default
P10-34 11DH	IM1-Vector control switch to V/F control frequency point setting	0.00–400.00Hz	0.00

◎ In the closed-loop vector control mode, the parameter P10-34 switching frequency point can be set to switch the V/F mode. (See to below figure).
◎ In the sensorless vector control mode, the frequency points can be set by switching the parameters P10-27 and P10-34 to perform the current mode and vector mode with V/F mode. (Such as the figure)



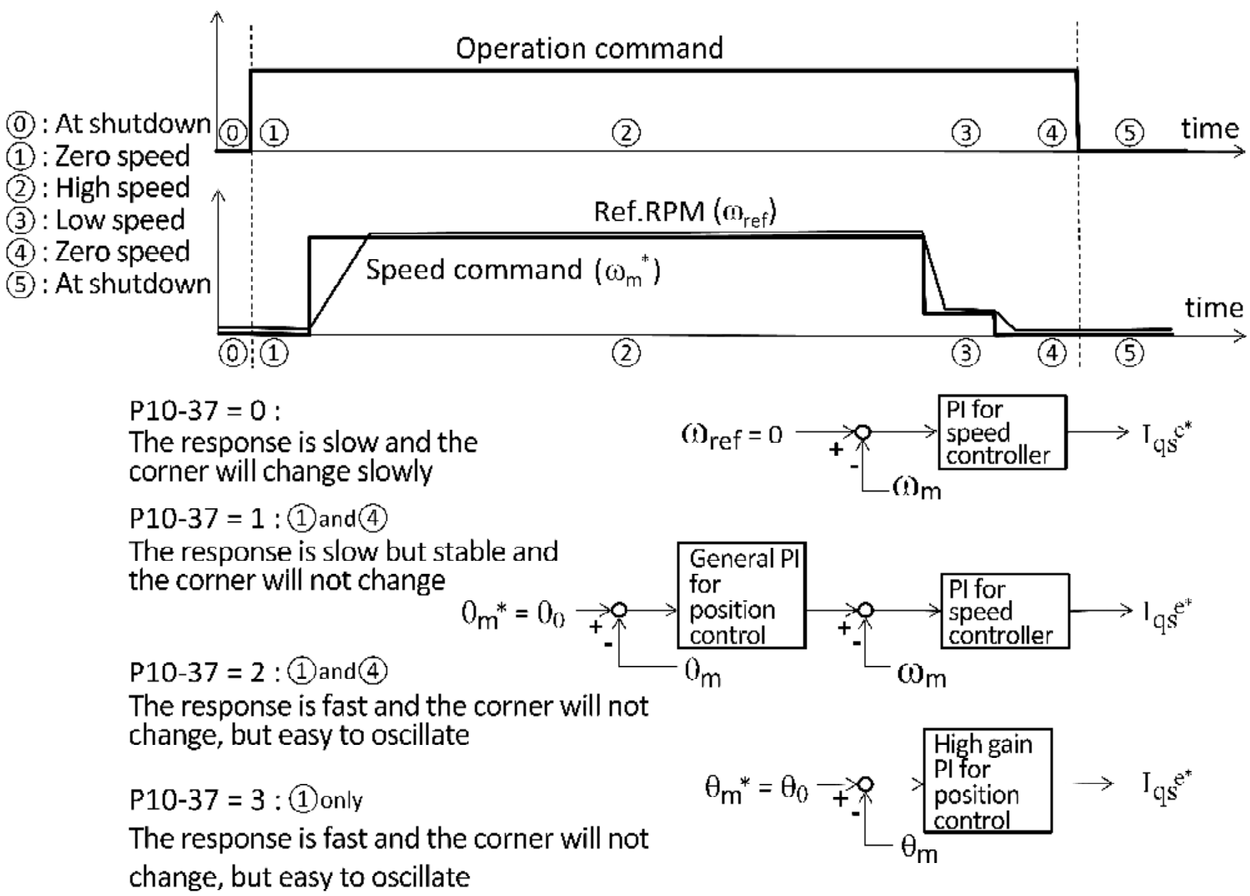
NO./Hex	Item	Range	Default
P10-35 11EH/★	IM1 senseless control out of low-speed zone power difference (Q15)	0–1000	100

P10 IM1, PM/SRM speed (ASR) controller parameter group (P10-36 to P10-59)			
NO./Hex	Item	Range	Default
P10-36 11FH	M1-Mechanical constant	0–30000	800

◎ Execute P01-07 (Motor parameter measurement) = 3: mechanical parameter detection, this parameter will be automatically saved after the detection is completed.
◎ When there is a problem with the motor response, this parameter can be modified (Recommended range value 500–900).
◎ After the speed PI (P10-41 to P10-44) is adjusted, you can adjust this parameter if you need to fine-tune it.
◎ If the motor response is too slow, increase this value. If the motor responds too fast and the motor shakes, decrease this value.

NO./Hex	Item	Range	Default
P10-37 120H	M1-Closed loop vector control zero-speed positioning	0–3	1

0	Do not start
1	Zero speed positioning (P10-38 to P10-40)
2	Zero speed shutdown (P10-38 to P10-40)
3	Zero speed shutdown (invalid during shutdown) (P10-38 to P10-40)



NO./Hex	Item	Range	Default
P10-38 121H	M1-positioning P gain	0.00–100.00%	15.00
P10-39 122H	M1-positioning I gain	0.00–100.00%	15.00
P10-40 123H	M1-zero-speed positioning frequency compensation limit	0.00–50.00%	20.00

◎ P10-37 = 1–3.

◎ Adjust the frequency correction control gain during zero-speed positioning action:

⊙ Poor followability of positioning stop-Increase P10-40 in steps of every 5% or increase P10-38 and P10-39 in steps of every 1%.

⊙ Sudden fluctuations when positioning stops-reduce P10-40 in steps of 5% or decrease P10-38 and P10-39 in steps of 1%.

⊙ Stop the vibration of the central axis-reduce P10-40 in steps of 5%.

NO./Hex	Item	Range	Default
P10-41 124H	M1-ASR high speed proportional gain	0.00–300.00%	10.00
P10-42 125H	M1-ASR high speed integral gain	0.00–100.00%	10.00
P10-43 126H	M1-ASR low speed proportional gain	0.00–300.00%	15.00
P10-44 127H	M1-ASR low speed integral gain	0.00–100.00%	20.00
P10-45 128H	M1-ASR α parameter setting	0.400–1.000	1.000

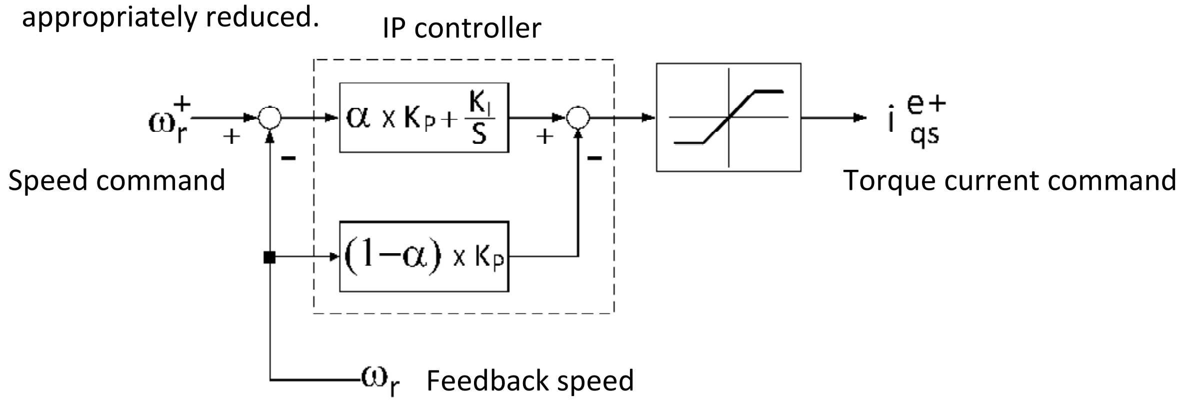
◎ ASR: refers to the operation of output frequency (With PG V/F control) or torque command (IM without PG vector control, IM with PG vector control, PM without PG vector control, PM with PG vector control), etc., to make The function that the deviation between the speed command and the motor speed tends to zero.

◎ P10-45 (When α = 1.000 when, $(1 - \alpha) \times$ Kp of part disappears, the IP controller degenerate into a traditional PI controller) .

The IP controller description :

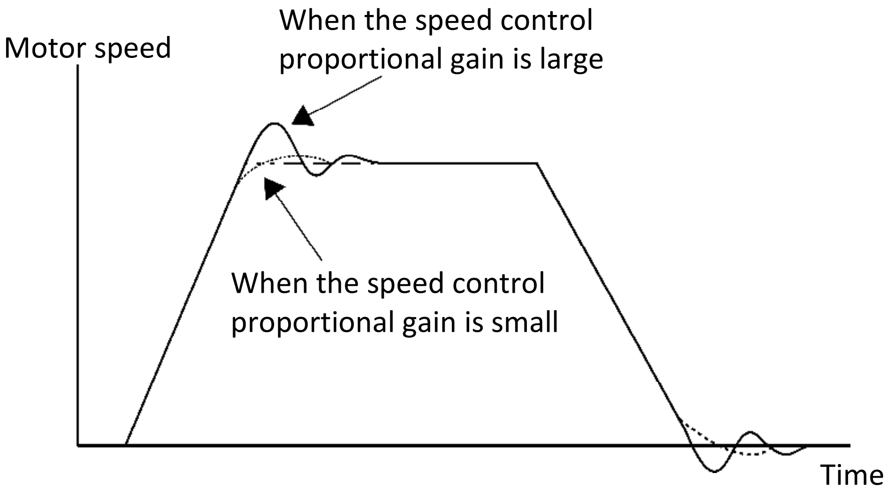
◎ The Kp partial solution to IP controller description: decompose Kp into two parts $(\alpha \times Kp)$ and $(1 - \alpha) \times Kp$, part $(1 - \alpha) \times Kp$ does not contain the speed command, similar state feedback control, can reduce the overshoot. When a larger Ki gain is needed, the α value can be reduced to reduce the overrun.

◎ Perform positioning control. If the motor shakes, the setting value of P10-45 can be appropriately reduced.



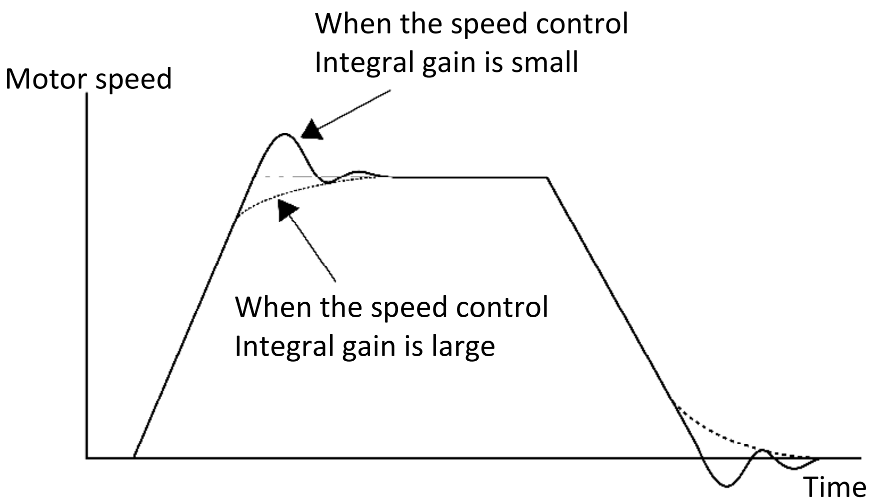
◎ P10-41, P10-43 This is to adjust the gain of the speed proportional control (ASR) response. When the setting value is increased, the responsiveness will improve. Generally, the greater the load, the greater the set value. However, if the setting value is too large, the motor will vibrate.

◎ The response example of the proportional gain of operating speed control (ASR) is as follows:



◎ P10-42, P10-44 This is to set the integral gain of speed control (ASR). The smaller the integral gain, the lower the responsiveness and the weaker the reaction force against the external force. If the integral gain is too large, vibration will occur.

◎ The response example of the integral gain of the operating speed control (ASR) is as follows:



◎ When changing P10-41, P10-43 (proportional (P) gain) and P10-42, P10-44 (integral (I) gain), please adjust the gain ratio first, and then adjust the integral gain.

Gain adjustment of speed control with PG V/F control:

⦿ Gain adjustment of the lowest output frequency, using the lowest output frequency to rotate the motor. Please increase the setting value of P10-43 within the range where no vibration occurs. Next, please increase the value of P10-44 within the range where no vibration occurs.

⦿ Monitor the output current of the inverter to confirm whether it is below 50% of the rated output current of the inverter. When it exceeds 50%, please decrease the set value of P10-43 and decrease the set value of P10-44.

⦿ Gain adjustment of the highest output frequency, using the highest output frequency to rotate the motor. Please increase the setting value of P10-41 within the range where no vibration occurs. Next, please increase the setting value of P10-42 within the range where no vibration occurs.

⦿ When oscillation occurs at the end of acceleration, please decrease the set value of P10-41 and decrease the set value of P10-42. When oscillation occurs during stop, please decrease the set value of P10-43 and decrease the set value of P10-44.

NO./Hex	Item	Range	Default
P10-46 **129H**	M1-Integral action selection in acceleration and deceleration	0–1	1

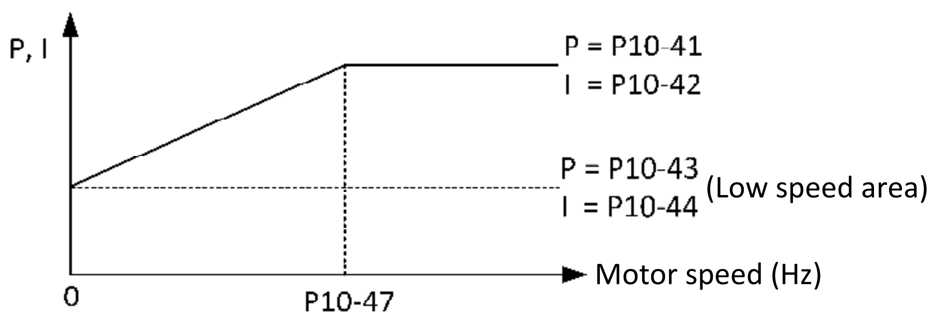
◎ Set the valid/invalid selection of speed control integral action in acceleration and deceleration. For machinery with large inertia or heavy-duty machinery, if the integral is enabled during acceleration and deceleration, over compensation (Over Shooting) and under compensation (Under Shooting) may occur at the end of acceleration and deceleration. When over-compensation (Over Shooting) and under-compensation (Under Shooting) occur, please set it to invalid.

0	Invalid
The integral does not act during acceleration and deceleration, but acts at constant speed.	
1	Valid
The integral always action.	

NO./Hex	Item	Range	Default
P10-47 **12AH**	M1-Automatically switch high-speed point gain	0.00–400.00Hz	3.00

◎ Set the frequency point for switching between P10-41, P10-43 (Proportional gain) and P10-42, P10-44 (Integral gain). When ASR proportional gain and integral gain cannot be ensured at low speed or high speed, linear gain can be changed according to the output frequency.

◎ When running at low speed or high speed, if vibration caused by resonance with the machine occurs, please set P10-47 to automatically switch high-speed point gain, low-speed and high-speed gain. As shown in the figure, the proportional gain P and the integral gain I can be switched by the motor speed frequency.



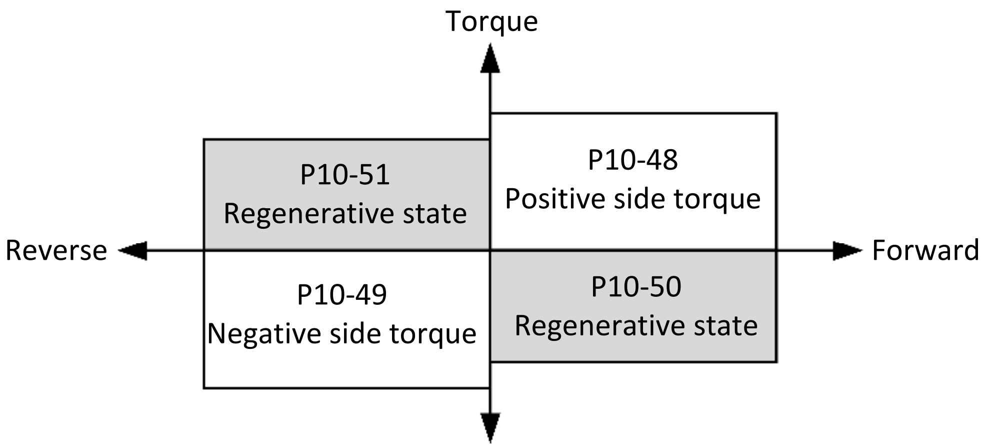
P10-47 = 0, P = P10-41; I = P10-42 is fixed

NO./Hex	Item	Range	Default
P10-48 12BH/★	M1-Forward electric torque current limit	0.00–200.00%	150.00
P10-49 12CH/★	M1-Reverse electric torque current limit	0.00–200.00%	150.00
P10-50 12DH/★	M1-Forward regenerative torque current limit	0.00–200.00%	150.00
P10-51 12EH/★	M1-Reverse regenerative torque current limit	0.00–200.00%	150.00

◎ Torque current limit: P01-00 × P10-48, 49, 50, 51

◎ Set the torque limit value with the rated motor torque as 100%. It can be set individually in 4 quadrants.

◎ P10-48 to P10-51 are limited by P09-03 (Overcurrent during acceleration) or P09-06 (Overcurrent during constant speed) and P09-23 (Output current limit).



NO./Hex	Item	Range	Default
P10-52 12FH/★	M1-Forward rotation start torque current limit	0.00–200.00%	150.00

◎ Parameters P10-52, P10-53, P10-59 are a set of functional parameters (Starting torque limit diagram, as illustrated in P10-59).

NO./Hex	Item	Range	Default
P10-53 130H	M1-Forward rotation start torque limit release time	0.00–10.00sec	0.00

◎ 0.00: Invalid.

◎ Parameters P10-52, P10-53, P10-59 are a set of functional parameters (Starting torque limit diagram, as illustrated in P10-59).

NO./Hex	Item	Range	Default
P10-54 131H	M1-ASR output delay time	0.000–0.500sec	0.000

◎ This parameter sets the filter time constant for the time from the speed loop to the torque command output. Increase this setting gradually in increments of 0.01 for loads with low rigidity, or when oscillation is a problem.

◎ If motor torque and speed response are too slow, gradually decrease the setting by 0.01.

NO./Hex	Item	Range	Default
P10-55 132H	M1-Torque control mode	0–1	0

0	Torque current limit

🕮 P00-01 = 42 (Torque current command) (Sensorless vector control or Vector + PG control display); 43 (Torque current)

Setting steps:

1. Set the motor nameplate. IM1 (P10); IM2 (P11); PM/SRM (P12)
2. Auto tuning. P01-07 = 2
3. If the P01-04 (IM1)/P01-05 (IM2) = 0: V/F or 2: V/F + PG (IM1), set as follows.

P10-32 (P11-32)	IM1 (IM2) V/F slip compensation gain	100%
P21-31	IM V/F torque limit	1
P21-32	IM V/F Acceleration and deceleration time when torque limit changes	2.00sec
🕮 The acceleration and deceleration time of the motor speed when the torque changes. 🕮 The time should not be set too long, otherwise the motor speed will not change in time. 🕮 In other modes, the time is automatically converted internally.		
P21-33	IM V/F Torque limit control gain	50.00%
The larger the value, the greater the torque limit change.		

4. Set the torque current limit:

IM1	P10-57 = 0	P10-48 (M1-Forward electric torque current limit)
		P10-49 (M1-Reverse electric torque current limit)
	P10-57 > 0	P10-57 × P10-48
		P10-57 × P10-49
IM2	P11-57 = 0	P11-48 (M2-Forward electric torque current limit)
		P11-49 (M2-Reverse electric torque current limit)
	P11-57 > 0	P11-57 × P11-48
		P11-57 × P11-49

🕮 P10-57 (P11-57) = 1–6: M1 (M2) M2-Torque current limiting source.

🕮 When the load exceeds the torque command causing the speed to drop to zero, and when the load is reduced and the torque command is less than the set value P10-57 (P11-57), at this time, the output zero point is set, which can present the speed response.

P10-57 (P11-57)		output zero point	P10-57 (P11-57)		output zero point
1	AV	–	4	AUX	P05-20
2	AVI	P05-05	5	Pulse input	–
3	ACI	P05-12	6	PID	–

5. P01-03 = 0: IM
P01-04 (IM1), P01-05 (IM2) = 0: V/F control
※When the load > torque command, there will be certain torque and speed according to the following settings.

Set torque curve limits for high, medium and low speeds.		
P10-05 (P11-05)	IM1 (IM2) Basic frequency/fe2	60.00Hz
P10-06 (P11-06)	IM1 (IM2) Basic voltage/V2	220.0V
P10-07 (P11-07)	IM1 (IM2) Intermediate frequency 1/fe1	3.00Hz
P10-08 (P11-08)	IM1 (IM2) Intermediate Voltage 1/V1	10.0V
The recommended value is between P10-10 (P11-10) + 0.1 and 2V.		
P10-09 (P11-09)	IM1 (IM2) Minimum frequency/fe0	1.50Hz
P10-10 (P11-10)	IM1 (IM2) Minimum voltage/V0	9.9V

6. P01-03 = 0: IM
P01-04 (IM1), P01-05 (IM2) = 1: Sensorless vector control
※When the load > torque command, there will be certain torque and speed according to the following settings.

Set the torque curve limits for high, medium and low speeds. P10-07 to P10-10 are non-operation parameters.		
P10-01 (P11-01)	IM1 (IM2) Maximum output frequency/fe4	60.00Hz
P10-02 (P11-02)	IM1 (IM2) Maximum output voltage/V4	200.0V
P10-03 (P11-03)	IM1 (IM2) Intermediate Frequency 2/fe3	40.00Hz
P10-04 (P11-04)	IM1 (IM2) Intermediate voltage 2/V3	150.0V
P10-05 (P11-05)	IM1 (IM2) Basic frequency/fe2	20.00Hz
P10-06 (P11-06)	IM1 (IM2) Basic voltage/V2	50.0V
The recommended range is 50–60V.		
P10-26 (P11-26)	IM1 (IM2) Magnetic field amplification factor in low speed zone	100.00%

7. P01-03 = 0: IM
P01-04 (IM1) = 2: V/F + PG control
※When the load > torque command, there is a certain torque and speed according to the following settings.

Set torque curve limits for high, medium and low speeds.		
P10-05 (P11-05)	IM1 (IM2) Basic frequency/fe2	60.00Hz
P10-06 (P11-06)	IM1 (IM2) Basic voltage/V2	220.0V
P10-07 (P11-07)	IM1 (IM2) Intermediate frequency 1/fe1	3.00Hz
P10-08 (P11-08)	IM1 (IM2) Intermediate Voltage 1/V1	10.0V
The recommended value is between P10-10 (P11-10) + 0.1 and 2V.		
P10-09 (P11-09)	IM1 (IM2) Minimum frequency/fe0	1.50Hz
P10-10 (P11-10)	IM1 (IM2) Minimum voltage/V0	9.9V

8. P01-03 = 0: IM
   P01-04 (IM1) = 3: Vector + PG control
※The effect is better. When the load > torque command, the motor speed is close to 0.

P10-36	M1-Mechanical constant	400

The larger the setting value, the higher the torque.

9. P01-03 = 1: PM / 2: SRM / 3: PMA-SRM
   P01-06 = 0: Sensorless vector control
※When the load > torque command, there will be certain torque and speed according to the following settings.

P12-27	PM/SRM: Sensorless low-speed frequency point (f1)	0.010
P12-28	PM/SRM: Sensorless low-speed magnetizing current (Id1)	10.0%
P12-29	PM/SRM non-sensing non-low-speed magnetizing current (Id2)	10.0%
P10-36	M1-Mechanical constant	600

If the setting is too low, the torque will be insufficient.

10. P01-03 = 1: PM / 2: SRM / 3: PMA-SRM
    P01-06 = 1: Vector + PG control
※The effect is better. When the load > torque command, the motor speed is close to 0.

P10-36	M1-Mechanical constant	400

The larger the setting value, the higher the torque.

1	Torque current command (speed limit); V/F or (Vector + PG) valid

🕮 P00-01 = 42 (Torque current command) (Sensorless vector control or Vector + PG control display); 43 (Torque current)

Setting steps:

1. Set the motor nameplate. IM1 (P10); IM2 (P11); PM/SRM (P12)
2. Auto tuning. P01-07 = 2
3. If the P01-04 (IM1)/P01-05 (IM2) = 0: V/F or 2 : V/F + PG (IM1), set as follows.

P10-32 (P11-32)	IM1 (IM2) V/F slip compensation gain	100%
P21-32	IM V/F Acceleration and deceleration time when torque limit changes	2.00sec

🕮 When the torque current command > load, the motor accelerates to P10-58 with the acceleration and deceleration time of P21-32.
🕮 When the torque current command < load, the motor decelerates toward 0 at the acceleration and deceleration time of P21-32.
🕮 When the torque current command = load, the motor speed remains unchanged.
🕮 In other modes, the time is automatically converted internally.

P21-33	IM V/F Torque limit control gain	50.00%

The larger the value, the greater the torque limit change.

4. To set the torque current limit:

P10-56 (P11-56)		M1 (M2) Torque current command
P10-58 (P11-58)		M1 (M2)Torque control-Speed limit (Frequency command)
IM1	P10-57 = 0	Forward/Reverse-torque current command = P10-56
	P10-57 > 0	Forward/Reverse-torque current command = P10-57 × P10-56
IM2	P11-57 = 0	Forward/Reverse-torque current command = P11-56
	P11-57 > 0	Forward/Reverse-torque current command = P11-57 × P11-56

🕮 P10-57 (P11-57) = 1–6: M1 (M2) M2-Torque current limiting source.

1	AV	3	ACI	5	Pulse input
2	AVI	4	AUX	6	PID

5. P01-03 = 0: IM
   P01-04 (IM1), P01-05 (IM2) = 0: V/F control
   ※Refer to item 3, P21-32 for action description.

Set torque curve limits for high, medium and low speeds.		
P10-05 (P11-05)	IM1 (IM2) Basic frequency/fe2	60.00Hz
P10-06 (P11-06)	IM1 (IM2) Basic voltage/V2	220.0V
P10-07 (P11-07)	IM1 (IM2) Intermediate frequency 1/fe1	3.00Hz
P10-08 (P11-08)	IM1 (IM2) Intermediate Voltage 1/V1	10.0V
The recommended value is between P10-10 (P11-10) + 0.1 and 2V.		
P10-09 (P11-09)	IM1 (IM2) Minimum frequency/fe0	1.50Hz
P10-10 (P11-10)	IM1 (IM2) Minimum voltage/V0	9.9V

6. P01-03 = 0: IM P01-04 (IM1) = 2: V/F + PG control ※For better effect, refer to item 3, P21-32 for action description.		
The larger the setting value, the higher the torque.		
P10-05 (P11-05)	IM1 (IM2) Basic frequency/fe2	60.00Hz
P10-06 (P11-06)	IM1 (IM2) Basic voltage/V2	220.0V
P10-07 (P11-07)	IM1 (IM2) Intermediate frequency 1/fe1	3.00Hz
P10-08 (P11-08)	IM1 (IM2) Intermediate Voltage 1/V1	10.0V
The recommended value is between P10-10 (P11-10) + 0.1 and 2V.		
P10-09 (P11-09)	IM1 (IM2) Minimum frequency/fe0	1.50Hz
P10-10 (P11-10)	IM1 (IM2) Minimum voltage/V0	9.9V

7. P01-03 = 0: IM P01-04 (IM1) = 3: Vector + PG control ※For better effect, refer to item 3, P21-32 for action description.		
P10-36	M1-Mechanical constant	400
The larger the setting value, the higher the torque.		

8. P01-03 = 1: PM / 2: SRM / 3: PMA-SRM P01-06 = 1: Vector + PG control ※Refer to item 3, P21-32 for action description.		
P10-36	M1-Mechanical constant	400
The larger the setting value, the higher the torque.		

NO./Hex	Item	Range	Default
P10-56 133H/★	M1-Torque current command	0.00–200.00%	100.00

◎ P10-55 = 1.
◎ P01-00 × P10-56.
◎ Limited to 2.5 times the rated current of the motor.

NO./Hex	Item	Range	Default
P10-57 134H	M1-Torque current limit source	0–6	0

◎ Used with P10-55.

0	Invalid
1	AV (Keypad operator knob)
2	AVI (–10 to 10V)
3	ACI (4–20mA)
4	AUX
5	Pulse input
6	PID

NO./Hex	Item	Range	Default
P10-58 135H	M1-Torque control-Speed limit P05-16 = 9, AUX × P10-58	0.00–400.00Hz	60.00

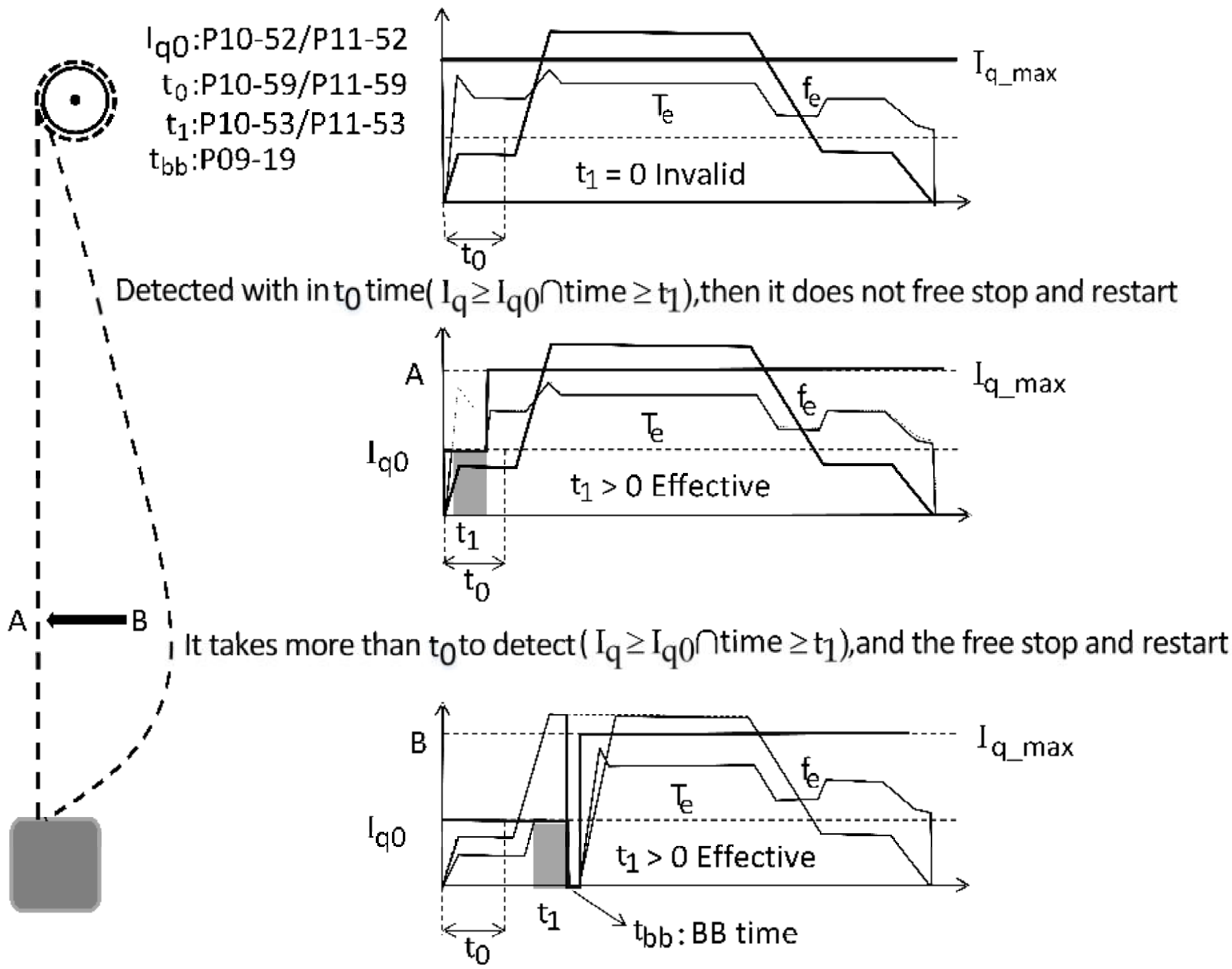
◎ P10-55 = 1.
◎ Output frequency setting of torque current command.
◎ When the output frequency > (P10-58 + 10.00Hz), the fault tripping 37.oS1 

NO./Hex	Item	Range	Default
P10-59 136H	M1-Start torque limit and free run stop detection time	(P10.53 + 0.50) to 20.00sec	2.00

◎ Parameters P10-52, P10-53, P10-59 are a set of functional parameters.

P10-52, P10-53, P10-59 Illustration of starting torque limit:

1. Only for sensorless control.
2. Each forward start is effective.
3. When the A and B action conditions are not met, the machine will continue to detect until the conditions are met and the action is completed, but it will only be executed once and will no longer detect until it is restarted in forward rotation.
4. The acceleration time for restarting after free stop is calculated based on the acceleration time of the operating speed before the action.



■Motor 2 (IM2) parameter function is the same as motor 1 (IM1) parameter function, please refer to P10-xx parameter group description.

P11 V/F curve, IM2 motor rated nameplate parameter group			
NO./Hex	Item	Range	Default
P11-00 137H	IM2-V/F curve selection	0–15	15
P11-01 138H	IM2-Maximum output frequency/fe4 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P11-02 139H	IM2-Maximum output voltage/V4	230V: 0.0–250.0V 460V: 0.0–500.0V	220.0 440.0
P11-03 13AH	IM2-intermediate frequency 2/fe3 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P11-04 13BH	IM2-intermediate voltage 2/V3	230V: 0.0–250.0V 460V: 0.0–500.0V	220.0 440.0
P11-05 13CH	IM2-Basic frequency/fe2 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	60.00
P11-06 13DH	IM2-Basic voltage/V2	230V: 0.0–250.0V 460V: 0.0–500.0V	220.0 440.0
P11-07 13EH	IM2-Intermediate frequency 1/fe1 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	3.00
P11-08 13FH	IM2-Intermediate voltage 1/V1	230V: 0.0–250.0V 460V: 0.0–500.0V	16.5 33.0
P11-09 140H	IM2-Lowest frequency/fe0 (0.1–1200.0 for high frequency only)	0.00–400.00Hz	1.50
P11-10 141H	IM2-Lowest voltage/V0	230V: 0.0–250.0V 460V: 0.0–500.0V	9.9 19.8
P11-11 142H	IM2-Free curve fe0, fe2 curvature (fe1, V1 is invalid)	0.0–3.0	0.0

◎ 0.0: This function is invalid.
◎ 1.0: A curve (Straight line).
◎ 2.0: Quadratic curve (Suitable for fan or pump load).
◎ 3.0: Cubic curve (Suitable for fan or pump load).

NO./Hex	Item	Range	Default
P11-12 143H	IM2-Output voltage limit	0–1	1

0	Output voltage without limitation
1	Output voltage is limited ※V/F; P11-00 = 15; P11-10 > 40V

NO./Hex	Item	Range	Default
P11-13 144H	IM2-Rated line voltage	200V: 100–250.0V 400V: 200–500.0V	220.0 440.0
P11-14 145H	IM2-Rated line current	25.0–135.0%	100.0

◎ Use A (Ampere) as the unit to set the motor nameplate rated current. The set value is the reference value for motor protection and torque limit.
◎ Displayed as Amps, P01-00 × P11-14

For example: P01-00 = 6.2A, P11-14 = **1.6A** (6.2 × 25.0%) to **8.3A** (6.2 × 135.0%)

NO./Hex	Item	Range	Default
P11-15 146H	IM2-Rated frequency	10.00–150.00Hz	60.00
P11-16 147H	IM2-Rated speed	0–9000rpm	1710
P11-17 148H	IM2-Rated capacity	0.1–1000.0HP	1.0
P11-18 149H	IM2-Pole number	2–48P	4
P11-19 14AH	IM2-Stator resistance (Q17)	500–60000	10000
P11-20 14BH	IM2-Rotor resistance (Q17)	500–60000	8000
P11-21 14CH	IM2-Stator leakage inductance (Q12)	0–5000	250
P11-22 14DH	IM2-Mutual inductance 1 (1.00pu) (Q12)	3250–60000	9000
P11-23 14EH	IM2-Mutual inductance 2 (0.85pu) (Q12)	3250–60000	9250
P11-24 14FH	IM2-Mutual inductance 3 (0.70pu) (Q12)	3250–60000	9500
P11-25 150H	IM2-No load current ※P11-14 × P11-25	0.0–99.0%	30.0
P11-26 151H	IM2-Low-speed area magnetic field amplification factor	50.00–200.00%	140.00
P11-27 152H	IM2-Low speed zone frequency point setting	0.000–0.100pu	0.000
P11-28 153H/★	IM2-Sensorless control forward torque current in low speed zone	–1.000 to 1.000pu	0.000
P11-29 154H/★	IM2-Sensorless control reverse torque current in low speed zone	–1.000 to 1.000pu	0.000
P11-30 155H	IM2-Magnetic flux estimator bandwidth	0.000–0.600pu	0.075
P11-31 156H	IM2-Speed estimator bandwidth	0.010–0.600pu	0.300
P11-32 157H/★	IM2-V/F slip compensation gain	0.00–200.00%	20.00
P11-33 158H/★	IM2-Sensorless slip compensation gain	0.00–200.00%	80.00
P11-34 159H	IM2-Vector control switch to V/F control frequency point setting	0.00–400.00Hz	0.00
P11-35 15AH/★	IM2-Sensorless power difference out of low speed zone (Q15)	0–1000	100

P11 IM2 Speed (ASR) controller parameter group (P11-36 to P11-59)			
NO./Hex	Item	Range	Default
P11-36 15BH	M2-Mechanical constant	0–30000	800
P11-37 15CH	Reserved	0–65535	0
P11-38 15DH	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P11-39 15EH	Reserved	0–65535	0
P11-40 15FH	Reserved	0–65535	0
P11-41 160H	M2-ASR high speed proportional gain	0.00–300.00%	10.00
P11-42 161H	M2-ASR high speed integral gain	0.00–100.00%	10.00
P11-43 162H	M2-ASR low speed proportional gain	0.00–300.00%	15.00
P11-44 163H	M2-ASR low speed integral gain	0.00–100.00%	20.00
P11-45 164H	M2-ASR α parameter setting	0.400–1.000	1.000
P11-46 165H	M2-Integral action selection in acceleration and deceleration	0–1	1

0	Invalid
The integral does not act during acceleration and deceleration, but acts at constant speed.	
1	Valid
The integral always action.	

NO./Hex	Item	Range	Default
P11-47 166H	M2-Automatic switches high speed point gain	0.00–400.00Hz	3.00
P11-48 167H/★	M2-Forward electric torque current limit	0.00–200.00%	150.00
P11-49 168H/★	M2-Reverse electric torque current limit	0.00–200.00%	150.00
P11-50 169H/★	M2-Forward regenerative torque current limit	0.00–200.00%	150.00
P11-51 16AH/★	M2-Reverse regenerative torque current limit	0.00–200.00%	150.00
P11-52 16BH/★	M2-Forward rotation start torque current limit	0.00–200.00%	150.00
P11-53 16CH	M2-Forward rotation start torque limit release time	0.00–10.00sec	0.00
P11-54 16DH	M2-ASR output delay time	0.000–0.500sec	0.000
P11-55 16EH	M2-Torque control mode	0–1	0

0	Torque current limit
Torque current output limit based on analog signal.	
1	Torque current command (speed limit); V/F valid
Torque current output limit based on analog signal.	

NO./Hex	Item	Range	Default
P11-56 16FH/★	M2-Torque current command	0.00–200.00%	100.00

NO./Hex	Item	Range	Default
P11-57 170H	M2-Torque current limiting source	0–6	0

◎ Use with P11-55.

0	Invalid
1	AV (Keypad operator knob)
2	AVI (–10 to 10V)
3	ACI (4–20mA)
4	AUX
5	Pulse input
6	PID

NO./Hex	Item	Range	Default
P11-58 171H	M2-Torque control-Speed limit P05-16 = 9, AUX × P11-58	0.00–400.00Hz	60.00
P11-59 172H	M2-Start torque limit and free stop detection time	(P11-53 + 0.50) to 20.00sec	2.00

P12 PM/SRM motor rated nameplate, excitation current parameter group			
NO./Hex	Item	Range	Default
P12-00 **173H**	PM/SRM-Maximum speed	0.00–200.00%	100.00

◎ Use P12-03 rated speed as the percentage level to set the maximum operating speed.

NO./Hex	Item	Range	Default
P12-01 **174H**	PM/SRM-Rated line voltage	220V:50.0–250.0 460V:100.0–500.0	220.0V

◎ Motor nameplate-Ke voltage (Vrms / 1000rpm).

For example: 110V (Rated voltage) = Ke (55V / 1000rpm) × P12-03 (2000rpm)

NO./Hex	Item	Range	Default
P12-02 **175H**	PM/SRM-Rated line current	25.0–135.0%	5.5A

◎ Use A (Ampere) as the unit to set the motor nameplate rated current. The set value is the reference value for motor protection and torque limit.
◎ Displayed as Amps, P01-00 × P12-02

For example: P01-00 = 6.2A, P12-02 = **1.6A** (6.2 × 25.0%) to **8.3A** (6.2 × 135.0%)

NO./Hex	Item	Range	Default
P12-03 **176H**	PM/SRM-Rated speed	20–15000rpm	2000

◎ Motor nameplate-rated speed (rpm).

NO./Hex	Item	Range	Default
P12-04 **177H**	PM/SRM-Rated capacity	0.1–1000.0HP	1.5

◎ Motor nameplate-rated capacity (HP).

NO./Hex	Item	Range	Default
P12-05 **178H**	PM/SRM-Pole number	2–60P	8

◎ Motor nameplate-pole number (P).

● Frequency conversion:
Frequency = (Rotation speed / 120) × Number of poles.
Example: 133.33Hz = (2000rpm / 120) × 8 poles
● Frequency upper/lower limits are set by parameter P03-05 (lower limit), P03-06 (upper limit) setting

NO./Hex	Item	Range	Default
P12-06 179H	PM/SRM-Stator resistance (PU: Q17)	500–60000	8000
P12-07 17AH	PM/SRM: d-axis inductance (PU: Q12)	0–60000	1000
P12-08 17BH	PM/SRM: q-axis inductance (PU: Q12)	0–60000	1000
P12-09 17CH	PM/SRM-Rated induced voltage 0 (Id = 0.00pu)	220V: 0.0–250.0V 460V: 0.0–500.0V	200.0
P12-10 17DH	PM/SRM-Rated induced voltage 1 (Id = – 0.25pu)	220V: 0.0–250.0V 460V: 0.0–500.0V	190.0
P12-11 17EH	PM/SRM-Rated induced voltage 2 (Id = +0.25pu)	220V: 0.0–250.0V 460V: 0.0–500.0V	210.0

◎ P12-06 to P12-11 are the electrical parameters of PM motor, which automatically learns (Auto-tuning), detects and stores the parameter group.

NO./Hex	Item	Range	Default
P12-12 17FH	Z point ≥ motor electrical angle	0.0–359.9 degrees	90.0

◎ When the motor parameters are self-learning (Auto-tuning), there is PG (ABZ) feedback, it will automatically read the relationship between the Z point and the electrical angle of the motor.

NO./Hex	Item	Range	Default
P12-13 180H	5012B Origin ≥ Motor electrical angle	0.0–359.9 degrees	90.0

◎ When the motor parameters are self-learning (Auto-tuning) and there is PG (Resolver 5012B) feedback, it will automatically read the electrical angle relationship between point 5012B (Z) and the motor.

NO./Hex	Item	Range	Default
P12-14 181H	SRM rated magnetizing current	0.000–1.000pu	0.500

NO./Hex	Item	Range	Default
P12-15 182H	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P12-16 183H	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P12-17 184H	Magnetic poles inlead current	0.00–100.00%	40.00
P12-18 185H	The rise time of the current inlead by the magnetic pole	0.00–5.00sec	0.50
P12-19 186H	The inlead time of the magnetic pole inlead current	0.00–5.00sec	0.30

◎ P12-17 to P12-19; P12-20, P12-21 = 3, 4
◎ Current = P01-00 × P12-17

NO./Hex	Item	Range	Default
P12-20 187H	PM/SRM: Sensorless starting angle detection method	0–4	1

◎ P01-06 = 0: Sensorless vector control (SVC-PM/SRM)
◎ The inverter will memorize the detected motor angle. Select the following so that the motor shaft will not rotate.
◎ Item 0, 1, 2 use with P12-22, P12-23.
◎ Item 3, 4 use with P12-17, P12-18, P12-19.

0	Start from the last stop position
🕮 The electrical angle of the last shutdown is used as the starting point of the PM/SRM motor.	
1	Only start the search the first time after booting
🕮 After the power is supplied, the electrical angle is searched only when the PM/SRM motor is started for the first time.	
2	Every search at startup
🕮 Every time the operation command is put into operation and the search for electrical angle is executed first before operation.	
3	Start magnetic pole inlead for the first time after booting
🕮 After the power is supplied, the electrical angle is searched only when the PM/SRM motor is started for the first time.	
4	Magnetic pole inlead for each start
🕮 Every time the operation command is put into operation and the search for electrical angle is executed first before operation.	

NO./Hex	Item	Range	Default
P12-21 188H	PM/SRM (ABZ Encoder)-Starting angle detection method	0–4	1

◎ P01-06 = 1: Vector + PG control (FOCPG-PM/SRM)
◎ Same as P12-20.

NO./Hex	Item	Range	Default
P12-22 189H	PM/SRM: Starting angle detection-voltage setting	5.00–40.00%	25.00
P12-23 18AH	PM/SRM: Starting angle detection-current setting	0.250–1.500	0.800

◎ P12-01 (Rated voltage) × P12-22.
◎ P12-02 (Rated current) × P12-23.

NO./Hex	Item	Range	Default
P12-24 18BH	PM/SRM-Magnetic field magnification setting	40.0–150.0%	100.0

◎ When the high-speed region rotation speed > P12-03 rated speed, the magnetic field magnification set required is less than 100%.

NO./Hex	Item	Range	Default
P12-25 18CH	PM/SRM (PG)-Magnetic field control start frequency (f0)	0.000–1.000pu	0.000

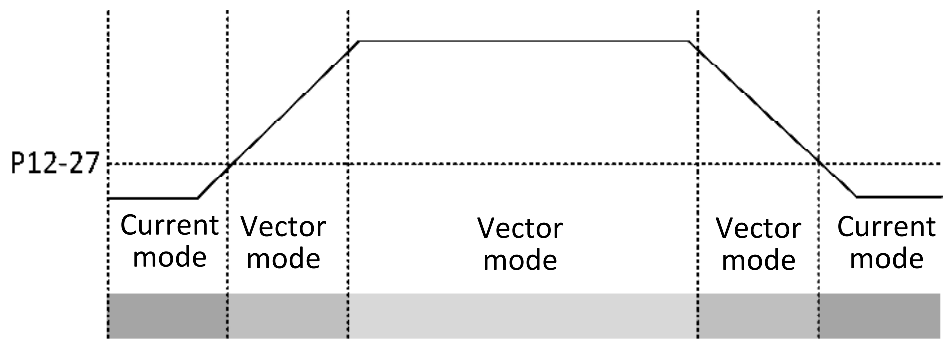
◎ 0.000: Invalid. (Generally no setting is needed)
◎ Starting frequency of magnetic field control.
Example:
Motor rated frequency (60.0Hz) × P12-25 (0.100) = 6.0Hz (starting frequency of magnetic field control)

NO./Hex	Item	Range	Default
P12-26 18DH/★	PM/SRM (PG) fe ≤ f0 Exciting current (Id0)	0.0–100.0%	10.0

◎ Low speed excitation current gain. fe (output frequency) ≤ f0 (P12-25).

NO./Hex	Item	Range	Default
P12-27 18EH	PM/SRM: Sensorless low-speed frequency point (f1)	0.010–0.150pu	0.080
P12-28 18FH/★	PM/SRM: Sensorless low-speed magnetizing current (Id1)	10.0–100.0%	35.0
P12-29 190H/★	PM/SRM: Sensorless non-low-speed magnetizing current (Id2)	10.0–100.0%	25.0

◎ The current mode is below the frequency point in the low speed zone.
◎ Sensorless low-speed frequency point = Output frequency upper limit × P12-27
Example:
Output frequency upper limit (133.33Hz) × P12-27 (0.080) = 10.66Hz (The following is the current mode).
◎ Sensorless low-speed magnetizing current = P12-02 × P12-28
Example: P12-02 (13.4A) × P12-28 (10%) = 1.34A
◎ Output frequency > P12-27 is a non-low-speed area.
◎ Sensorless non-low-speed magnetizing current = P12-02 × P12-29 (< P12-28)
Example: P12-02 (13.4A) × P12-29 (7%) = 0.93A



NO./Hex	Item	Range	Default
P12-30 191H	PM/SRM-Sensorless flux estimator bandwidth	0.005–0.600pu	0.075

◎ When the setting value is small, the low-speed torque is large, the speed error is relatively small, and the speed is likely to be unstable.
◎ When the setting value is large, the low-speed torque is small, the speed error is relatively large, and the speed is relatively stable.

NO./Hex	Item	Range	Default
P12-31 192H	PM/SRM: Sensorless speed estimator bandwidth	0.010–0.600pu	0.300

◎ If low frequency vibration occurs in the output frequency during operation (The output frequency waveform is similar to sin waveform vibration), adjust the high frequency bandwidth. If high frequency vibration occurs (The output frequency waveform is severely jittered and the waveform is similar to burrs), adjust the low frequency bandwidth.

NO./Hex	Item	Range	Default
P12-32 193H/★	PM/SRM: Excitation current control mode	0.0–75.0 degrees	0.0

◎ 0.0: (P12-25 to P12-29) magnetic field control.
◎ 0.1–75.0 degrees: Excitation angle control. (45 degrees)

NO./Hex	Item	Range	Default
P12-33 194H	PM/SRM-Excitation angle control cycle	1–2000ms	5

NO./Hex	Item	Range	Default
P12-34 195H	PM/SRM-Efficiency control excitation angle correction amplitude	0.0–30.0 degrees	0.0

◎ 0.0: invalid

NO./Hex	Item	Range	Default
P12-35 196H	PM/SRM: The ratio of the magnetic flux estimator bandwidth without PG	10.00–100.00%	25.00

NO./Hex	Item	Range	Default
P12-36 197H/★	PM Encoder calibration-current setting	0.00–100.00%	45.00

P13 IM, PM/SRM positioning point control command parameter group

Note :

◎ To use the positioning function, the inverter needs to be equipped with a feedback card.
(IM) P01-04 = 3: Vector + PG control
(PM/SRM) P01-06 = 1: Vector + PG control

◎ It does not operate by external pulse input.

A. Return to the origin, refer to P07-20 for instructions.
B. Except for the automatic operation mode (P16), the operation signal is required to activate the positioning function in other modes.
C. Setting digit Do (P08-00 to P08-05).

NO.	Content
32	Positioning completed
P08-13, defines the allowable error value.	
33	Forward and reverse limit reached

D. Monitoring operation content selection

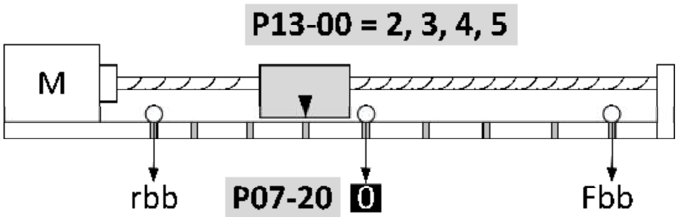
P00-01	RS485 (HEX)	Content
33	2127	Positioning point command value (Revolution)
34	2128	Positioning point command value (Pulse wave)
41	212F	Positioning completed flag
35	2129	Positioning point feedback value (Revolution)
36	212A	Positioning point feedback value (Pulse wave)

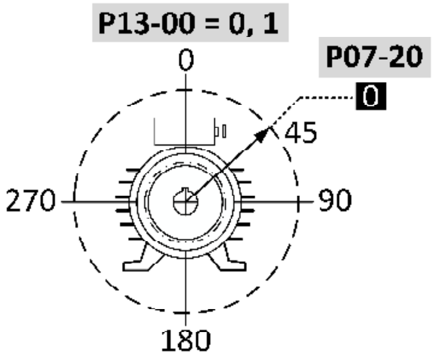
Position operation control mode :

1. Use the digital input terminal (Di) to execute 0-15 multi-segment position operation.

◎ P07-23 = 0

◎ Set the digital input terminal (Di), P07-03 to P07-09.

<table>
<tr><th>NO.</th><th>Content</th></tr>
<tr><td>45</td><td>Multi-stage speed/Multi-stage position terminal function switching</td></tr>
<tr><td colspan="2">To be executed with virtual Di and Do.</td></tr>
<tr><td>46</td><td>Start positioning point control</td></tr>
<tr><td colspan="2">To cooperate with the operation signal.</td></tr>
<tr><td>48</td><td>Return to the original point to enable (Priority < Jogging)</td></tr>
<tr><td colspan="2">No running signal is required.</td></tr>
<tr><td>47</td><td>External mechanical origin input (ORG)</td></tr>
<tr><td>50</td><td>Forward limit switch (Fbb)</td></tr>
<tr><td>51</td><td>Reverse limit switch (rbb)</td></tr>
<tr><td colspan="2">P13-00 = 2, 3, 4, 5, matches 47–51.


P13-00 = 0, 1, the functions of 47–51 are not required.

</td></tr>
<tr><td>49</td><td>Incremental position command cumulative return to zero (The zero reset action must be used when stopping)</td></tr>
<tr><td colspan="2">Match P13-00 = 4, 5.</td></tr>
<tr><td>03</td><td>Multi-stage position command 1</td></tr>
<tr><td>04</td><td>Multi-stage position command 2</td></tr>
<tr><td>05</td><td>Multi-stage position command 3</td></tr>
<tr><td>06</td><td>Multi-stage position command 4</td></tr>
<tr><td colspan="2">0–15 Multi-position switching.</td></tr>
</table>

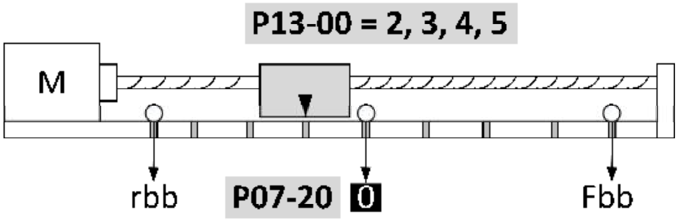
NO.	Item	
P07-10	Virtual Di8 setting	1 group
P08-03	Virtual Do2 setting function driver	
P07-11	Virtual Di9 setting	1 group
P08-04	Virtual Do3 setting function driver	
P07-12	Virtual Di10 setting	1 group
P08-05	Virtual Do4 setting function driver	
Virtual Di, Do, set according to the needs of physical terminals.		

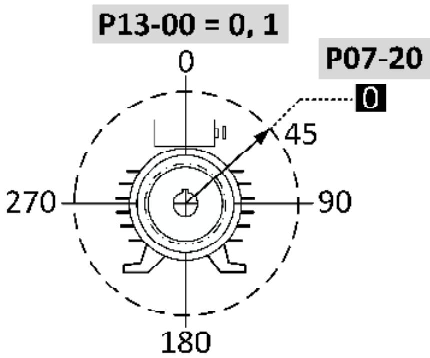
0 : OFF, 1 : ON,

Di Switch				**No.**	**Multi-stage speed Di = 45: OFF**	**Multi-stage position (Di = 45: ON)**	
06 (4)	05 (3)	04 (2)	03 (1)			Revolution	Pulse
0	**0**	**0**	**0**	**0**	P03-08	P13-03	P13-04
0	**0**	**0**	**1**	**1**	P03-09	P13-05	P13-06
0	**0**	**1**	**0**	**2**	P03-10	P13-07	P13-08
0	**0**	**1**	**1**	**3**	P03-11	P13-09	P13-10
0	**1**	**0**	**0**	**4**	P03-12	P13-11	P13-12
0	**1**	**0**	**1**	**5**	P03-13	P13-13	P13-14
0	**1**	**1**	**0**	**6**	P03-14	P13-15	P13-16
0	**1**	**1**	**1**	**7**	P03-15	P13-17	P13-18
1	**0**	**0**	**0**	**8**	P03-16	P13-19	P13-20
1	**0**	**0**	**1**	**9**	P03-17	P13-21	P13-22
1	**0**	**1**	**0**	**10**	P03-18	P13-23	P13-24
1	**0**	**1**	**1**	**11**	P03-19	P13-25	P13-26
1	**1**	**0**	**0**	**12**	P03-20	P13-27	P13-28
1	**1**	**0**	**1**	**13**	P03-21	P13-29	P13-30
1	**1**	**1**	**0**	**14**	P03-22	P13-31	P13-32
1	**1**	**1**	**1**	**15**	P03-23	P13-33	P13-34

2. Automatic operation, executing 0–15 multi-position operation.

◎ Set the digital input terminal (Di), P07-03 to P07- 09.

<table>
<tr><th>NO.</th><th>Content</th></tr>
<tr><td>48</td><td>Return to the original point to enable (Priority < Jogging)</td></tr>
<tr><td colspan="2">No running signal is required.</td></tr>
<tr><td>47</td><td>External mechanical origin input (ORG)</td></tr>
<tr><td>50</td><td>Forward limit switch (Fbb)</td></tr>
<tr><td>51</td><td>Reverse limit switch (rbb)</td></tr>
<tr><td colspan="2">P13-00 = 2, 3, 4, 5, matches 47–51.


P13-00 = 0, 1, the functions of 47–51 are not required.

</td></tr>
<tr><td>49</td><td>Incremental position command cumulative return to zero (The zero reset action must be used when stopping)</td></tr>
<tr><td colspan="2">Match P13-00 = 4, 5.</td></tr>
<tr><td>37</td><td>Automatic operation (Priority > 38)</td></tr>
<tr><td>38</td><td>Click to trigger automatic operation</td></tr>
<tr><td>39</td><td>Pause automatic operation</td></tr>
</table>

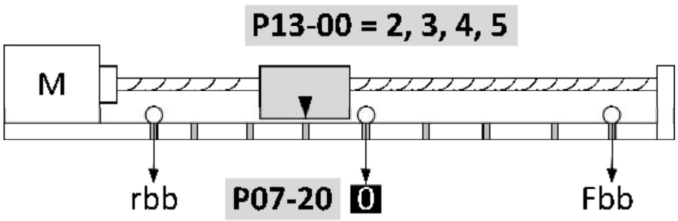
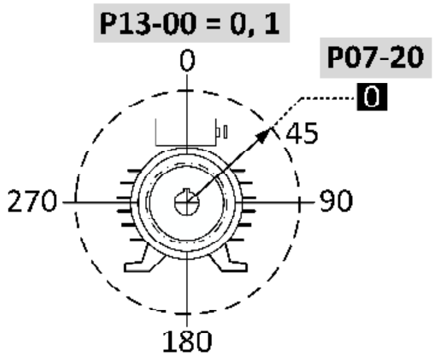
NO.	Item	
P07-10	Virtual Di8 setting	1 group
P08-03	Virtual Do2 setting function driver	
P07-11	Virtual Di9 setting	1 group
P08-04	Virtual Do3 setting function driver	
P07-12	Virtual Di10 setting	1 group
P08-05	Virtual Do4 setting function driver	
Virtual Di, Do, set according to the needs of physical terminals.		

📖 Automatic operation setting, P16 parameter group.
📖 The following 0–15 position corresponding settings.

Position	P13-01 (Direction)	P13-02 (Direction)	Revolution/Pulse	Time (sec)
0	–	1	P13-03/04	P16-05
1	–	1	P13-05/06	P16-06
2	–	1	P13-07/08	P16-07
3	–	1	P13-09/10	P16-08
4	–	1	P13-11/12	P16-09
5	–	1	P13-13/14	P16-10
6	–	1	P13-15/16	P16-11
7	–	1	P13-17/18	P16-12
8	1	–	P13-19/20	P16-13
9	1	–	P13-21/22	P16-14
10	1	–	P13-23/24	P16-15
11	1	–	P13-25/26	P16-16
12	1	–	P13-27/28	P16-17
13	1	–	P13-29/30	P16-18
14	1	–	P13-31/32	P16-19
15	1	–	P13-33/34	P16-20

3. Operate by writing parameters to the position.

◎ P07-23 = 0
◎ P13-00 = 1, 3
◎ Set the digital input terminal (Di), P07-03 to P07-09.

NO.	Content
46	Start positioning point control
To cooperate with the operation signal.	
48	Return to the original point to enable (Priority < Jogging)
No running signal is required.	
47	External mechanical origin input (ORG)
50	Forward limit switch (Fbb)
51	Reverse limit switch (rbb)
P13-00 = 2, 3, 4, 5, matches 47–51.  P13-00 = 0, 1, the functions of 47–51 are not required. 	
49	Incremental position command cumulative return to zero (The zero reset action must be used when stopping)
Match P13-00 = 4, 5.	

NO.	Item	
P07-10	Virtual Di8 setting	1 group
P08-03	Virtual Do2 setting function driver	
P07-11	Virtual Di9 setting	1 group
P08-04	Virtual Do3 setting function driver	
P07-12	Virtual Di10 setting	1 group
P08-05	Virtual Do4 setting function driver	
Virtual Di, Do, set according to the needs of physical terminals.		

Write parameter location		
P13-35	1BB	Communication positioning point direction setting (0: Forward/1: Reverse)
P13-36	1BC	Communication positioning point instruction (Revolution)
P13-37	1BD	Communication positioning point instruction (Pulse)

When the system uses communication as a positioning command, P13-35 to P13-37 are a set of parameters, please set P13-35, P13-36 first, and then finally set set P13-37, when P13-37 the positioning command is inputted, the position of the new command will be executed. (P13-37 is the communication positioning recognition of instructions, there is no need to modify).

Communication Writing Example

P13-35 = 1, P13-36 = 40, P13-37 = 0

Tx：01. 06. **1**1. BB. 00. 01. CRCL .CRCH
Rx：01. 06. **1**1. BB. 00. 01. CRCL .CRCH

Tx：01. 06. **1**1. BC. 00. 28. CRCL .CRCH
Rx：01. 06. **1**1. BC. 00. 28. CRCL .CRCH

Tx：01. 06. **1**1. BD. 00. 00. CRCL .CRCH
Rx：01. 06. **1**1. BD. 00. 00. CRCL .CRCH

🕮 Write parameters from communication, attention to format details:

A. **Store** to EEPROM: **0** 1BBh --> **0** 1BCh --> **0** 1BDh
B. **Not stored** in EEPROM: **1** 1BBh --> **1** 1BCh --> **1** 1BDh
C. Using A for frequent writing will shorten the life of EEPROM. Try to use B to extend the life of EEPROM.

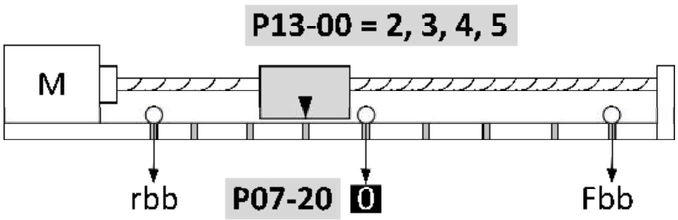
4. By the RS485 communication, 0–15 multi-position operation.

◎ P07-23 = 1

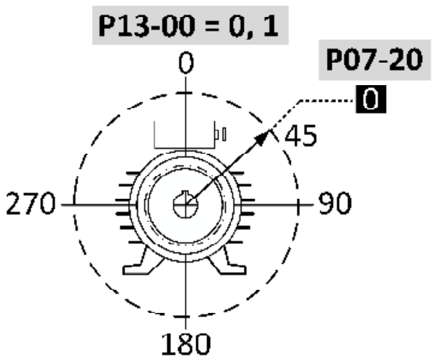
◎ Set the digital input terminal (Di), P07-03 to P07- 09.

NO.	Content
47	External mechanical origin input (ORG)
50	Forward limit switch (Fbb)
51	Reverse limit switch (rbb)

P13-00 = 2, 3, 4, 5, matches 47–51.



P13-00 = 0, 1, the functions of 47–51 are not required.



◎ RS485 communication code.

①: Incremental position command to zero
②: Multi-stage position 4
③: Multi-stage position 3
④: Multi-stage position 2
⑤: Multi-stage position 1
⑥: The pulse input or Z counter is zeroed

Bit	Content	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
14	Multi-stage position	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	–	–
13	①	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	–
12	Back to origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11	②	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0
10	③	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
09	④	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
08	⑤	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0
07	E.F.ON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06	Abnormal reset	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05	Running direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04	Running direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02	⑥	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01	Running command	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
00	Running command	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Position	Revolution/Pulse	No.	HEX	P13-01 (Direction)	P13-02 (Direction)
0	P13-03/04	**A**	4002	–	1
1	P13-05/06	**B**	4102	–	1
2	P13-07/08	**C**	4202	–	1
3	P13-09/10	**D**	4302	–	1
4	P13-11/12	**E**	4402	–	1
5	P13-13/14	**F**	4502	–	1
6	P13-15/16	**G**	4602	–	1
7	P13-17/18	**H**	4702	–	1
8	P13-19/20	**I**	4802	1	–
9	P13-21/22	**J**	4902	1	–
10	P13-23/24	**K**	4A02	1	–
11	P13-25/26	**L**	4B02	1	–
12	P13-27/28	**M**	4C02	1	–
13	P13-29/30	**N**	4D02	1	–
14	P13-31/32	**O**	4E02	1	–
15	P13-33/34	**P**	4F02	1	–

Q	2000	Incremental position command cumulative return to zero. (The zero reset action must be used when stopping)
R	1000	Return to the original point to enable.

Communication Writing Example
Example 1: Write to multi-segment location 1 (4102) Tx ：01. 06. 20. 00. **41. 02**. CRCL .CRCH Rx ：01. 06. 20. 00. **41. 02**. CRCL .CRCH Example 2: Write the return origin search (1000) Tx ：01. 06. 20. 00. **10. 00**. CRCL .CRCH Rx ：01. 06. 20. 00. **10. 00**. CRCL .CRCH

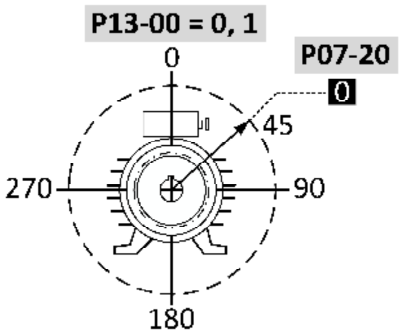
P13 IM, PM/SRM positioning point control command parameter group			
NO./Hex	Item	Range	Default
P13-00 198H	Multi-stage position control form	0–5	0

0	Absolute position (Encoder Z)

- It is controlled by digital input Di to perform multi-stage position command (Pulse) action.
- Multi-stage position command (Pulse) parameters: P13-04, 06, 08, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34.
- Multi-stage position command 0 (Pulse) to Multi-stage position command 15 (Pulse), a total of 16-staget positions can be changed sequentially.
- Automatic operation can be set by parameter group P16.

1	Communication absolute position (Encoder Z)

Write the absolute position command by parameter (P13-35, P13-37).



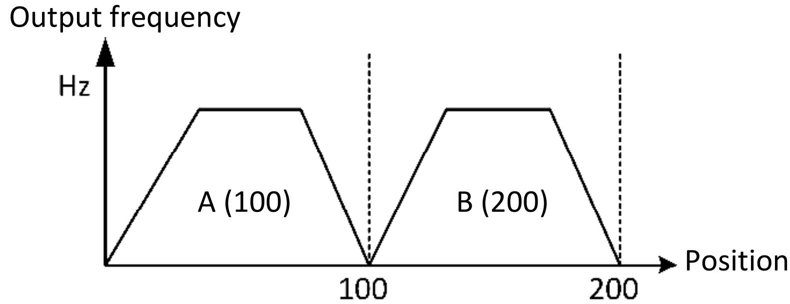
2	Absolute position (Mechanical origin Di input)

- Controlled by digital input Di or RS485 communication, it performs multi-stage position command (Revolution) / (Pulse) action.
- Multi-stage position command (Revolution) / (Pulse) parameters: P13-03 to P13-34.
- Multi-stage position command 0 (Revolution) / (Pulse) to Multi-stage position command 15 (Revolution) / (Pulse), a total of 16 positions can be changed.
- Automatic operation can be set by parameter group P16.

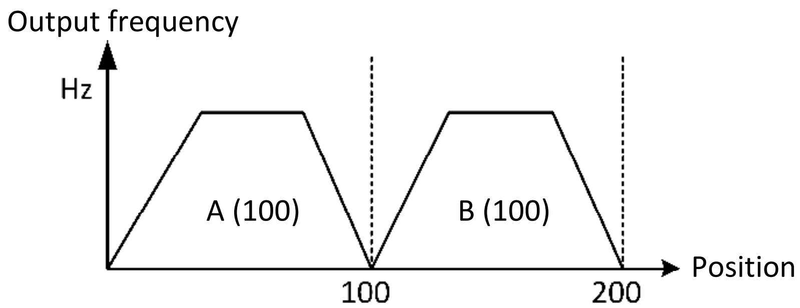
3	Communication absolute position (Mechanical origin Di input)

Write the absolute position command by parameter (P13-35, P13-36, P13-37).

P13-00 = 2, 3
For example:
A. P13-03 = 100, the position can be moved to 100 during action.
B. P13-05 = 200, the position can be moved to 200 during action.

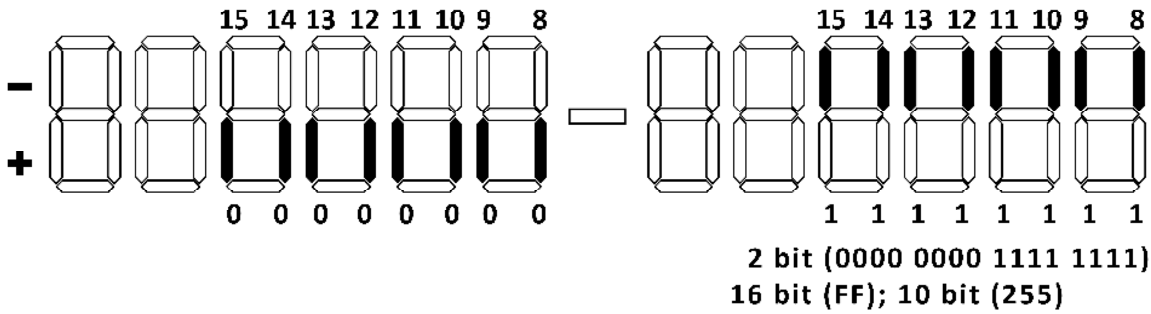


4	Incremental position (Mechanical origin Di input)
🕮 It is controlled by digital input Di to perform multi-stage position command (Revolution) / (Pulse) action. 🕮 Multi-stage position command (Revolution) / (Pulse) parameters: P13-03 to P13-34. 🕮 Multi-stage position command 0 (Revolution) / (Pulse) to Multi-stage position command 15 (Revolution) / (Pulse), a total of 16 positions can be changed. 🕮 Automatic operation can be set by parameter group P16.	
5	**Communication incremental position (Mechanical origin Di input)**
Incremental position command is written by parameter (P13-35, P13-36, P13-37). **P13-00 = 4, 5** **For example:** C. P13-03 = 100, the position can be moved to 100 during action. D. P13-05 = 100, the position can be moved to 200 during action.	



NO./Hex	Item	Range	Default
P13-01 **199H**	Multi-stage position direction setting H byte	0–255	0

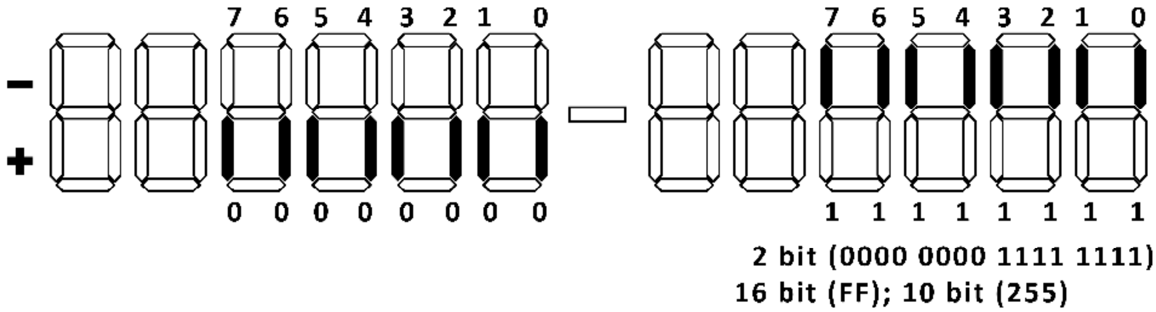
◎ P13-19 to P13-34 multi-stage position command as the rotation direction.
◎ (+) Symbol is the forward direction, defined in the right direction of the origin; (–) symbol is the reverse direction, defined in the left direction of the origin.



NO./Hex	Item	Range	Default
P13-02 19AH	Multi-stage position direction setting L byte	0–255	0

◎ P13-03 to P13-18 multi-stage position command as the rotation direction setting.

◎ (+) Symbol is the forward direction, defined in the right direction of the origin; (–) symbol is the reverse direction, defined in the left direction of the origin.



NO./Hex	Item	Range	Default
P13-03 19BH/★	Multi-stage position command 0 (Revolution)	0–60000 Rev.	0
P13-04 19CH/★	Multi-stage position command 0 (Pulse)	0 to (4 × P01-32) – 1	0
P13-05 19DH/★	Multi-stage position command 1 (Revolution)	0–60000 Rev.	0
P13-06 19EH/★	Multi-stage position command 1 (Pulse)	0 to (4 × P01-32) – 1	0
P13-07 19FH/★	Multi-stage position command 2 (Revolution)	0–60000 Rev.	0
P13-08 1A0H/★	Multi-stage position command 2 (Pulse)	0 to (4 × P01-32) – 1	0
P13-09 1A1H/★	Multi-stage position command 3 (Revolution)	0–60000 Rev.	0
P13-10 1A2H/★	Multi-stage position command 3 (Pulse)	0 to (4 × P01-32) – 1	0
P13-11 1A3H/★	Multi-stage position command 4 (Revolution)	0–60000 Rev.	0
P13-12 1A4H/★	Multi-stage position command 4 (Pulse)	0 to (4 × P01-32) – 1	0
P13-13 1A5H/★	Multi-stage position command 5 (Revolution)	0–60000 Rev.	0
P13-14 1A6H/★	Multi-stage position command 5 (Pulse)	0 to (4 × P01-32) – 1	0
P13-15 1A7H/★	Multi-stage position command 6 (Revolution)	0–60000 Rev.	0
P13-16 1A8H/★	Multi-stage position command 6 (Pulse)	0 to (4 × P01-32) – 1	0
P13-17 1A9H/★	Multi-stage position command 7 (Revolution)	0–60000 Rev.	0
P13-18 1AAH/★	Multi-stage position command 7 (Pulse)	0 to (4 × P01-32) – 1	0
P13-19 1ABH/★	Multi-stage position command 8 (Revolution)	0–60000 Rev.	0
P13-20 1ACH/★	Multi-stage position command 8 (Pulse)	0 to (4 × P01-32) – 1	0

NO./Hex	Item	Range	Default
P13-21 1ADH/★	Multi-stage position command 9 (Revolution)	0–60000 Rev.	0
P13-22 1AEH/★	Multi-stage position command 9 (Pulse)	0 to (4 × P01-32) – 1	0
P13-23 1AFH/★	Multi-stage position command 10 (Revolution)	0–60000 Rev.	0
P13-24 1B0H/★	Multi-stage position command 10 (Pulse)	0 to (4 × P01-32) – 1	0
P13-25 1B1H/★	Multi-stage position command 11 (Revolution)	0–60000 Rev.	0
P13-26 1B2H/★	Multi-stage position command 11 (Pulse)	0 to (4 × P01-32) – 1	0
P13-27 1B3H/★	Multi-stage position command 12 (Revolution)	0–60000 Rev.	0
P13-28 1B4H/★	Multi-stage position command 12 (Pulse)	0 to (4 × P01-32) – 1	0
P13-29 1B5H/★	Multi-stage position command 13 (Revolution)	0–60000 Rev.	0
P13-30 1B6H/★	Multi-stage position command 13 (Pulse)	0 to (4 × P01-32) – 1	0
P13-31 1B7H/★	Multi-stage position command 14 (Revolution)	0–60000 Rev.	0
P13-32 1B8H/★	Multi-stage position command 14 (Pulse)	0 to (4 × P01-32) – 1	0
P13-33 1B9H/★	Multi-stage position command 15 (Revolution)	0–60000 Rev.	0
P13-34 1BAH/★	Multi-stage position command 15 (Pulse)	0 to (4 × P01-32) – 1	0

◎ When the encoder parameters P01-31 and P01-32 are modified, the multi-stage position command 0–15 (Pulse) will reset to 0 and need to be set again.

NO./Hex	Item	Range	Default
P13-35 1BBH/★	Communication positioning point direction setting	0–1	0

0	Forward
1	Reverse

NO./Hex	Item	Range	Default
P13-36 1BCH/★	Communication positioning point instruction (Revolution)	0–60000 Rev.	0
P13-37 1BDH/★	Communication positioning point instruction (Pulse)	0 to (4 × P01-32) – 1	0

◎ For the control method of P13-35 to P13-37, refer to (Position operation control mode: 3. Position operation is written by parameter).

NO./Hex	Item	Range	Default
P13-38 1BEH	Software left limit (Revolution)	0–60000 Rev.	0
P13-39 1BFH	Software left limit (Pulse)	0 to (4 × P01-32) – 1	0
P13-40 1C0H	Software right limit (Revolution)	0–60000 Rev.	0
P13-41 1C1H	Software right limit (Pulse)	0 to (4 × P01-32) – 1	0
P13-42 1C2H	The software has a positive or negative sign on the left and right limits	0–2	1

◎ P07-20 = 7; P13-00 = 2, 3, 4, 5.

◎ With the origin as the standard point, define the negative and positive signs of the left and right limiter of the parameters (P13-38 to P13-41).

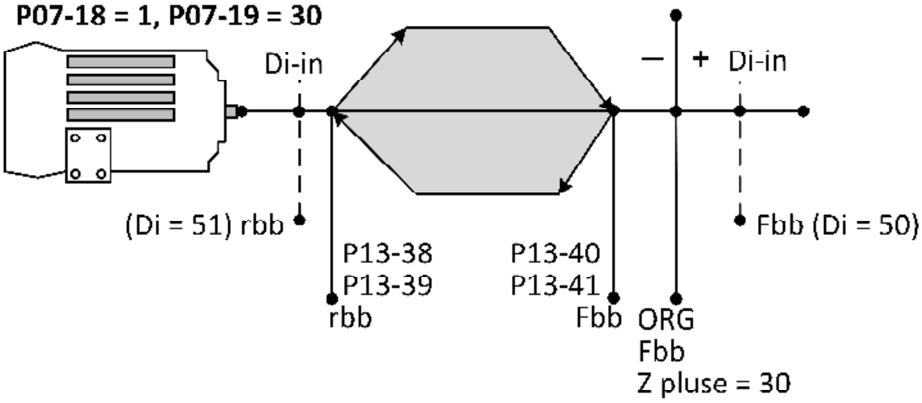
◎ In conjunction with the P13-43 actions, set the software limits so that during position movement, it does not exceed the set values before the left limit switch (Di = 51: rbb) and the right limit switch (Di = 50: Fbb).

0	Left negative/right negative

The left area of the origin is a negative sign, and the left and right ends of the left area are the setting range.

P07-18 = 0 

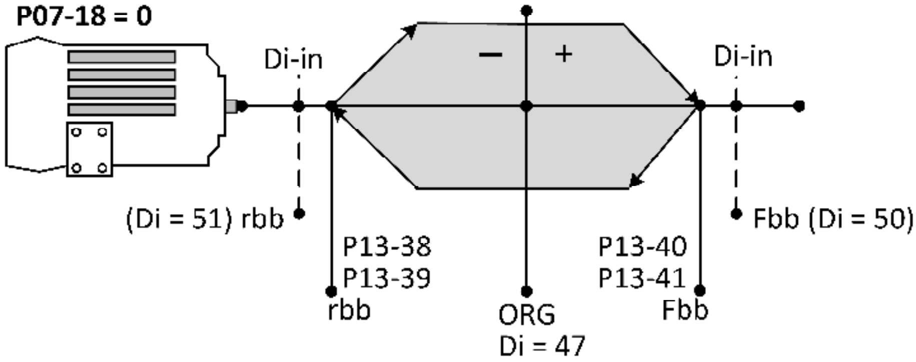
P07-18 = 1, P07-19 = 30

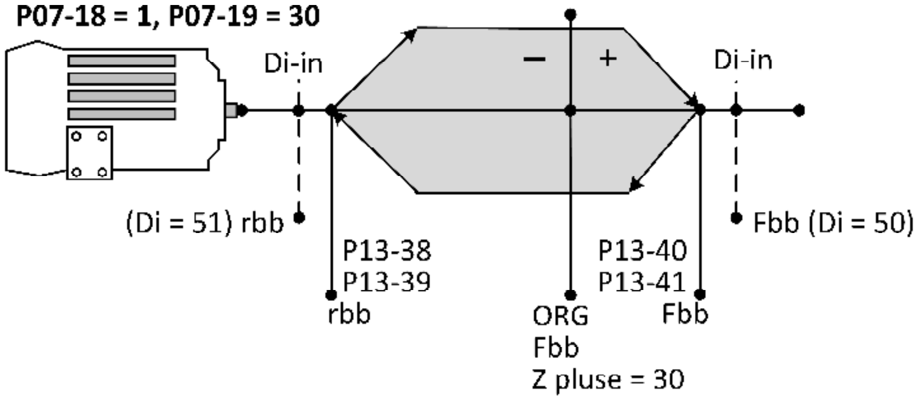


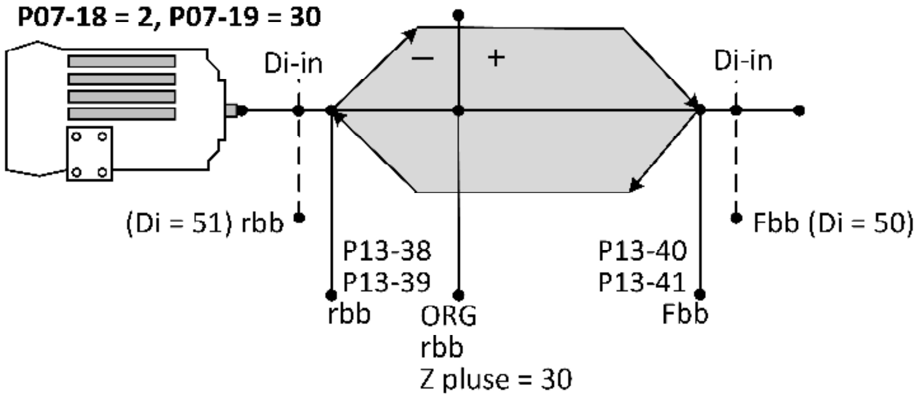
P07-18 = 2, P07-19 = 30 

1	Left negative/right positive

In the left and right areas of the origin, the left side is the negative sign and the right side is the setting range of the positive sign.



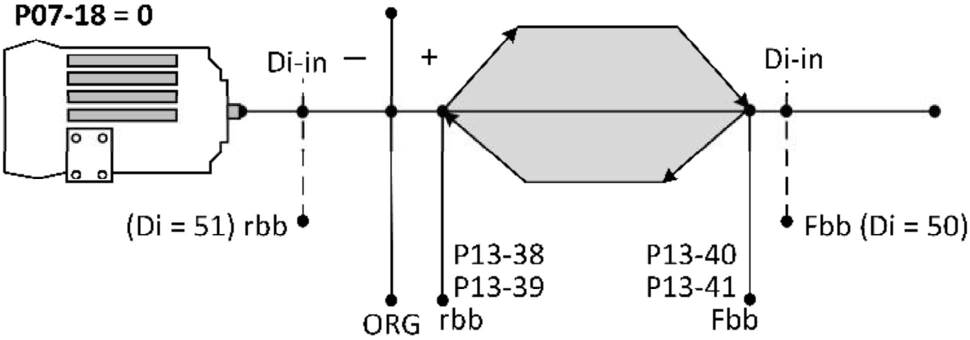




2	Left positive/right positive

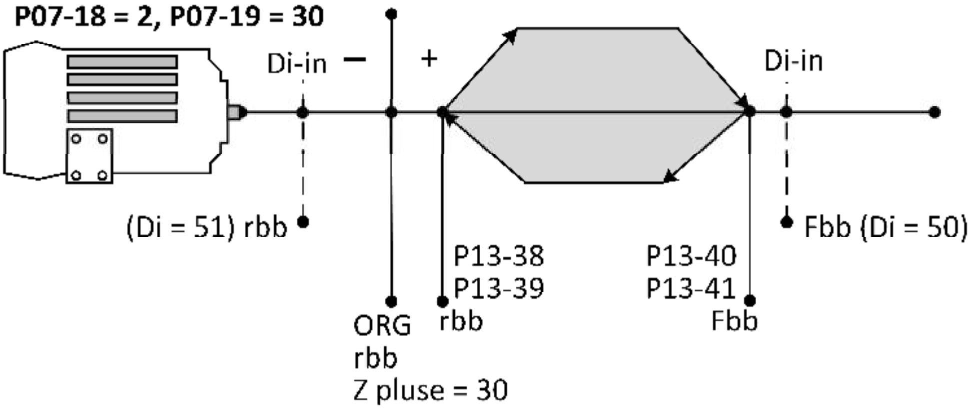
The area on the right of the origin is a positive sign, and the left and right ends of the area on the right are the setting range.

P07-18 = 0



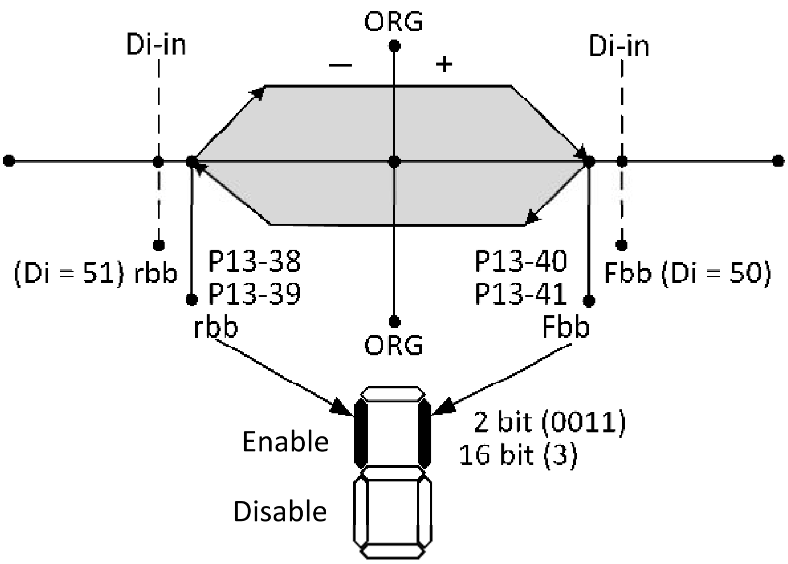
P07-18 = 1, P07-19 = 30 

P07-18 = 2, P07-19 = 30



NO./Hex	Item	Range	Default
P13-43 1C3H	Software left and right limit enable	0–3	0

◎ When P07-20 = 7, when returning to the origin, the forward/reverse limit position of the software will be automatically measured and stored in parameters P13-38 to P13-41. At the same time, P13-42 = 1, P13-43 = 3 will be modified.



NO./Hex	Item	Range	Default
P13-44 1C4H	Manually set the offset angle of the mechanical Z point (Pulse)	0 to (4 × P01-32) – 1	0

◎ When the encoder parameters P01-31 and P01-32 are modified, the mechanical Z point manually set the offset angle (Pulse) will be reset to 0 again.

◎ Define the ideal offset angle between Encoder Z point and mechanical Z point, which can be read by monitoring parameter P00-01 = 29. When the axis is rotated to the specified mechanical angle position, the angle value read at this time, after inputting this parameter, this angle is the mechanical origin.

◎ Suitable for 360 degree circular motion control.

◎ Only for P13-00 = 0, 1.

NO./Hex	Item	Range	Default
P13-45 1C5H	Positioning point control frequency command	0.00 to P13-46 Hz	10.00
P13-46 1C6H	Positioning and following start frequency	0.00–400.00Hz	30.00
P13-47 1C7H/★	Positioning point-acceleration and deceleration time	0.00–100.00sec	5.00

◎ Position control and return to origin frequency command P13-45, acceleration/deceleration time P13-47.

◎ P21-41 is the deceleration time curve mode.

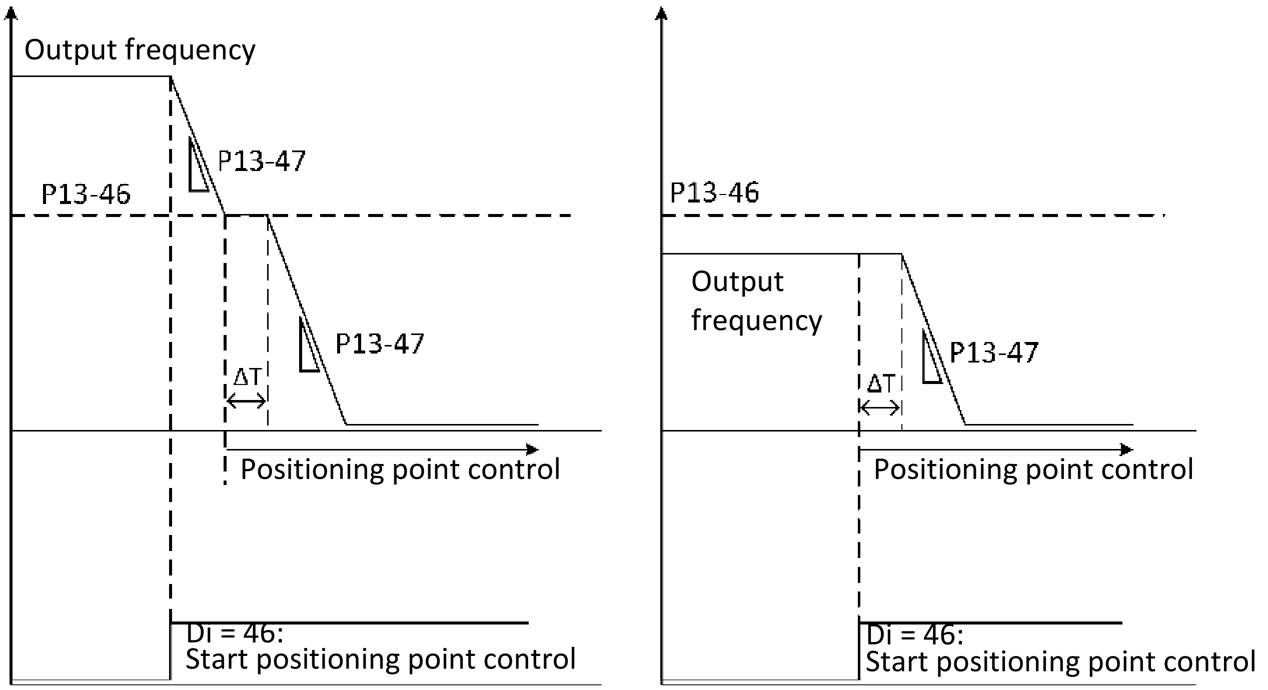
◎ P02-09 and P02-10 are steady-state positioning adjustments after deceleration.

P13-45 to P13-47 Description:

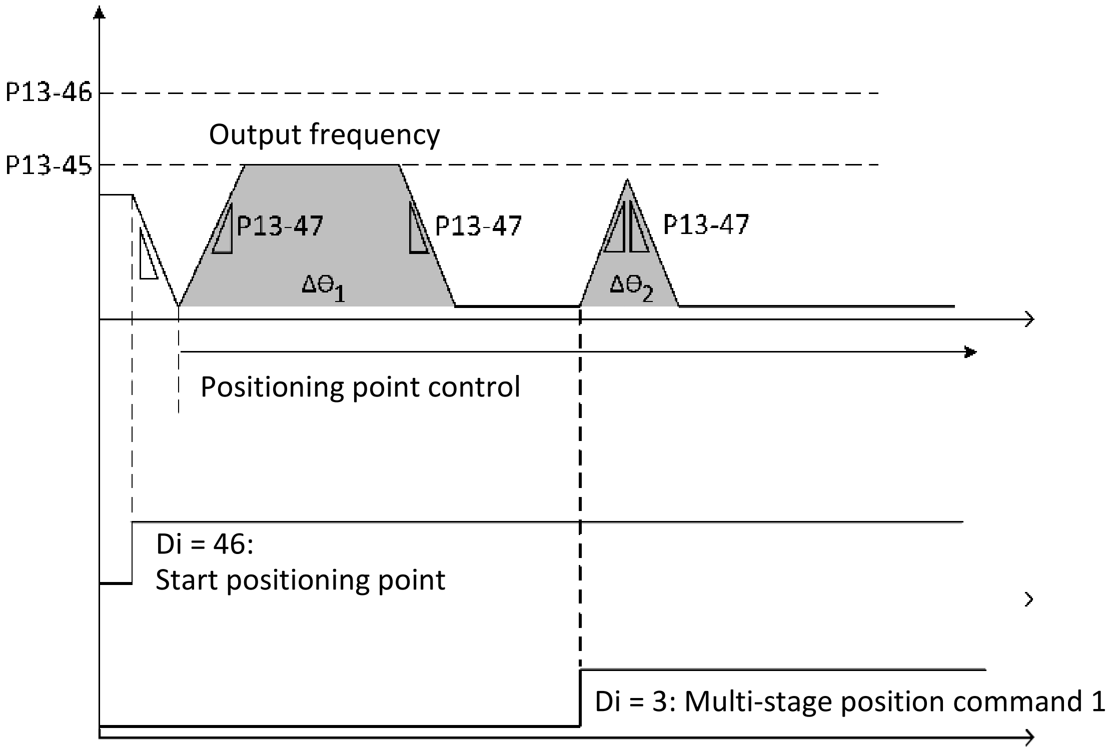
P13-00 = 0, 1:

When positioning control is started in speed control mode, it will decelerate at the time set by P13-47, and start positioning control when the output frequency is ≤ the setting of P13-46.

1. If the speed before starting positioning is greater than P13-46, it will first decelerate to P13-46 and stay for a compensation time ΔT, and then decelerate to position to the target position.
2. If the speed before starting positioning is less than P13-46, it will run at the speed before positioning for a compensation time ΔT, and then decelerate to position to the target position.
3. The compensation time ΔT will be automatically calculated based on the current position, target position and deceleration time.



P13-00 = 2, 3, 4, 5:
If the output frequency is not 0 when the positioning control is started, it will first decelerate to 0, and then use the speed of P13-45 for positioning point control. The output frequency will accelerate from 0 to P13-45, maintain a constant speed, and then decelerate to 0 to complete the positioning action. If the position movement amount exceeds half of the expected position movement amount during the acceleration process, it will immediately decelerate to 0 to complete the positioning action.



■ P14 PID Control parameter group

This product is equipped with PID control function. Integrate or differentiate the deviation between the control target value and the feedback value to adjust the output so that the detected value and the target value tend to be consistent. This function is used to control the parameters such as flow, pressure, temperature and so on by adjusting the output frequency, so as to make it towards the target. Combine the characteristics of the following control functions to form the best control.

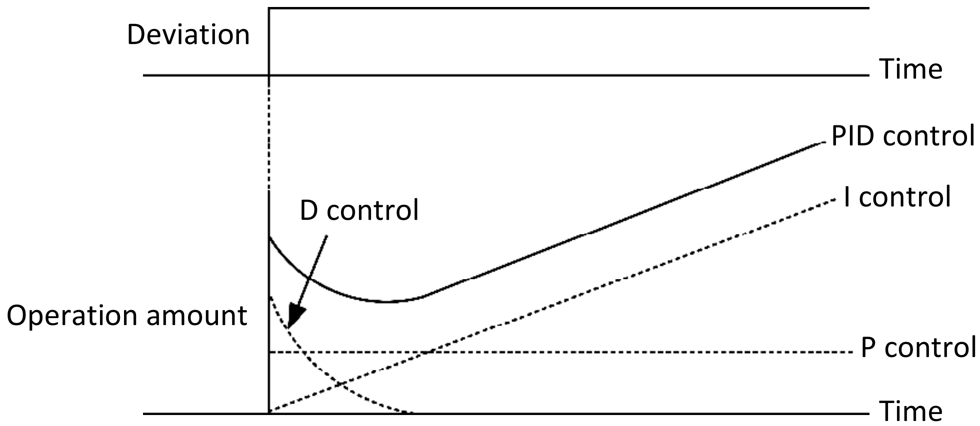
◎ P control is proportional control. Output the operation amount (Control output amount) proportional to the deviation. But P control alone will produce steady-state errors, unable to eliminate other deviations.

◎ I control is integral control. The operation amount (Control output amount) that integrates the deviation is output. Helps to make the feedback value approach the target value. Single using P control alone will produce steady-state errors, but combined with integral control, it will eliminate steady-state errors over time.

◎ D control is differential control. Increase the amount of work accordingly for sharp load changes, bringing the control state back to its original equilibrium state as soon as possible. Multiply the differential (Tilt of the deviation) by the time parameter, and reflect its results into the PID input, guess the deviation of the signal, and make up the positive deviation.

Note: When using D control, because the deviation signal is subject to more interference, it is prone to unstable operation. please use D control only when necessary.

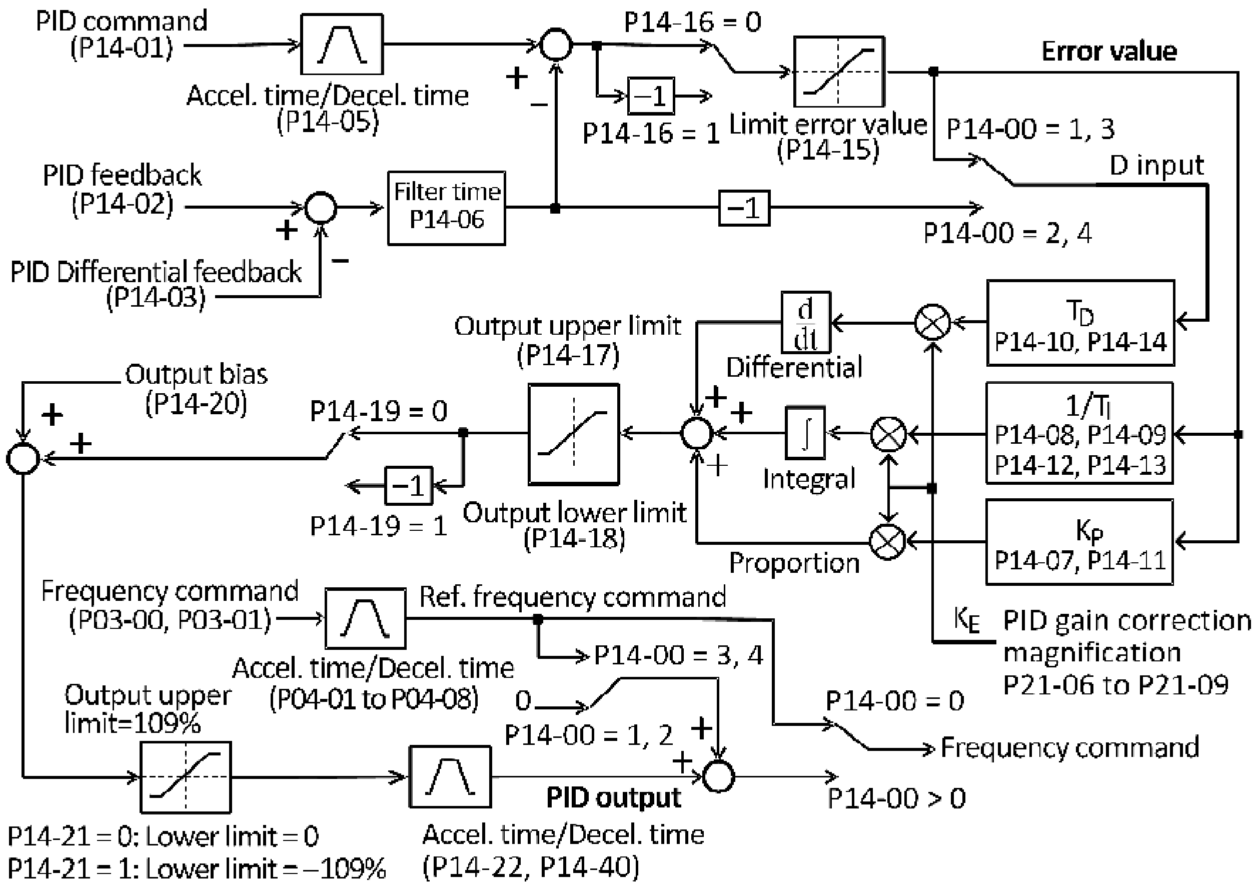
◎ The action of the PID control is as follows. Assuming that the deviation (the difference between the target value and the feedback value) is constant, the change in the operating quantity (output frequency) is shown in the figure.

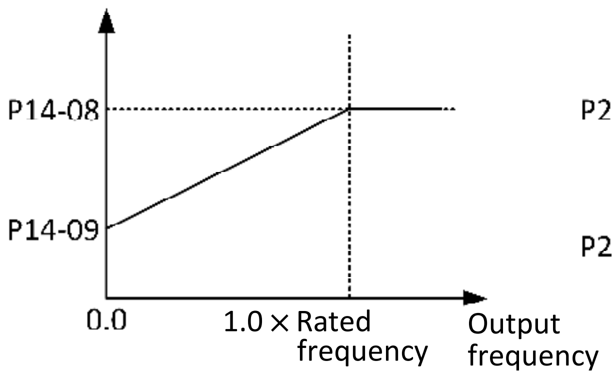


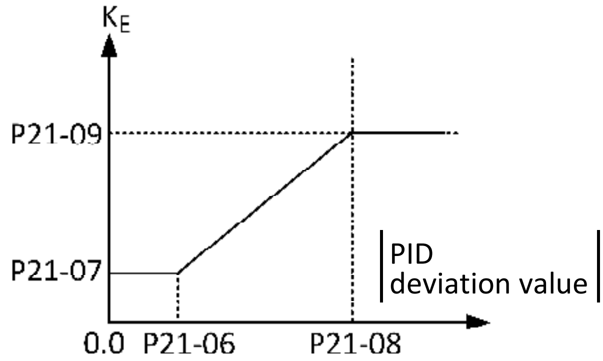
◎ The application of PID control, the application example of PID control using inverter is shown in the table below.

Application	Control content
Speed control	Feedback the speed information of the mechanical system to make the speed consistent with the target value. Use the speed information of other mechanical systems as the target value input, feedback the actual speed is speed controlled.
Pressure control	Feedback the pressure information to control the pressure.
Flow control	Feedback the flow information to perform high-precision flow control.
Temperature control	Feedback temperature information, temperature control by rotating fan.

■ P14 PID Block Diagram







P14 PID Control parameter group			
NO./Hex	Item	Range	Default
P14-00 **1C8H**	PID mode	0–6	0

◎ Error value = PID command (P14-01) – (P14-02) PID feedback.

◎ Error value > 0, PID output = Output frequency upper limit (P03-06) × P14-17.

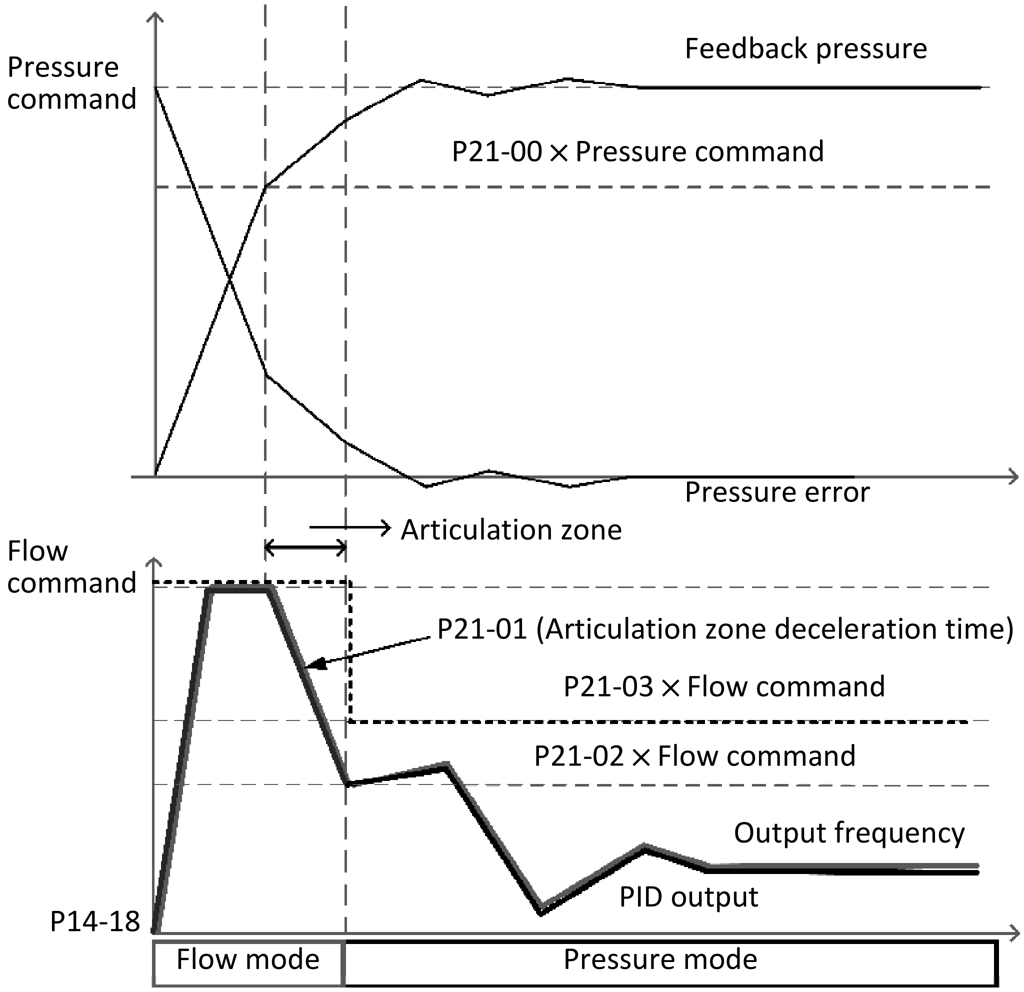
◎ P00-01 (Monitoring operation content selection) = 16–20.

◎ Do = 25: PID target value is equal to the detected value (< 3.0%).

<table>
<tr><td>0</td><td>Disable PID</td></tr>
<tr><td>1</td><td>PID output 1 (Deviation value as D input)</td></tr>
<tr><td>2</td><td>PID output 2 (Feedback value is D input)</td></tr>
<tr><td>3</td><td>Frequency command + PID output 1</td></tr>
<tr><td colspan="2">Error value ≤ 0, Output frequency = Frequency command.</td></tr>
<tr><td>4</td><td>Frequency command + PID output 2</td></tr>
<tr><td colspan="2">Error value ≤ 0, Output frequency = Frequency command.</td></tr>
<tr><td>5</td><td>Flow (Frequency command)/Pressure (PID output 1) automatic switching mode</td></tr>
<tr><td>6</td><td>PID output 1 (Deviation value as D input) but does not execute frequency command</td></tr>
<tr><td colspan="2">🕮 Execute PID related actions, but do not output frequency.
🕮 Frequency output is required, follow P03-00 to P03-0 3; P04-01 to P04-08 settings.</td></tr>
</table>

■ **P14-00 = 5:**

1. When digital (Di) input setting (P07-03 to P07-09) = 55.
   - Digital (Di) input OFF: execute flow mode (Frequency command).
   - Digital (Di) input ON: When the pressure mode condition (Item 3) is satisfied, the pressure mode (PID output 1) is executed, and when it is not satisfied, the flow mode (frequency command) is executed.
2. When the digital (Di) input setting (P07-03 to P07-09) ≠ 55, when the pressure mode condition (Item 3) is satisfied, the pressure mode (PID output 1) is executed, and when it is not satisfied, the flow mode is executed (Frequency instruction).
3. A, B and C are met at the same time, it is pressure mode, otherwise it is flow mode (Frequency command).
   A. Frequency command ≥ P14-36 (Pressure mode threshold 1).
   B. Pressure command ≥ P14-37 (Pressure mode threshold 2).
   C.
      I. P21-00 = 0: PID error ≤ P14-38, and continuous time ≥ P14-39.
      II. P21-00 > 0: After pressure > P21-00, the output frequency decreases to (P21-02 × Frequency command).
4. The pressure mode breaks away from the condition: D or E or F is established.
   D. Frequency Command < P14-36 (Pressure mode threshold1).
   E. PID Command < P14-37 (Pressure mode threshold 2).
   F. Digital (Di) input setting (P07-03 to P07-12) = 55, and the digital input is OFF.
5. When executing flow mode (Frequency command), PID output = S-curve or Ramp-curve.
6. When performing pressure mode (PID output 1), S-curve or Ramp-curve = PID output, And PID_Max = (Flow mode × P21-03).



NO./Hex	Item	Range	Default
P14-01 **1C9H**	PID command point selection (P14-34, P14-35)	0–9	0

◎ Please select the command input terminal from 0 to 9 as the source of the PID control target value.

0	P14-04	**5**	Pulse input
1	AV (Digital Operator Knob)	**6**	RAMP output
2	AVI (–10 to 10V input)	**7**	Output current (2.00pu)
3	ACI (4–20mA input)	**8**	Torque current (2.00pu)
4	AUX (0–10V input)	**9**	Encoder feedback value

NO./Hex	Item	Range	Default
P14-02 1CAH	PID feedback point selection	0–9	3

◎ Please select the input terminal from 0 to 9 as the source of PID feedback point detection.

0	P14-04	**5**	Pulse input
1	AV (Digital Operator Knob)	**6**	RAMP output
2	AVI (0–10V input)	**7**	Output current
3	ACI (4–20mA input)	**8**	Torque current
4	AUX (0–10V input)	**9**	Encoder feedback value

NO./Hex	Item	Range	Default
P14-03 1CBH	PID differential feedback point selection	0–9	0

◎ Please select the input terminal from 0 to 9 as the source of PID differential operation feedback point detection.

0	None	**5**	Pulse input
1	AV (Digital Operator Knob)	**6**	RAMP output
2	AVI (0–10V input)	**7**	Output current
3	ACI (4–20mA input)	**8**	Torque current
4	AUX (0–10V input)	**9**	Encoder feedback value

NO./Hex	Item	Range	Default
P14-04 1CCH	PID setting value	0 to P14-34, P14-35	0

◎ Set the target value command of PID input. (P14-01, P14-02 = 0)

NO./Hex	Item	Range	Default
P14-05 1CDH/★	PID command acceleration and deceleration time	0.00–600.00sec	0.05

NO./Hex	Item	Range	Default
P14-06 1CEH/★	Feedback input filter time	0.00–10.00sec	0.05

◎ Set the filter time of PID feedback input. (If the setting is too large, the response becomes slow).

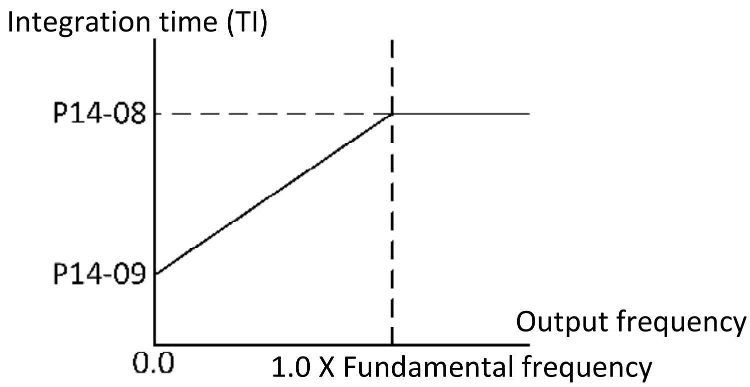
NO./Hex	Item	Range	Default
P14-07 1CFH/★	Group 1-proportional gain	0.0–500.0%	100.0

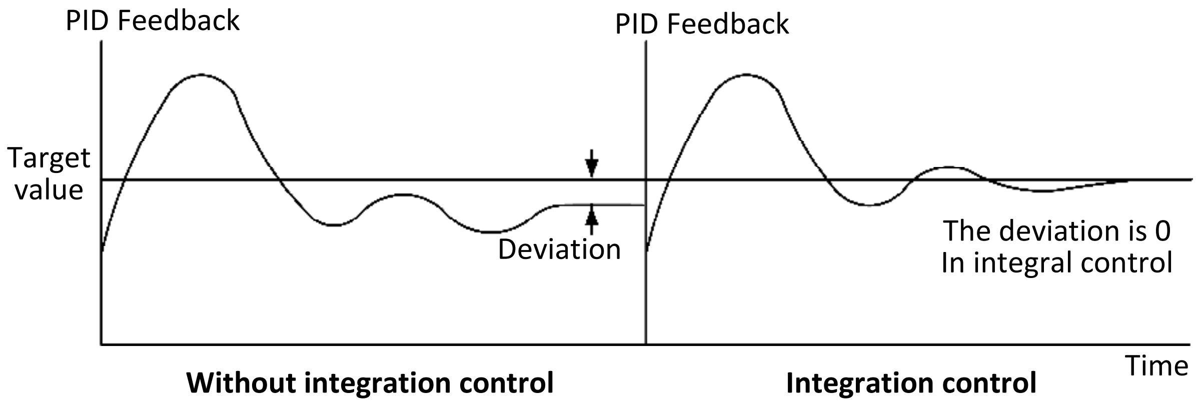
◎ This gain determines how responsive the scale controller is to the amount of feedback error, and the greater the gain, the faster the response, but the larger it will produce a shock. If the setting is too small, the deviation between the target value and the back value becomes larger.

NO./Hex	Item	Range	Default
P14-08 1D0H/★	Group 1-Integration time (H)	0.01–99.99sec	0.50
P14-09 1D1H/★	Group 1-integration time (L)	0.01–99.99sec	0.25

◎ When only proportional control is used, there will be a deviation between the PID target value and the PID feedback value. In order to eliminate this fixed deviation, it is necessary to set definite integration time (I).

◎ When the integration time is too large, the integral function is too weak, it is difficult to eliminate the steady state error, the integration time is too small, the number of system shocks increases, the integration time is too small, the system may be unstable.





NO./Hex	Item	Range	Default
P14-10 1D2H/★	Group 1-Differential time	0.00–10.00sec	0.00

◎ This time determines the degree of response of the differential controller to the variation of the error. Proper derivative time can make proportional controller and integral controller. the amount of overshoot of the brake is reduced, and the oscillation quickly attenuates and stabilizes. But when the differential time is too large, it can cause system oscillation itself. Assume When set to 0.00, D control does not operate.

NO./Hex	Item	Range	Default
P14-11 1D3H/★	Group 2-Proportional Gain	0.0–500.0%	100.0
P14-12 1D4H/★	Group 2-Integration time (H)	0.01–99.99sec	0.80
P14-13 1D5H/★	Group 2-Integration time (L)	0.01–99.99sec	0.50
P14-14 1D6H/★	Group 2-Differential time	0.00–10.00sec	0.00

◎ The second group of PID is selected by the external Di command (34: open the second group of PID parameters). (Refer to the description of PID group 1 for function)

NO./Hex	Item	Range	Default
P14-15 1D7H	PID Deviation limit	0.0–600.00%	300.00

◎ When the input value of PID control is large, the output of PID control will also become large. This setting is made when the input value of PID control needs to be limited.

NO./Hex	Item	Range	Default
P14-16 1D8H	PID Input characteristic selection	0–1	0

◎ The polarity of the PID output can be reversed. This allows the target value of the PID to increase, while the inverter's output frequency decreases in the counter-characteristic load.

0	Positive characteristics (command value – feedback value)
PID input is positive, the PID output increases. (Positive characteristics)	
1	Negative characteristics (– command value + feedback value)
PID input is negative, the PID output decreases. (Negative characteristics)	

NO./Hex	Item	Range	Default
P14-17 1D9H	PID output upper limit (P03-06 × P14-17)	0.00–100.00%	100.00

◎ Output frequency upper limit (P03-06) × P14-17.

NO./Hex	Item	Range	Default
P14-18 1DAH	PID output lower limit (P03-06 × P14-18)	–100.00 to 100.00%	0.00

◎ Output frequency upper limit (P03-06) × P14-18.
◎ Negative percentages, P14-21 = 1: Reverse effective.

NO./Hex	Item	Range	Default
P14-19 **1DBH**	PID output characteristic selection	0–1	0

0	The output is not inverted
Forward.	
1	Output inversion
Reversed. (P14-21 = 1)	

NO./Hex	Item	Range	Default
P14-20 **1DCH**	PID output offset (P03-06 × P14-20)	–100.00 to 100.00%	0.00

◎ Adjust the parameters of the bias value of PID control output.
◎ Output frequency upper limit (P03-06) × P14-20.

NO./Hex	Item	Range	Default
P14-21 **1DDH**	PID output reverse selection	0–1	0

0	Reversal is invalid
1	Reverse effective

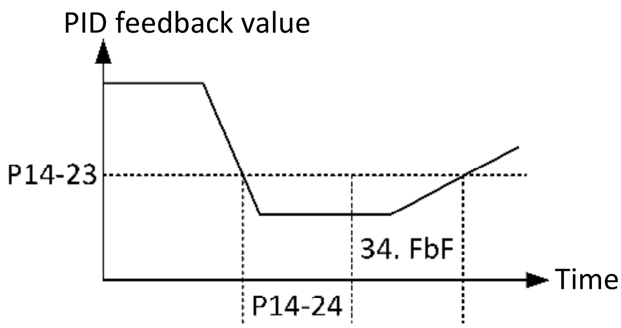
NO./Hex	Item	Range	Default
P14-22 **1DEH**	PID output acceleration and deceleration time	0.00–600.00sec	1.50

◎ PID Output acceleration and deceleration time is used to set the acceleration and deceleration time of the PID control output port.

NO./Hex	Item	Range	Default
P14-23 **1DFH**	PID feedback signal lost detection level (P14-34, P14-35) × P14-23	0.00–100.00%	18.00
P14-24 **1E0H**	PID feedback signal lost detection time	0.00–30.00sec	5.00
P14-25 **1E1H**	PID feedback signal lost processing method	0–2	0

0	No detection
1	Fault detection (Continue to run when a minor fault occurs)
2	Fault detection (Stop output when fault occurs)

🕮 If the feedback value is lower than (P14-34, P14-35) × P14-23 and exceeds the time of P14-24, an abnormality is detected.
🕮 Displayed when abnormal (34. FbF 34. FbF)

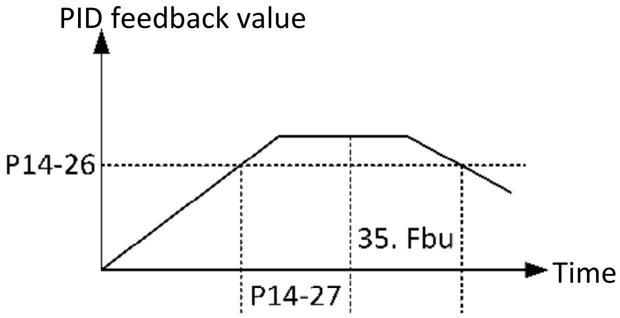


NO./Hex	Item	Range	Default
P14-26 1E2H	PID feedback out-range detection value (P14-34, P14-35) × P14-26	0.00–100.00%	100.00
P14-27 1E3H	PID feedback out-range detection time	0.00–30.00sec	2.00
P14-28 1E4H	PID feedback out-range detection processing method	0–2	0

0	No detection
1	Fault detection (Continue to run when a minor fault occurs)
2	Fault detection (Stop output when fault occurs)

🕮 When the feedback value is higher than parameter (P14-34, P14-35) × P14-26 and exceeds the time of parameter P14-27, the detected feedback function will be lost immediately.

🕮 Displayed when abnormal (35. Fbu )

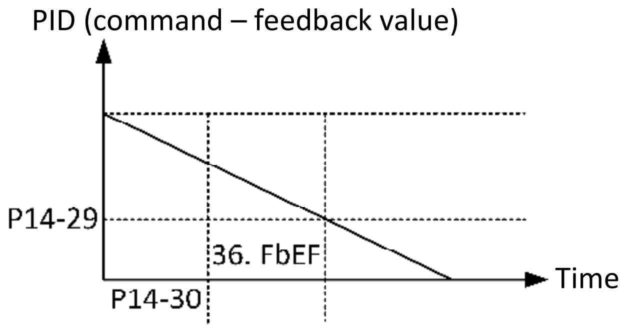


NO./Hex	Item	Range	Default
P14-29 1E5H	PID deviation out-range detection value (P14-34, P14-35) × P14-29	0.00–100.00%	20.00
P14-30 1E6H	PID deviation out-range detection time	0.00–30.00sec	5.00
P14-31 1E7H	PID deviation out-range detection processing method	0–2	0

0	No detection
1	Fault detection (Continue to run when a minor fault occurs)
2	Fault detection (Stop output when fault occurs)

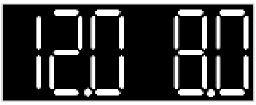
🕮 (Command value – feedback value) > (P14-34, P14-35) × P14-29, and if the time exceeds P14-30, an abnormality is detected.

🕮 Displayed when abnormal (36. FbEF )



NO./Hex	Item	Range	Default
P14-32 1E8H	PID 100% monitor display value (for P00-01=16)	1–999	100
P14-33 1E9H	PID monitor display value decimal point position	0–2	1

◎ Use a digital operator to monitor the PID value (P00-01 = 16) and (P14-34, P14-35) another display unit setting.



P14-32 PID feedback value
P14-33

NO./Hex	Item	Range	Default
P14-34 1EAH	Pressure Sensor rating setting (P00-01 = 17, 18, 19)	0–60000	1000
P14-35 1EBH	Pressure Sensor decimal point position	0–4	1

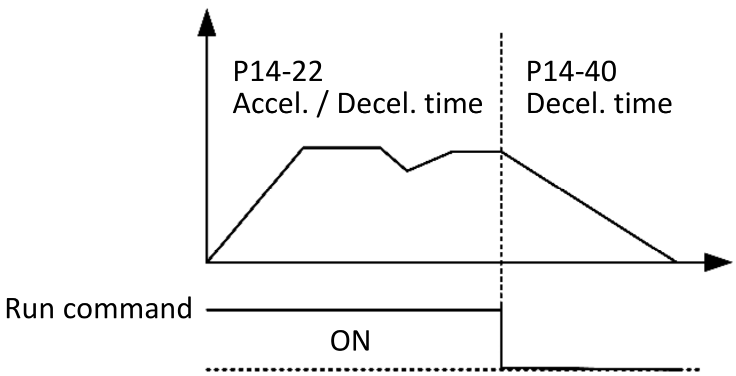
◎ According to the sensor rated specifications, set (P14-34) the corresponding rated value of the maximum feedback voltage or feedback current, and (P14-35) the decimal point position.

NO./Hex	Item	Range	Default
P14-36 1ECH	Pressure mode threshold 1 (Frequency command) (P03-00, P03-01)	0.00–100.00%	0.00
P14-37 1EDH	Pressure mode threshold 2 (PID command)	0.00–100.00%	20.00
P14-38 1EEH	PID reaches the deviation detection level	0.00–50.00%	2.00
P14-39 1EFH	PID arrival detection time	0.00–30.00sec	0.10

◎ P14-36 to P14-39, Please refer to the description of P14-00 = 5.

NO./Hex	Item	Range	Default
P14-40 1F0H	PID stop deceleration time	0.00–600.00sec	5.00

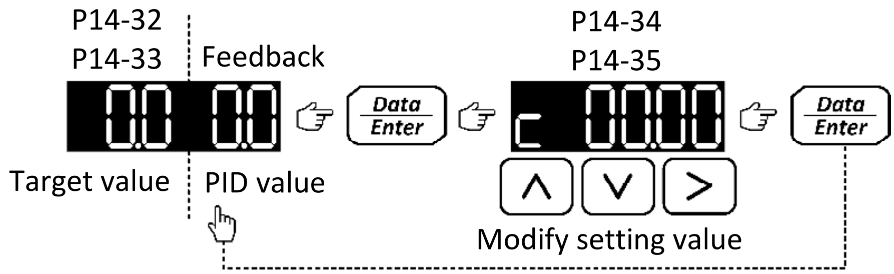
◎ When the stop operation command is input, the PID control target calculation value is used to decelerate and stop the time.



P15 PID Pump sleep control parameter group			
NO./Hex	Item	Range	Default
P15-00 1F1H	Water pump function	0–1	0

0	Do not start
1	Start

P14-00 = 1 or 2, P14-01 = 0, P14-02 = 2 or 3.



NO./Hex	Item	Range	Default
P15-01 1F2H	Sleep detection interval	5–30000sec	30

◎ Setting of water detection time for timing detection.

NO./Hex	Item	Range	Default
P15-02 1F3H	Sleep level	0.00–100.00%	55.00

◎ When the constant pressure operation frequency is lower than P15-02, it will slow down to 0.0Hz and enter the sleep standby state maintained by constant pressure.

◎ Sleep frequency = Output frequency upper limit × P15-02

NO./Hex	Item	Range	Default
P15-03 1F4H	Wake-up deviation	0.00–100.00%	4.00

◎ Wake-up pressure value = P14-04 – (P14-34, 35 × P15-03).

◎ Feedback pressure value < wake-up pressure value, start operation.

NO./Hex	Item	Range	Default
P15-04 1F5H	Sleep standby time	0–30000sec	900
P15-05 1F6H	Sleep standby operation time	0–30000sec	60
P15-06 1F7H	Sleep standby operation frequency	0.00–400.00Hz	0.00

◎ Sleep time sequence: P15-04 (sec), 0Hz --> P15-05 (sec), P15-06 (Hz)

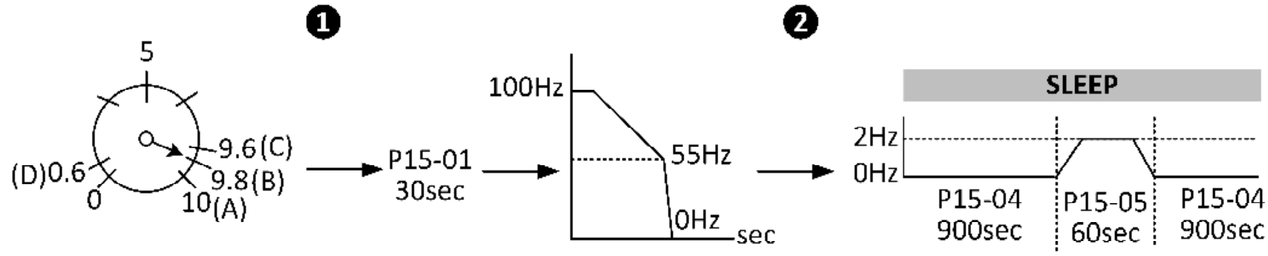
Example : Pressure switch : 4–20mA; 0–10bar, output frequency upper limit 100Hz.

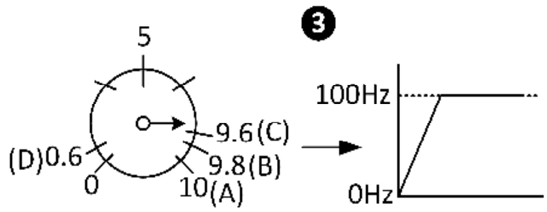
P14-00 = 1: PID output 1 (error value as D input)
P14-02 = 3: ACI (4–20mA input)

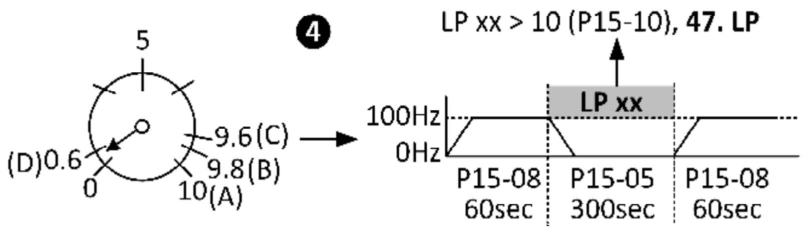
P15-01 = 30sec, P15-02 = 55%, P15-03 = 4%, P15-04 = 900sec, P15-05 = 60sec, P15-06 = 2Hz
P15-07 = 6%, P15-08 = 60sec, P15-09 = 300sec, P15-10 = 10, P15-11 = 0

A. P14-04 = 10.0bar. P14-01 = 0; P14-34, 35 = 10.0; P14-32, 33 = 10.0
B. **Saturation pressure level** = P14-04 – ((P14-34, 35 × P15-03) / 2) = 10.0 – 0.2 = 9.8bar
C. **Awakening level =** P14-04 – (P14-34, 35 × P15-03) = 10 – 0.4 = 9.6bar
D. **Low water pressure level =** P14-34, 35 × P15-07 = 0.6bar

1. Start pressurizing at an output frequency of 100Hz. When the pressure reaches 9.8bar (B), it will decelerate to 0Hz after the P15-01 time. When the frequency drops to 55Hz (Note 1), the deceleration time will be shorter.
   Note 1: 55Hz = upper frequency limit (100Hz) × P15-02 (55%)
2. When decelerating to 0Hz, the sleep time and frequency cycle (Note 2) are executed, and SLEEP (PID mode) is displayed.
   Note 2: P15-04 (900sec), 0Hz --> P15-05 (60sec), 2Hz (P15-06).
3. During sleep, when the pressure is less than 9.6bar (C), pressurization operation starts.
4. When the pressure is less than 6 bar (D), the output frequency is 100Hz for 60 seconds (P15-08), then decelerates to 0Hz, waits for 300 seconds (P15-09) and counts (LP xx), then operates to increase pressure. When the count value exceeds 10 (P15-10), a low water pressure abnormality is detected and 47. LP is displayed. (Note 3)
   Note 3: P15-08 (60sec, 100Hz) --> P15-09 (300sec, 0Hz) / LP xx. LP 11 > 10 (P15-10), 47. LP







NO./Hex	Item	Range	Default
P15-07 1F8H	Low water pressure detection level	0.00–100.00%	6.00
P15-08 1F9H	Low water pressure detection time	0–12000sec	60
P15-09 1FAH	Low water pressure detection standby time	0–30000sec	1200
P15-10 1FBH	Low water pressure detection recovery times	0–1000 times	10

◎ When the water source is lack, the water pipe is broken or the pressure detector fails (open circuit), it is the detection range of low water pressure.

◎ When the pressure is lower than the low water pressure level (P14-34, 35 × P15-07), the output frequency increases the pressure by P15-08 (sec) and then decelerates to 0Hz, waits for P15-09 (sec) and counts (LP xx), and then operates to increase the pressure. When the count value exceeds P15-10 (times), the low water pressure abnormality is detected and 47. LP is displayed 47. LP

NO./Hex	Item	Range	Default
P15-11 1FCH	Sleep detection mode	0–1	0

0	Constant pressure pump-down mode
The controller detects the water status by reducing the pressure command value.	
1	Constant pressure pump-boost mode
The controller uses the boost pressure command value to detect the water status. A. Saturation pressure level = P14-04 – ((P14-34, 35 × P15-03) / 2) B. When the pressure reaches (A), the boost test time sequence output frequency is executed to achieve the purpose of boosting. Please pay attention when using the continuous output frequency. A. P15-05 --> P15-12	

NO./Hex	Item	Range	Default
P15-12 1FDH	Pressure test allowable time	0–60sec	6

◎ P15-11 = 1.

NO./Hex	Item	Range	Default
P15-13 1FEH	Reserved	0–65535	0

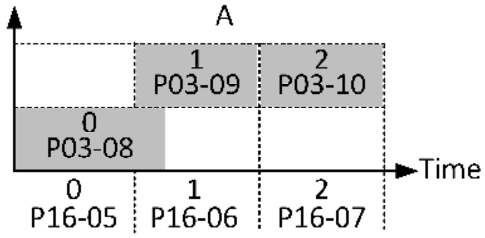
■ P16 Programmable operating parameters automatically edit group

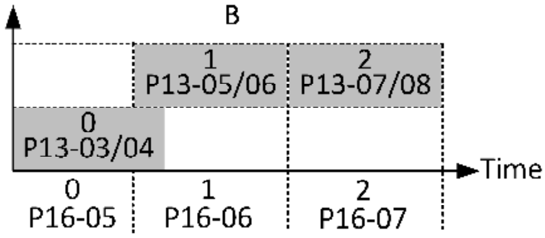
The application of this parameter can be used as the operation program control of general small machinery, food processing machinery, and washing equipment. It can replace some traditional relays, switches, timers and other control circuits.

◎ Di settings = 37, 38, 39.
◎ P00-01 = 25: Automatic program operation.
◎ The operation time is set from 0 (P16-05) to 15 (P16-20). Please pay attention to the frequency acceleration and deceleration time settings.

A. P16-00 = 1–2 means that during the operation time of P16-05, the acceleration time of P03-08 exceeds the setting. When executing the next operation time P16-06, it will operate at the speed and time of P03-09 and skip the P03-08 speed.

B. P16-00 = 5–6 means that during the operation time of P16-05, the acceleration time of P13-03/ 04 exceeds the setting. When executing the next operation time P16-06, it will operate at the position of P13-05/06 and skip the command of P13-03/04.





P16-00 = 1–4 Speed control mode			Operation cycle		P16-00 = 5–8 Position control mode		
Multi-stage speed	Direction		**No.**	**sec**	Revolution/Pulse	Direction	
	P16-02	P16-03				P13-01	P13-02
P03-08	–	1	**0**	**P16-05**	P13-03 / 04	–	1
P03-09	–	1	**1**	**P16-06**	P13-05 / 06	–	1
P03-10	–	1	**2**	**P16-07**	P13-07 / 08	–	1
P03-11	–	1	**3**	**P16-08**	P13-09 / 10	–	1
P03-12	–	1	**4**	**P16-09**	P13-11 / 12	–	1
P03-13	–	1	**5**	**P16-10**	P13-13 / 14	–	1
P03-14	–	1	**6**	**P16-11**	P13-15 / 16	–	1
P03-15	–	1	**7**	**P16-12**	P13-17 / 18	–	1
P03-16	1	–	**8**	**P16-13**	P13-19 / 20	1	–
P03-17	1	–	**9**	**P16-14**	P13-21 / 22	1	–
P03-18	1	–	**10**	**P16-15**	P13-23 / 24	1	–
P03-19	1	–	**11**	**P16-16**	P13-25 / 26	1	–
P03-20	1	–	**12**	**P16-17**	P13-27 / 28	1	–
P03-21	1	–	**13**	**P16-18**	P13-29 / 30	1	–
P03-22	1	–	**14**	**P16-19**	P13-31 / 32	1	–
P03-23	1	–	**15**	**P16-20**	P13-33 / 34	1	–

P16 Programmable operating parameters automatically edit group			
NO./Hex	Item	Range	Default
P16-00 1FFH	Program operation mode selection	0–8	0

◎ Items 1–4 are speed control mode.
◎ One operation cycle is from 0 (P16-05) to 15 (P16-20).

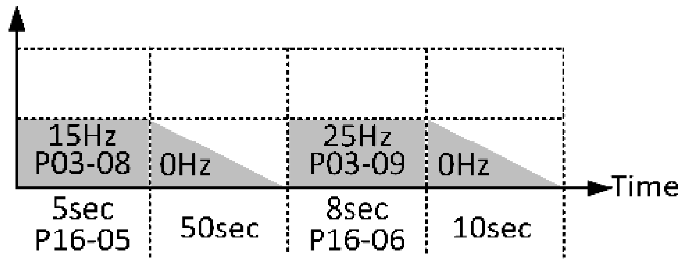
Time	0 (P16-05)	to	15 (P16-20)
Multi-stage speed	0 (P03-08)	to	15 (P03-23)

0	Automatic operation mode is invalid
1	Automatically run for N cycles and then stop
When the operation cycle reaches the setting of P16-22, the operation stops.	
2	Automatic operation cycle operation
Continuous cycle operation.	
3	Automatically run for N cycles and then stop (as deceleration interval)

🕮 When the operation cycle reaches the setting of P16-22, the operation stops.
🕮 Deceleration interval: The previous stage decelerates to 0Hz before executing the next stage.

For example:
P16-05 = 5sec, P03-08 = 15Hz, Acceleration/Deceleration time (1/50) sec
P16-06 = 8sec, P03-09 = 25Hz, Acceleration/Deceleration time (2/10) sec

It accelerates to 15Hz in 1sec, runs for 5sec, then decelerates to 0Hz in 50sec, then accelerates to 25Hz in 2sec, runs for 8.0sec, then decelerates to 0Hz in 10sec.

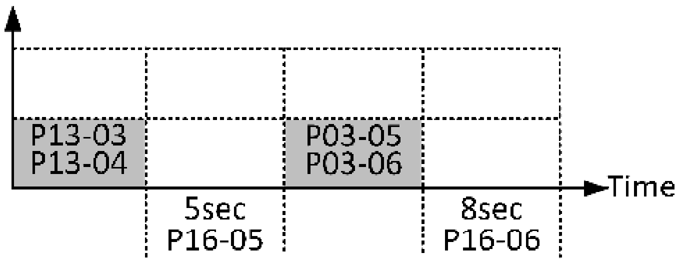


4	Automatic operation cycle operation (as deceleration interval)

🕮 Continuous cycle operation.
🕮 Refer to item 3 for the deceleration interval description.

◎ Items 5–8 are Position control mode.
◎ One operation cycle is from 0 (P16-05) to 15 (P16-20).

Time	0 (P16-05)	to	15 (P16-20)
Revolution	0 (P13-03)		15 (P13-33)
Pulse	0 (P13-04)		15 (P13-34)

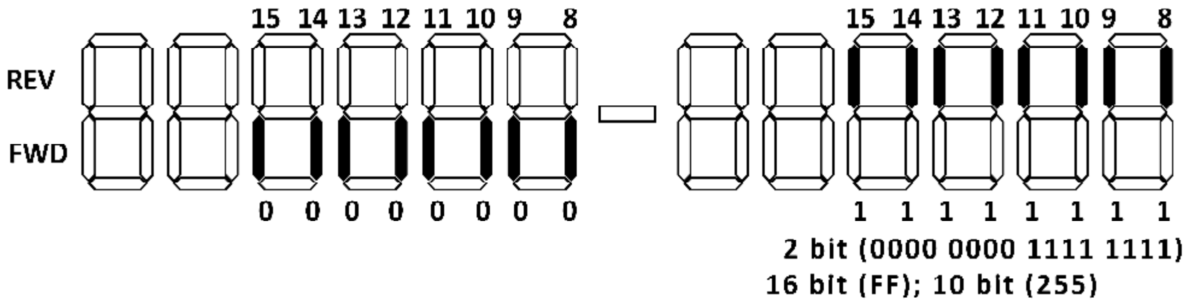
<table>
<tr><td>5</td><td>Automatically run for N cycles and then stop</td></tr>
<tr><td colspan="2">When the operation cycle reaches the setting of P16-22, the operation stops.</td></tr>
<tr><td>6</td><td>Automatic operation and cyclic operation</td></tr>
<tr><td colspan="2">Continuous cycle operation.</td></tr>
<tr><td>7</td><td>Automatically run for N cycles and then stop (The time will be counted when you reach the designated point)</td></tr>
<tr><td colspan="2">🕮 When the operation cycle reaches the setting of P16-22, the operation stops.
🕮 Timing starts only when reaching a fixed point, set in P16-21.
For example:
P16-05 = 5sec, P16-06 = 8sec
After the P13-03/04 position operation is completed, wait for 5 seconds, then execute the P13-05/06 position command, and wait for 8 seconds after completion.

</td></tr>
<tr><td>8</td><td>Automatic operation and cyclic operation (The time will be counted when you reach the designated point)</td></tr>
<tr><td colspan="2">🕮 Continuous cycle operation.
🕮 The time is counted when the fixed point is reached. Please refer to item 7 for instructions.</td></tr>
</table>

NO./Hex	Item	Range	Default
P16-01 200H	Restart mode after abnormal programming operation	0–1	0

0	Restart
After the inverter releases the abnormal signal, P16-05 restarts the cycle.	
1	Continue the last speed and time
After the inverter releases the abnormal signal, it continues to operate automatically at the last speed (position).	

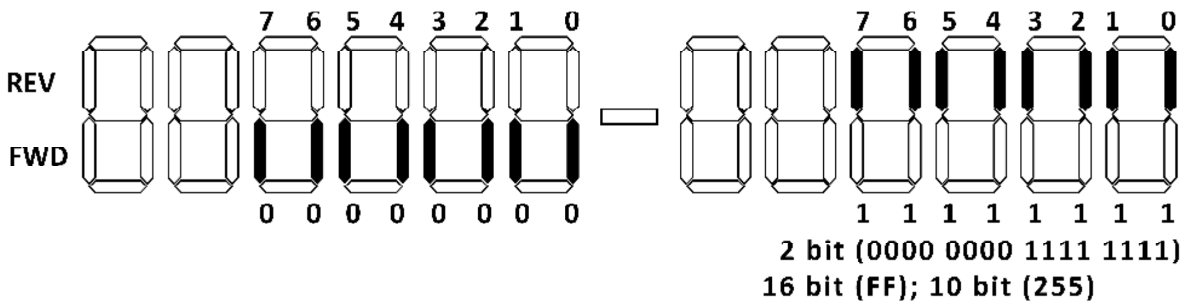
NO./Hex	Item	Range	Default
P16-02 201H	Program running direction setting H byte	0–255	0

◎ Execute step frequency command P03-16 (8) to P03-23 (15) for automatic operation, and set the required forward and reverse direction.



NO./Hex	Item	Range	Default
P16-03 202H	Program running direction setting L byte	0–255	0

◎ Execute step frequency command P03-08 (0) to P03-15 (7) for automatic operation, and set the required forward and reverse direction.



NO./Hex	Item	Range	Default
P16-04 203H	Running time unit	0–1	0

0	0.1sec
1	1.0sec

NO./Hex	Item	Range	Default
P16-05 204H	0th stage running time setting	0.0–6000.0sec 0–60000	0.0
P16-06 205H	1st stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-07 206H	2nd stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-08 207H	3rd stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-09 208H	4th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-10 209H	5th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-11 20AH	6th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-12 20BH	7th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-13 20CH	8th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-14 20DH	9th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-15 20EH	10th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-16 20FH	11th stagerun time setting	0.0–6000.0sec 0–60000	0.0
P16-17 210H	12th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-18 211H	13th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-19 212H	14th stage run time setting	0.0–6000.0sec 0–60000	0.0
P16-20 213H	15th stage run time setting	0.0–6000.0sec 0–60000	0.0

◎ Automatic operation (P03-08 to P03-23) (P13-03 to P013-34) time setting.
◎ When set to 0.0, the operation of this stage will not work.

NO./Hex	Item	Range	Default
P16-21 214H	Position arrival timing selection	0–1	0

◎ Applicable parameter P16-00 = 7, 8.

0	Position command reached
1	Position feedback reached

NO./Hex	Item	Range	Default
P16-22 215H	Automatic operation cycle number setting	1–9999	1

◎ P16-00 = 1, 3, 5, 7.

P17 Abnormality record parameter group			
NO./Hex	Item	Range	Default
P17-00 216H	Number of abnormal restarts	0–10 times	0

◎ When an abnormal fault trip occurs during operation, during the control operation of the entire system, when automatic abnormal reset and restart are allowed, the number of abnormal restart permitted can be set by this parameter.

WARNING	**WARNING** Abnormal restart When this function is set and used, it will automatically return and restart abnormally, which may cause danger to the operator. Please be sure to carefully evaluate the use settings.

NO./Hex	Item	Range	Default
P17-01 217H	Abnormal restart waiting time	0.00–60.00sec	5.00

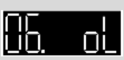
◎ It is the time between the occurrence of the abnormal alarm and the reset of the inverter, which is called the waiting time for abnormal restart.

NO./Hex	Item	Range	Default
P17-02 218H	Abnormal restart method	0–1	0

0	Start from 0Hz
1	Flying re-start
Restart mode, please refer to the description of parameter P02-04.	

NO./Hex	Item	Range	Default
P17-03 219H	Latest abnormality record	0–60	0
P17-04 21AH	Last abnormality record	0–60	0
P17-05 21BH	Last 2 abnormality record	0–60	0
P17-06 21CH	Last 3 abnormality record	0–60	0
P17-07 21DH	Last 4 abnormality record	0–60	0
P17-08 21EH	Last 5 abnormality record	0–60	0
P17-09 21FH	Last 6 abnormality record	0–60	0
P17-10 220H	Last 7 abnormality record	0–60	0

A: Abnormal reason / **T:** Troubleshoot method

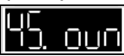
Error code		Description
00		No abnormality
01. rLEr		Before operation, the DC voltage is too low
A	1. The DC voltage is too low when the operation command is activated.	
T	1. Check whether the input voltage is normal.	
02. Lu		DC voltage is too low (Vdc < P09-01)
A	1. The power system capacity is insufficient, and the voltage drop is too large. 2. The DC voltage of the main circuit of the inverter < P09-01 setting. 3. Check whether the load is suddenly overloaded.	
T	1. Check whether the input power voltage is normal. 2. Check the setting value of parameter P09-01. 3. Check whether the power supply capacity is too small.	
03. ocA		Overcurrent during acceleration, more than twice the rated current value
A	1. The output terminal of the inverter is short-circuited, loosened or grounded. 2. The motor capacity is much larger than the inverter capacity. 3. The acceleration time is too short.	
T	1. Check whether the output terminal wiring is correct. 2. Check whether the capacity of the motor and the inverter match. 3. Extend the acceleration time.	
04. ocd		Overcurrent during deceleration, more than twice the rated current value
A	1. The motor capacity is much larger than the inverter capacity. 2. The deceleration time is too short.	
T	1. Check whether the capacity of the motor and the inverter match. 2. Extend the deceleration time.	
05. ocn		Over current in constant speed, more than twice the rated current value
A	1. The power supply changes instantly. 2. The motor capacity is much larger than the inverter capacity. 3. Impact load, the current changes drastically.	
T	1. Install a reactor on the power input side. 2. Check whether the capacity of the motor and the inverter match. 3. Reduce the load or increase the inverter capacity.	
06. oL		Inverter overload HD (current > 150%, time > 60sec) Inverter overload ND (current > 120%, time > 60sec)
A	1. The motor capacity is greater than the inverter capacity. 2. The inverter has been overloaded for a long time.	
T	1. Increase the inverter capacity. 2. Reduce the motor load.	

Error code	Description
07. oL1	Motor overload 1 (Electronic thermal relay action)
A	1. The motor rated current setting is bad. 2. The motor has been overloaded for a long time. 3. Improper setting of electronic thermal relay parameters.
T	1. Set the motor rated current correctly. 2. Reduce the motor load or increase the motor and inverter capacity. 3. Check the parameter settings of the electronic thermal relay function (P09-07 to P09-10).
08. oL2	Motor overload 2 (Current > P09-15, and time > P09-16)
A	1. The mechanical load over torque is abnormal.
T	1. Check whether the load mechanical action is normal. 2. Set proper over torque parameters (P09-15, P09-16).
09. Hoc1	Three-phase output detection overcurrent
A	1. The output terminal of the inverter is short-circuited, loosened or grounded. 2. The motor capacity is much larger than the inverter capacity. 3. Impact load, the current changes drastically.
T	1. Check whether the output terminal wiring is correct. 2. Check whether the capacity of the motor and the inverter match. 3. Reduce the load.
10. Hoc2	Reserved
A	
T	
11. Hoc3	IPM/Sc detection over current protection
A	1. The output current of the power crystal exceeds 200%. 2. Short circuit on the load side.
T	1. Check whether the motor is overloaded. 2. Check the wiring.
12. Hou	Vdc detection over voltage 200V (410Vdc) / 400V (820Vdc)
A	1. The power input voltage is too high. 2. The deceleration time is too short. 3. Surge voltage is generated.
T	1. Confirm whether the input power voltage is normal. 2. Extend the deceleration time or install a braking resistor. 3. Install AC reactor on the input side of the inverter.
13. EF	External abnormal
A	1. Input external abnormality from the terminal.
T	1. Troubleshoot the cause of the external abnormality, press the reset button, if it is invalid, then send to factory for repair

Error code	Description
14. ocbE	Three-phase output current unbalance > P09-22, and time > 32/fe
A	1. Three-phase output current unbalance > P09-22, and time > 32/fe (fe = Current output frequency).
T	1. Check whether the wiring from the output side to the motor is correct. 2. Check the current unbalance detection level setting (P09-22).
15. AutF	Automatic parameter detection failed
A	1. The basic parameters of the motor are set incorrectly. 2. The load inertia is too large. 3. Wiring error.
T	1. Set the parameters according to the motor nameplate. 2. Extend the acceleration and deceleration time (P01-09, P01-10). 3. Check whether the motor connection line is correct.
16. ct1E	U-phase output side abnormal or CT failure
17. ct2E	V-phase output side abnormal or CT failure
18. ct3E	W-phase output side abnormal or CT failure
A	1. The wiring from the output side to the motor is loose. 2. The signal cable of the current sensor is loose. 3. The current sensor U/ V/ W phase is abnormal.
T	1. Check the wiring from the output terminal of the inverter to the motor. 2. Check the cable, re-plug the cable. 3. Return to the original factory for maintenance.
19. ErP0	Parameter reading is abnormal
A	1. Abnormal reading of internal memory data.
T	1. The parameter setting value is out of range, reset the parameter (P01-02) to factory setting, if invalid, send it to the factory for repair.
20. ErP1	Parameter setting error 1
A	1. The parameter P07-03 to P07-12 set value, repeat the setting.
T	1. Check whether the parameters P07-03 to P07-12 are set repeatedly.
21. ErP2	Parameter setting error 2
A	1. The parameter P10-02, 04, 06, 08, 10 is set incorrectly.
T	1. Check if the IM1 output voltage setting is wrong.
22. ErP3	Parameter setting error 3
A	1. The parameter P11-02, 04, 06, 08, 10 is set incorrectly.
T	1. Check if the IM2 output voltage setting is wrong.
23. conF	RS485 transmission abnormal
A	1. The RS485 communication parameters are not set properly. 2. The RS485 wiring is improper. 3. The RS485 transmission format is wrong. 4. The wiring is too long and noise interference.
T	1. Check the RS485 communication parameter settings. 2. Check the RS485 wiring. 3. Check the load resistance setting. 4. Strengthen the prevention of noise interference and use dedicated communication cables

Error code	Description
24. Acio	ACI (4–20mA) disconnected
A	1. The analog signal ACI terminal is broken.
T	1. Check the ACI wiring circuit. 2. Check whether the ACI signal is less than 4mA.
25. tPEr	Parameters cannot be copied for different models
A	1. The inverter's rated voltage and capacity are different, and the parameters cannot be copied. 2. The parameters copied to the control board are blank data.
T	1. It is only suitable for the same model to copy parameters. 2. First save the parameters to the specified location (P01-02), and then copy them to the control board.
26. PGE	PG setting error
A	1. PG selection setting is wrong. 2. Improper PG wiring.
T	1. Check the PG model and reset the parameters (P01-31 to P01-33). 2. Check the PG wiring.
27. Pgo	PG disconnection detection
A	1. PG wiring is wrong. 2. The PG power supply disappears.
T	1. Check the PG wiring.
28. oS	Over speed (P09-31 to P09-33)
A	1. Motor speed > P09-32 (Over speed level), and > P09-33 (Over speed degree delay detection time).
T	1. Check whether the parameter settings of P09-32 and P09-33 are correct. 2. Check whether the PI gain and acceleration/deceleration settings are appropriate.
29. oES	Speed deviation is too large (P09-34 to P09-36)
A	1. Excessive load. 2. The load is locked (Such as brake mechanism action). 3. The parameter setting of P09-35 and P09-36 is wrong. 4. The acceleration/deceleration time is too short.
T	1. Check the mechanical load. 2. Check whether the brake mechanism is working. 3. Check whether the settings of P09-35 and P09-36 are correct. 4. Extend the acceleration/deceleration time.
30. oH0	Inverter overheating forecast (Internal temperature > (P09-25 – 5.0°C))
A	1. The ambient temperature is too high. 2. The cooling fan is faulty. 3. The blockage of fan filter or air duct.
T	1. Check the ventilation of the surrounding environment and reduce the temperature. 2. Check whether the fan, filter, heat sink and air duct are normal.
31. oH1	External overheat detection (Di input terminal overheat detection)
A	1. Digital input terminal for receiving external overheating warning.
T	1. Check whether the external input system condition is active.

Error code		Description
32. oH2		Inverter overheating (Internal heat sink temperature > P09-25)
A		1. The ambient temperature is too high. 2. The cooling fan is faulty or the filter or air duct is blocked by foreign matter. 3. Whether the setting value of parameter P09-25 is too low.
T		1. Check the ventilation of the surrounding environment and reduce the temperature. 2. Check whether the fan, filter, heat sink and air duct are normal. 3. Please check the setting value of parameter P09-25.
33. oH3		PT100 overheating (AUX input terminal P09-26)
A		1. The input terminal receives an external overheating warning. 2. P09-26 parameter setting error.
T		1. Check external conditions. 2. Check whether the parameter setting of P09-26 is correct.
34. FbF		Loss of PID feedback signal (P14-23 to P14-25)
A		1. PID feedback signal < P14-23 and time > P14-24, PID feedback signal loss is detected.
T		1. Check whether the settings of P14-23 and P14-25 are reasonable. 2. Check whether the sensor is abnormal or disconnected.
35. Fbu		PID feedback over-value detection (P14-26 to P14-28)
A		1. PID feedback signal > P14-26, and time > P14-27, PID feedback over-value detection.
T		1. Check whether the settings of P14-26 and P14-28 are reasonable. 2. Check whether the sensor is abnormal or the wiring is wrong.
36. FbEF		PID deviation over-value detection (P14-29 to P14-31)
A		1. PID deviation signal > P14-29, and time > P14-30, PID deviation over value detection.
T		1. Check whether the settings of P14-29 and P14-30 are reasonable. 2. Check whether the sensor is abnormal or the wiring is wrong.
37. oS1		Torque control overspeed trip
A		1. In torque control mode, the running speed exceeds the setting of P10-58, P11-58.
T		1. Check whether the parameter settings of P09-35 and P09-36 are correct. 2. Reset P10-58, P11-58.
38. LL		Low torque detection (P09-11 to P09-13)
A		1. Low torque detection of mechanical load: output current < P09-12, and when time > P09-13.
T		1. The mechanical load is suddenly reduced. (For example, the belt is broken). 2. Check whether the settings of P09-11 and P09-13 are reasonable.
39. nAut		Motor electrical parameters are not detected, vector control cannot be performed
A		1. The electrical parameters of the motor are not detected and vector control cannot be performed.
T		1. Please perform motor electrical parameter test (P01-07).
40. PF		Input power is out of phase or voltage too low
A		1. The wiring breaker or electromagnetic contactor has poor conduction. 2. The wiring terminals of the input power supply are loose. 3. The voltage of the input power supply fluctuates too much.
T		1. Check the cause, take countermeasures, and perform power recovery.

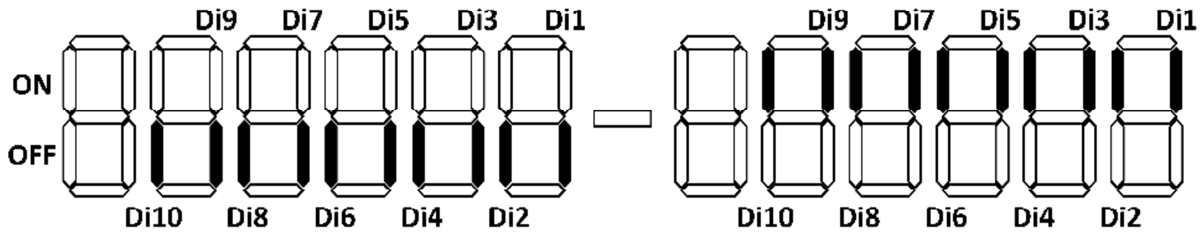
Error code		Description
41. EPE0		Memory read error (EEPROM read error)
A	1. Abnormal reading of internal memory data.	
T	1. Reset the parameter (P01-02) to the factory setting, if it is invalid, send factory maintenance.	
42. EPE1		Memory write error (EEPROM write error)
A	1. Abnormal writing of internal memory data.	
T	1. Reset the parameter (P01-02) to the factory setting, if it is invalid, send factory maintenance.	
43. ouA		Overvoltage during acceleration: Vdc > (410/820V)
A	1. Whether it is started when the motor is idling (it is easy to cause overvoltage or over current). 2. Poor motor insulation causes leakage.	
T	1. Please set (P02-04) = 1: Flying Re-start. Or start previous braking mode (P02-05, P02-06). 2. Check the motor insulation.	
44. oud		Overvoltage during deceleration: Vdc > (410/820V)
A	1. Whether the deceleration time is too short, it is easy to cause overvoltage.	
T	1. Properly extend the deceleration time or install a braking resistor.	
45. oun		Overvoltage in constant speed: Vdc > (410/820V)
A	1. Whether the motor is dragged by external force. 2. Whether the load changes sharply.	
T	1. Improve the system and eliminate the source of external force. 2. Make the load gentler.	
46. ErP4		Parameter setting error 4
A	1. Parameter (P13-38 to P13-42) software left and right limit setting error.	
T	1. Check whether the settings of P13-38 to P13-42 are correct.	
47. LP		Abnormality was detected at low water pressure
A	1. Low water pressure detection recovery times > P15-10 setting value, output pressure < P15-07, and time > P15-08.	
T	1. Please check whether the water source is short of water, whether the water pipe is broken or stressed Detector failure.	
48. StoP		Long press the “STOP” button for more than 5 seconds (StoP)
A	1. Long press the “STOP” button for more than 5 seconds to display abnormal fault (48.StoP).	
T	1. When the virtual Di and virtual Do functions are set improperly, make the inverter. When the control fails, press and hold the “STOP” button for more than 5 seconds to disable it. Then reset the appropriate virtual Di and virtual Do functions.	

Error code		Description
※The following are warnings and not abnormal		
49. Fbb		Forward limit
50. rbb		Reverse limit
A	1. Override the forward or reverse limit switch when running.	
T	1. The limit warning can be released by reverse operation .	
51. dnE		Operation prohibited
A	1. When the operation permission input terminal is disconnected.	
T	1. Check whether the digital input terminal (Di) is disconnected. (P07-03 to 12 = 1)	
52. HErr		Home not found
A	1. Multi-stage position control, execution of the return to origin action failed.	
T	1. Check whether the mechanical origin switch is abnormal. 2. Check whether the settings of P07-22 are correct.	
53. FErr		Forward limit error
54. rErr		Reverse limit error
A	1. The running direction is opposite to the limit switch	
T	1. Check whether the forward and reverse limit switches are consistent with the digital Di setting.	
55:		Reserved
A		
T		
56:		Reserved
A		
T		
57:		Reserved
A		
T		
58:		Reserved
A		
T		
59:		Reserved
A		
T		
60:		Reserved
A		
T		

- **Users can read the parameters P17-11 to P17-23 in this section to know the latest abnormal records and the corresponding frequency, current, voltage and other status information, and analyze the abnormal conditions of the frequency inverter.**

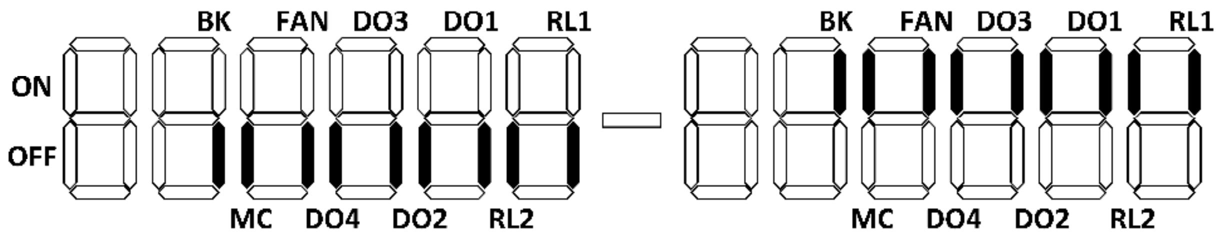
NO./Hex	Item	Range	Default
P17-11 221H	Speed command in the event of a failure	0.00–400.00Hz	0.00
P17-12 222H	Output frequency in the event of a failure	0.00–400.00Hz	0.00
P17-13 223H	Motor speed in the event of a fault	–30000 to 30000rpm	0
P17-14 224H	Output voltage in the event of a fault	0.0–1000.0V	0.0
P17-15 225H	Output current in the event of a fault	0.0–3000.0A	0.0
P17-16 226H	DC voltage in the event of a fault	0.0–1000.0V	0.0
P17-17 227H	q-axis current command in the event of a fault	–500.0 to 500.0%	0.0
P17-18 228H	q-axis current in the event of a fault	–500.0 to 500.0%	0.0
P17-19 229H	d-axis current command in the event of a fault	–500.0 to 500.0%	0.0
P17-20 22AH	d-axis current in the event of a fault	–500.0 to 500.0%	0.0

NO./Hex	Item	Range	Default
P17-21 22BH	Input terminal status in the event of a fault	0–1023	0



2 bit (0000 0011 1111 1111)
16 bit (3FF); 10 bit (1023)

NO./Hex	Item	Range	Default
P17-22 22CH	Output terminal status in the event of a fault	0–511	0



2 bit (0000 0001 1111 1111)
16 bit (1FF); 10 bit (511)

NO./Hex	Item	Range	Default
P17-23 22DH	Inverter temperature in the event of a fault	–50.0 to 150.0°C	0.0
P17-24 22EH	Cumulative of runtimes in the event of a failure	0–65535hr	0
P17-25 22FH	Cumulative running hours at the previous failure	0–65535hr	0
P17-26 230H	Cumulative running hours for the first 2 failures	0–65535hr	0
P17-27 231H	Cumulative running hours for the first 3 failures	0–65535hr	0
P17-28 232H	Cumulative running hours for the first 4 failures	0–65535hr	0
P17-29 233H	Cumulative running hours for the first 5 failures	0–65535hr	0
P17-30 234H	Cumulative running hours for the first 6 failures	0–65535hr	0
P17-31 235H	Cumulative running hours for the first 7 failures	0–65535hr	0
P17-32 236H	AD value of OC when the fault occurs	0–65535	0
P17-33 237H	AD value of VDC when the fault occurs	0–65535	0
P17-34 238H	Reserved	0–65535	0
P17-35 239H	Reserved	0–65535	0

P18 RS485 communication parameters group			
NO./Hex	Item	Range	Default
P18-00 23AH	Inverter communication address	1–254	1

◎ When the system uses RS485 serial communication interface to control or monitor, each inverter must set it's communication address and each address is "unique" and cannot be repeated.

NO./Hex	Item	Range	Default
P18-01 23BH	PC transfer rate	1.0–115.2 Kbps	9.6

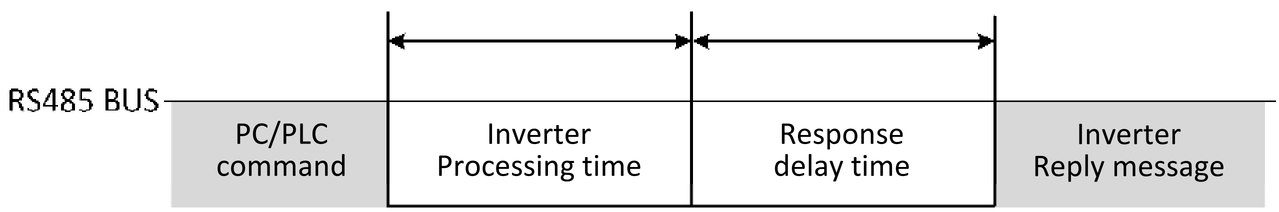
◎ This parameter is used to set the transmission rate of computer and inverter.
◎ Often field with Speed 9.6 Kbps, 19.2 Kbps, 38.4 Kbps, 57.6 Kbps, 115.2 Kbps.

NO./Hex	Item	Range	Default
P18-02 23CH	Communication data format	0–6	4

0	Modbus ASCII	7, N, 2	**3**	Modbus RTU	8, N, 2
1	Modbus ASCII	7, E, 1	**4**	Modbus RTU	8, N, 1
2	Modbus ASCII	7, O, 1	**5**	Modbus RTU	8, E, 1
			6	Modbus RTU	8, O, 1

NO./Hex	Item	Range	Default
P18-03 23DH	Inverter response time	3–50ms	5

◎ When the host computer has not completed the state transition (transmission and reception), use this parameter to delay the transmission time of the inverter.



NO./Hex	Item	Range	Default
P18-04 23EH	Transmission time-out detected	0.0–120.0sec	0.0

◎ 0.0: Detected when there is no transmission timeout.
◎ There is no operation signal and the overflow detection process is not executed.
◎ During operation, use communication to read/write the inverter. If the time exceeds the setting and there is no response, the overflow detection process is executed according to the setting of P18-05.

NO./Hex	Item	Range	Default
P18-05 23FH	Time-out detection processing method	0–3	3

◎ When the communication is abnormal and the time exceeds the setting of P18-04, the overflow detection is executed.

0	Free to stop
Inverter cuts off the output, and the motor stops running freely.	
1	Decelerate to stop
The inverter decelerates and stops.	
2	Emergency stop
Inverter according to P04-10 time the set, with Deceleration for Emergency STOP.	
3	Continue to run (Only display conF)
The operator displays 23. conF  but continues to run. In order to protect the motor and machinery from damage, usually do not use this setting.	

NO./Hex	Item	Range	Default
P18-06 240H	Receive a failed response code	0–7	0

◎ The digital operator reads this parameter to determine the communication reception failure response value.

0	None
1	The address code is wrong
2	Function code error
3	CRC/LRC code error
4	ASCII end code error
5	Parameter address error
6	The parameter value is wrong
7	Write non-modifiable parameters

NO./Hex	Item	Range	Default
P18-07 241H/★	Communication monitoring content 1 selection	0–57	3
P18-08 242H/★	Communication monitoring content 2 selection	0–57	4
P18-09 243H/★	Communication monitoring content 3 selection	0–57	5
P18-10 244H/★	Communication monitoring content 4 selection	0–57	6
P18-11 245H/★	Communication monitoring content 5 selection	0–57	20
P18-12 246H/★	Communication monitoring content 6 selection	0–57	38

◎ Set the communication code range 0 (2100H) to 57 (2139H).
◎ The host computer communication code reads 213aH (P00-01 = 52) to 213fH (P00-01 = 57).

- When the host computer needs to read the monitoring content, it is not necessary to change the communication code, just change the value of P18-07 to P18-12, which can avoid modifying the internal program of the host computer.

◎ The corresponding relationship is as follows:

No.	Content	HEX
P00-01 = 52	Communication monitoring variable 1	213a
P18-07 = XX	Communication monitoring content 1	
P00-01 = 53	Communication monitoring variable 2	213b
P18-08 = XX	Communication monitoring content 2	
P00-01 = 54	Communication monitoring variable 3	213c
P18-09 = XX	Communication monitoring content 3	
P00-01 = 55	Communication monitoring variable 4	213d
P18-10 = XX	Communication monitoring content 4	
P00-01 = 56	Communication monitoring variable 5	213e
P18-11 = XX	Communication monitoring content 5	
P00-01 = 57	Communication monitoring variable 6	213f
P18-12 = XX	Communication monitoring content 6	

For example: P18-07 = 5 (2105H: Output current)

Address	Function	Starting data register		Data Quantity		CRC (L)	CRC (L)
01	03	**21**	**3a**	00	01	0–FFh	0–FFh

NO./Hex	Item	Range	Default
P18-13 247H	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P18-14 248H	Reserved	0–65535	0

■ Communication Description

◎ The transmission mode:

ASCII mode:

Each 8-bit data consists of two ASCII characters. For example: one 1-byte data 64H (Hexadecimal notation), expressed in ASCII “64”, including ’6’ (36H) and ‘4’ (34H).

Character symbol	‘0’	‘1’	‘2’	‘3’	‘4’	‘5’	‘6’	‘7’
ASCII code	30H	31H	32H	33H	34H	35H	36H	37H

Character symbol	‘8’	‘9’	‘A’	‘B’	‘C’	‘D’	‘E’	‘F’
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

RTU mode:

Each 8-bit data consists of two 4-bit hexadecimal characters. **For example:** 64H

◎ Character format

0: Data format (7, N, 2)

10 bits (1 start bit + 7 data bits + 2 stop bit) for ASCII

START BIT	0	1	2	3	4	5	6	STOP BIT	STOP BIT

1: Data format (7, E, 1)

10 bits (1 start bit + 7 data bits + 1 Even bit + 1 stop bit) for ASCII

START BIT	0	1	2	3	4	5	6	EVEN PARITY	STOP BIT

2: Data format (7, O, 1)

10 bits (1 start bit + 7 data bits + 1 Odd bit + 1 stop bit) for ASCII

START BIT	0	1	2	3	4	5	6	Odd PARITY	STOP BIT

3: Data format (8, N, 2)

11 bits (1 start bit + 8 data bits + 2 stop bit) for RTU

START BIT	0	1	2	3	4	5	6	7	STOP BIT	STOP BIT

4: Data format (8, N, 1)

11 bits (1 start bit + 8 data bits + 1 stop bit) for RTU

START BIT	0	1	2	3	4	5	6	7	STOP BIT

5：Data format (8, E, 1)

11 bits (1 start bit + 8 data bits + 1 Even bit + 1 stop bit) for RTU

START BIT	0	1	2	3	4	5	6	7	EVEN PARITY	STOP BIT

6：Data format (8, O, 1)

11 bits (1 start bit + 8 data bits + 1 Odd bit + 1 stop bit) for RTU

START BIT	0	1	2	3	4	5	6	7	Odd PARITY	STOP BIT

◎ **Data structure (Data content is in 16-bit unsigned format)**

ASCII Mode:

STX	Start character ' : ' (3AH)
ADR 1	Communication address: The 8-bit address contains 2th ASCII codes.
ADR 0	
CMD 1	Function code: The 8-bit command contains 2th ASCII codes.
CMD 0	
DATA (n – 1)	Data content: n × 8-bit data contains 2n ASCII codes. n ≤ 25, up to 50 ASCII codes.
⋯	
DATA 0	
LRC CHK 1	Error detection value: The 8-bit error detection value contains 2th ASCII codes.
LRC CHK 0	
END 1	End character: END1 = CR (0DH), END0 = LF (0AH)
END 0	

RTU Mode:

START	Static period longer than 10ms.
ADR	Communication address: 8-bit address.
CMD	Function code: 8-bit command.
DATA (n – 1)	Data content: n × 8-bit data, n ≤ 25.
⋯	
DATA 0	
CRC CHK Low	CRC detection value: The 16-bit error detection value consists of 2th 8-bit characters.
CRC CHK High	
END	Static period longer than 10ms

◎ **Function code**

(1) 03H: Read inverter setting parameters and display parameters.

(2) 06H: Write inverter operating parameters and setting parameters.

(3) 08H: Communication loop test.

(1) Function code 03H: Read the inverter setting parameters			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	03h	Function code	03h
#Th setting parameters (H)	0xh 1xh	Data byte Number	00–80h
#Th setting parameters (L)	00–xxh	Setting parameter content 1 (H)	0–FFh
Number of data (H)	00h	Setting parameter content 1 (L)	0–FFh
Number of data (L)	00–40h	Setting parameter content··· (H)	0–FFh
CRCL	0–FFh	Setting parameter content··· (L)	0–FFh
CRCH	0–FFh	Setting parameter content n (H)	0–FFh
–	–	Setting parameter content n (L)	0–FFh
–	–	CRCL	0–FFh
–	–	CRCH	0–FFh

◎ (0xh) / (1xh) can choose either of two formats to given command.

For example: The computer asks the inverter: parameter P01-09 (0Eh) a piece of data.
Inverter reply: P01-09 (0Eh) = 10.0 = 100 (10 bit) = 64h (16 bit)

Communication format	**Computer inquiry**		Communication format	**Inverter reply**	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30 31	Communication address	01h	30 31
Function code	03h	30 33	Function code	03h	30 33
#Th setting parameter (H)	00h	30 30	Data byte number	02h	30 32
#Th setting parameter (L)	0Eh	30 45	Setting parameter content 1 (H)	00h	30 30
Number of data (H)	00h	30 30	Setting parameter content 1 (L)	64h	36 34
Number of data (L)	01h	30 31	CRCL / LRC1 CRCH / LRC0	B9h AFh	39 36
CRCL / LRC1	E5h	45	END1	–	0D
CRCH / LRC0	C9h	44	END0	–	0A
END1	–	0D	–	–	–
END0	–	0A	–	–	–

(2) Function code 03H: Read inverter to display parameters			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	03h	Function code	03h
#Th display parameters (H)	21h	Data byte Number	00–80h
#Th display parameters (L)	00–3Fh	Display parameter content 1 (H)	0–FFh
Number of data (H)	00h	Display parameter content 1 (L)	0–FFh
Number of data (L)	00–40h	Display parameter content···(H)	0–FFh
CRCL	0–FFh	Display parameter content···(L)	0–FFh
CRCH	0–FFh	Display parameter content n (H)	0–FFh
–	–	Display parameter content n (L)	0–FFh
–	–	CRCL	0–FFh
–	–	CRCH	0–FFh

◎ For the setting range, refer to parameter P00-01.

◎ 2101h in the communication monitoring content selection table is explained as follows:

Bit 15	Reserved	–
Bit 14	Reserved	–
Bit 13	Reserved	–
Bit 12	Reserved	–
Bit 11	Parameter lock	**0**
Bit 10	Operation commands are controlled by the communication interface	**0**
Bit 09	Reserved	**0**
Bit 08	Reserved	**0**
Bit 07	IM2 Motor	**0**
Bit 06	IM1 Motor	**0**
Bit 05	PM/SRM Motor	**1**
Bit 04	Reversed	**1**
Bit 03	Forward	**0**
Bit 02	Jogging	**1**
Bit 01	Stopping	**0**
Bit 00	In operation	**1**

For example:

Display the use of PM/SRM motor, Jogging, Reverse rotation, and Running, the display mode is as follows: **0000 0000 0011 0101** (2 bit), 53 (10 bit), 35 (16 bit).

For example:

The computer asks the Inverter, and three displays of parameter data: 2102–2104 Inverter reply:
2102: Setting frequency (30.00Hz) = 3000 (10 bit) = 0BB8h (16 bit)
2103: Output frequency (30.15Hz) = 3015 (10 bit) = OBC7h (16 bit)
2104: Output Voltage (68.0V) = 680 (10 bit) = 02A8h (16 bit)

Communication format	Computer inquiry		Communication format	Inverter reply	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30	Communication address	01h	30
		31			31
Function code	03h	30	Function code	03h	30
		33			33
#Th display parameter (H)	21h	32	Data byte number	06h	30
		31			36
#Th display parameter (L)	02h	30	Display parameter content 1 (H)	0Bh	30
		32			42
Number of data (H)	00h	30	Display parameter content 1 (L)	B8h	42
		30			38
Number of data (L)	03h	30	Display parameter content 2 (H)	0Bh	30
		33			42
CRCL / LRC1	AEh	44	Display parameter content 2 (L)	C7h	43
CRCH / LRC0	37h	36			37
END1	–	0D	Display parameter content 3 (H)	02h	30
END0	–	0A			32
–	–	–	Display parameter content 3 (L)	A8h	41
–	–	–			38
–	–	–	CRCL / LRC1	33h	42
–	–	–	CRCH / LRC0	12h	37
–	–	–	END1	X	0D
–	–	–	END0	X	0A

(3) Function code 06H: Write inverter operating parameters			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	06h	Function code	06h
#Th Operating parameters (H)	20h	#Th Operating parameters (H)	20h
#Th Operating parameters (L)	00h	#Th Operating parameters (L)	00h
Write the parameter content (H)		Write the parameter content (H)	
Write the parameter content (L)		Write the parameter content (L)	
CRCL	0–FFh	CRCL	0–FFh
CRCH	0–FFh	CRCH	0–FFh

◎ 2000h operation parameter setting description is as follows:

Bit	Content				
15	Reserved.				
14	1: Multi-stage position / 0: Multi-stage speed.				
Multi-stage position control and multi-stage speed control switch.					
13	Incremental position command to zero				
P13-00 = 4.					
12	Back to origin				
Multi-stage position control usage.					
11	Multi-stage position 4/Multi-stage speed selection 4				
10	Multi-stage position 3/Multi-stage speed selection 3				
09	Multi-stage position 2/Multi-stage speed selection 2				
08	Multi-stage position 1/Multi-stage speed selection 1				
Cooperate with Bit 14, 0–15 stage switch, please refer to the following description: P07-03 to 12 = 03: Multi-stage speed 1/Multi-stage position 1 P07-03 to 12 = 04: Multi-stage speed 2/Multi-stage position 2 P07-03 to 12 = 05: Multi-stage speed 3/Multi-stage position 3 P07-03 to 12 = 06: Multi-stage speed 4/Multi-stage position 4					
P07-23 = 1, Bit 08 to Bit 14 it can action.					
07	E.F. ON				
External abnormal input.					
06	Abnormal reset				
05	Running direction	0	0	1	1
04	Running direction	0	1	0	1
	–	No action	FWD	REV	Change direction
03	Reserved				
02	The pulse input or Z counter is zeroed				
01	Running command	0	0	1	1
00	Running command	0	1	0	1
	–	No action	Stop	Run	Jog running

For example:

The computer commands to make the drive jog running. (0000 0000 0001 0011b = 0013h)

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 09	Bit 08	Bit 07	Bit 06	Bit 05	Bit 04	Bit 03	Bit 02	Bit 01	Bit 00
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**

Communication format	Computer inquiry		Communication format	Inverter reply	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30	Communication address	01h	30
		31			31
Function code	06h	30	Function code	06h	30
		36			36
#Th operating parameter (H)	20h	32	#Th operating parameter (H)	20h	32
		30			30
#Th operating parameter (L)	00h	30	#Th operating parameter (L)	00h	30
		30			30
Write the parameter content (H)	00h	30	Write the parameter content (H)	00h	30
		30			30
Write the parameter content (L)	13h	31	Write the parameter content (L)	13h	31
		33			33
CRCL / LRC1	C3h	43	CRCL / LRC1	C3h	43
CRCH / LRC0	C7h	36	CRCH / LRC0	C7h	36
END1	–	0D	END1	–	0D
END0	–	0A	END0	–	0A

(4) Function code 06H: Write the drive setting parameters			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	06h	Function code	06h
#Th Setting parameters (H)	0xh **1xh (note)**	#Th Setting parameters (H)	0xh **1xh (note)**
#Th Setting parameters (L)	0–FFh	#Th Setting parameters (L)	0–FFh
Write the parameter content (H)	0–FFh	Write the parameter content (H)	0–FFh
Write the parameter content (L)	0–FFh	Write the parameter content (L)	0–FFh
CRCL	0–FFh	CRCL	0–FFh
CRCH	0–FFh	CRCH	0–FFh

◎ Through the setting parameter code (0xh) of the inverter, the parameter store to EEPROM.

※ (Note 1) Set the parameter code (1xh), and only store the parameters in RAM (after the inverter is powered off, the changed parameter content will disappear).

※ Frequent writing of parameters (0xh) will shorten the life of EEPROM. If the modified parameters do not need to be stored after the inverter is powered off, use parameter writing (1xh) as far as possible to extend the life of EEPROM.

For example:

The computer modifies the inverter setting parameter P03-08 (45h) (frequency command 0) = 50.00Hz, and stores it in EEPROM.

Communication format	**Computer inquiry**		Communication format	**Inverter reply**	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30 31	Communication address	01h	30 31
Function code	06h	30 36	Function code	06h	30 36
#Th setting parameter (H)	**0**0h	30 30	#Th setting parameter (H)	**0**0h	30 30
#Th setting parameter (L)	45h	34 35	#Th setting parameter (L)	45h	34 35
Write the parameter content (H)	13h	31 33	Write the parameter content (H)	13h	31 33
Write the parameter content (L)	88h	38 38	Write the parameter content (L)	88h	38 38
CRCL / LRC1	95h	31	CRCL / LRC1	95h	31
CRCH / LRC0	49h	39	CRCH / LRC0	49h	39
END1	–	0D	END1	–	0D
END0	–	0A	END0	–	0A

For example:

The computer modifies the inverter setting parameter P03-08 (45h) (frequency command 0) = 50.00Hz, which is not stored in EEPROM.

Communication format	Computer inquiry		Communication format	Inverter reply	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30	Communication address	01h	30
		31			31
Function code	06h	30	Function code	06h	30
		36			36
#Th setting parameter (H)	10h	31	#Th setting parameter (H)	10h	31
		30			30
#Th setting parameter (L)	45h	34	#Th setting parameter (L)	45h	34
		35			35
Write the parameter content (H)	13h	31	Write the parameter content (H)	13h	31
		33			33
Write the parameter content (L)	88h	38	Write the parameter content (L)	88h	38
		38			38
CRCL / LRC1	91h	30	CRCL / LRC1	91h	30
CRCH / LRC0	89h	39	CRCH / LRC0	89h	39
END1	–	0D	END1	–	0D
END0	–	0A	END0	–	0A

(5) Function code 06H: Write DO ※P08-00 to P08-05 = 41			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	06h	Function code	06h
#Th Setting parameters (H)	20h	#Th Setting parameters (H)	20h
#Th Setting parameters (L)	01h	#Th Setting parameters (L)	01h
Write the parameter content (H)	00h	Write the parameter content (H)	00h
Write the parameter content (L)	0–3Fh	Write the parameter content (L)	0–3Fh
CRCL	0–FFh	CRCL	0–FFh
CRCH	0–FFh	CRCH	0–FFh

Bit	Content	Remark	
Bit 15	Reserved	–	
Bit 14	Reserved	–	
Bit 13	Reserved	–	
Bit 12	Reserved	–	
Bit 11	Reserved	–	
Bit 10	Reserved	–	
Bit 09	Reserved	–	
Bit 08	Reserved	–	
Bit 07	Reserved	–	
Bit 06	Reserved	–	
Bit 05	DO4	1: DO4 action	
Bit 04	DO3	1: DO3 action	
Bit 03	DO2	1: DO2 action	
Bit 02	DO1	1: DO1/DCM short circuit	0: DO1/DCM open circuit
Bit 01	RL2	1: Ta2/Tc2 short circuit	0: Ta2/Tc2 open circuit
Bit 00	RL1	1: Ta1/Tc1 short circuit	0: Ta1/Tc1 open circuit

For example:

Command from the computer to make the inverter RL1 (P08-00 = 41) and Do1 (P08-02 = 41) action (0000 0000 0000 0101b = 5h).

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 09	Bit 08	Bit 07	Bit 06	Bit 05	Bit 04	Bit 03	Bit 02	Bit 01	Bit 00
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**

Communication format	**Computer inquiry**		Communication format	**Inverter reply**	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30	Communication address	01h	30
		31			31
Function code	06h	30	Function code	06h	30
		36			36
#Th setting parameter (H)	20h	32	#Th setting parameter (H)	20h	32
		30			30
#Th setting parameter (L)	01h	30	#Th setting parameter (L)	01h	30
		31			31
Write the parameter content (H)	00h	30	Write the parameter content (H)	00h	30
		30			30
Write the parameter content (L)	05h	30	Write the parameter content (L)	05h	30
		35			35
CRCL / LRC1	13h	44	CRCL / LRC1	13h	44
CRCH / LRC0	C9h	33	CRCH / LRC0	C9h	33
END1	–	0D	END1	–	0D
END0	–	0A	END0	–	0A

(6) Function code 06H: AO1/AO2/Pulse output setting			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	06h	Function code	06h
#Th Setting parameters (H)	20h	#Th Setting parameters (H)	20h
#Th Setting parameters (L)	02–04h	#Th Setting parameters (L)	02–04h
Write the parameter content (H)		Write the parameter content (H)	
Write the parameter content (L)		Write the parameter content (L)	
CRCL	0–FFh	CRCL	0–FFh
CRCH	0–FFh	CRCH	0–FFh

P05-27 = 23: AO1 Communication command for output					
06	20	**02**	00	00	(0: –10V)
			27	10	(10000: 0V)
			4E	20	(20000: 10V)
P05-32 = 23: AO2 Communication command for output					
06	20	**03**	00	00	(0: 0V)
			27	10	(10000: 10V)
P06-12 = 23: Pulse output communication command for output					
06	20	**04**	00	00	(0: 0.00%)
			27	10	(10000: 100.00%)

For example:

Command from the computer to make the inverter Ao1 output 5V = 15000 = (3A98h).

Communication format	Computer inquiry		Communication format	Inverter reply	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30	Communication address	01h	30
		31			31
Function code	06h	30	Function code	06h	30
		36			36
#Th setting parameter (H)	20h	32	#Th setting parameter (H)	20h	32
		30			30
#Th setting parameter (L)	02h	30	#Th setting parameter (L)	02h	30
		32			32
Write the parameter content (H)	3Ah	33	Write the parameter content (H)	3Ah	33
		41			41
Write the parameter content (L)	98h	39	Write the parameter content (L)	98h	39
		38			38
CRCL / LRC1	30h	30	CRCL / LRC1	30h	30
CRCH / LRC0	C0h	35	CRCH / LRC0	C0h	35
END1	–	0D	END1	–	0D
END0	–	0A	END0	–	0A

(7) Function code 08H: Loop detection			
A. PC call:		B. Inverter responds:	
Communication address	00–FFh	Communication address	00–FFh
Function code	08h	Function code	08h
Test data content (1)	00–FFh	Test data content (1)	00–FFh
Test data content (2)	00–FFh	Test data content (2)	00–FFh
Test data content (3)	00–FFh	Test data content (3)	00–FFh
Test data content (4)	00–FFh	Test data content (4)	00–FFh
CRCL	0–FFh	CRCL	0–FFh
CRCH	0–FFh	CRCH	0–FFh

For example:

Computer test frequency inverter communication loop circuit (08h), test data: 33h, 56h, 0Ah, BBh

Communication format	Computer inquiry		Communication format	Inverter reply	
	RTU	ASCII		RTU	ASCII
Start code	X	3A	Start code	X	3A
Communication address	01h	30	Communication address	01h	30
		31			31
Function code	08h	30	Function code	08h	30
		38			38
Test data content (1)	33h	33	Test data content (1)	33h	33
		33			33
Test data content (2)	56h	35	Test data content (2)	56h	35
		36			36
Test data content (3)	0Ah	30	Test data content (3)	0Ah	30
		41			41
Test data content (4)	BBh	42	Test data content (4)	BBh	42
		42			42
CRCL / LRC1	49h	41	CRCL / LRC1	49h	41
CRCH / LRC0	8Ch	39	CRCH / LRC0	8Ch	39
END1	–	0D	END1	–	0D
END0	–	0A	END0	–	0A

CHK (check sum: detection error value)

ASCII mode:
ASCII mode adopts LRC (Longitudinal Redundancy Check) detection error value. The LRC error detection value is the sum of ADR1 to the last data content, and the result obtained is in 256 units, and the excess part is removed (for example, if the result obtained is 128H in hexadecimal, only 28H is taken), and then the second inversion is calculated. The result obtained after compensation is the LRC error detection value.

For example:
Read 1 word from the 0401H address of the AC motor driver whose address is 01H.
01H + 03H + 04H + 01H + 00H + 01H = 0AH, the second complement of 0AH is F6H.

STX	:
ADR 1	0
ADR 0	1
CMD 1	0
CMD 0	3
Starting data address	0
	4
	0
	1
Number of data	0
	0
	0
	1
LRC CHK 1	F
LRC CHK 0	6
END 1	CR
END 0	LF

RTU mode:

RTU mode uses CRC (Cyclical Redundancy Check) error detection value, and the CRC error detection value is calculated in the following steps:

1. CRC = 0FFFFH
2. CRC = (CRC) XOR (D1)
3. Judge whether bit 0 of CRC is 1
   Yes: CRC = (CRC >> 1) XOR (0A001H)
   No: CRC = CRC >> 1
   Note: >> means right shift 1 bit, high bit complement 0
4. Repeat step 3 and make seven times (That is, perform step 3 and make eight times in total)
5. Load the next data D2
6. Repeat steps 2 to 4
7. Repeat steps 5 to 6 until all data have been executed

For example :

Read 2 words from the 2102H address of the AC motor driver whose address is 01H, and the final content of the CRC register calculated from ADR to the last byte of the data number is F76FH, then its command message As shown below, 6FH is transmitted before F7H.

ADR	01H
CMD	03H
Starting data address	21H
	02H
Number of data (Calculated in word)	00H
	02H
CRC CHK Low	6FH
CRC CHK High	F7H

P19 Memory operating parameter group before power off			
NO./Hex	Item	Range	Default
P19-00 249H	Number of automatic operation cycles at the last shutdown	1–9999	0
P19-01 24AH	Number of automatic running segments at shutdown	–1 to 15	–1
P19-02 24BH	Remaining time of the number of automatic running segments at shutdown	0–60000sec	0

◎ Before power off, it is used to record the number of cycles, stage and remaining time of the inverter performing automatic operation.

NO./Hex	Item	Range	Default
P19-03 24CH	PM last stop position (Qe: Q12)	0–25736	0
P19-04 24DH	PM last stop position (Pulse)	0–65535 Pulse	0

◎ Before power off, it is used to record the stop position of PM synchronous power before power off.

NO./Hex	Item	Range	Default
P19-05 24EH	Cumulative boot time (Hours)	0–65535hr	0
P19-06 24FH	Cumulative boot time (Seconds)	0–3599sec	0

◎ Before power off, it is used to record the accumulated time when the inverter is turned on.

NO./Hex	Item	Range	Default
P19-07 250H	Cumulative running time (Hours)	0–65535hr	0
P19-08 251H	Cumulative running time (Seconds)	0–3599sec	0

◎ Before power off, it is used to record the accumulated time when the inverter is turned on.

NO./Hex	Item	Range	Default
P19-09 252H	Monitor variable also selection backup	0–70	0

NO./Hex	Item	Range	Default
P19-10 253H	Position of anchor point at last stop (Direction)	0–1	0

◎ Before turning off the power, it is used to record the parking position of the positioning point during shutdown.

0	Positive
1	Negative

NO./Hex	Item	Range	Default
P19-11 254H	Position of last stop anchor point (Revolution)	0–60000 Rev.	0
P19-12 255H	Position of last stop location (Pulse)	0–65535 Pulse	0

◎ Before turning off the power, it is used to record the parking position of the positioning point during shutdown.

NO./Hex	Item	Range	Default
P19-13 256H	Shutdown storage and setting frequency selection	0–1	1

◎ P03-02, 03 = 0, when the frequency command is written by the digital operator (keypad) or communication, you can choose whether to store the current set frequency when the power is turned off to provide a reference for the operating frequency after the next power supply.

0	Do not remember the frequency before power off
1	Memory frequency before power off

NO./Hex	Item	Range	Default
P19-14 257H	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P19-15 258H	Reserved	0–65535	0

P20 Load mode operating parameter group			
NO./Hex	Item	Range	Default
P20-00 **259H**	Inverter model display	100–299	0

◎ The digital operator displays the inverter model (200V/L; 400V/H) and horsepower (HP).

Example: 220V/2HP, the digital operator displays L2.0 

◎ The numerical codes read in communication mode are as follows:

220V	100	101	102	103	104	105	106	107	108	109	110	111	112	113
440V	200	201	–	202	203	204	205	206	207	208	209	210	211	212
HP	0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.5	10	15	20	25	30	40

220V	114	115	116	117	118	119	120	121	122	123	–	–	–	–
440V	213	214	215	216	217	218	219	220	221	222	223	224	225	226
HP	50	60	75	100	125	150	175	215	250	300	375	420	475	500

Example: 220V/2HP, the code read in communication mode is 103.

NO./Hex	Item	Range	Default
P20-01 **25AH**	Inverter load mode	0–1	0

◎ When the load mode is re-selected and set, all parameters will be reset to factory settings.

0	Heavy duty type, HD (OL: 150% / 60sec)
1	Light load type, ND (OL: 120% / 60sec)

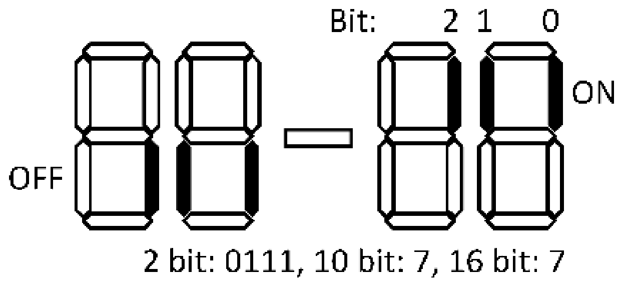
NO./Hex		NO./Hex	Item	Range	Default
P20-02 **25BH**	to	**P20-11** **264H**	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P20-12 **265H**	High frequency mode	0–1	0

0	400.00Hz
1	1200.0Hz
IM: dedicated for high-frequency V/F. Specified parameters before leaving the factory.	

NO./Hex		NO./Hex	Item	Range	Default
P20-13 **266H**	to	**P20-16** **269H**	Reserved	0–65535	0

NO./Hex	Item	Range	Default
P20-17 **26AH**	Bit 0: Current zero correction during operation Bit 1: Current feedback bandpass filter Bit 2: Estimated flux bandpass filter	0–7	0



NO./Hex	Item	Range	Default
P20-18 **26BH**	Reserved	0–65535	0
P20-19 **26CH**	Reserved	0–65535	0

P21 Reserved area for parameter function			
NO./Hex	Item	Range	Default
P21-00 **26DH**	The flow pattern enters the articulation zone pressure point	0.00–100.00%	0.00
P21-01 **26EH**	Articulation zone deceleration time	0.00–600.00sec	0.50
P21-02 **26FH**	The frequency point at which the articulation zone enters the pressure mode	–20.00 to 100.00%	50.00
P21-03 **270H**	PID maximum attenuation coefficient in pressure mode	0.00–100.00%	0.00

◎ P21-00 to P21-03, please read the parameter description of P14-00 = 5 for details.

NO./Hex	Item	Range	Default
P21-04 **271H**	Reserved		
P21-05 **272H**	Reserved		

NO./Hex	Item	Range	Default
P21-06 **273H**	Corresponding error of PID correction magnification 0	0.00 to P21-08	0.00
P21-07 **274H**	PID gain correction magnification 0	5.00–100.00%	100.00
P21-08 **275H**	PID correction magnification 1 corresponding error	0.00–100.00%	100.00
P21-09 **276H**	PID gain correction magnification 1	5.00–100.00%	100.00

◎ Please refer to P14 PID block diagram for details.

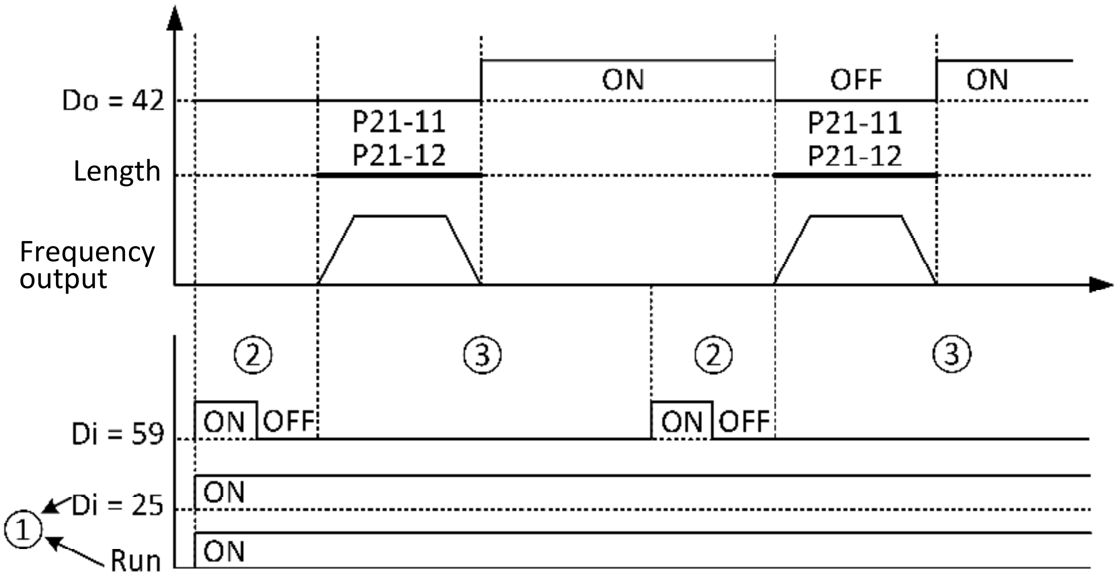
NO./Hex	Item	Range	Default
P21-10 **277H**	Reserved		

NO./Hex	Item	Range	Default
P21-11 278H/★	Target length command (integer)	0–6000cm	200
P21-12 279H/★	Target length instruction (mantissa)	0.00–0.99cm	0.00

Length control example:

P07-05 (Di3)	25: Enable length control mode
P07-06 (Di4)	59: Length calculation returns to zero (rising edge returns to zero)
P08-02 (Do1)	42: Length arrival
P00-01	Monitoring operation content selection
47: Length integer (L _ xxxx cm) 48: Length mantissa (l_ _ 0.xx cm) 49: Length (L xxxx.x cm)	

① Di3: on, operation signal starts. (Standby)
② Di4: on, off. (Length control starts)
③ Operation-->Reach target (P21-11, 12) --> Do1 (Output)--> ②
※Di4 must be on, off to execute length control.



Communication length control example:

P07-05 (Di3)	25: Enable length control mode
P08-02 (Do1)	42: Length arrival
P00-01	Monitoring operation content selection
47: Length integer (L _ xxxx cm) 48: Length mantissa (l_ _ 0.xx cm) 49: Length (L xxxx.x cm)	

① Di3: on, operation signal starts. (Standby)

② Communication write

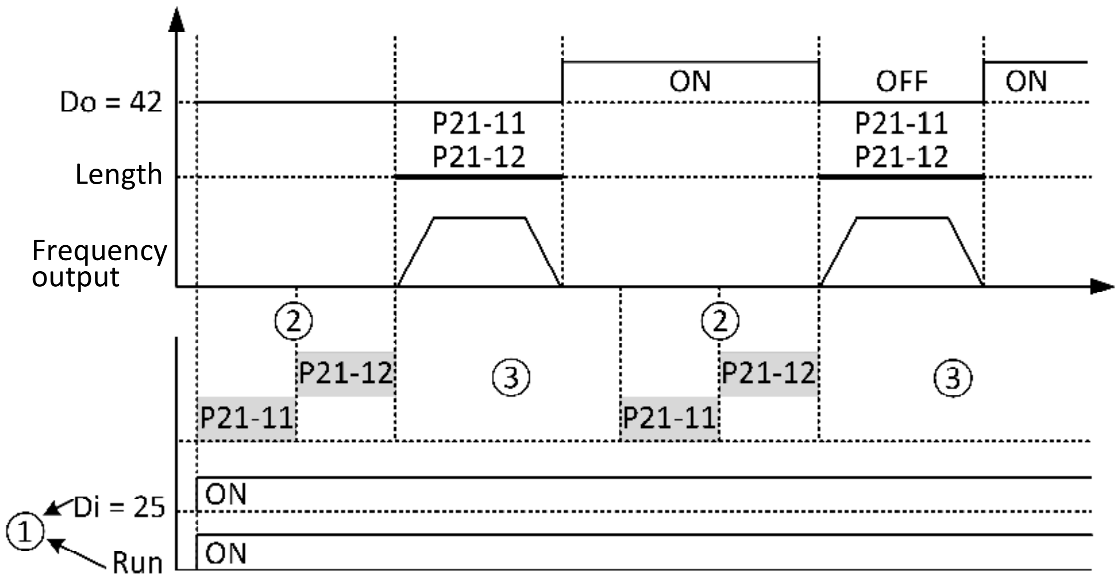
A. Not stores it in EEPROM: P21-11 (1278H) --> P21-12 (1279H)

B. Stores it in EEPROM: P21-11 (278H) --> P21-12 (279H)

③ Operation --> Reach target (P21-11, 12) -->Do1 (Output) --> ②

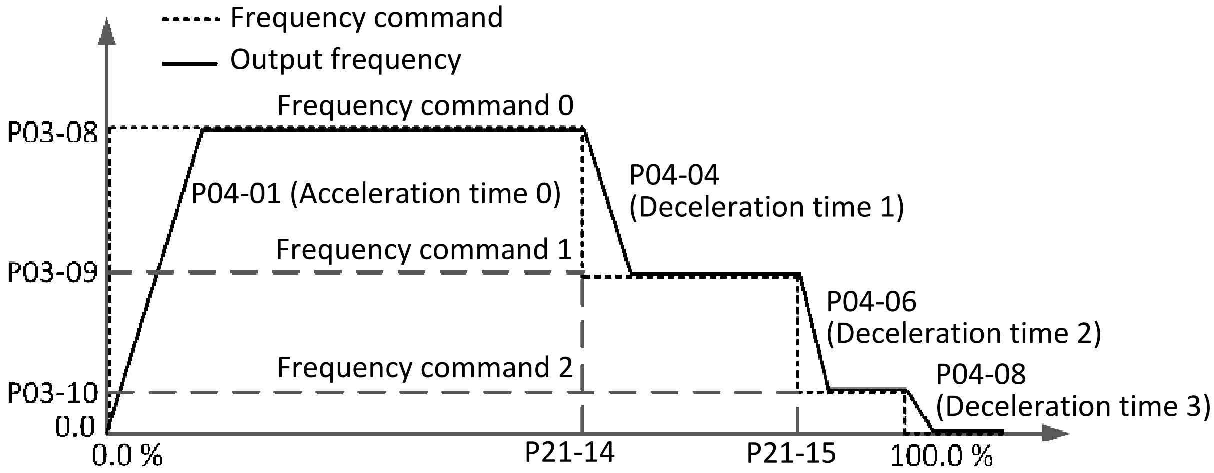
※Write P21-12 to execute the length operation and execute the length calculation zeroing action at the same time.

※If the value of P21-11 remains unchanged, just write to P21-12.

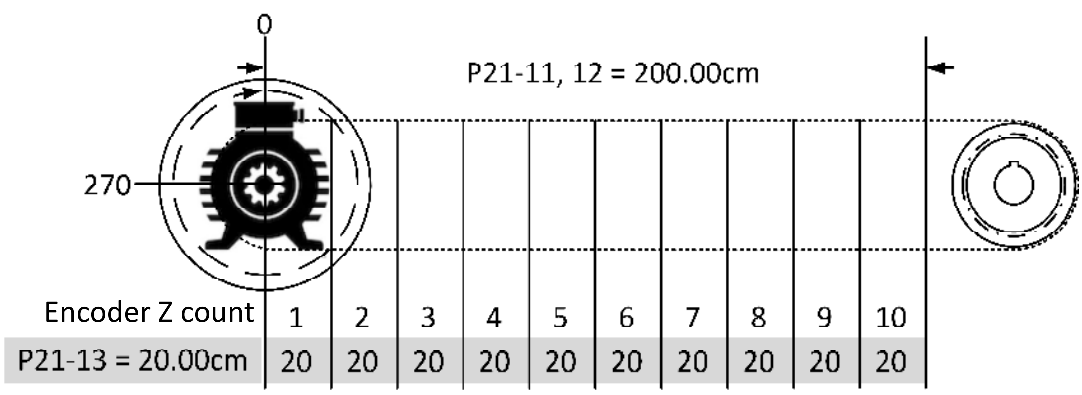


NO./Hex	Item	Range	Default
P21-13 27AH	Encoder-rotation corresponding length	0.00–200.00cm	20.00
P21-14 27BH	Length control mode frequency command 1 switching point	0.0–100.0%	95.0
P21-15 27CH	Length control mode frequency command 2 switching point	0.0–100.0%	98.0

◎ P21-11, 12.
◎ After completing P21-14 percentage based on the length of the object, use P04-04 (Deceleration time 1) to decelerate to P03-09 (Frequency command 1).
◎ After completing P21-15 percentage based on the length of the object, use P04-06 (Deceleration time 2) to decelerate to P03-10 (Frequency command 2).
◎ Run until the length is reached and decelerate to stop using P04-08 (Deceleration time 3).
◎ P21-15 setting range, 0.0% to P21-10 (Invalid); P21-10 + 0.1 to 100.0% (Effective).



Example: P21-13
1. The running length is 200.00cm (P21-11 = 200, P21-12 = 0.00)
2. The length per motor revolution is one (revolution) × 20.00cm (P21-13)
3. 10 (revolutions) × 20.00cm (P21-13) = 200.00cm (P21-11, 12)
※P00-01 = 28 (Encoder Z count)



NO./Hex	Item	Range	Default
P21-16 27DH	P00-01= 50 (average speed) calculation cycle	0–13	6

T = $2^{(P21\text{-}16 - 6)} \times 0.1$sec；6 = 0.1sec, 7 = 0.2sec …

NO./Hex	Item	Range	Default
P21-17 27EH	Reserved		
P21-18 27FH	Reserved		
P21-19 280H	Reserved		
P21-20 281H	Reserved		

NO./Hex	Item	Range	Default
P21-21 282H/★	PM/SRM magnetic field control KP gain	0.00–100.00%	10.00
P21-22 283H/★	PM/SRM magnetic field controls KI gain	0.00–100.00%	25.00

◎ In conjunction with P12-25: PM/SRM (PG) magnetic field control starting frequency (f0).

NO./Hex	Item	Range	Default
P21-23 284H	Reserved		
P21-24 285H	Reserved		
P21-25 286H	Reserved		
P21-26 287H	Reserved		
P21-27 288H	Reserved		
P21-28 289H	Reserved		
P21-29 28AH	Reserved		
P21-30 28BH	Reserved		

NO./Hex	Item	Range	Default
P21-31 28CH	IM V/F torque limit	0–1	0

◎ IM motor, V/F control, torque limit function, please refer to P10-55 parameter description for details.

0	Invalid
1	Valid

NO./Hex	Item	Range	Default
P21-32 28DH	IM V/F Acceleration and deceleration time when torque limit changes	0.00–100.00sec	2.00
P21-33 28EH/★	IM V/F Torque limit control gain	0.00–100.00%	50.00

◎ In conjunction with P21-31.

NO./Hex	Item	Range	Default
P21-34 28FH	IM motor electrical parameter detection mode	0–1	1

◎ IM motor, cooperate with P01-07 electrical parameter detection.

0	V/F mode
1	I/F mode

NO./Hex	Item	Range	Default
P21-35 290H	IM1 Closed loop control initial slip limit	0.00–20.00Hz	0.00

◎ P01-03 = 0 (IM1 induction motor)

◎ P01-04 = 2 (V/F + PG control)
3 (Vector + PG control)

◎ In order to avoid the motor speed surge caused by PG disconnection, P21-13 can be enabled to start slip limit. Before the Run signal comes in and the PG count value changes less than 10, the slip frequency is limited to the setting value of P21-13. If If the PG count value changes by more than 10, the slip frequency limit of P21-13 will be automatically released.

◎ Combined with P09-29 (PG disconnection detection selection) and P09-30 (PG disconnection detection delay time), PG disconnection detection can be performed.

NO./Hex	Item	Range	Default
P21-36 291H	Reserved		

NO./Hex	Item	Range	Default
P21-37 292H	Positioning point correction mode setting	0–1000 Pulse	0.00

◎ 0 Pulse: Instant correction.
◎ 8 to 1000 Pulse: No corrections are made within this range.

NO./Hex	Item	Range	Default
P21-38 293H	Encoder as frequency command	0–1	0

◎ Please refer to P03-00 = 8: Encoder as frequency command, parameter description for details.

0	Invalid
1	Valid

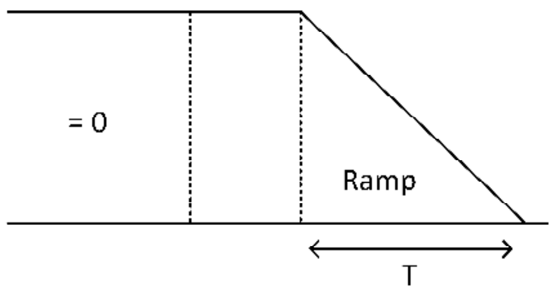
NO./Hex	Item	Range	Default
P21-39 294H	I/f & SensorLess control interval (Encoder is used as frequency command)	0–1200rpm	200
P21-40 295H	I/f & SensorLess control interval (Current)	0.00–100.00%	30.00

◎ In conjunction with P21-38.

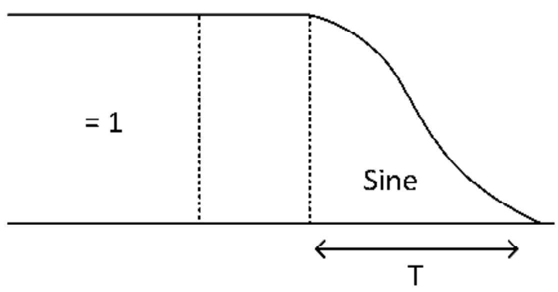
NO./Hex	Item	Range	Default
P21-41 296H	Positioning point control deceleration mode setting	0–1	0

◎ In accordance with P13 (Multi-stage position control) deceleration time.

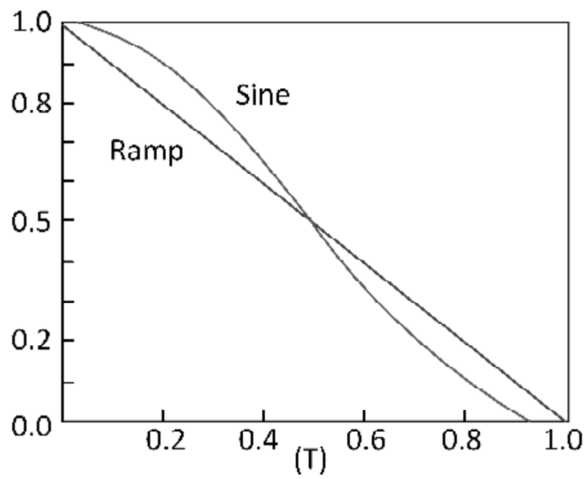
0	Ramp straight line
1	Sline curve

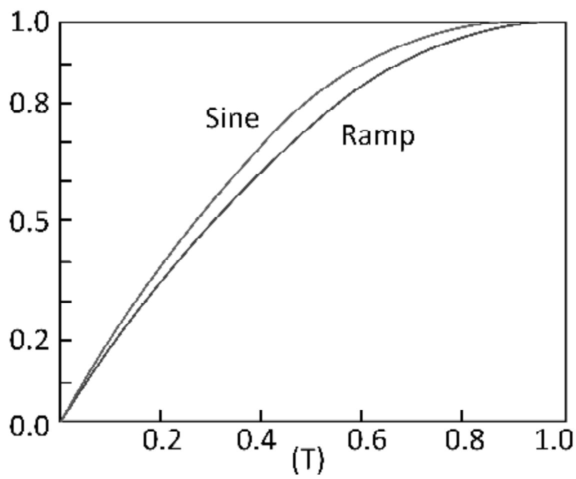


Speed change curve



Position change curve





NO./Hex	Item	Range	Default
P21-42 297H	Synchronous axis current filter setting	0.00–100.00%	0.00

◎ 0.00%: Invalid.

◎ 0.01–100.00%：$\omega_0 \times T_s$ = 1/2 to 1/20

NO./Hex	Item	Range	Default
P21-43 **298H**	Braking current build-up time	0.00–5.00sec	0.10

◎ In conjunction with P02-06, P02-13.

NO./Hex	Item	Range	Default
P21-44 **299H**	Random PWM dispersion width	0–2000Hz	0

◎ 0Hz: Invalid.
◎ 100–2000Hz: Valid.

NO./Hex	Item	Range	Default
P21-45 **29AH**	Frequency setting unit selection	0–3	0

◎ P03-07 to P03-30, set the frequency unit selection.
◎ The digital operator sets the frequency unit selection.
◎ RS485 communication mode, the unit is 0.01Hz and cannot be selected.

0	0.01Hz	
1	0.01%	
2	1rpm	
3	Unitless (P00-03, P00-04)	

Application Parameters (User Defined) – 00 to 31

P22 User modify settings or define parameters (Ur)			
NO./Hex	Item	Range	Default
P22-00 29BH	– 00	P00-00 to P21-45	0
P22-01 29CH	– 01	P00-00 to P21-45	0
P22-02 29DH	– 02	P00-00 to P21-45	0
P22-03 29EH	– 03	P00-00 to P21-45	0
P22-04 29FH	– 04	P00-00 to P21-45	0
P22-05 2A0H	– 05	P00-00 to P21-45	0
P22-06 2A1H	– 06	P00-00 to P21-45	0
P22-07 2A2H	– 07	P00-00 to P21-45	0
P22-08 2A3H	– 08	P00-00 to P21-45	0
P22-09 2A4H	– 09	P00-00 to P21-45	0
P22-10 2A5H	– 10	P00-00 to P21-45	0
P22-11 2A6H	– 11	P00-00 to P21-45	0
P22-12 2A7H	– 12	P00-00 to P21-45	0
P22-13 2A8H	– 13	P00-00 to P21-45	0
P22-14 2A9H	– 14	P00-00 to P21-45	0
P22-15 2AAH	– 15	P00-00 to P21-45	0
P22-16 2ABH	– 16	P00-00 to P21-45	0
P22-17 2ACH	– 17	P00-00 to P21-45	0
P22-18 2ADH	– 18	P00-00 to P21-45	0
P22-19 2AEH	– 19	P00-00 to P21-45	0
P22-20 2AFH	– 20	P00-00 to P21-45	0
P22-21 2B0H	– 21	P00-00 to P21-45	0
P22-22 2B1H	– 22	P00-00～P21-45	0
P22-23 2B2H	– 23	P00-00 to P21-45	0
P22-24 2B3H	– 24	P00-00 to P21-45	0

Application Parameters (User Defined) – 00 to 31

NO./Hex	Item	Range	Default
P22-25 2B4H	– 25	P00-00 to P21-45	0
P22-26 2B5H	– 26	P00-00 to P21-45	0
P22-27 2B6H	– 27	P00-00 to P21-45	0
P22-28 2B7H	– 28	P00-00 to P21-45	0
P22-29 2B8H	– 29	P00-00 to P21-45	0
P22-30 2B9H	– 30	P00-00 to P21-45	0
P22-31 2BAH	– 31	P00-00 to P21-45	0

NO./Hex	Item	Range	Default
P22-32 2BBH	User modify settings or define parameter setting mode	0–7	3

◎ Compatible with the digital Keypad operator operation process description in Chapter 5.3.
◎ You can query the parameter content from 0 to 31 through the up and down keys, and the recorded parameters are stored.
◎ Parameters written by communication will also be stored, but writing to P03-08 will not be stored.

Chapter 9 Accessories card and braking resistor

9.1 Safety precautions

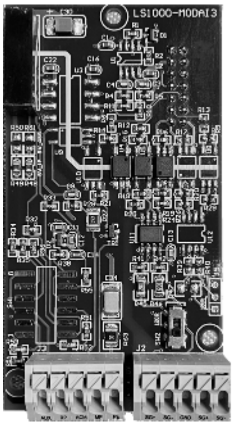
DANGER	**DANGER** To prevent electric shock, do not perform wiring work while the power is on. Otherwise, there is a danger of electric shock. Even if the power is cut off, there is still residual voltage in the capacitor inside the inverter. After cutting off the power, please wait at least 5 minutes, 15 minutes above 15HP.

WARNING	**WARNING** ☑ Do not run with the inverter cover removed, otherwise there will be a risk of electric shock. ☑ In order to illustrate the details of the product, the illustrations in this manual sometimes show the state of removing the outer cover or safety cover. Be sure to operate the inverter in accordance with the instruction manual with the specified cover or covering installed. ☑ Do not remove the cover of the inverter or touch the printed circuit board when the power is on. Otherwise, there is a danger of electric shock. ☑ Non-electrical construction professionals should not perform maintenance, inspection or replacement of parts. Otherwise, there is a danger of electric shock. ☑ Installation, wiring, repair, inspection and parts replacement should be carried out by a person who is familiar with the installation, adjustment and repair of the inverter. ☑ When wearing loose clothes or accessories, and without eye protection with goggles, please do not work on the inverter. Otherwise, there is a danger of electric shock or injury. ☑ Be sure to ground the ground terminal on the motor side. Otherwise, it may cause electric shock or fire due to contact with the motor casing. ☑ Please tighten the terminal screws according to the specified torque. If the connection of the main circuit wire is loose, it may cause a fire due to overheating of the wire connection.

Important
When operating the drive, observe the steps specified in the Electrostation Prevention Measures (ESD). Otherwise, the internal circuit of the inverter will be damaged due to static electricity. **When the inverter is outputting voltage, do not unplug the motor wiring.** Otherwise, the inverter will be damaged.

9.2 Accessories card list

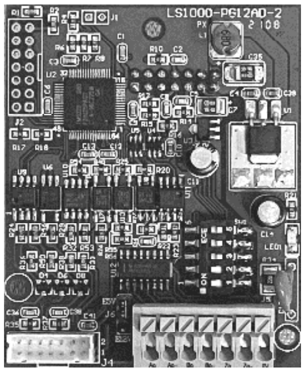
Expansion card (LS1000)



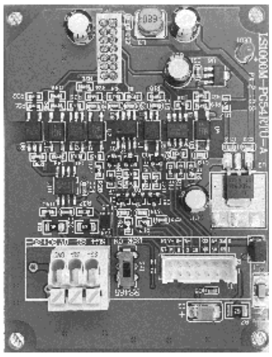
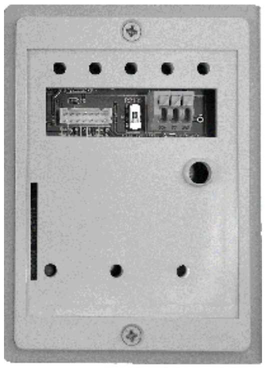
Type No.	Function
LS1000-HMOD02-A1	1. With pulse input/output.
LS1000-HMOD03-A1	1. Analog signal isolation input (AUX).
LS1000-HMOD04-A1	1. With pulse input/output. 2. Analog signal isolation input (AUX).

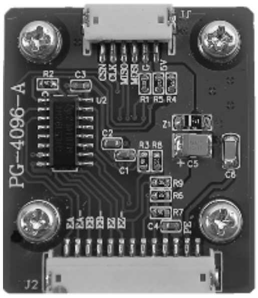
PG card (LS1000)

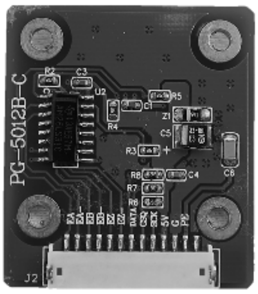
Line Driver, Push pull
3-phase pulse wave (ABZ pulse wave)
Maximum input frequency: 300KHz
Voltage output: 5V or 12V
Maximum current: 200mA
Magnetic field angle



Type No.	Function
LS1000-HPG010-A1	ABZ
LS1000-HPG011-A1	ABZ, Divide multiple 1 : 1
LS1000-HPG012-A1	ABZ, Divide multiple 1 : 32
LS1000-HPG020-A1	Magnetic encoder
LS1000-HPG021-A1	Magnetic encoder, Divide multiple 1 : 1
LS1000-HPG022-A1	Magnetic encoder, Divide multiple 1 : 32
LS1000-HPG010-B1	Magnetic encoder
LS1000-HPG011-B1	Magnetic encoder, Divide multiple 1 : 1
LS1000-HPG012-B1	Magnetic encoder, Divide multiple 1 : 32

PG card (LS1000M)	
Line Driver, Push pull 3-phase pulse wave (ABZ pulse wave) Magnetic field angle	 
Type No.	**Function**
LS1000M-HPG010-A1	Magnetic encoder

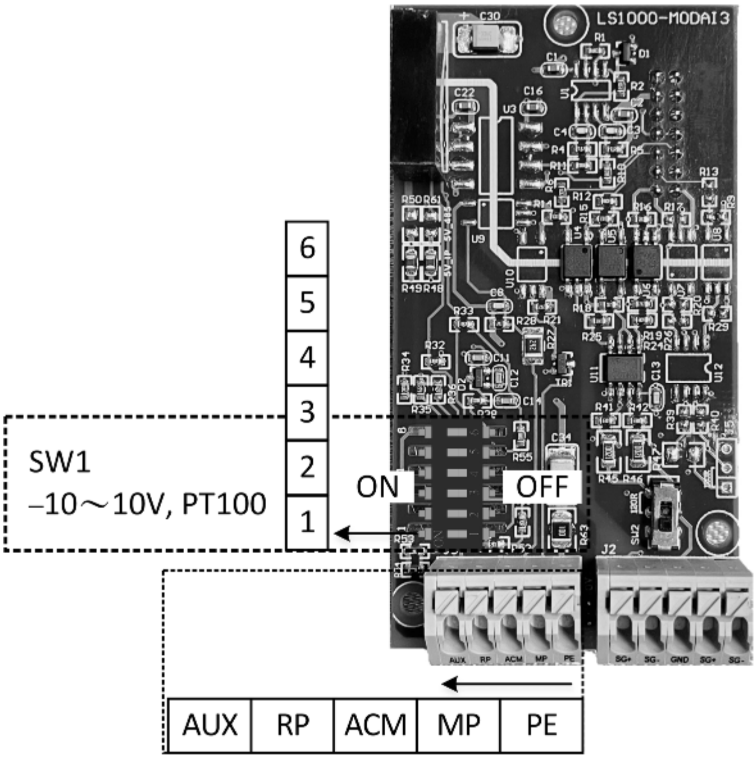


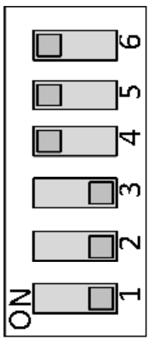
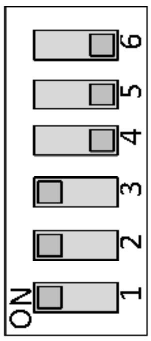


Magnetic encoder			
Type No.	**Function**	**Type No.**	**Function**
MG-H4096-A1	For Motor concave shaft	MG-H5012-A1	For Motor concave shaft
MG-H4096-A2	For Motor convex shaft	MG-H5012-A2	For Motor convex shaft
★Pre-writter software before shipment.		–	

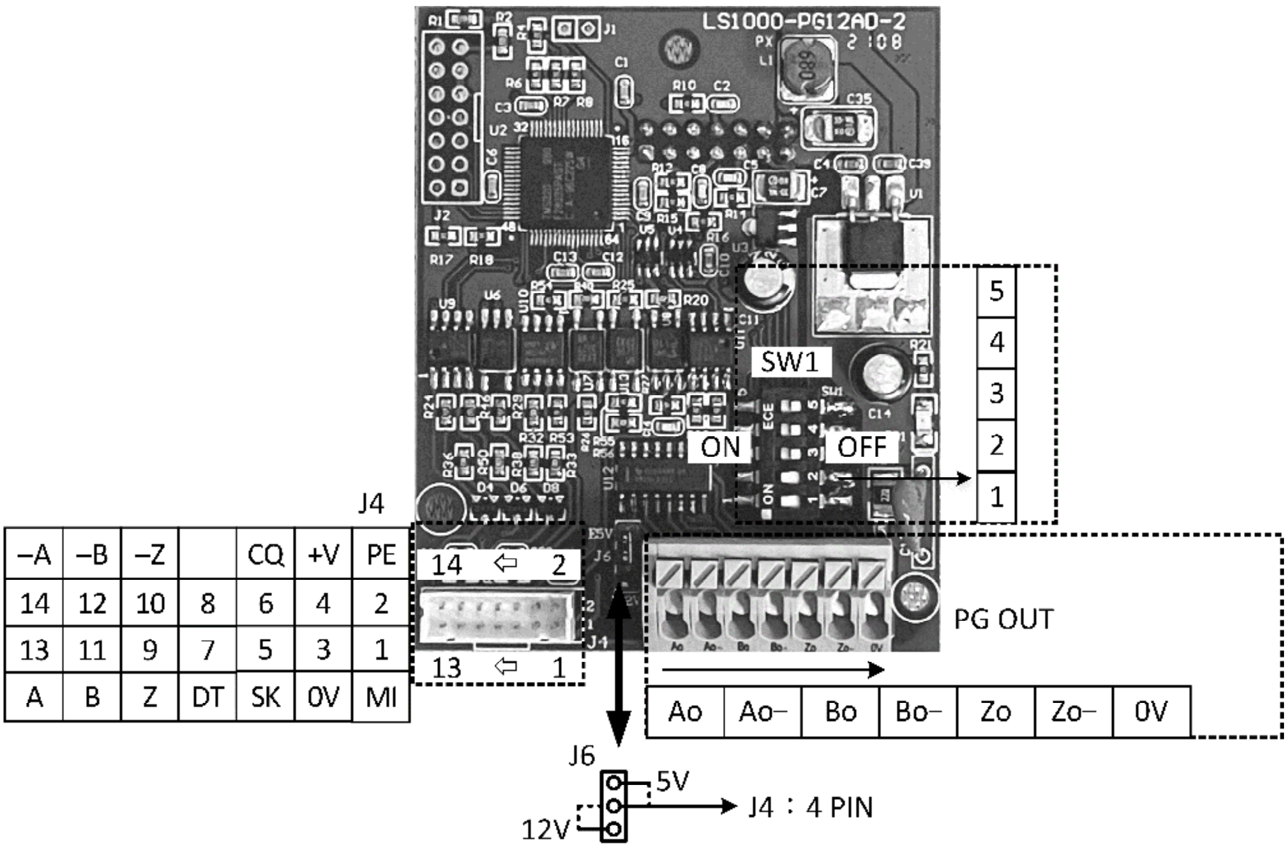
9.3 Accessory card description

Expansion card series (HMOD02-A1, HMOD03-A1, HMOD04-A1)



<table>
<tr><th colspan="3">With pulse input/output</th></tr>
<tr><td>PE</td><td colspan="2">Shield isolation ground terminal</td></tr>
<tr><td>MP</td><td colspan="2">High-speed pulse wave multi-function output setting, Single polarity output</td></tr>
<tr><td>ACM</td><td colspan="2">Analog and digital input/output signal common terminal</td></tr>
<tr><td>RP</td><td colspan="2">High-speed pulse wave multi-function input setting, Single polarity input</td></tr>
<tr><th colspan="3">Analog signal isolation input (AUX)</th></tr>
<tr><td>PE</td><td colspan="2">Shield isolation ground terminal</td></tr>
<tr><td>ACM</td><td colspan="2">Analog and digital input/output signal common terminal</td></tr>
<tr><td>AUX</td><td colspan="2">Optocoupler isolation accepts differential analog input</td></tr>
<tr><td>SW1</td><td>AUX: PT100 temperature sensor
1, 2, 3: OFF
2, 4, 6: ON
SW1
</td><td>AUX: –10 to 10V
1, 2, 3: ON
2, 4, 6: OFF
SW1
</td></tr>
</table>

PG card (LS1000)



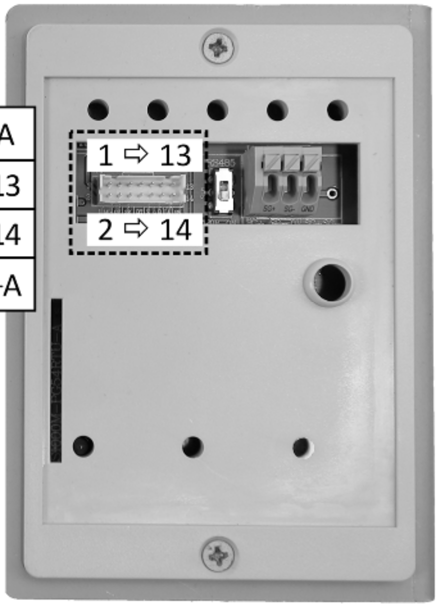
J4 Terminal definition													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
MI	PE	0V	+V	SK	CQ	DT	-	Z	–Z	B	–B	A	–A

DIP Switch	SW1 Divide frequency															
ON	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	ON	ON	ON	ON	ON	ON	ON	ON
3	-	-	-	-	ON	ON	ON	ON	-	-	-	-	ON	ON	ON	ON
2	-	-	ON	ON	-	-	ON	ON	-	-	ON	ON	-	-	ON	ON
1	-	ON	-	ON	-	ON	-	ON	-	ON	-	ON	-	ON	-	ON

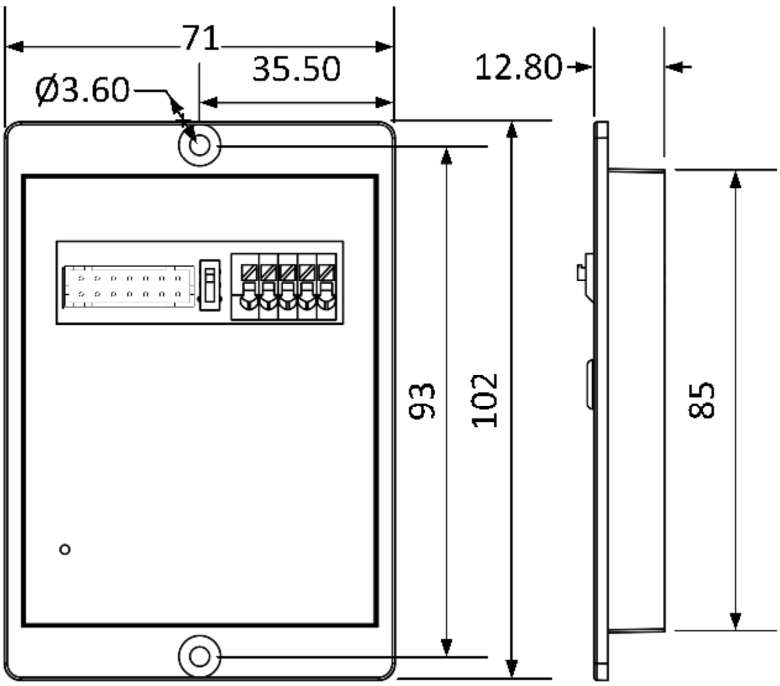
DIP Switch	SW1 Divide frequency															
ON	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
5	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
4	-	-	-	-	-	-	-	-	ON	ON	ON	ON	ON	ON	ON	ON
3	-	-	-	-	ON	ON	ON	ON	-	-	-	-	ON	ON	ON	ON
2	-	-	ON	ON	-	-	ON	ON	-	-	ON	ON	-	-	ON	ON
1	-	ON	-	ON	-	ON	-	ON	-	ON	-	ON	-	ON	-	ON

PG card (LS1000M)

MI	0V	SK	DT	Z	B	A
1	3	5	7	9	11	13
2	4	6	8	10	12	14
PE	+V	CQ		–Z	–B	–A

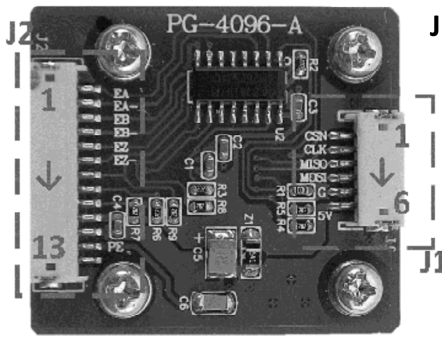


Terminal definition													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
MI	PE	0V	+V	SK	CQ	DT	-	Z	–Z	B	–B	A	–A



ENCODER (MG-H4096-A1, MG-H4096-A2)

J2	1	EA
	2	EA—
	3	EB
	4	EB—
	5	EZ
	6	EZ—
	7	DATA
	8	CSQ
	9	SCK
	10	5V
	11	GND
	12	PE
	13	MI

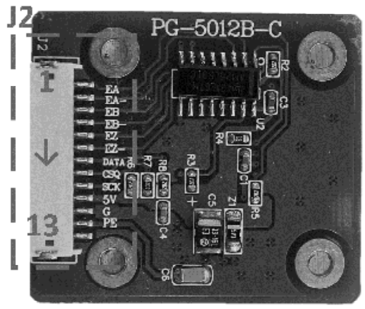


J1: Pre-writter software before shipment

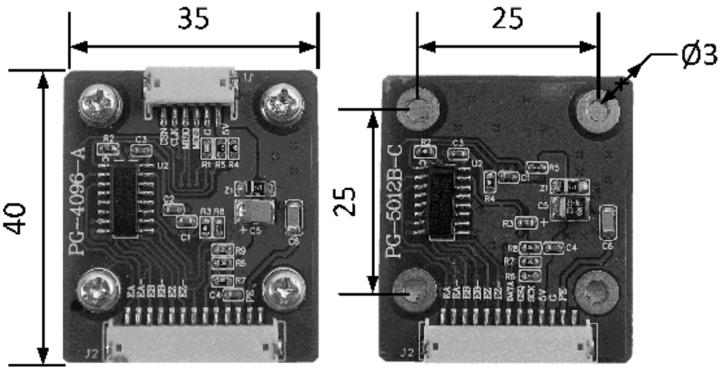
CSN	1	J1
CLK	2	
MISO	3	
MOSI	4	
GND	5	
5V	6	

ENCODER (MG-H5012-A1, MG-H5012-A2)

J2	1	EA
	2	EA—
	3	EB
	4	EB—
	5	EZ
	6	EZ—
	7	DATA
	8	CSQ
	9	SCK
	10	5V
	11	GND
	12	PE
	13	

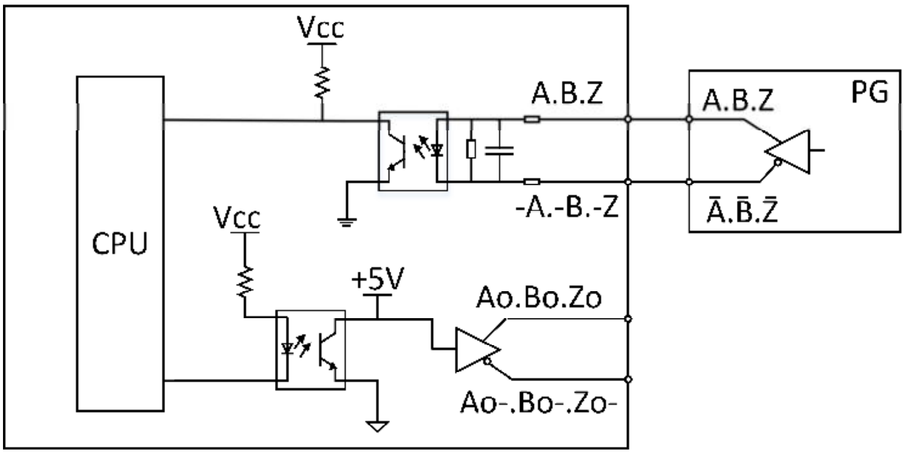


Encoder common size

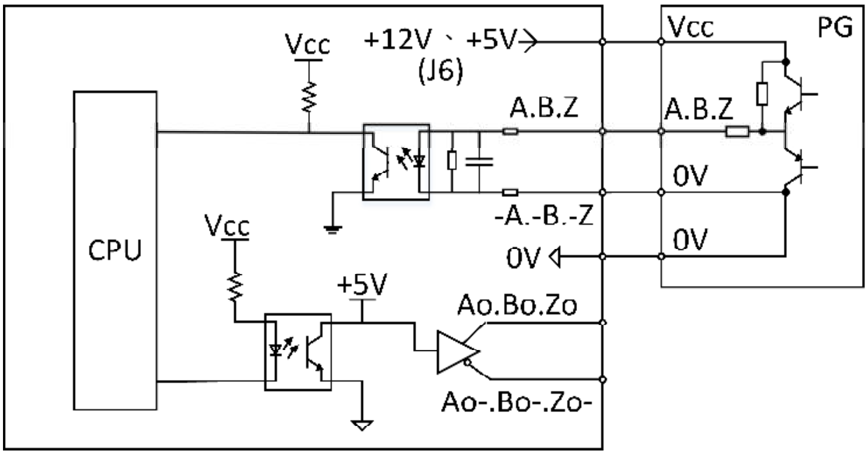


9.4 Accessory card circuit diagram

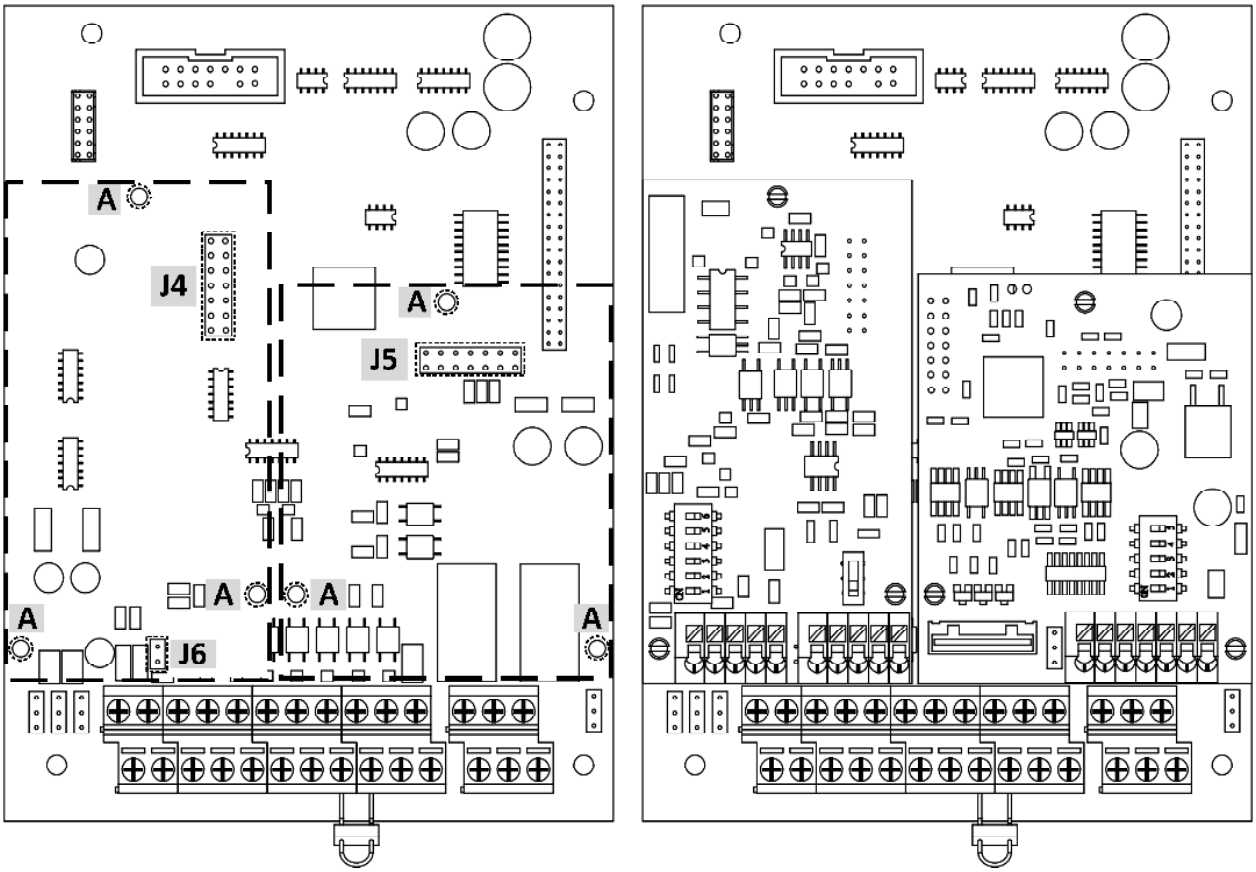
Line Driver (Recommended wiring length below 100m)



Push pull (Recommended wiring length below 50m)

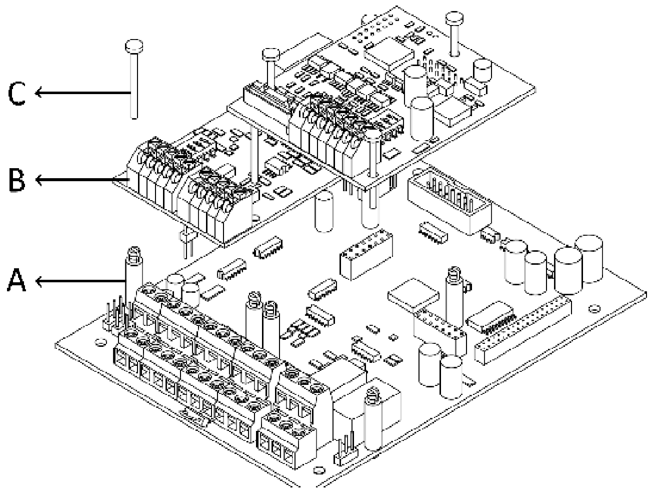


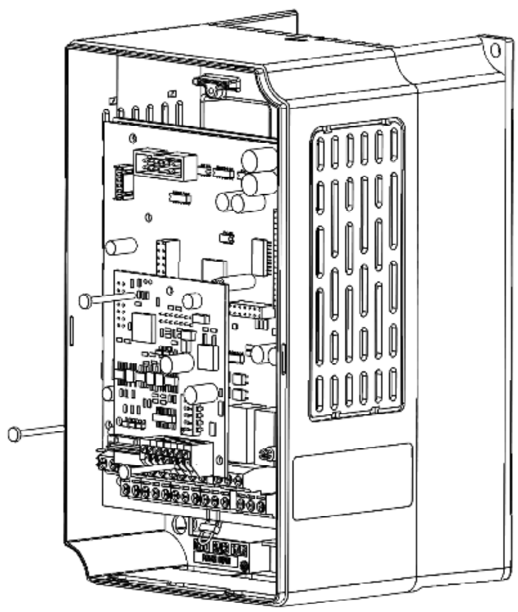
9.5 Wiring diagram and installation



◎ A: Indicates the fixing hole of the spacer, each card has 3 fixing holes.

◎ J4, J6 and J5 are the transmission pins for power and signal, which must be properly aligned to avoid damage.





◎ First insert the spacer (A), then install the accessory card (B), and finally press in the pin (C).

Connection diagram

◎ To prevent interference, be sure to use shielded cables, and do not use them side by side with wiring with a voltage above 200Vac.

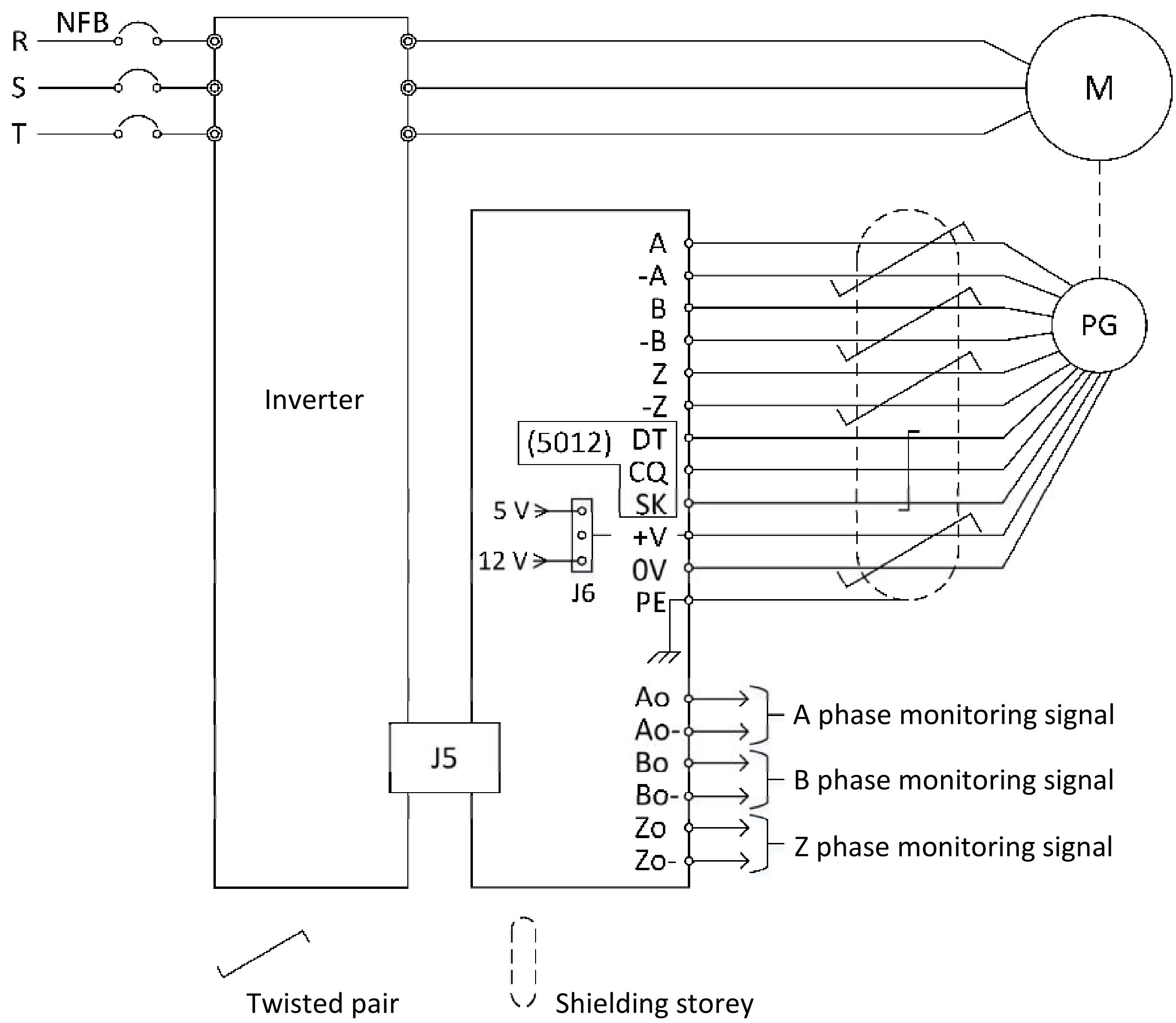
◎ Please separate the control signal line of the optional card from the main circuit line, power line, relay drive circuit and power line.

◎ The suitable wire specification is 0.21 to 0.81mm^2 (24 to 18 AWG).

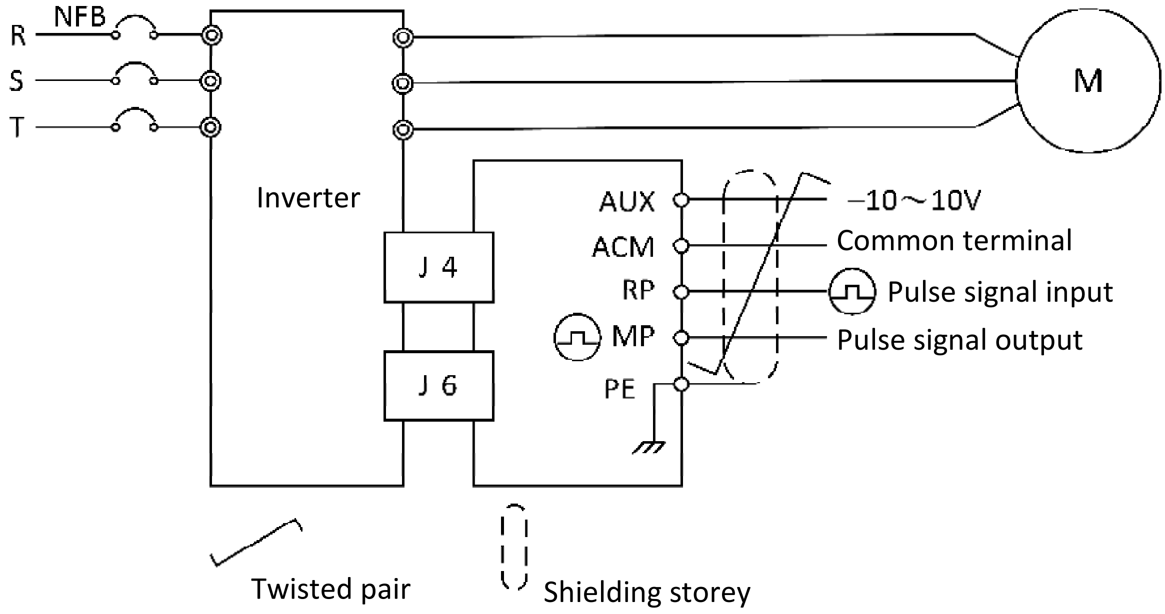
Wiring length:

PG card	Wiring length
Line Driver	100m or less
Push pull	50m or less

Wiring diagram of PG card (Feedback card) series.



Wiring diagram of Accessory card



9.6 Braking resistor selection

WARNING	WARNING **To prevent electric shock,** do not perform wiring work while the power is on. **In order to prevent high temperature,** after the braking resistor is continuously discharged, high temperature will be generated around it, which will endanger the surrounding objects. Keep away from flammable materials and keep a distance of more than 2 meters. The installation place must be ventilated or installed with a fan to help heat dissipation.

Specification sheet: 200V series

HP	KW	Equivalent resistance Specification W / Ω	Braking torque (10%ED)	Equivalent minimum resistance (Ω)	Braking resistor Unit (Module)	SET	Externally provided unit specifications	SET
0.5	0.4	150W/150Ω	225	75Ω	–	–	Included	–
1	0.75	150W/150Ω	150	75Ω	–	–		–
2	1.5	300W/100Ω	125	39Ω	–	–		–
3	2.2	500W/60Ω	140	30Ω	–	–		–
5	4.0	800W/40Ω	125	27Ω	–	–		–
7.5	5.5	1200W/25Ω	135	18Ω	DR1K5W-24	1		–
10	7.5	1500W/20Ω	125	10Ω	DR1K5W-20	1		–
15	11	2200W/13.6Ω	125	10Ω	DR3K1W-12	1		–
20△	15	3000W/10Ω	125	6.6Ω	DR3K1W-10	1	LSBR-2015B	1
25△	18.5	3700W/8Ω	125	6.6Ω	DR4K6W-8	1	LSBR-2022B	1
30△	22	4400W/6.8Ω	125	3.3Ω	DR4K6W-6.6	1	LSBR-2022B	1
40△	30	6000W/5Ω	125	3.3Ω	DR6K2W-5	1	LSBR-2015B	2
50△	37	7400W/4Ω	125	3.3Ω	DR4K6W-8	2	LSBR-2022B	2
60△	45	9000W/3.3Ω	125	2.5Ω	DR4K6W-6.6	2	LSBR-2022B	2
75△	55	11000W/2.7Ω	125	2.5Ω	DR6K2W-5	2	LSBR-2022B	3
100	75	15000W/2Ω	125	–	DR6K2W-6	3	LSBR-2022B	4
125	90	18000W/1.6Ω	125	–	DR6K2W-5	3	LSBR-2022B	4/5
150	110	22000W/1.3Ω	125	–	DR6K2W-5	4	LSBR-2022B	5

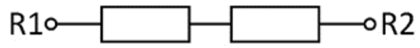
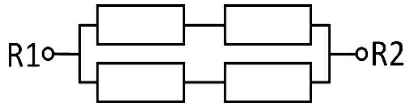
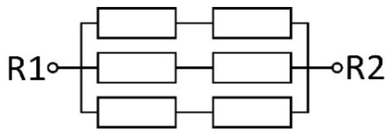
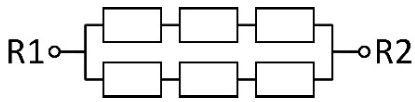
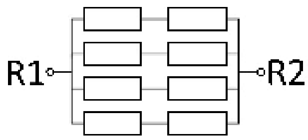
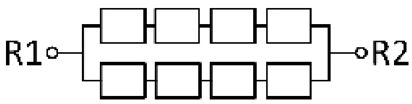
◆If there is no built-in brake circuit, you can request additional installation when placing an order, or ask our company or local distributors. (Optional)

Specification sheet: 400V series

HP	KW	Equivalent resistance Specification W / Ω	Braking torque (10%ED)	Equivalent minimum resistance (Ω)	Braking resistor Unit (Module)	SET	Externally provided unit specifications	SET
1	0.75	150W/300Ω	200	150Ω	–	–	Included	–
2	1.5	300W/300Ω	155	150Ω	–	–		–
3	2.2	500W/150Ω	175	72Ω	–	–		–
5	4.0	800W/100Ω	170	72Ω	–	–		–
7.5	5.5	1200W/80Ω	155	40Ω	DR1K5W-80	1		–
10	7.5	1500W/60Ω	155	40Ω	DR1K5W-60	1		–
15	11	2200W/50Ω	135	40Ω	DR3K1W-48	1		–
20∆	15	3000W/40Ω	125	20Ω	DR3K1W-40	1	LSBR-4015B	1
25∆	18.5	3700W/32Ω	125	20Ω	DR4K6W-30	1	LSBR-4030B	1
30∆	22	4400W/27.2Ω	125	20Ω	DR4K6W-30	1	LSBR-4030B	1
40∆	30	6000W/20Ω	125	14.3Ω	DR6K2W-20	1	LSBR-4030B	1
50∆	37	7400W/16Ω	125	14.3Ω	DR4K6W-30	2	LSBR-4030B	2
60∆	45	9000W/13.3Ω	125	10Ω	DR4K6W-6.6	2	LSBR-4030B	2
75∆	55	11000W/10Ω	125	6.6Ω	DR6K2W-20	2	LSBR-4030B	2
100	75	15000W/8Ω	125	6.6Ω	DR6K2W-20	3	LSBR-4030B	3
125	90	18000W/6.6Ω	125	–	DR6K2W-20	3	LSBR-4030B	3
150	110	22000W/5.4Ω	125	–	DR6K2W-20	4	LSBR-4030B	4
175	132	26400W/4.5Ω	125	–	DR6K2W-20	4	LSBR-4030B	5
200	160	32000W/3.7Ω	125	–	DR6K2W-20	5	LSBR-4030B	6
250	185	37000W/3.2Ω	125	–	DR6K2W-20	6	LSBR-4030B	7
300	220	44000W/2.7Ω	125	–	DR6K2W-20	8	LSBR-4030B	8
375	280	60000W/2Ω	125	–	DR6K2W-20	10	LSBR-4030B	10
425	315	75000W/1.6Ω	125	–	DR6K2W-24	13	LSBR-4030B	13

◆If there is no built-in brake circuit, you can request additional installation when placing an order, or ask our company or local distributors. (Optional)

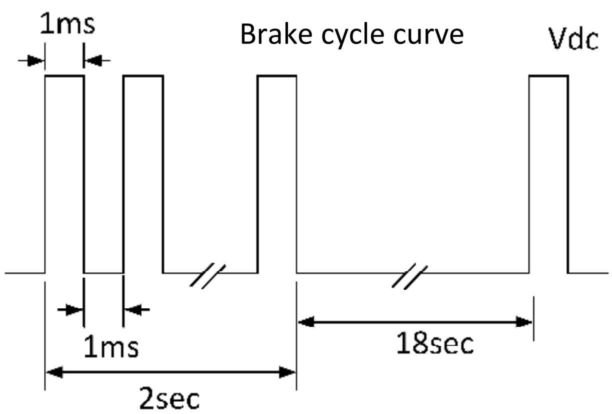
Braking resistor (Module) selection (DR braking resistor specifications)

Type No.	Even connection (The portion with opposed)
DR1K5W-R	16Ω, 20Ω, 24Ω, 40Ω / R1, R2 wire diameter at least 3.5mm^2 or more
	
DR3K1W-R	8Ω, 10Ω, 12Ω, 20Ω / R1, R2 wire diameter at least 5.5mm^2 or more
	
	32Ω, 40Ω, 48Ω, 60Ω / R1, R2 wire diameter at least 5.5mm^2 or more
	
DR4K6W-R	5.3Ω, 6.6Ω, 8Ω, 13.3Ω / R1, R2 wire diameter at least 5.5mm^2 or more
	
	12Ω, 15Ω, 18Ω, 30Ω / R1, R2 wire diameter at least 5.5mm^2 or more
	
DR6K2W-R	4Ω, 5Ω, 6Ω, 10Ω / R1, R2 wire diameter at least 8.0mm^2 or more
	
	16Ω, 20Ω, 24Ω, 40Ω / R1, R2 wire diameter at least 8.0mm^2 or more
	

Braking resistor (Module) model description

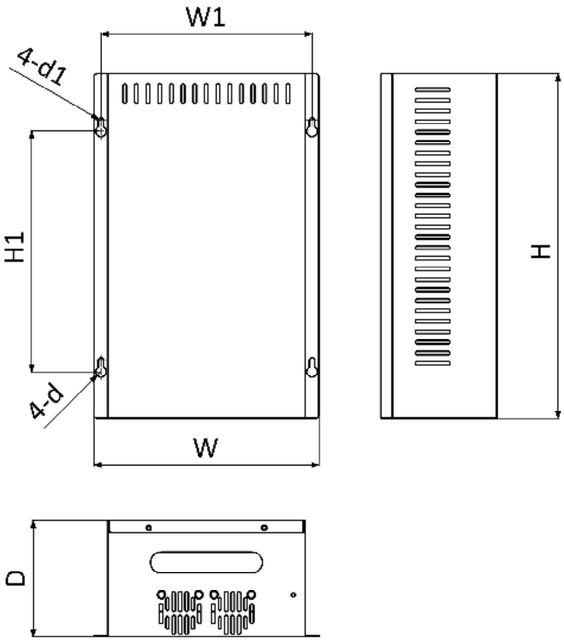
DR 3K1W-10

- DR: Brake resistance module
- 3K1W: Power (watt)
- 10: Resistance value (Ω) ±5%



Braking resistor (Module) size (mm)

Model	Dimensions			Fixed size		ø	
	W	H	D	W1	H1	d	d1
DR1K5W-R	140	184	110	128	135	9	4.5
DR3K1W-R **DR4K6W-R**	193	295	100	181	206	9	4.5
DR6K2W-R	193	314	120	181	206	9	4.5



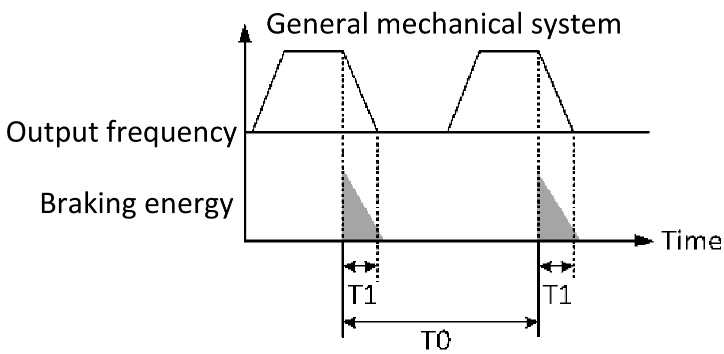
Braking resistor calculation method of wattage and resistance value

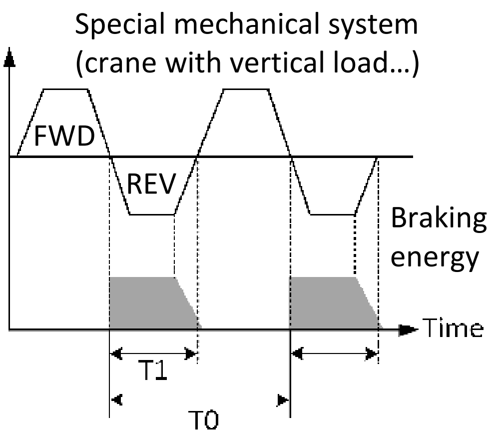
Braking torque	Resistance	200–230V	380–460V
125%	R	150.00KW	600KW
130%	R	143.75KW	575KW
135%	R	137.50KW	550KW
140%	R	131.25KW	525KW
150%	R	118.75KW	475KW
160%	R	106.25KW	425KW
170%	R	93.75KW	375KW
180%	R	81.25KW	325KW

T1: Braking time

T0: Duty time

Working as frequency % (ED %) : $\frac{T1}{T0} \times 100$





For Example (Long time braking): 380V / 100HP / 75KW (brake torque 125%, 10%ED)
Resistance power (W) = (Motor) 75000W × 20% = 15000 (W)
Resistance value (R) = 600 / 75KW = 8Ω

※ The resistance value, the larger the braking torque, the braking flows more current unit. Do not make the working current of the braking unit greater than its maximum allowable current, otherwise the device will be damaged.

Resistance watters (10%ED) calculation method:
Braking properties; resistance watter

1. General load: resistance watters (W) = Motor (W) × 10%
2. Frequent braking cycle **T0** (less than 5 times in 1 minute): resistance watters (W) = Motor (W) × 15%
3. Long-term braking T1 (each time less than 4 seconds): resistance watters (W) = Motor (W) × 20%
4. Large inertia long time braking T1 (less than 10 seconds each time):
   Resistance watters (W) = motor (W) × (more than 40%)

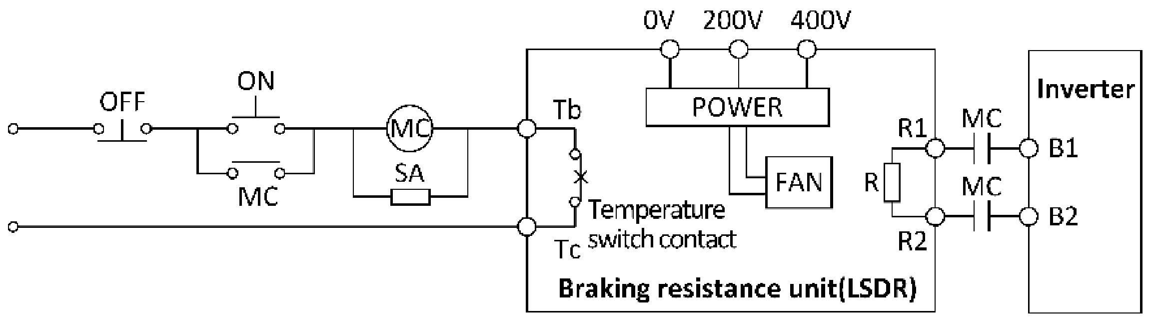
◎ When connecting multiple braking resistors, it is recommended to connect the braking resistors in series. If parallel connection is required, the braking resistance value, wire diameter and wire length shall be consistent, so that the current is evenly divided, and the service life of each brake resistor can be effectively protected.

◎ When used in series or parallel, the resistance value of each unit must be consistent, and pay attention to the final total resistance value.

9.7 Installed brake control loop

Carry out the overheat protection of the braking resistor unit (LSDR).

0.4–11KW inverter (200V class / 400V class):



15–220KW Inverter (200V class / 400V Class):
Figure 1: As shown above.
Figure 2:

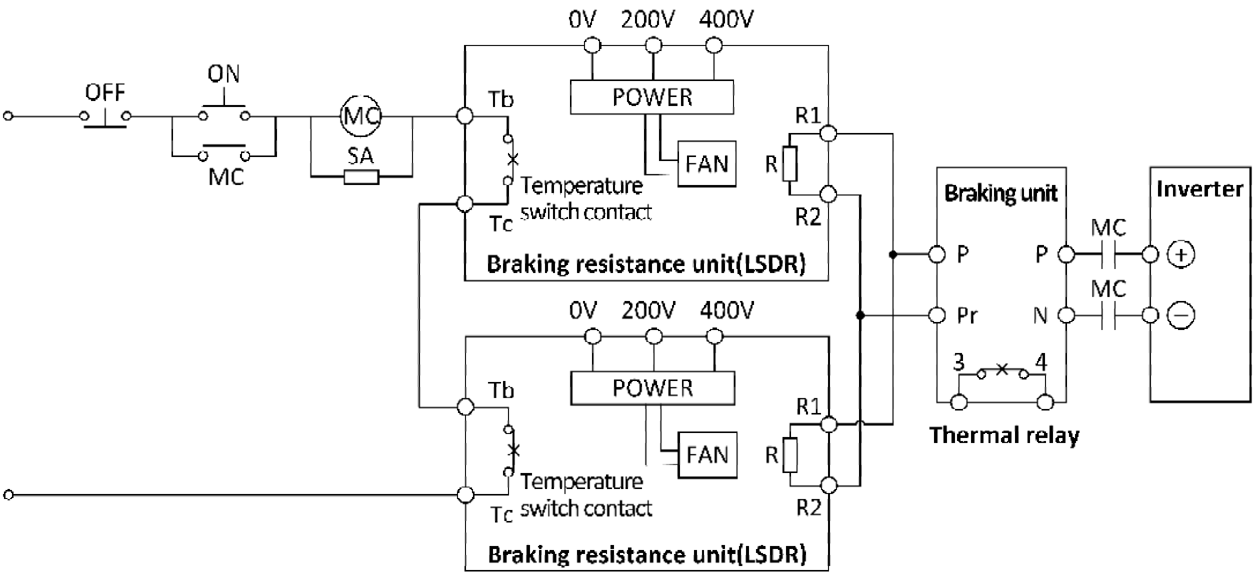
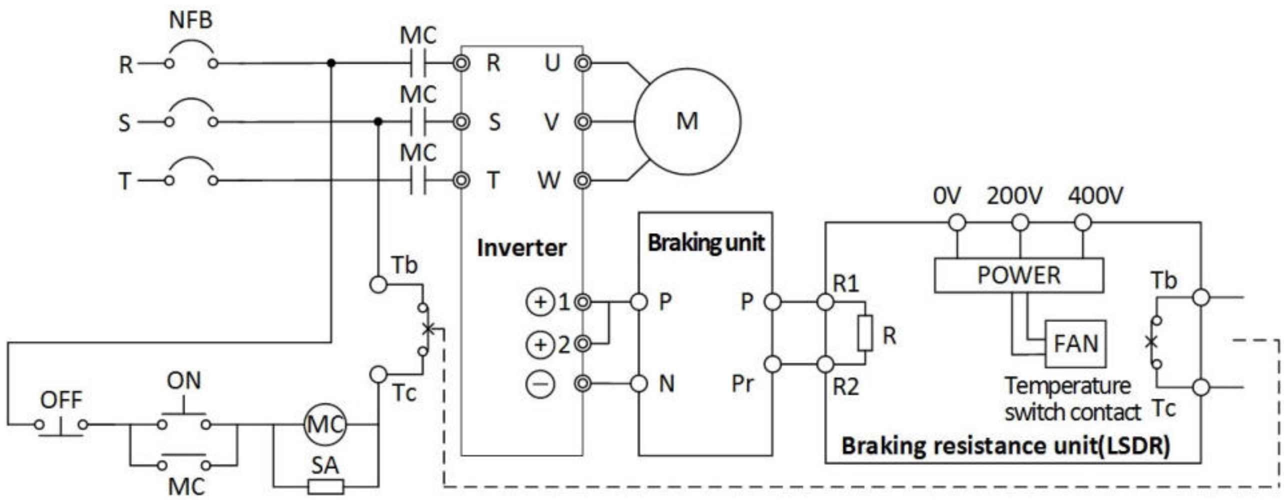


Figure 3:



Chapter 10 Specifications and dimensions

10.1 Specifications

200V series specifications

KVA: Rated output capacity   A : Rated output a current

KHz : Carrier frequency upper limit   ★: Overcurrent capability

LS1000-2□□□			0K4	0K7	1K1	1K5	2K2	3K0	4K0	5K5	7K5	011	015	018	022	030	037	045
Output	Heavy load (HD)	KW	0.4	0.75	1.1	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	22	30	37	45
		HP	0.5	1	1.5	2	3	4	5	7.5	10	15	20	25	30	40	50	60
		KVA	1.4	1.9	2.4	2.8	3.8	5.7	6.7	9.5	13	19	26	31	38	50	63	72
		A	3.7	5	6.2	7.5	10	15	17.5	25	34	50	68	82	100	130	165	190
		KHz	15											12		10		
		★	OL: 150%/60sec, OC: 200%															
	Light load (ND)	KW	0.75	1.1	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
		HP	1	1.5	2	3	4	5	7.5	10	15	20	25	30	40	50	60	75
		KVA	1.6	2.3	2.8	3.5	4.6	6.8	8	11	16	22	28	34	45	56	72	83
		A	4.3	6.0	7.5	9.3	12	18	21	30	41	59	75	89	118	148	188	217
		KHz	6												5			
		★	OL: 120%/60sec, OC: 160%															
LS1000-2□□□			055	075	090	110												
Output	Heavy load (HD)	KW	55	75	90	110												
		HP	75	100	125	150												
		KVA	88	114	133	173												
		A	230	300	350	455												
		KHz	8			6												
		★	OL: 150%/60sec, OC: 200%															
	Light load (ND)	KW	75	90	110	132												
		HP	100	125	150	175												
		KVA	100	130	152	190												
		A	263	342	400	500												
		KHz	4															
		★	OL: 120%/60sec, OC: 160%															
Maximum output voltage (V)			Three corresponding input voltages															
Output frequency range			0.0–400.0Hz															
Input voltage/frequency			Three-phase power supply 200–240V, 50/60Hz															
Allowable voltage variation range			±10% (180–264V)															
Allowable frequency range			±5% (47–63Hz)															
Cooling fan			Forced fan															

400V series specifications

KVA: Rated output capacity A : Rated output a current

KHz : Carrier frequency upper limit ★: Overcurrent capability

LS1000-4□□□			0K4	0K7	1K5	2K2	3K0	4K0	5K5	7K5	011	015	018	022	030	037	045	055
Output	Heavy load (HD)	KW	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
		HP	0.5	1	2	3	4	5	7.5	10	15	20	25	30	40	50	60	75
		KVA	1.9	2.8	3.8	5.7	5.7	7.6	11.4	13.3	19	29	33	38	52	62	76	99
		A	2.5	3.7	5	7.5	7.5	10	15	17.5	25	38	43	50	68	82	100	130
		KHz	15										12		10			8
		★	OL: 150%/60sec, OC: 200%															
	Light load (ND)	KW	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		HP	1	2	3	4	5	7.5	10	15	20	25	30	40	50	60	75	100
		KVA	2.3	3.3	4.3	6.2	6.8	8.9	13.4	16	24	33	37	46	59	71	87	113
		A	3	4.3	5.7	8.2	9	11.7	17.7	21.5	31	43	49	60	78	93	114	148
		KHz	6												5			
		★	OL: 120%/60sec, OC: 160%															
LS1000-4□□□			**075**	**090**	**110**	**132**	**160**	**185**	**220**	**280**	**315**							
Output	Heavy load (HD)	KW	75	90	110	132	160	185	220	280	315							
		HP	100	125	150	175	200	250	300	375	425							
		KVA	126	152	175	209	229	267	347	419	472							
		A	165	200	230	275	300	350	455	550	620							
		KHz	8		6			5			4							
		★	OL: 150%/60sec, OC: 200%															
	Light load (ND)	KW	90	110	132	160	185	220	280	315	355							
		HP	125	150	175	200	250	300	375	425	475							
		KVA	139	174	206	242	274	317	409	490	543							
		A	183	228	270	318	360	416	537	643	713							
		KHz	4				3											
		★	OL: 120%/60sec, OC: 160%															

Maximum output voltage (V)	Three corresponding input voltages
Output frequency range	0.0–400.0Hz
Input voltage/frequency	Three-phase power supply 380–480V, 50/60Hz
Allowable voltage variation range	±10% (342–528V)
Allowable frequency range	±5% (47–63Hz)
Cooling fan	Forced fan

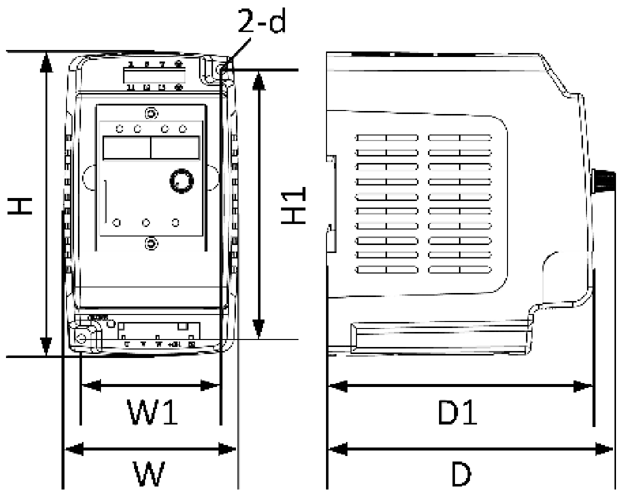
Common characteristics

Operation method	
6 digit number of LED digit display operation. 32-bit DSP-MCU, sine wave SVPWM control mode, using high-performance low-noise IGBT.	
System control mode	
V/F control, V/F closed loop control (V/F + PG), SensorLess flux vector control (SVC), closed loop flux vector control (FOC + PG), torque control (TQC + PG)	
Frequency accuracy (Temperature change)	
Digital instruction: ± 0.01 % (–10 to + 40°C); Analog instruction: ± 0.1% (25°C ± 10°C)	
Frequency command resolution	
Digital command: 0.01Hz; Analog command: 0.03Hz (11 bit / 60Hz)	
Frequency output resolution	
Digital instruction: ± 0.01Hz; Analog instruction: ± 0.5%	
Starting torque	
V/F, V/F + PG 150% / 3.0Hz, IM (SVC) 150% / 0.3Hz PM (SVC) 100% / 5% speed, IM, PM (FOC + PG) 200% / 0 min-1	
Speed control range	
V/F control 1 : 40; V/F + PG, IM (SVC) control 1 : 200 PM (SVC) control 1 : 20; IM, PM (FOC + PG) control 1 : 1500	
Motor control	
Induction motor (IM); Permanent magnet motor (SPM, IPM)	
External frequency setting signal	
4 groups of analog commands: DC 0–5V, 0–10V, – 10 to +10V, 4–20mA 1 set of pulse command: pulse input.	
Main control function	
• Up to 16 speed control • 16 sets of positioning point command control • 4 groups of accel. and decel. time switch • 5 points arbitrary V/F curve and 15 constant V/F curves • V/F and vector control switch • Zero Servo Function • Start/stop DC braking • DWELL function • Online dynamic/static AUTOTUNE function • Torque limit • Overvoltage suppression function • 8 groups of fault history • 4 cooling fan start mode settings • Brake torque up to about 20% • Speed search • Mechanical inertia (ASR) self-learning	• Inching frequency setting • Simple PLC function • S curve acceleration and deceleration function • Three-wire control • Slip compensation • 2 groups of PID control • Carrier frequency 1–15KHz can be set • Pulse input frequency command • Modbus RS485 communication • 3 sets of frequency hopping • Energy saving efficiency control • Pulse multiple output • PID constant presure water pump sleep function • IM deceleration overexcitation braking function • Abnormal restart function • Automatic torque compensation • Over torque and low torque detection

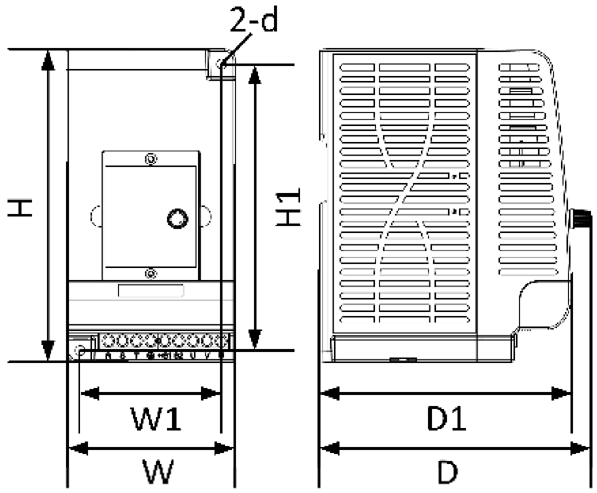
Main control function	
• Torque control • Restart after momentary power failure • The latest inverter fault status record • Parameter lock	• Temperature overheating protection (trip level can be set) • Cumulative record of power-on time and operating time • Heavy duty (HD), light duty (ND) options
Protection functions	
Inverter overload (OL)	Inverter rated current-heavy duty (HD): 150% / 1 minute Inverter rated current-light load type (ND): 120% / 1 minute
Motor overload (OL1)	Electronic overload curve protection (motor rated current)
Over torque (OL2)	Inverter rated current 160%
Instantaneous overcurrent (OC)	Inverter rated current-heavy load type (HD): 200%/ < 1 second Inverter rated current-light load type (ND): 160%/ < 1 second
Stall prevention	The operating current can be set during acceleration and constant speed, and the stall prevention voltage during deceleration can be set.
Voltage protection	Low voltage level (Lu): Vdc < 190 (200V class) / 380 (400V class) Overvoltage level (Hou): Vdc > 410 (200V class) / 820 (400V class)
Output three-phase unbalanced	Built-in current detector protection.
Automatic restart after instantaneous power failure	Power off for more than 15ms.
Over temperature protection (oH2)	Built-in temperature detector or thermistor detection (Inverter overheating protection)
Environment specifications	
Refer to section 3.1 Environment	

10.2 Dimensions

Frame number M

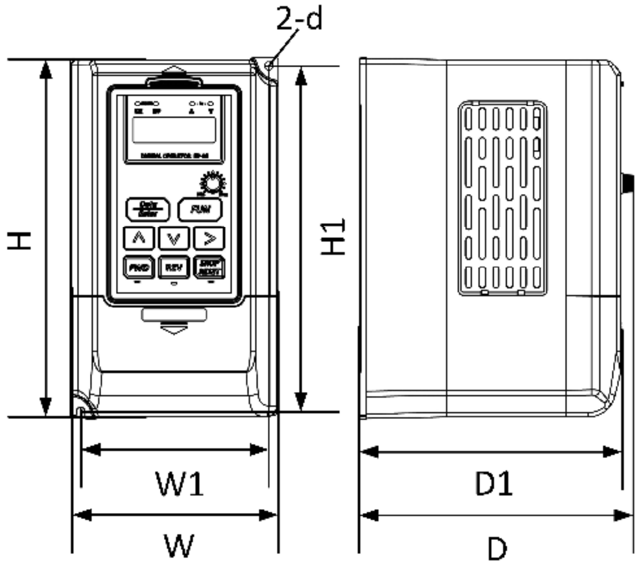


Frame number M-1



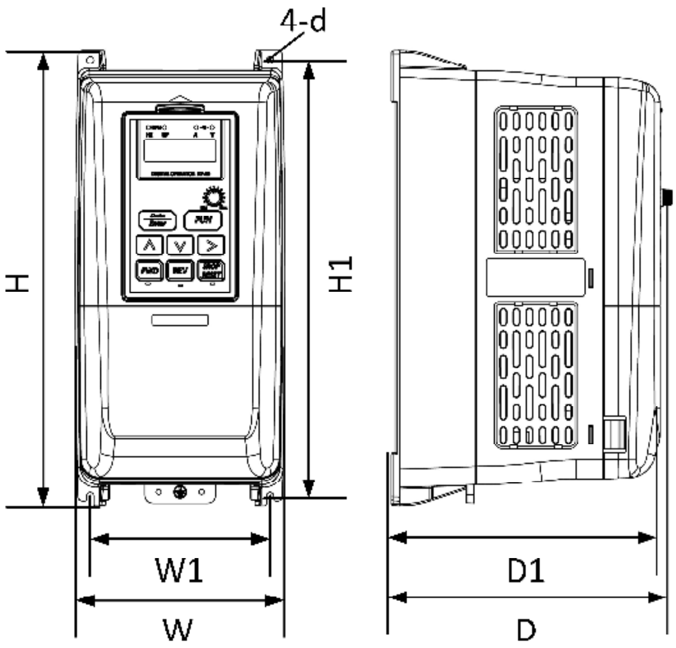
<table>
<tr><th rowspan="2">Voltage</th><th colspan="2">Applicable motor</th><th rowspan="2">Model</th><th colspan="8">Dimensions (mm)</th><th rowspan="2">Frame</th></tr>
<tr><th>HP</th><th>KW</th><th>W</th><th>H</th><th>D</th><th>W1</th><th>W2</th><th>H1</th><th>D1</th><th>d</th></tr>
<tr><td rowspan="4">220V</td><td>0.5</td><td>0.4</td><td>20K4</td><td rowspan="4">83</td><td rowspan="4">145</td><td rowspan="4">138</td><td rowspan="4">67</td><td rowspan="4">–</td><td rowspan="4">129</td><td rowspan="4">128</td><td rowspan="4">4.6</td><td rowspan="4">M</td></tr>
<tr><td>1</td><td>0.75</td><td>20K7</td></tr>
<tr><td>2</td><td>1.5</td><td>21K5</td></tr>
<tr><td>3</td><td>2.2</td><td>22K2</td></tr>
<tr><td>220V</td><td>5</td><td>4.0</td><td>24K0</td><td rowspan="5">92</td><td rowspan="5">169</td><td rowspan="5">147</td><td rowspan="5">77</td><td rowspan="5">–</td><td rowspan="5">155</td><td rowspan="5">136</td><td rowspan="5">5.2</td><td rowspan="5">M-1</td></tr>
<tr><td rowspan="4">440V</td><td>1</td><td>0.75</td><td>40K7</td></tr>
<tr><td>2</td><td>1.5</td><td>41K5</td></tr>
<tr><td>3</td><td>2.2</td><td>42K2</td></tr>
<tr><td>5</td><td>4.0</td><td>44K0</td></tr>
</table>

Frame number A



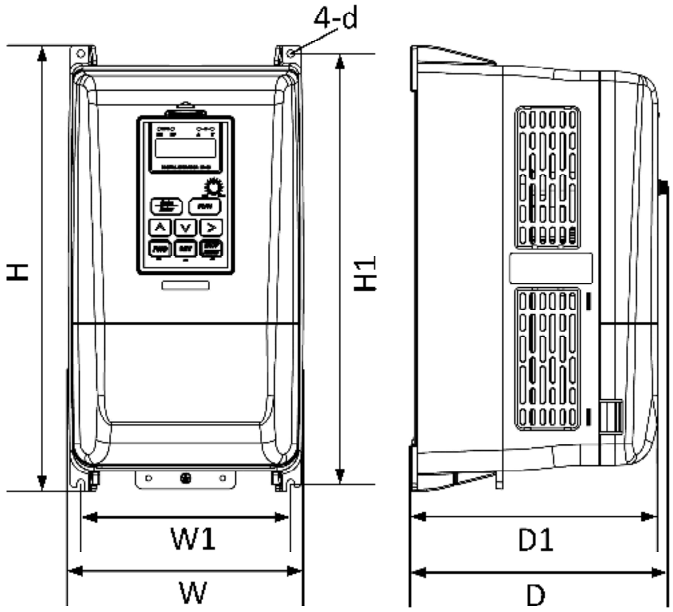
Voltage	Applicable motor		Model	Dimensions (mm)								Frame
	HP	KW		W	H	D	W1	W2	H1	D1	d	
220V	0.5	0.4	20K4	115	199	151	103	—	190	144	4.8	A
	1	0.75	20K7									
	2	1.5	21K5									
	3	2.2	22K2									
	5	4.0	24K0									
440V	0.5	0.4	40K4									
	1	0.75	40K7									
	2	1.5	41K5									
	3	2.2	42K2									
	5	4.0	44K0									

Frame number B



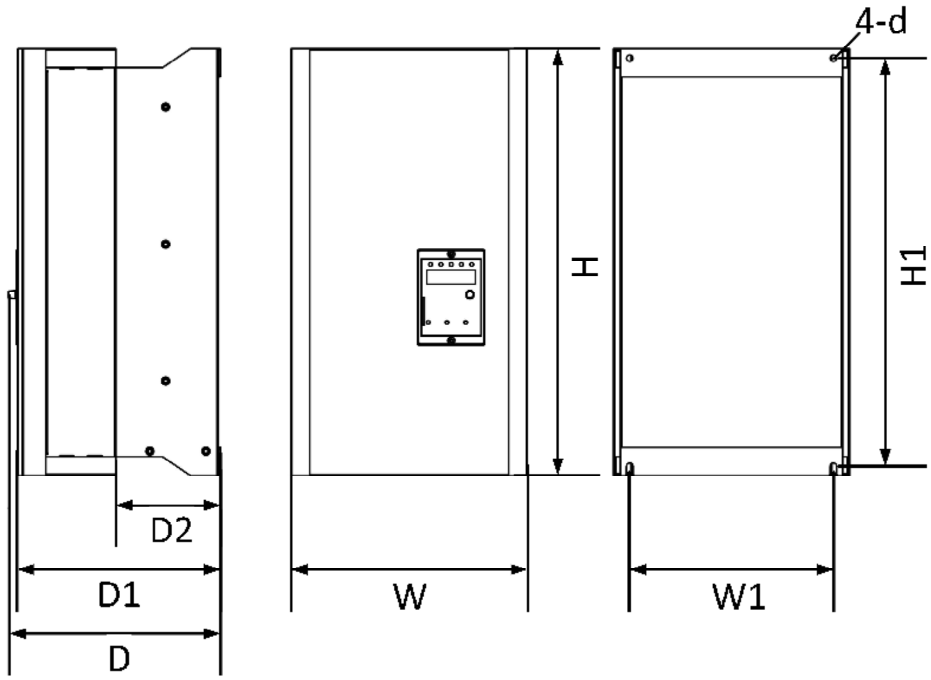
<table>
<tr><th rowspan="2">Voltage</th><th colspan="2">Applicable motor</th><th rowspan="2">Model</th><th colspan="8">Dimensions (mm)</th><th rowspan="2">Frame</th></tr>
<tr><th>HP</th><th>KW</th><th>W</th><th>H</th><th>D</th><th>W1</th><th>W2</th><th>H1</th><th>D1</th><th>d</th></tr>
<tr><td rowspan="2">220V</td><td>5</td><td>4.0</td><td>24K0</td><td rowspan="5">129</td><td rowspan="5">286</td><td rowspan="5">176</td><td rowspan="5">113</td><td rowspan="5">—</td><td rowspan="5">274</td><td rowspan="5">169</td><td rowspan="5">4.5</td><td rowspan="5">B</td></tr>
<tr><td>7.5</td><td>5.5</td><td>25K5</td></tr>
<tr><td rowspan="3">440V</td><td>5</td><td>4.0</td><td>44K0</td></tr>
<tr><td>7.5</td><td>5.5</td><td>45K5</td></tr>
<tr><td>10</td><td>7.5</td><td>47K5</td></tr>
</table>

Frame number C



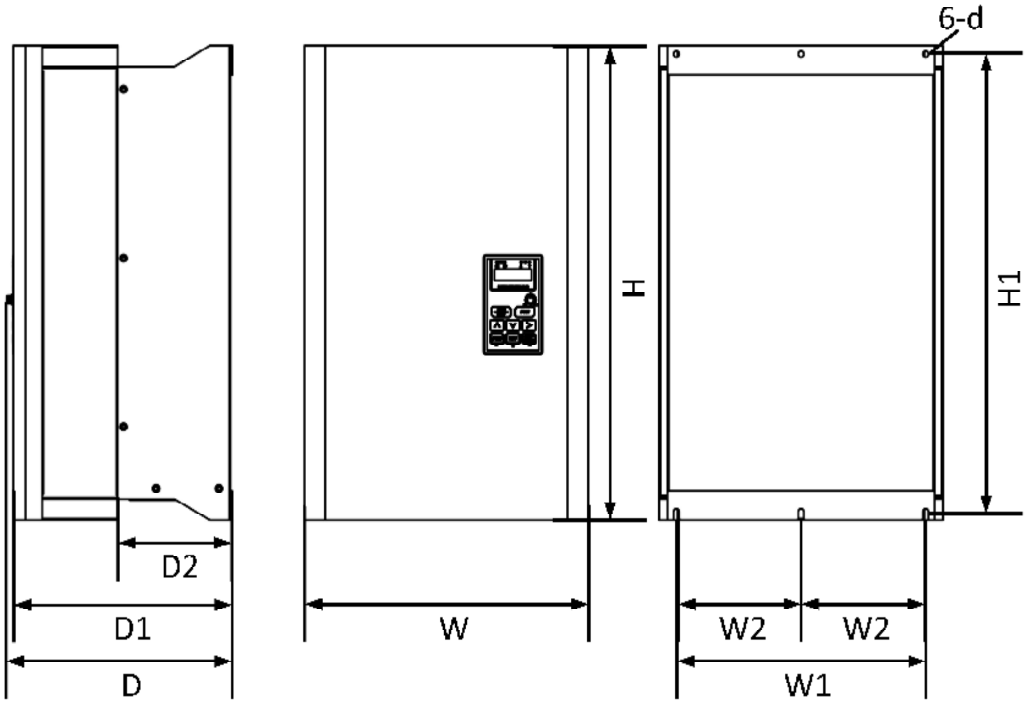
Voltage	Applicable motor		Model	Dimensions (mm)								Frame
	HP	KW		W	H	D	W1	W2	H1	D1	d	
220V	10	7.5	27K5	175	335	193	158	—	323	186	5.5	C
	15	11	2011									
	20	15	2015									
440V	15	11	4011									
	20	15	4015									
	25	18.5	4018									

Frame number D



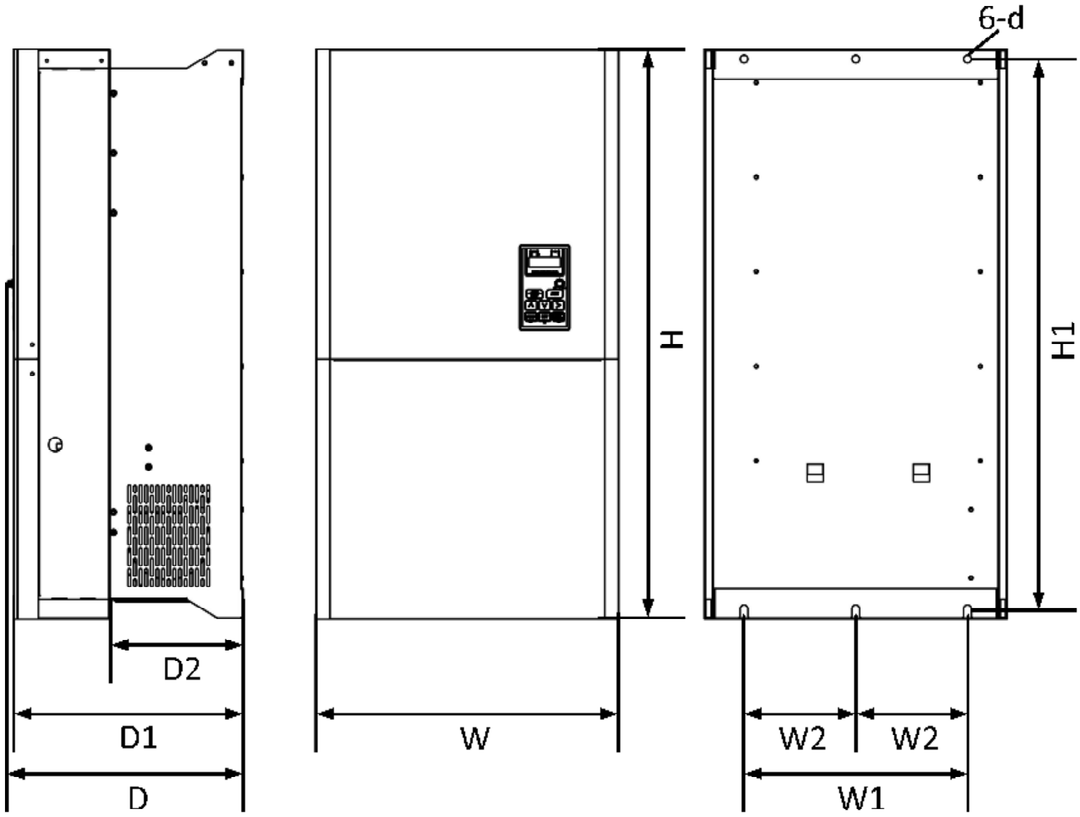
Voltage	Applicable motor		Model	Dimensions (mm)									Frame
	HP	KW		W	H	D	W1	W2	H1	D1	D2	d	
220V	25	18.5	2018	253	458	227	218	—	438	217	112	7	D
	30	22	2022										
	40	30	2030										
440V	30	22	4022										
	40	30	4030										
	50	37	4037										

Frame number E



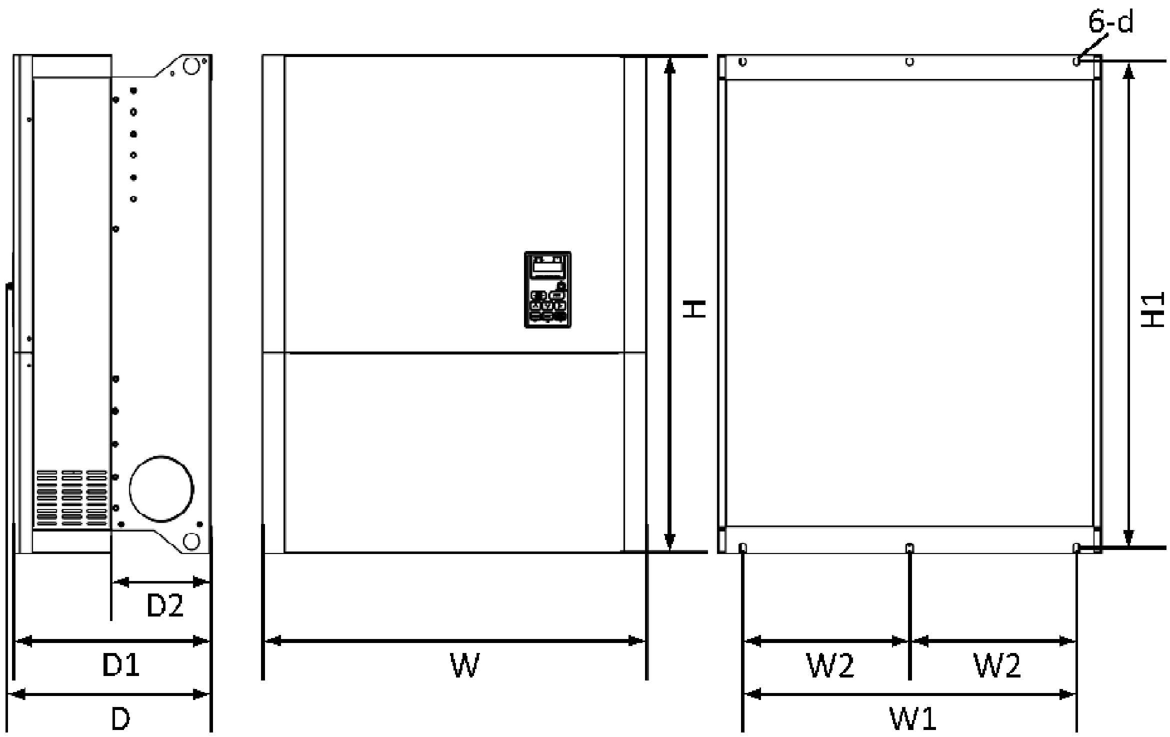
Voltage	Applicable motor		Model	Dimensions (mm)									Frame
	HP	KW		W	H	D	W1	W2	H1	D1	D2	d	
220V	50	37	2037	345	563	276	303	151	543	266	139	7	E
	60	45	2045										
	75	55	2055										
440V	60	45	4045										
	75	55	4055										
	100	75	4075										

Frame number F



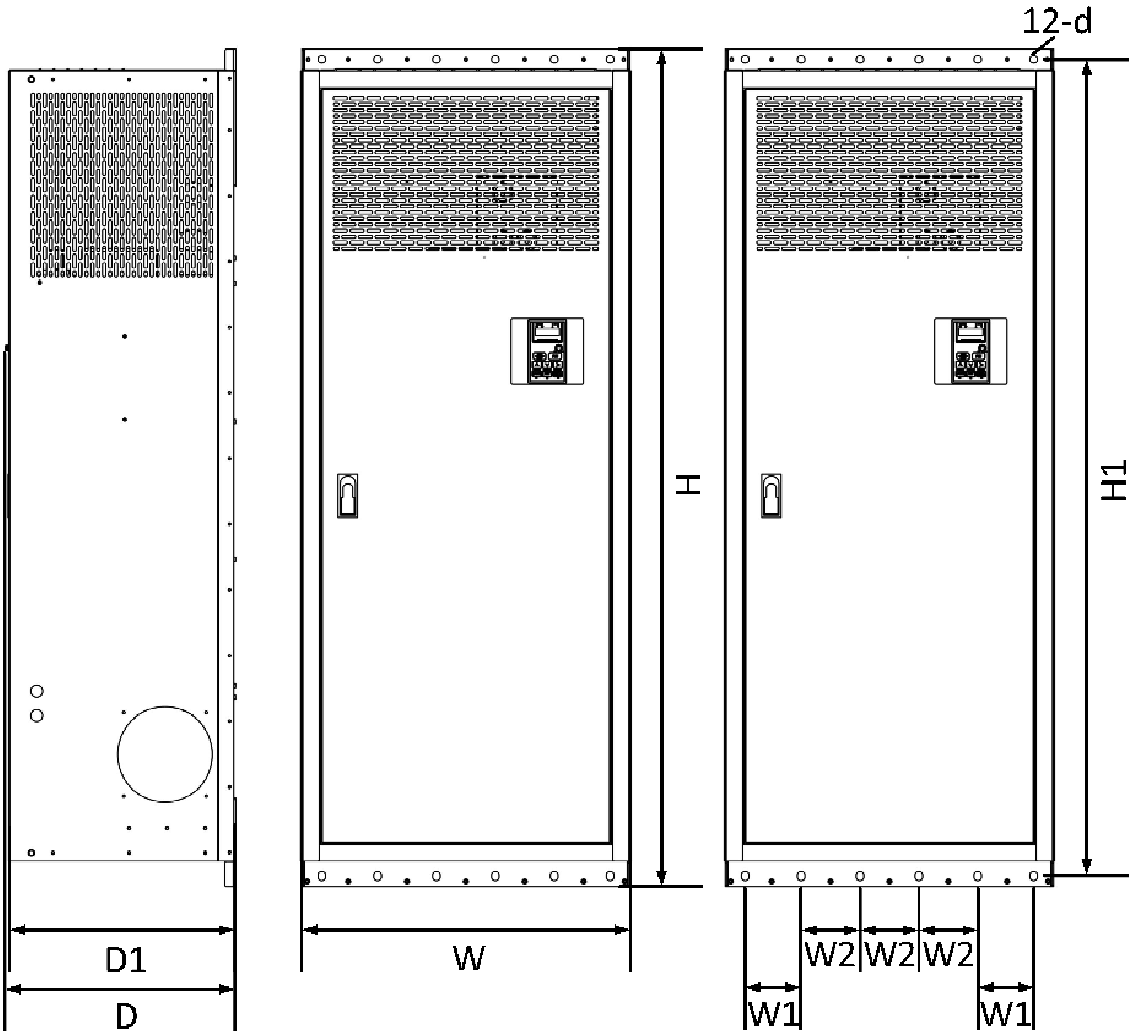
Voltage	Applicable motor		Model	Dimensions (mm)									Frame
	HP	KW		W	H	D	W1	W2	H1	D1	D2	d	
220V	100	75	2075	430	790	336	317	158	763	326	189	11	F
440V	125	90	4090										
	150	110	4110										
	175	132	4132										

Frame number G



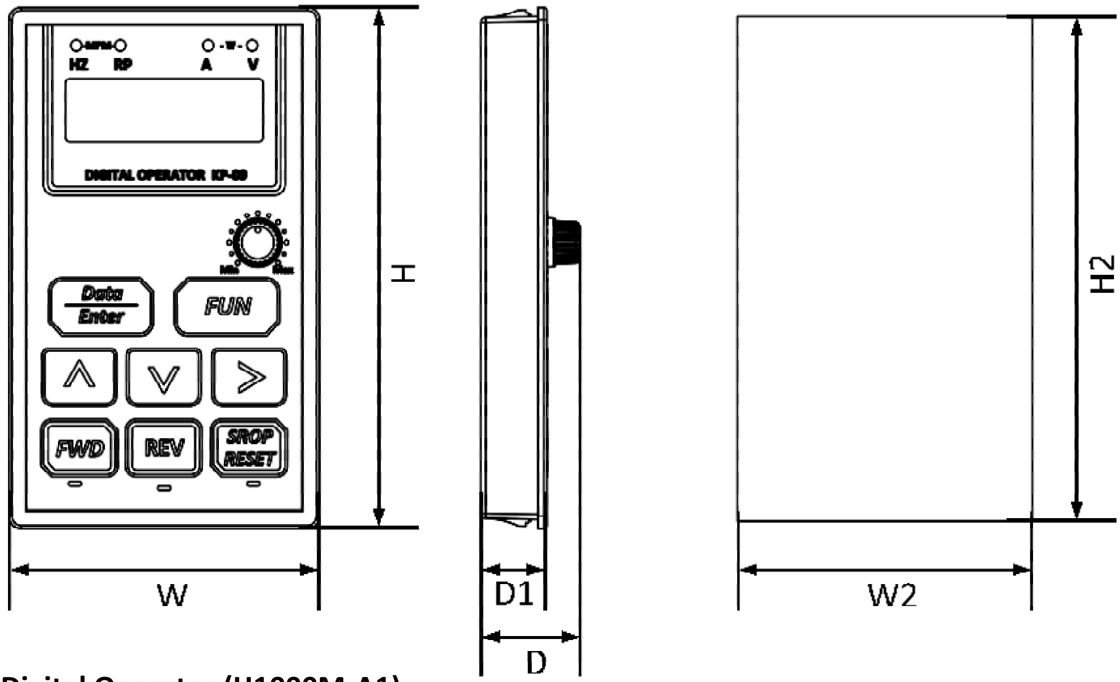
Voltage	Applicable motor		Model	Dimensions (mm)									Frame
	HP	KW		W	H	D	W1	W2	H1	D1	D2	d	
220V	125	90	2090	604	770	322	525	262	750	312	158	11	G
	150	110	2110										
440V	200	160	4160										
	250	185	4185										
	300	220	4220										

Frame number H

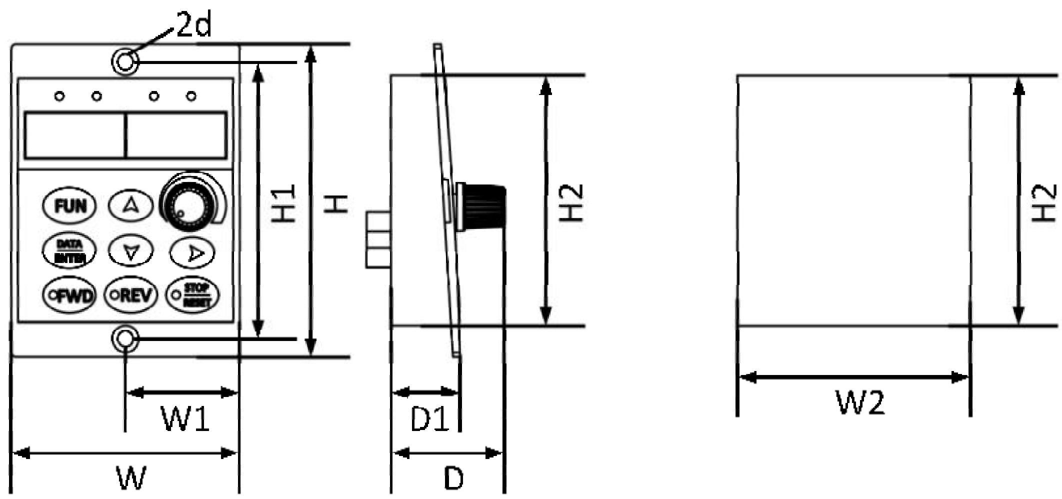


Voltage	Applicable motor		Model	Dimensions (mm)									Frame
	HP	KW		W	H	D	W1	W2	H1	D1	D2	d	
440V	375	280	4280	612	1532	428	104	109	1493	421	—	14	H
	425	315	4315										

Digital Operator (H1000-A1)



Digital Operator (H1000M-A1)

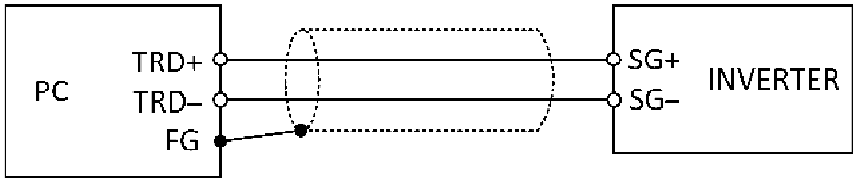


Keypad operator	Dimensions (mm)							Digging hole size (mm)		
	W	W1	H	H1	D	D1	d	W2	H2	Thickness
H1000-A1	70.7	—	116.7	—	22.5	15	—	67	113	1.6
H1000M-A1	52	26	70	62	27	14	3.5	51	57	—

Chapter 11 Appendix

11.1 Communication connections

◎ When wiring for communication, please separate the main circuit wiring from other power lines and electric power line. Use a shielded wire for communication wiring, wrap the shielded wire and connect it to the ground terminal of the host, and do not connect to the other end. It has the effect of preventing malfunction caused by interference.



11.2 Regular inspection and maintenance

WARNING	**WARNING**
	☑ First of all by the maintenance professionals personally confirm the current state of the power switch, in order to ensure that the job safety is strictly prohibited others close to the power supply on and off should be put on the switch identification label. ☑ Within a short time after the power supply is cut off, high-voltage DC power is still accumulated in the large-capacity electrolytic capacitor in the internal rectifier circuit of the inverter. So when you want to check the substrate, please confirm whether the [CHARGE] light has been extinguished.

Daily inspection, regular inspection:

◎ Electronic equipment cannot be used permanently. Even under normal working conditions, if the service life is exceeded, characteristics changes or malfunctions will occur. In order to prevent malfunctions, preventive maintenance such as daily inspections, regular inspections, and parts replacement must be carried out.

◎ Inverter is composed of IGBT (power transistor), semiconductor parts such as IC, electronic parts such as capacitors and resistors, and many parts such as fans and relays. If all these parts can't operate normally, the product will not be able to perform its functions.

◎ Please perform regular inspections in accordance with the checklist in this chapter.

◎ When installing the inverter in the following environment, please shorten the period of regular inspection compared with the normal situation.

- ⦿ High temperature environment.
- ⦿ Frequent starting and stopping environment.
- ⦿ Environment with AC power supply or load fluctuation.
- ⦿ There is an environment with excessive vibration or shock.
- ⦿ Environments with dust, metal dust, salts, sulfuric acid, and chlorine.
- ⦿ Stored in a harsh environment.
- ⦿ It is recommended to check the equipment every 1 to 2 years after installation.

◆ Daily inspection

The daily inspection of our company's inverter is shown in the table below. In order to avoid the inverter function deterioration and product damage, please confirm the following items daily.

Motor
● Whether the motor has abnormal vibration and abnormal sound?
☑ Confirm the connection with the machine. ☑ Measure the vibration of the motor. ☑ Tighten the screws of the connection part.
Cooling system
● Whether the inverter and motor have abnormal heating and discoloration?
☑ Confirm whether it is overloaded. ☑ Lock screw. ☑ Check whether the heat sink and motor of the inverter are dirty. ☑ Confirm the ambient temperature.
Confirm the cooling fan and the fan for circuit board cooling?
☑ Confirm the dirtiness of the cooling fan and internal air agitation fan. ☑ Use parameters to confirm the operating time of the cooling fan and internal air agitation fan.
Surroundings
● Whether the installation environment meets the standard?
☑ Remove sources of contamination or improve the installation environment.
Load
● Whether the output current of the inverter is higher than the rated value of the motor or inverter for a certain period of time?
☑ Confirm whether it is overloaded. ☑ Confirm the setting of motor parameters.
Voltage
● Whether the main circuit voltage and control voltage are normal?
☑ Adjust the voltage and current values to be within the value on the nameplate. ☑ Confirm each phase of the main circuit voltage.

◆ Regular inspection

The regular inspection of our company's inverter is shown in the table below. In general, it is recommended to conduct regular inspections every 1 to 2 years, but please determine the actual frequency of inspections based on the actual use and working environment of each inverter. Regular inspection helps prevent deterioration of functions and product damage.

Main circuit:

Overall
● Are there any parts that have changed color due to overheating or aging? ● Whether each part is damaged or deformed?
☑ Replace damaged parts. ☑ If there are damaged bits that cannot be repaired or replaced, replace the entire inverter.
● Whether there is dirt, garbage, dust?
☑ Confirm whether the door of the control panel equipped with the inverter is tightly closed. ☑ Clear with dry air. ☑ Please replace the severely soiled part if it cannot be removed.
Wire
● Whether the wires and connections are discolored, damaged or aged due to overheating? ● Whether the wire rubber coating is damaged, cracked, or discolored?
☑ Repair or replace damaged wires.
Terminal block
● Whether the connecting terminal is worn, damaged or loose?
☑ If the screws or terminals are damaged after locking, they should be replaced.
Electromagnetic contactor, Relay
● Whether there is an abnormal sound during the action? ● Whether the coil is overheated and the rubber coating of the wire is aging or cracked?
☑ In both cases where the voltage exceeds the reference value and does not exceed the reference value, the voltage of the coil is confirmed separately. ☑ Replace damaged electromagnetic contactors, relays, circuit boards.
Brake resistor (option)
● Whether the insulator is discolored due to overheating?
☑ Slight discoloration is not abnormal. ☑ When discoloration occurs, please confirm whether the wiring is bad.
Electrolytic capacitor
● Whether it is leaking, discolored, or cracked? ● Whether the safety valve is exposed, expanded or leaked?
☑ If there are damaged parts that cannot be repaired or replaced, replace the entire inverter.

Motor:

Action check
● Whether vibration and running noise are abnormally aggravated?
☑ Stop the motor and contact professional maintenance personnel.

Control loop:

Overall
● Whether the terminals are worn, damaged, or improperly connected? ● Whether the screws are loose?
☑ If the screws or terminals are damaged after locking, they should be replaced. ☑ If the terminals of the printed circuit board cannot be repaired or replaced, replace the entire inverter.
Aprinted circuit board
● Whether there is abnormal smell, discoloration, severe rust, whether the connector is installed correctly, whether there is dust and oil mist?
☑ Reinstall the connector class. ☑ If it cannot be cleaned with an electric clothr vacuum cleaner, replace the printed circuit board. ☑ Do not use solvents on printed circuit boards. ☑ Use dry air to remove garbage and dust. ☑ If there are damaged parts that cannot be repaired or replaced, replace the entire drive.

Cooling system:

Cooling fan
● Whether the motor has abnormal sound and vibration? ● Whether there are damaged or missing blades?
☑ Clean or replace the fan.
Heat sink, ventilation holes
● Whether it is blocked or contaminated with foreign material?
☑ Please use dry air to remove obstacles and dust.

11.3 Precautions for Virtual Di and Do

Correspondence table of virtual Di and Do:

P07-10	Virtual Di8 function	P08-03	Virtual Do2 setting
P07-11	Virtual Di9 function	P08-04	Virtual Do3 setting
P07-12	Virtual Di10 function	P08-05	Virtual Do4 setting

◎ The virtual Di and Do are the expansion of the virtual digital input terminals of the software, because the digital input terminals of the actual external input are only Di1 to Di7, when the use is not satisfied, the virtual digital input terminals are used to extend.

For example: To use virtual Di8 to perform zero servo action.
a. P08-03 (Do2) = 0: In operation, P07-10 (Di8) = 13: Zero servo.
b. There will be zero servo action when running.

※ Because the use of virtual Di and Do need to cooperate with the setting of parameters to meet the action requirements, the settings listed below should be avoided, otherwise the inverter will enter a special abnormal condition.
※ The following situation is the problem of virtual Do setting 06 (Operation preparation completed).

P07-10 to P07-12 (Di)		
No	Content	Situation
02	Abnormal reset (Reset)	This feature has no action when used by virtual Di.
12	External blocking b.b.	The inverter jumps to fault b.b. as soon as it is turned on. **Troubleshooting:** Long press the STOP button for about 5 seconds, then you can see the fault code 48, then press the FUN button to modify the parameters.
13	Zero servo	As soon as the inverter is turned on, the servo will be zero, which means that the inverter is in the running state and all parameters cannot be set. **Troubleshooting:** As explained in No. 12
17	External fault	The inverter trips fault 13 as soon as it is turned on. **Troubleshooting :** Restart the inverter and execute P01-02 (return to factory settings). ※Pressing the STOP button has no effect.
18	External fault	
19	External fault	
20	External fault	
27	Inverter overheating warning (OH1)	The inverter trips fault 31 as soon as it is turned on. **Troubleshooting:** As explained in No. 17–20.
33	Parameter lock	The inverter locks parameters as soon as it is turned on. **Troubleshooting:** Execute P01-02 (Return to factory settings).

◎ In case of abnormal conditions of the inverters not listed in the table, they can be operated and set normally without the special treatment methods in the table.

LONG SHENQ ELECTRONIC CO., LTD.
NO. 12-2, WULIN STREET, SHULIN DIST, NEW TAIPEI CITY,
TAIWAN, R.O.C (Shulin Industrial Park)
Tel: +886 2 26842888
Fax: +886 2 26842889
http://www.acinverter.com.tw

All the products are constantly modified there of specifications to improve the perfection; for downloading the latest version of specifications, please visit Long Shenq website.