HD09-S Series

High-performance Smart Inverter

User Manual

Single-phase 220 - 240V, 0.25 - 2.2kW

Three-phase 380 - 460V, 0.4 - 5.5kW

V1.1 2018.07

FOREWORD

Thank you for purchasing HD09-S series high-performance smart inverter manufactured by Shenzhen Hpmont Technology Co., Ltd.

This User Manual describes how to use HD09-S series inverters and their installation wiring, parameter setting, troubleshooting and daily maintenance etc.

Before using the product, please read through this User Manual carefully. In addition, please do not use this product until you have fully understood safety precautions.

Note:

- Preserve this Manual for future use.
- If you need the User Manual due to damage, loss or other reasons, please contact the regional distributor of our company or directly contact our company Technical Service Center.
- If you still have some problems during use, please contact our company Technical Service Center.
- Due to product upgrade or specification change, and for the purpose of improving convenience and accuracy of this manual, this manual's contents may be modified.
- Email address: **overseas_1@hpmont.com**

Version and Revision Records

Version information: At the bottom right corner of the front cover.

Time: 2018/7

Version: V1.1

Revised chapter	Revised contents
Chapter 7	• d00.11 (Master setting frequency source) added function: 6 - 12 • F00.10 (Frequency setting access selection) added function: 6 - 11 • Add F04.01 (Setting channel selection) • The factory default setting value of F09.01 - F09.04 (Motor V/f frequency value / Voltage value) are changed into: 80.0%, 80.0%, 50.0%, 50.0% • F15.00 - F15.03 (DI terminal function) added function: 30 (Switch to normal running mode) • F16.00 - F16.01 (Potentiometer, AI terminal function) added function: 4 (Process PID setting)
Chapter 9	• The communication protocol part added

CONTENTS

Chapter 1 Safety Information 1

Chapter 2 Product Information 3

2.1 Nameplate 3

2.2 Rated Value 4

Chapter 3 Machenical Installation 5

3.1 Dimension and Weight 5

3.2 Requirement for the Installation Site 6

3.3 Installation of Exterior Keypad 7

Chapter 4 Electrical Installation 9

4.1 Electric Requirements 10

4.2 Power Terminals and Connection 13

4.3 Control Terminals and Connection 14

4.4 External Keypad or Upper Computer 17

Chapter 5 Technical Data 19

5.1 Peripheral Accessories Selection 19

5.2 Braking Resistor 20

5.3 Technical Data 21

Chapter 6 Operation 23

6.1 Keypad 23

6.2 Shutdown and Operating Status Parameters 25

6.3 Keypad Control Operation 25

6.4 Terminal Control Running 26

6.5 Communication Control Operation 27

Chapter 7 Detailed Function Introduction 29

7.1 d00: Status Display Parameters 29

7.2 F00: Basic Parameter 31

7.3 F01: Parameter Protection Function 34

7.4 F02: Start and Stop Controlling Parameter 35
7.5 F03: Acc. and Dec. Parameter 38
7.6 F04: Process PID Controlling Parameter 39
7.7 F05: External Setting Curve Parameters 41
7.8 F06: Multistage Speed Function 43
7.9 F08: Motor Parameter 43
7.10 F09: V/f Controlling Parameter 45
7.11 F10: Motor Vector Control Speed-loop Parameters 47
7.12 F11: Motor Vector Control Current Loop Parameter 49
7.13 F15: Digital Input / Output Terminals Parameter 49
7.14 F16: Analogue Input / Output Terminal Parameter 58
7.15 F17: SCI Communication Parameter 60
7.16 F18: Display Control Parameter 62
7.17 F19: Enhancement Parameters 63
7.18 F20: Fault Protection Parameter 68
7.19 F23: PWM Controlling Parameter 70
7.20 R02: AI Correction Parameters 71

Chapter 8 Troubleshooting and Maintenance 73
8.1 Troubleshooting 73
8.2 Maintenance 76

Chapter 9 MODBUS Communication Protocol 79
9.1 Communication Terminal 79
9.2 The Transmitted Value Corresponding to Calibration Relationship 79
9.3 Protocol Functions 79
9.4 Address Mapping Relationship 82

Chapter 10 Parameter 85

Chapter 1 Safety Information

Safety Definition

Pay attention to contents with following marks in the user manual or on the product.

Danger

Danger: A Danger contains information which is critical for avoiding safety hazard.

Warning

Warning: A Warning contains information which is essential for avoiding a risk of damage to products or other equipements.

Note

Note: A Note contains information which helps to ensure correct operation of the product.

Professional Staff

Only qualified electrical engineer can perform electrical installation.

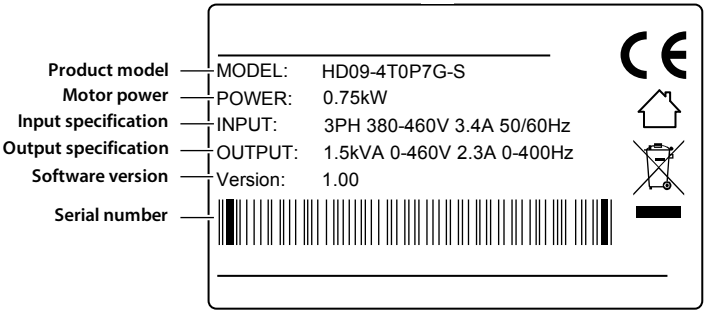
Only professional staff that received special training and authorized can carry out maintenances.

Chapter 2 Product Information

2.1 Nameplate

Nameplate Label

Name plate label is pasted on right side of the product. Its contents are shown in the following figure.

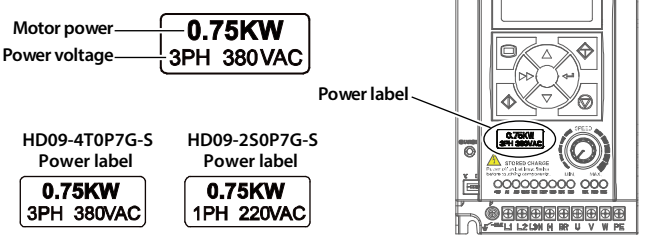


Power Label

Power label is below the keypad for recognizing the products easily and quickly.

Power label includes motor power and supply voltage. See section 2.2 Rated Value, page 4.

Its contents are shown in the following figure.



2.2 Rated Value

Note:

The built-in brake is standard in three-phase power supplies (HD09-4T■P■G-S) and single-phase power supplies (HD09-2S■P■G-B-S) and optional brake resistor.

Single-phase: 200 - 240V, 50/60Hz

Size	Model	Motor power (kW)	Rated input current (A)	Rated volume (kVA)	Rated output current (A)
Size A	HD09-2S0P2G-S	0.25	4.3	0.6	1.7
Size A	HD09-2S0P4G-S HD09-2S0P4G-B-S	0.4	5.8	1.0	2.5
Size A	HD09-2S0P7G-S HD09-2S0P7G-B-S	0.75	10.5	1.5	4.0
Size A	HD09-2S1P5G-S HD09-2S1P5G-B-S	1.5	18.5	2.8	7.5
Size A	HD09-2S2P2G-S HD09-2S2P2G-B-S	2.2	24.1	3.8	10.0

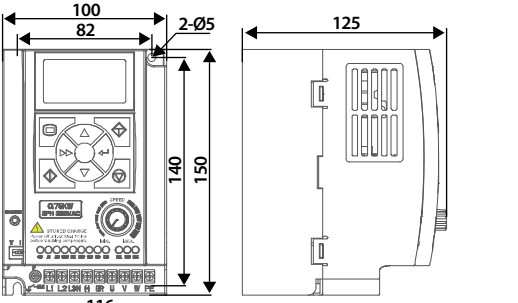
Three-phase: 380 - 460V, 50/60Hz

Size	Model	Motor power (kW)	Rated input current (A)	Rated volume (kVA)	Rated output current (A)
Size A	HD09-4T0P4G-S	0.4	1.8	1.0	1.4
Size A	HD09-4T0P7G-S	0.75	3.4	1.5	2.3
Size A	HD09-4T1P5G-S	1.5	5.2	2.5	3.8
Size A	HD09-4T2P2G-S	2.2	7.3	3.4	5.1
Size B	HD09-4T4P0G-S	4.0	11.9	5.9	9.0
Size B	HD09-4T5P5G-S	5.5	15.0	8.5	13.0

Chapter 3 Machenical Installation

Danger	• After opening the package, if damage or incompleteness is found, please do not install it and contact our distributor or us for solutions. • When conveying the inverter, please employ suitable tools according to its weight. Please avoid scratch to the product. Be careful: Rollover and drop may cause hurt. • Avoid scaps of the drill slip into the inverter during installation. • For inverter with more than 2 year's storage, please use regulator to power it slowly.

3.1 Dimension and Weight



Size A:

Dimension: 100 × 150 × 125 mm

Mounting dimension: 82 × 140 mm

Mounting aperture: 5 mm

G.W.: 1.5 kg

Size B:

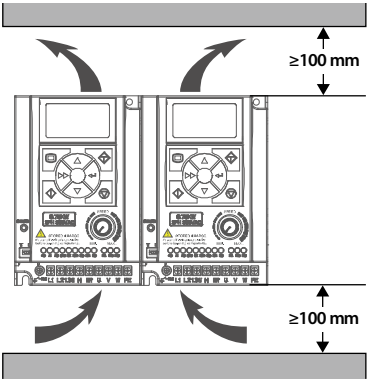
Dimension: 116 × 185 × 145 mm

Mounting dimension: 98 × 174 mm

Mounting aperture: 6.5 mm

G.W.: 2.7 kg

3.2 Requirement for the Installation Site



Ensure the installation site meets the following requirements:

- Do not install at the direct sunlight, moisture, water droplet location;
- Do not install at the flammability, explosive, corrosive gas and liquid locations;
- Do not install at the oily dust, fiber and metal powder location;
- Be vertical installation on fire-retardant material with a strong support;
- Install at where the humidity is less than 95%RH and non-condensing location;
- Install at where the vibration is 3.5m/s^2 in 2 - 9Hz, 10m/s^2 in 9 - 200Hz (IEC60721-3-3);
- This inverter meets IP20, and Pollution Degree level 2 (Dry, Non conducting dust pollution);
- Make sure adequate cooling space for the inverter so as to keep the ambient temperature between -10 - 40°C, as shown in the figure at the left;

  It needs derating use if the inverter operation temperature exceeds 40°C. The derating value of the output current of the inverter shall be 2% for each degree centigrade, Max. allowed temperature is 50°C.

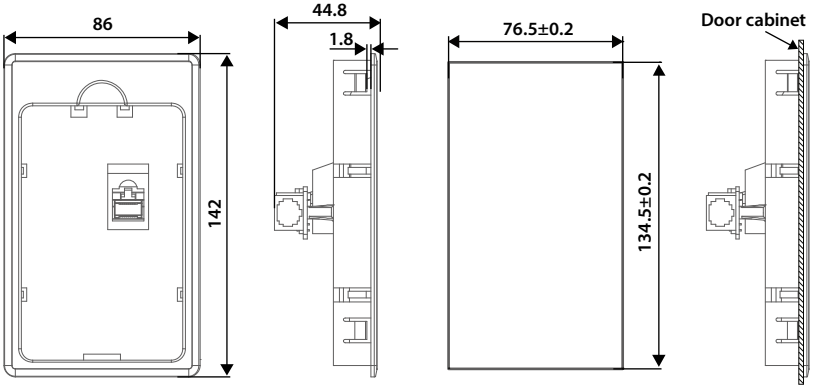
3.3 Installation of Exterior Keypad

HD09-S allows installing the optional keypad on the keypad of control door cabinet. The optional keypads are HD-LED-P and HD-LED-S.

3.3.1 Installation of HD-LED-P

HD-LED-P needs a mounting base HD-KMB for installation. Firstly install the base on the keypad of control door cabinet, and then install HD-LED-P inside the base.

The HD-KMB base and mounting aperture sizes are shown in the following figure (unit: mm).



3.3.2 Installation of HD-LED-P-S

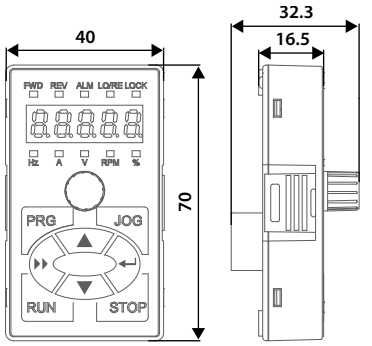
There are 2 installation methods selectable for HD-LED-P-S: Install with screws or a mounting base.

Packing contents: Mounting base, keypad, 2 pieces of M3x5 screws, 1 meter extension cable.

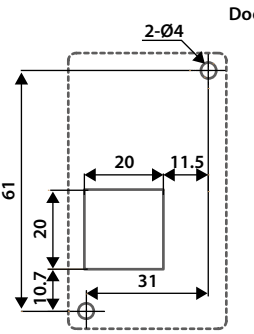
To Install with Screws

Install the HD-LED-P-S on the keypad of control door cabinet with screws.

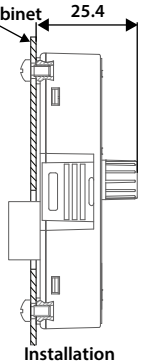
Dimension and mounting aperture sizes are shown in the following figure (unit: mm).



HD-LED-P-S dimension



Mounting aperture size

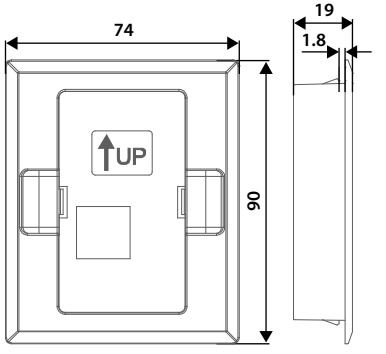


Installation

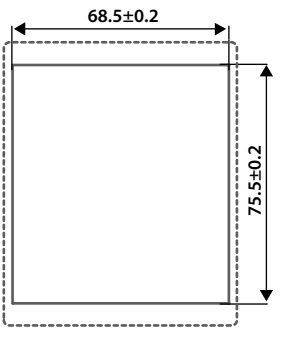
To Install with a Mounting Base

Firstly install the mounting base HD-KMB-S on the keypad of control door cabinet, and then install HD-LED-S inside the base.

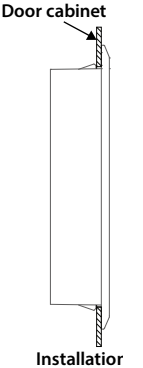
The HD-KMB-S base and mounting aperture sizes are shown in the following figure (unit: mm).



HD-KMB-S size



Mounting aperture size



Installatior

Chapter 4 Electrical Installation

Danger	• Only qualified electrical engineer can perform wiring job. • Only when the power supply switch is completely off can you do the wiring job. • Check that the operation is effective and reliable after conneting to the emergency stop terminal of external power supply. • You must wrap the bare metal part of the power terminal with insulating tape. • Do not touch the wire terminals of the inverter when it is live.

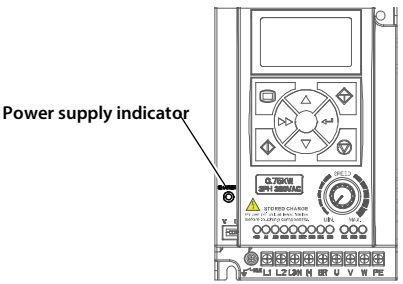
Ensure the power supply is completely off

Only when the power supply switch is completely off can you do the wiring job.

Steps:

First, disconnect the power supply of the inverter.

Second, wait till the internal power supply indicator goes out (its position shown in the following figure) or wait until 5 minutes later.



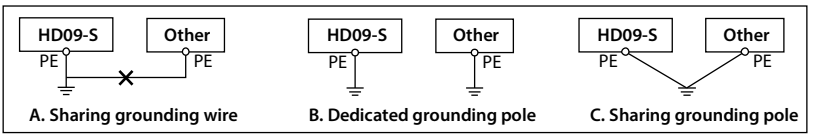
4.1 Electric Requirements

4.1.1 Grounding Requirements

Danger
Before grounding, the ground terminal of the inverter must be grounded reliably.

There is leakage current to the inverter, ground terminal PE must be grounded, and with the grounding point as close as possible, grounding area as large as possible, and to ensure that the grounding resistance is less than 10Ω.

Do not share the ground wire (A) with other power equipment. It is best to have a special grounding pole (B), but you can also share the ground (C).



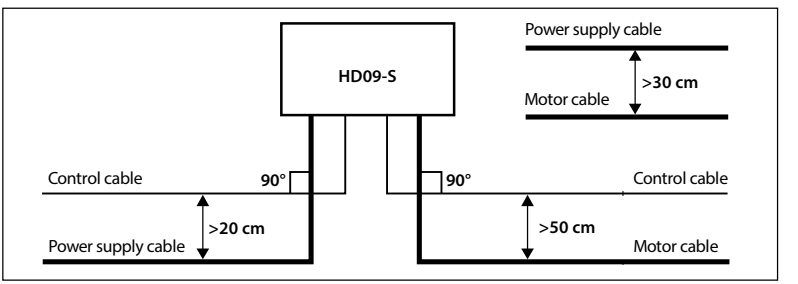
If you use several inverters at the same time, you can take a special grounding or common ground way grounding.

4.1.2 Wiring Requirements

To avoid coupling, the power cables, motor cables and control cables must be installed separately and ensure a sufficient distance, especially when the cables are installed in parallel and the extension distance is long.

If the signal cable must pass through the power cable or motor cable, it must pass vertically (90°), as shown in the following figure.

The power cables, motor cables and control cables should be distributed in different pipelines.



4.1.3 Power Cable

Warning

- Do not connect the input power cord to the output U / V / W terminal.
- Do not connect the phase-shifting capacitor to the output circuit.
- Make sure that the AC input source voltage matches the rated input voltage of the inverter.

For the selection of the power cable, refer to section 5.1 Peripheral Accessories Selection, page 19.

4.1.4 Motor Cable

Selection of motor cables, see section 5.1 Peripheral Accessories Selection, page 19.

The longer the motor cable, the higher the carrier frequency, the higher the harmonic leakage current on the cable. Leakage current can adversely affect the frequency converter and nearby equipment.

When the motor cable exceeds 100 meters, it is recommended to install the AC output reactor, and refer to the following table to set the carrier frequency (F23.00).

Motor cable length	< 50 m	50 - 100 m	> 100 m
Carrier frequency setting	Below 8 kHz	Below 5 kHz	Below 2 kHz

When the motor cable is too long or the cable cross-section is too large, the derating is reduced by about 5% for each additional stroke in the recommended cross-sectional area.

Because the larger the cross-sectional area of the cable, the greater the capacitance to ground, the greater the leakage current.

4.1.5 Control Cable

To reduce the interference and attenuation of the control signal, the length of the control cable should be limited to 50 meters.

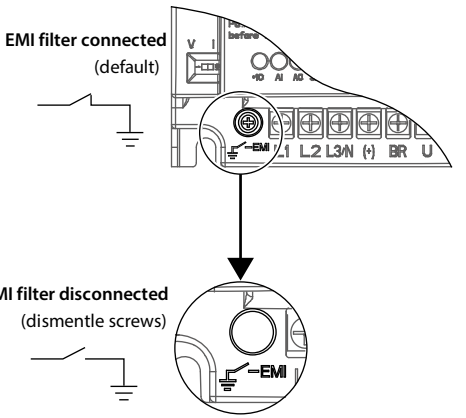
The control cable must be a shielded cable, and the analog signal cable should be twisted shielded.

Shielded cables should use high-frequency low-impedance shielded cables, such as braided copper mesh, aluminum wire mesh or barbed wire.

4.1.6 Leakage Protection Switch

HD09-S inverter built-in EMI filter, the inverter can be connected to the case of power protection can reduce the external radio frequency interference, while the protection of the ground to produce 10mA AC leakage current.

In the case of low leakage current applications, the connection between the built-in EMI filter and the protective ground wire can be disconnected, and the leakage current from the protective ground wire is less than 1mA AC after disconnection. Disconnect the built-in EMI filter as shown below.



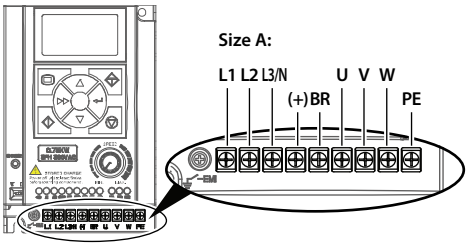
The leakage current protection switch (ELCB / RCD) is installed on the input side of the inverter, disconnect the built-in EMI filter to prevent mistake action of the ELCB / RCD.

The ELCB / RCD action is related to the fault current waveform it detects, and there are three types:

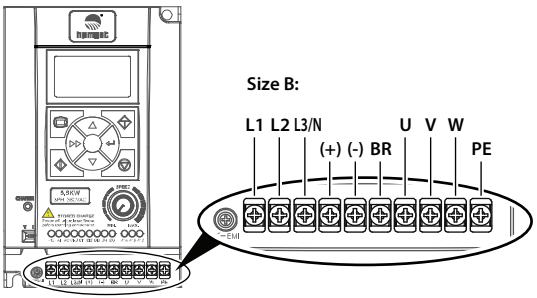
- AC type: Detects AC fault current and is not suitable for frequency converters.
- Type A: Detects AC fault current and pulsating DC fault current, only applies to single-phase power input inverter.
- Type B: Detection of AC fault current, pulsating DC fault current and smooth DC fault current, three-phase power input required that type.

4.2 Power Terminals and Connection

Power Terminal Description



Terminal	Description
L1, L2, L3/N	Three-phase AC power input terminals
L1, L3/N	One-phase AC power input terminals
U, V, W	Output terminals, connect to AC motor
(+), BR	Braking resistor connection terminals
PE	Ground terminal, connect to the ground

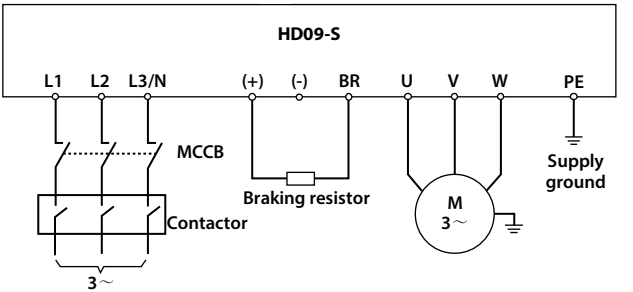


Terminal	Description
L1, L2, L3/N	Three-phase AC power input terminals
L1, L3/N	One-phase AC power input terminals
U, V, W	Output terminals, connect to AC motor
(+), BR	Braking resistor connection terminals
(+), (-)	DC supply input terminals
PE	Ground terminal, connect to the ground

Power Terminal Connection

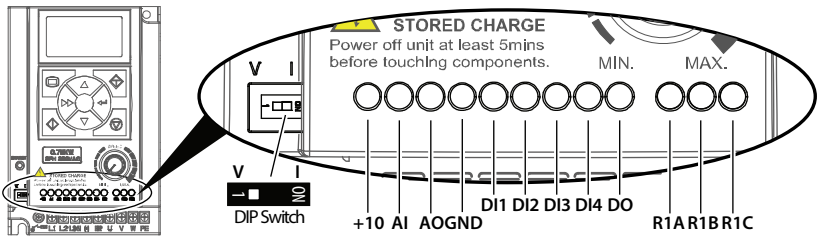
Power terminal wiring is as shown in following figure.

For selection of contactor, MCBB, power supply cable, motor cable, ground cable and braking resistor, please refer to section 5.1.1 Wiring Specifications of Input and Output, page 19.



4.3 Control Terminals and Connection

Control Terminals Description



Terminal		Description
+10	External power	Max. output current100mA
AI	Analogue input	The DIP switch decides the voltage input or current input • Voltage 0 - 10V, impedance 32kΩ (factory setting) • Current 0 - 20mA, impedance 500Ω
	Digital input (DI function)	When AI is used as DI, switch signals above 6V can be received • Function F15.44 is the same with DI1 - DI3 (F15.00 - F15.02)
AO	Analogue output	Voltage 0 - 10V
GND	Power ground	Analogue and digital site, 0V

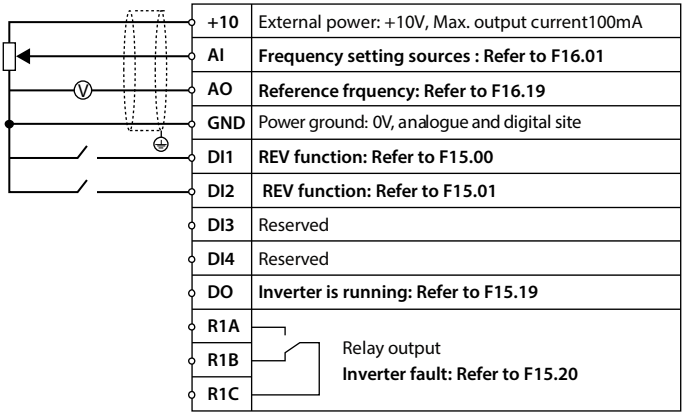
Terminal		Description
DI1, DI2, DI3	Digital input	Effective with GND short circuit
DI4	Digital input	Effective with GND short circuit or High frequency input (F15.03 set as No.53 function) • Max. frequency 50.0kHz (F16.17 setting)
DO	Digital output	Open collector output • External voltage 10 - 30VDC, max. current 50mA or High frequency input (F15.19 set as No.38 function) • Max. frequency 50.0kHz (F16.26 setting)
R1A, R1B, R1C	Relay output	• Contact rating: 250VAC / 3A or 30VDC / 1A • R1B, R1C: Normally closed; R1A, R1C: Normally open

Note:

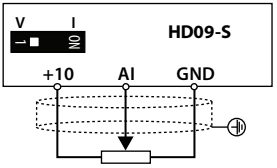
Limit the current within 3A if the relay terminal is to connect to AC 220V voltage signal.

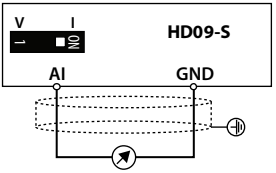
Control Terminals Connection

The following figure shows wire connection of control terminal (factory setting).

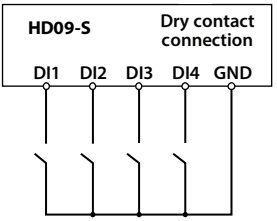


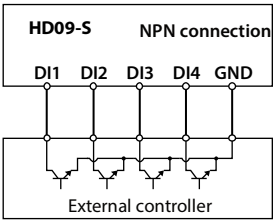
Analogue Input Connection



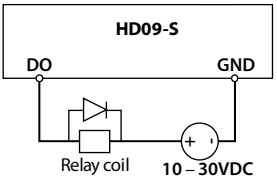


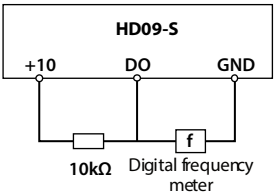
Digital Input Connection





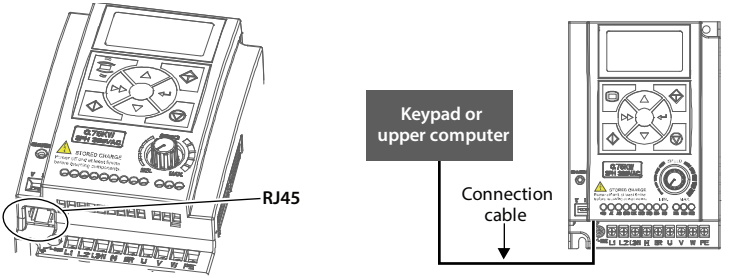
Digital Output Connection

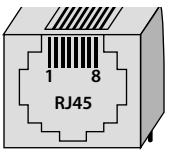




4.4 External Keypad or Upper Computer

The RJ45 terminal can connect the optional keypad or upper computer, as shown in the following figure.



<table>
<tr><td rowspan="6">RJ45</td><td rowspan="6"> 
</td><td>Pin</td><td>Definition</td></tr>
<tr><td>1, 3</td><td>+5V</td></tr>
<tr><td>2</td><td>485+</td></tr>
<tr><td>4, 5, 6</td><td>GND</td></tr>
<tr><td>7</td><td>485-</td></tr>
<tr><td>8</td><td>Reserved</td></tr>
<tr><td>Keypad</td><td colspan="3">Can connect the optional keypad to realize keypad control
• Refer to section 6.1 Keypad, page 23</td></tr>
<tr><td>Upper Computer</td><td colspan="3">Can connect the upper computer to realize communication control
• The upper computer includes PLC, touch screen, PC, etc.</td></tr>
<tr><td>Connection Cable</td><td colspan="3">• 1m conncection cable [HD-CAB-1M]
• 2m conncection cable [HD-CAB-2M]
• 3m conncection cable [HD-CAB-3M]
• 6m conncection cable [HD-CAB-6M]</td></tr>
</table>

Chapter 5 Technical Data

5.1 Peripheral Accessories Selection

5.1.1 Wiring Specifications of Input and Output

The AC supply to the drive must be installed with suitable protection against overload and short-circuits, i.e. MCCB (molded case circuit breaker) or equivalent device.

The recommended specification of MCCB, contactor & cables were shown as following tables.

The size of earth wire should not be smaller than the requirement in 4.3.5.4 of IEC61800-5-1.

Size	Model	MCCB (A)	Contactor (A)	Power Cable (mm^2)	Motor Cable (mm^2)	Ground Cable (mm^2)
Size A	HD09-2S0P2G-S	16	10	1	0.5	2.5
Size A	HD09-2S0P4G-S	16	10	1	0.5	2.5
Size A	HD09-2S0P4G-B-S	16	10	1	0.5	2.5
Size A	HD09-2S0P7G-S	16	10	2.5	0.5	2.5
Size A	HD09-2S0P7G-B-S	16	10	2.5	0.5	2.5
Size A	HD09-2S1P5G-S	20	16	4	1.5	6.0
Size A	HD09-2S1P5G-B-S	20	16	4	1.5	6.0
Size A	HD09-2S2P2G-S	32	20	6	2.5	6.0
Size A	HD09-2S2P2G-B-S	32	20	6	2.5	6.0
Size A	HD09-4T0P4G-S	10	10	0.5	0.2	2.5
Size A	HD09-4T0P7G-S	10	10	0.5	0.5	2.5
Size A	HD09-4T1P5G-S	16	10	1	0.5	2.5
Size A	HD09-4T2P2G-S	16	10	1.5	1	2.5
Size B	HD09-4T4P0G-S	25	16	2.5	1.5	2.5
Size B	HD09-4T5P5G-S	32	25	4	2.5	4

Note:

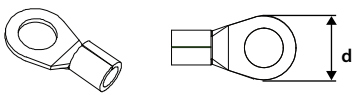
1. Please select braking resistor based on the above table.
Bigger resistor can protect the braking system in fault condition, but oversized resistor may bring a capacity decrease, lead to over voltage protection.

2. The braking resistor should be mounted in a ventilated metal housing to prevent inadevertent contact during it works, for the temperature is high.

3. Only three-phase power (4T) and HD09-B-S built-in braking unit, braking resistor can be optional.

5.1.2 Power Terminal Lug

The terminal lugs (round bare terminals) of the power terminals can be selected according to the terminal wiring specifications, screw specifications and the max. outer diameter of the lugs.



Size	Size A	Size B
Screw size	M3	M3.5
Tightening torque (N. M)	0.6 - 0.8	0.8 - 1.2
Max. outer diameter of lug d (mm)	6.1	7

5.2 Braking Resistor

Size	Model	Resistance Value (Ω)	Resistance Power (W)
Size A	HD09-2S0P4G-B-S	200 - 300	50
Size A	HD09-2S0P7G-B-S	150 - 250	100
Size A	HD09-2S1P5G-B-S	100 - 150	200
Size A	HD09-2S2P2G-B-S	80 - 100	250
Size A	HD09-4T0P4G-S	300 - 400	80
Size A	HD09-4T0P7G-S	250 - 350	100
Size A	HD09-4T1P5G-S	200 - 300	200
Size A	HD09-4T2P2G-S	150 - 250	250
Size B	HD09-4T4P0G-S	100 - 150	300
Size B	HD09-4T5P5G-S	80 - 100	500

Note:

Only three-phase power (4T) and HD09-B-S built-in braking unit, braking resistor can be optional.

5.3 Technical Data

Electrical	
Input voltage	HD09-2S■P■G-S: Single-phase 200 - 240V HD09-2S■P■G-B-S: Single-phase 200 - 240V HD09-4T■P■G-S: Three-phase 380 - 460V Fluctuating within ± 10%, imbalance rate < 3%
Input frequency	50/60Hz ± 5%
Output voltage	0 - input voltage
Output frequency	0 - 400Hz
Specification	
Control mode	V/f, SVC control
Max. current	150% rated output current 2 minutes; 180% rated output current 10 seconds
Speed resolution	Digital setting: 0.1Hz; Analogue setting: 0.1% × max. frequency
Wave frequency	Default setting: 8kHz, setting range: 1 - 8kHz
Environment	
Operation temperature	-10 - +40°C, no ferating; 40 - 50°C, the derating value of the output current shall be 2% for each more than 1°C
Storage temperature	-40 - +70°C
Location for use	Indoor, preveting from direct sunlight, no dust, corrosive, flammable gases, oil mist, water vaper, dripping or salt etc.
Altitude	Less than 1000m, no ferating; Otherwise shouldbe serating use
Humidity	Less than 95%RH, non-condensing
Vibration resistance	It is 3.5m/s^2 in 2 - 9Hz, it is 10m/s^2 (IEC60721-3-3) in 9 - 200Hz
Protection level	IP20
Pollution degree	Level 2 (Dry, Non conducting dust pollution)
Accessories	
Keypad	HD-LED-P: LED keypad with potentiometer, matched with HD-KMB mounting base HD-LED-P-S: Small size keypad, matched with HD-KMB-S mounting base
Connection cable	1m / 2m / 3m / 6m connection cable [HD-CAB-1M / 2M / 3M / 6M]

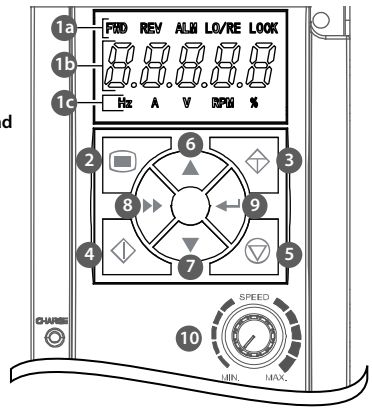
Chapter 6 Operation

6.1 Keypad

HD09-S can either installed with LCD display keypad (standard), or LED display keypad (optional).

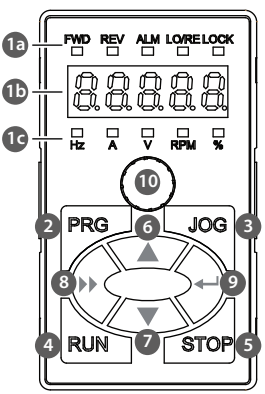
LCD display keypad

Standard

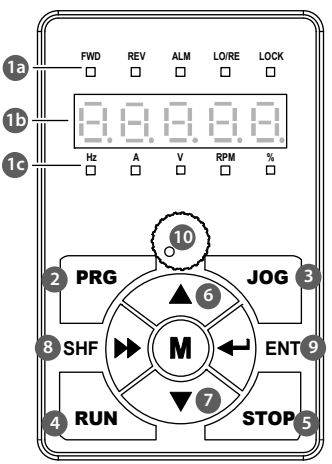


LED display keypad

Optional



HD-LED-P-S



HD-LED-P

No.	Description	
1	The standard keypad contains LCD display, while the optional keypad contains LED nixie tube display. • Three status: Lighting, flashing and lightless. • Do not remove the standard LCD keypad. a. **Status indicator: Indicating current status.** • FWD (Forward status): Motor is FWD running (standard LCD) / lighting (optional LED) • REV (Reverse status): Motor is REV running (standard LCD) / lighting (optional LED) • ALM (Alarm status): Motor is faulty (standard LCD) / lighting (optional LED) • LO / RE (Local / Remote status): Inverter is in terminal or communication control mode (standard LCD) / lighting (optional LED) • LOCK (Password locked status): User password lock of the inverter is avail (standard LCD) / lighting (optional LED) b. **Display area: Normal: Displays parameter. Faulty: Displays error code when the inverter is faulty.** • If a value is flashing, it mean that the value is revisable. c. **Unit indicator: Display unit of the current value.** • Include: Hz (frequency), A (current), V (voltage), RPM (rotate speed), % (percentage)	
2	PRG	**Program / Exit button**: Entry or programming button
3	JOG	**Jog button**: In the keypad control, jog start the inverter
4	RUN	**Run button**: In the keypad control, press this button to run the inverter
5	STOP	**Stop / Reset button**: In the keypad control, to stop the inverter and reset the fault
6	▲	**Increment button**: In selecting parameter status, press it to increass the value of parameter; In setting parameter status, press it to incress the setting value.
7	▼	**Decrement button**: In selecting parameter status, press it to decreass the value of parameter; In setting parameter status, press it to decress the setting value.
8	▶▶	**SHE shift button**: In selecting pr setting parameter status, shift 1 bit.
9	↵	**ENT enter / confirm button**: Enter lower menu; In setting parameter status, confirm and save the data.
10	**Potentiometer**: In setting parameter status, anti-clockwise means decrease, while clockwise means increase.	

6.2 Shutdown and Operating Status Parameters

HD09-S Inverter in the state of stop / run, press the key ▶▶ to cycle display the stop / run status parameter.

- Stop status parameter (F18.08 – F18.13): Set frequency, DC bus voltage, AI input voltage, potentiometer input voltage, input terminal status, output terminal status.
- Operating status parameter (F18.02 – F18.07): Setting frequency (after Acc. and Dec.), set frequency, output frequency, output voltage, output current, DC bus voltage.

6.3 Keypad Control Operation

In operation under keypad control (F00.11 = 0), the inverter can be started and operated directly with keypad.

Steps are as follows:

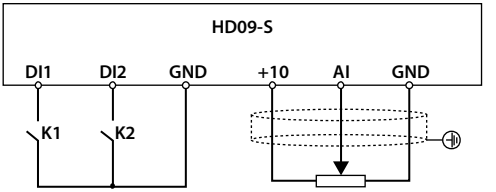
1. Turn on the input power.
2. Set the motor parameters according to the motor nameplate: F08.00 (Rated power), F08.01 (Rated voltage), F08.02 (Rated current), F08.03 (Rated frequency), F08.04 (Rated speed).
3. Set the operating frequency: F00.13, range 0.00 - 50.00Hz.
4. Set Acc. / Dec. time: F03.01 (Acc. time), F03.02 (Dec. time).
5. Press key ◇ (standard) / key **RUN** (optional), the inverter starts.
6. Press key ▽ (standard) / key **STOP** (optional), the inverter stops.

6.4 Terminal Control Running

When the terminal controls the operation (F00.11 = 1), the inverter can be started and stopped directly with the terminal, and the running frequency and the motor running direction.

As follows:

1. After wiring as shown below, turn on the input power.



2. Set the command channel to terminal control (F00.11 = 1).

3. Set the AI setting frequency (F00.10 = 3, F16.01 = 2).

3. Set DI1 terminal FWD (F15.00 = 2), DI2 terminal REV (F15.01 = 3).

4. Set the motor parameters according to the motor nameplate: F08.00 (Rated power), F08.01 (Rated voltage), F08.02 (Rated current), F08.03 (Rated frequency), F08.04 (Rated speed).

6. Set Acc. / Dec. time: F03.01 (Acc. time), F03.02 (Dec. time).

7. When the K1 is closed, the motor is running; When K2 is closed, the motor is running in REV.

8. K1, K2 are closed or disconnected at the same time, the inverter stops.

6.5 Communication Control Operation

In communication control operation (F00.11 = 2), the function parameters, state parameters, and control commands of the converter can be read and written by the host computer.

In communication, converter is in the slave mode.

Please see section 4.4 External Keypad or Upper Computer, page 17.

For details, see section 7.15 F17: SCI Communication Parameter, page 60.

Chapter 7 Detailed Function Introduction

7.1 d00: Status Display Parameters

<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td>d00.00</td><td>Series of the inverter</td><td>[Actual value]</td></tr>
<tr><td>d00.01</td><td>Software version of the control board</td><td>[Actual value]</td></tr>
<tr><td>d00.03</td><td>Special software version of the control board</td><td>[Actual value]</td></tr>
<tr><td>d00.05</td><td>Software version of the keypad</td><td>[Actual value]</td></tr>
<tr><td>d00.06</td><td>Customized series No.</td><td>[Actual value]</td></tr>
<tr><td>d00.07</td><td>Control mode</td><td>[Actual value]</td></tr>
<tr><td></td><td colspan="2">00: V/f contorl without PG. 20: Vector control without PG.</td></tr>
<tr><td>d00.08</td><td>Rated current of the inverter (A)</td><td>[Actual value]</td></tr>
<tr><td>d00.10</td><td>Inverter status</td><td>[Actual value]</td></tr>
<tr><td></td><td colspan="2">Display the inverter status, as shown in the following table:
<table>
<tr><th></th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th></tr>
<tr><td>Unit</td><td>Zero speed running
0: In non-zero speed runing
1: In zero speed running</td><td>Forward / REV
0: Forward
1: Reverse</td><td>Bit1: Run / stop
0: Stop
1: Run</td><td>Bit0: Inverter fault
0: No fault
1: Fault</td></tr>
<tr><td>Ten</td><td>DC braking
0: Non-DC braking status
1: In DC braking</td><td>Reserved</td><td colspan="2">Bit1&Bit0: Acc. / Dec. / constant
00: Constant 01: Acc.
11: Constant 10: Dec.</td></tr>
<tr><td>Hundred</td><td>Reserved</td><td>Speed limiting value
0: Not in the limiting
1: In the limiting</td><td>Reserved</td><td>Parameter auto-tuning
0: No auto-tuning
1: Auto-tuning</td></tr>
<tr><td>Thousand</td><td>Reserved</td><td>Reserved</td><td>Current limiting
0: In
1: Not in</td><td>Stall overvoltage
0: In
1: Not in</td></tr>
</table></td></tr>
<tr><td>d00.11</td><td>Master setting frequency source</td><td>[Actual value]</td></tr>
<tr><td></td><td colspan="2">0: Keypad set.
1: Terninal set.
2: Communicaiton set.
3: Analogue set.
4: Terminal pulse set.
6: AI1 terminal setting.
10: Keypad potentiometer setting.
11: PID.
12: Multi-speed.</td></tr>
</table>

Ref. Code	Function Description	Setting Range [Default]
d00.12	Master setting frequency (Hz)	[Actual value]
d00.13	Auxiliary setting frequency (Hz)	[Actual value]
d00.14	Setting frequency (Hz)	[Actual value]
d00.15	Reference frequency (after Acc. / Dec.) (Hz)	[Actual value]
d00.16	Output frequency (Hz)	[Actual value]
d00.17	Setting RPM (rpm)	[Actual value]
d00.18	Running RPM (rpm)	[Actual value]
d00.20	Output voltage (V)	[Actual value]
d00.21	Output current (A)	[Actual value]
d00.22	Torque setting (%)	[Actual value]
d00.23	Output torque (%)	[Actual value]
d00.24	Output power (kW)	[Actual value]
d00.25	DC bus voltage (V)	[Actual value]
d00.26	Potentiometer input voltage of the keypad (%)	[Actual value]
d00.27	AI input (%)	[Actual value]
	Display filtered AI input voltage / current. • When AI selects the voltage input, 0V corresponds to 0.0% and 10V corresponds to 100.0%. • When AI selects current input, 0mA corresponds to 0.0% and 20mA corresponds to 100.0%.	
d00.28	AI input (after disposal) (%)	[Actual value]
	Displays the AI input voltage / current after gain, offset processing. • When AI selects the voltage input, 0V corresponds to 0.0% and 10V corresponds to 100.0%. • When AI selects current input, 0mA corresponds to 0.0% and 20mA corresponds to 100.0%.	
d00.35	DI4 terminal pulse input frequency (Hz)	[Actual value]
d00.36	AO output (%)	[Actual value]
	AO output is displayed. • When AO selects the voltage output, 0.0% corresponds to 0V and 100.0% corresponds to 10V. • When AO selects 0 - 20mA current output, 0.0% corresponds to 0mA and 100.0% corresponds to 20mA.	
d00.38	High-speed output pulse frequency (Hz)	[Actual value]
d00.39	Heatsink temperature (°C)	[Actual value]
d00.40	Setting line speed	[Actual value]
d00.41	Reference line speed	[Actual value]
d00.44	Process PID reference (%)	[Actual value]
d00.45	Process PID feedback (%)	[Actual value]
d00.46	Process PID tolerance (%)	[Actual value]
d00.47	Process PID integral item (%)	[Actual value]
d00.48	Process PID output (%)	[Actual value]
d00.49	External counting value	[Actual value]

<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td>d00.50</td><td>Input terminal status</td><td>[Actual value]</td></tr>
<tr><td></td><td colspan="2">Input terminal status is displayed. Each bit (binary) of the function parameter represents a different physical channel, see the table on the right.
• 0: The multi-function input terminal is disconnected from the corresponding common terminal.
• 1: The multi-function input terminal is connected to the corresponding common terminal.
<table><tr><td>Bit12</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr><tr><td>AI</td><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td></tr></table></td></tr>
<tr><td>d00.51</td><td>Output terminal status</td><td>[Actual value]</td></tr>
<tr><td></td><td colspan="2">Display output terminal status. Each bit (binary) of the function parameter represents a different physical channel, see the table on the right.
• 0: The multi-function output terminal is disconnected from the corresponding common terminal.
• 1: The multi-function output terminal is connected to the corresponding common terminal.
<table><tr><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr><tr><td>Reserved</td><td>RLY</td><td>DO</td><td>Reserved</td></tr></table></td></tr>
<tr><td>d00.55</td><td>Total time at power-on (h)</td><td>[Actual value]</td></tr>
<tr><td>d00.56</td><td>Total time at operation (h)</td><td>[Actual value]</td></tr>
<tr><td>d00.57</td><td>High bit of motor total energy consumption (k kW.h)</td><td>[Actual value]</td></tr>
<tr><td>d00.58</td><td>Low bit of motor total energy consumption (kW.h)</td><td>[Actual value]</td></tr>
<tr><td>d00.59</td><td>High bit of energy consumption at this time running (k kW.h)</td><td>[Actual value]</td></tr>
<tr><td>d00.60</td><td>Low bit of energy consumption at this time running (kW.h)</td><td>[Actual value]</td></tr>
<tr><td>d00.61</td><td>Present fault</td><td>[Actual value]</td></tr>
</table>

7.2 F00: Basic Parameter

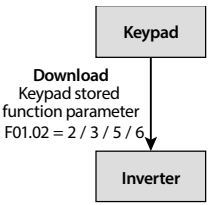
<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td>F00.01</td><td>Control mode selection</td><td>0 - 2 [0]</td></tr>
<tr><td></td><td colspan="2">0: V/f control without PG.
• Constant control voltage / frequency ratio.
• Especially suitable for inverters driving sveral electrical machinery's occasion, in order to improve the current velocity modulation system.
• When V/f control is selected, set the F09 V/f control parameters reasonably to achieve a good control effect.
2: PG without vector control.
• That is, the speed sensorless vector control method.
• For general purpose variable speed drive with high performance and torque requirements.
• Auto tuning of the motor parameters is required. Correctly set motor nameplate parameters in F08.00 - F08.04, start motor parameter auto-tuning to obtain the correct motor parameters, and set the vector control parameters of F10 group to exert excellent vector control effects.</td></tr>
</table>

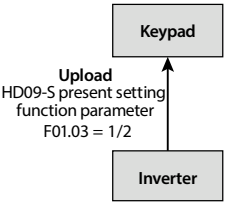
Ref. Code	Function Description	Setting Range [Default]
F00.06	**Max. output frequency**	**50.00 - 400.00 [50.00Hz]**
	Defines the max. frequency the inverter can output. • The max. frequency for V/f control is 400Hz and the max. frequency for vector control is 150Hz. • According to the nameplate parameters of the controlled motor and the actual operating conditions, it should be set with care and reasonableness.	
F00.08	**Max. operating frequency**	**0.00 - F00.06 [50.00Hz]**
F00.09	**Min. operating frequency**	**0.00 - F00.08 [0.00Hz]**
	Used to limit the actual output frequency value. When the set frequency is greater than the zero-frequency threshold (F19.10) and less than F00.09, operation in lower limit frequency. • Motor parameter auto tuning operation is invalid. • Except for upper / lower limit frequency limit, inverter's running output frequency is affected by start / stop DWELL frequency (F02.02, F02.14), zero-frequency threshold (F19.10), starting frequency of stopping DC braking (F02.16), hopping frequency (F05.17) and other parameter settings.	
F00.10	**Frequency setting access selection**	**0 - 4 [0]**
	0: Keypad digital setting. • The initial value is set by F00.13 through the key ▲, ▼ on the operation keypad. 1: Terminal digital setting. • Adjust with terminal UP / DN, the initial value is set by F00.13. 2: SCI communication setting. • Change the setting frequency through SCI communication frequency setting command. • SCI communication frequency initial value is 0. 3: Analogue setting. • Set by analogue input voltage, see group F16. • For the correspondence between analog value and inverter running frequency setting, refer to F05 group. 4: Terminal impulse setting. • Set by terminal pulse DI4. • Input pulse signal specifications: Voltage range 15 - 30V; Frequency range 0 - 50.00kHz. • Refer to F05 for the correspondence between terminal pulse frequency and inverter running frequency setting. 6: AI1 terminal setting. 11: Keypad potentiometer setting.	
F00.11	**Operation command access selection**	**0 - 2 [0]**
	0: Keypad operation command. • Start and stop with buttons / **RUN**, / **STOP**, / **JOG** on keypad. 1: Terminal operation command. • Start and stop with the corresponding external terminals. • External terminals FWD rotation (DI terminal set to 2), REV rotation (DI terminal set to 3), JOGF (DI terminal set to 20) and JOGR (DI terminal set to 21).	

Ref. Code	Function Description	Setting Range [Default]
	2: SCI communication command. • Start and stop according to the communication protocol through SCI communication port.	
F00.13	**Original operation frequency digital setting**	**0.00 - F00.08 [50.00Hz]**
	F00.10 = 0,1, F00.13 Determine the initial value of the set frequency.	
F00.14	**UP / DOWN digital setting control**	**0000 - 1111 [1001]**
	Enable only when F00.10 = 0,1. • When F00.13 is changed, the new value will replace current setted frequency. **Unit: Storage option of set frequency when power down** • 0: Not saved. • 1: Save in F00.13. **Ten: Options of set frequency in stop** • 0: Frequency hold. • 1: The set frequency returns to F00.13 when stopped. **Hundred: Options of set frequency in communication** • 0: Not saved. • 1: Save in F00.13. **Thousand: Options of set frequency in frequency channel switching** • 0: Do not save. • 1: Save. • If the current frequency channel is keypad or terminal and the frequency is A, the frequency channel will be switched to other channels such as analog and then back to the keypad or terminal. • If set to 0 (not saved), the current set frequency is determined by F00.13; If set to 1 (save), the current setting frequency is A.	
F00.15	**Inching operation frequency digital setting**	**0.00 - F00.08 [5.00Hz]**
F00.17	**Running direction selection**	**0,1 [0]**
	0: Same direction. 1: Contrary direction.	
F00.18	**Anti-REV operation**	**0,1 [0]**
	This function is valid when F00.11 = 0, 1, 2. 0: Reverse allowed. 1: Do not REV. • The inverter only responds to the FWD run command. If the current frequency is set negative, the inverter runs at zero frequency. • The inverter will not respond to the REV command if it is stopped. If it receives the REV command during operation, the inverter decelerates to stop immediately and remains in the stop status.	
F00.19	**Dead time between positive and negative rotation**	**0.0 - 3600.0 [0.0s]**
	Waitting time of inverter in zero frequency during the transition from FWD to REV or from REV to FWD.	
F00.20	**External keypad potentiometer enabled**	**0,1 [0]**
	0: Enable. • When the inverter uses the external keypad of the communication interface, the operation keypad other than the potentiometer input voltage shall prevail. 1: Invalid. • When the inverter uses the external keypad of the communication interface, the potentiometer input voltage is subject to its own operation keypad.	

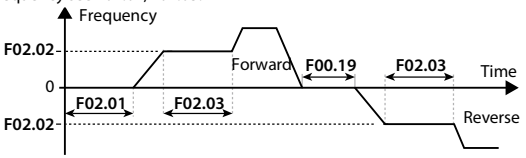
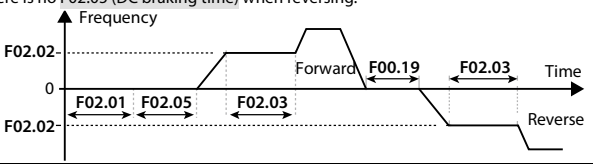
7.3 F01: Parameter Protection Function

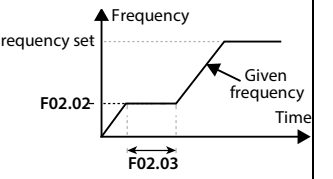
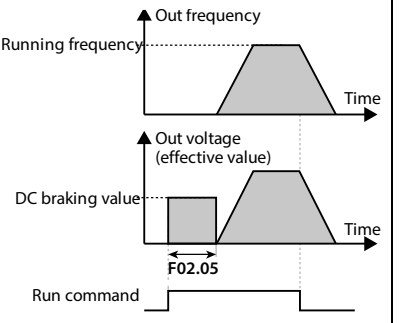
Ref. Code	Function Description	Setting Range [Default]
F01.00	**User password**	**00000 - 65535 [00000]**
	XXXXX: After user password setted (not all zero), password will be valid. Only function parameter can be viewed via keypad. • If needing to change parameter, right password shall be entered. **00000**: Setted at 00000, the password is not valid and if password has been existed before, then it will be removed. **Password setting**: After setting, press button ▣ / PRG back to stop / running status or no action for 5 minustes, the password will be valid.	
F01.01	**Menu mode selection**	**0,1 [0]**
	0: Standard menu mode. • Display all parameter. 1: Verifying menu mode. • Only display parameters different from default setting.	
F01.02	**Function code parameter initialization (parameter download)**	**0 - 6 [0]**
	0: No action. • The inverter is in normal status of parameter reading and writing. • Whether the parameters can be changed, depends on the setting status of the user password and the current working condition of the inverter. 1: Restore the factory parameter. • Except F01.00, F01.02, F01.03, F08, F13.01 - F13.15, F19.15, F19.19, F19.24, F20.08, F20.09, F20.21 - F20. 37, F23.00 and group y. • **Operation steps:** Set F01.02 = 1, press key ↵ confirm. At this moment, the factory parameters are restored. The "rESEt" is displayed on the keypad. After the factory parameters are restored, the keypad displays the parameters of stop status. 2: Cope the storaged parameter 1 of keypad to controller board for current function code value updating. 3: Cope the storaged parameter 2 of keypad to controller board for current function code value updating. 4: Clear out fault records. • Clear out the recorded fault information in F20.21 - F20.37. 5: Keypad storage parameters 1 is copied to the control keypad and update the current function code setting (including motor parameters). 6: keypad storage parameter 2 is copied to the control keypad and the current function code setting value (including motor parameters) is updated. *Note:* *1. The parameters F01.00, F01.02, F01.03, F20.21 - F20.37 and y are not copied.* *2. Options 2, 3, 5, 6 are only valid when the operator keypad is used externally.*	

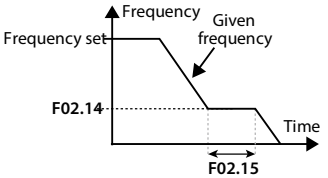
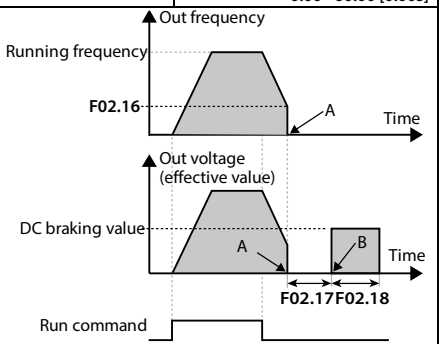


Ref. Code	Function Description	Setting Range [Default]
F01.03	**Copy the parameters to keypad**	0 - 2 [0]
	0: No action. • Converter is in normal reading status. 1: Current function code value is copied to keypad storage parameter 1. 2: Current function code value is copied to keypad storage parameter 2. *Note:* *1. F01.00, F01.02, F01.03, F20.21 - F20.37 and group y not be copied.* *2. Parameter copying is valid only in external keypad.*	

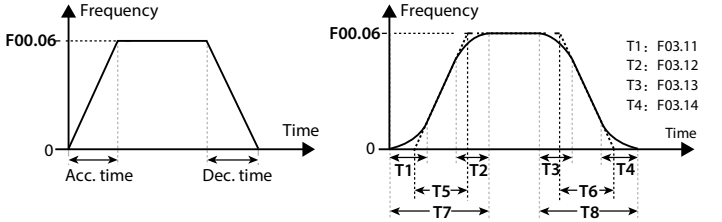
7.4 F02: Start and Stop Controlling Parameter

Ref. Code	Function Description	Setting Range [Default]
F02.00	**Start mode selection**	0,1 [0]
	0: Start from starting DWELL frequency. • Start DWELL frequency see F02.02, F02.03.  1: Brake firstly and then start from DWELL frequency. • DC braking see F02.04, F02.05. • Start-up DC-braking is valid only during start-up from stop to operating state. In the REV running direction, the starting accelerating process in the other direction is invalid. As shown in the following figure, there is no F02.05 (DC braking time) when reversing. 
F02.01	**Starting delay time**	0.00 - 10.00 [0.00s]
	When the inverter receives the run command, it will wait for the delay time set by F02.01 and then start running.	

<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td>F02.02</td><td>Frequency setting of DWELL starting</td><td>0.00 - F00.08 [0.00Hz]</td></tr>
<tr><td>F02.03</td><td>Frequency keeping time of DWELL starting</td><td>0.00 - 10.00 [0.00s]</td></tr>
<tr><td></td><td colspan="2">At start-up, the set output frequency is temporarily maintained to prevent the motor from stalling.
For motor-driven load, When a brake is installed, when the brake moves slowly, use the start-up DWELL function to accelerate after the brake is fully open to prevent brake friction.
• During Acc., when the setting frequency matches the frequency set by F02.02, the output frequency is kept accelerating after the time set in F02.03.
• F02.02 = 0 or F02.03 = 0, DWELL frequency in starting is not valid.
 
</td></tr>
<tr><td>F02.04</td><td>DC brake current setting</td><td>0 - 100% (inverter rated current) [50%]</td></tr>
<tr><td>F02.05</td><td>Starting DC braking time</td><td>0.00 - 60.00 [0.00s]</td></tr>
<tr><td></td><td colspan="2">F02.04 is the percentage of the inverter's rated current. Set the DC braking start and stop DC braking current value.
• If the set DC brake current is more than 5 times the rated motor current, the injected current is 5 times the rated motor current.
• DC braking current is valid for both DC braking and DC braking.
F02.05 = 0, no DC braking procedure.
• F02.05 is valid only when F02.00 = 1.
 
</td></tr>
<tr><td>F02.13</td><td>Stoping mode selection</td><td>0 - 2 [2]</td></tr>
<tr><td></td><td colspan="2">0: Reserved.
1: Stop freely.
• After the inverter receives the stop command, the output will be terminated immediately. The load will stop freely according to the mechanical inertia.
2: Dec. stop + DC brake.
• After the inverter receives the stop command, it will decrease the output frequency according to the Dec. time. When the frequency set by F02.16 is reached, DC braking will start.
• Stop DC braking function see F02.16 - F02.18. For Dec. time see F03.01 - F03.02.</td></tr>
</table>

Ref. Code	Function Description	Setting Range [Default]
F02.14	**DWELL frequency setting in stopping**	0.00 - F00.08 [0.00Hz]
F02.15	**DWELL frequency keeping time in stopping**	0.00 - 10.00 [0.00s]
	When stopping, the set output frequency is temporarily maintained to prevent the motor from stalled. For Motor-Driven Load, a brake is installed, use the stop DWELL function to shut down the brake with the brakes fully closed, in the event of slow keypade and possible danger to prevent the brake from fully closing. • Valid only when F02.13 = 0. • During Dec., when the setting frequency and the frequency set by F02.14 are consistent, the output frequency should be kept decelerating after the time set in F02.15. • F02.14 = 0 or F02.15 = 0, stopping DWELL frequency is invalid. 	
F02.16	**Starting frequency of stopping DC braking**	0.00 - 50.00 [0.50Hz]
F02.17	**DC braking waiting time at stop**	0.00 - 10.00 [0.00s]
F02.18	**Stopping DC braking time**	0.00 - 60.00 [0.00s]
	F02.17 refers to the time interval from point A (running frequency reaches F02.16) to B (starting to apply DC braking) during Dec. and stop. • No output during stop brake waiting. The setting of F02.17 can effectively prevent the current overshoot at the start of braking (point B) for high-power motors. • F02.04 sets the stop DC brake current. F02.18 = 0, there is no DC braking process. • F02.16 - F02.18 valid only when F02.13 = 2. 	
F02.19	**Jog control mode**	0,1 [0]
	0: In JOG mode, the start mode set by F02.00 and the stop mode set by F02.13 are invalid. When the JOG command is valid, the inverter will run directly; When the JOG command is invalid, the inverter will decelerate and stop. 1: During jogging operation, the inverter runs according to the starting mode set by F02.00 and the stop mode set by F02.13.	
F02.20	**Pre-excitation time**	0.00 - 0.50 [0.01s]
	Pre-excitation: Establish the motor flux before the motor rotates for faster Acc.. • This function is only effective under the open-loop vector control mode (F00.01 = 2). It is recommended that the setting value of F02.20 be not less than 0.10s. • F02.20 = 0, the pre-excitation function is invalid.	

7.5 F03: Acc. and Dec. Parameter

Ref. Code	Function Description	Setting Range [Default]
F03.00	**Acc. / Dec. mode selection**	**0,1 [0]**
	0: Linear Acc. / Dec.. • The output frequency increases or decreases at a constant slope. 1: S curve Acc. and Dec.. • Output frequency increases or decreases according to S curve. • T5 sets the Acc. time and T7 the actual Acc. time. T6 sets the Dec. time, T8 is the actual Dec. time. 	
F03.01	**Acc.time 1**	**0.1 - 6000.0 [10.0s]**
F03.02	**Dec.time 1**	**0.1 - 6000.0 [10.0s]**
F03.03	**Acc.time 2**	**0.1 - 6000.0 [10.0s]**
F03.04	**Dec.time 2**	**0.1 - 6000.0 [10.0s]**
F03.05	**Acc.time 3**	**0.1 - 6000.0 [10.0s]**
F03.06	**Dec.time 3**	**0.1 - 6000.0 [10.0s]**
F03.07	**Acc.time 4**	**0.1 - 6000.0 [10.0s]**
F03.08	**Dec.time 4**	**0.1 - 6000.0 [10.0s]**
	Acc. time means converter accelerating time from 0 to F00.06 (Max. output frequency) in line mode. Dec. time means converter decelerating time from F00.06 (Max. output frequency) to 0 in line mode. **Acc. time, Dec. time switch:** • Acc. / Dec. time can be selected by DI terminal 26 or 27 function or F03.09 and F03.10 during inverter running. *Note: If the brake module is improperly selected, rapid Dec. or load inertia is large, an overvoltage fault may occur in the inverter; F19.18 can be adjusted by selecting appropriate brake components or increasing the Dec. time and adjust F19.19 to avoid overvoltage faults that may occur.*	
F03.09	**Frequency switchover of Acc. Time 2 and 1**	**0.00 - F00.08 [0.00Hz]**
	When running frequency is lower than F03.09, accelerats in Acc.time 2; Otherwise, speed up in Acc. time. • It is invalid when terminals are chosed to Acc. and Dec. time (DI are setted as function 26 and 27).	

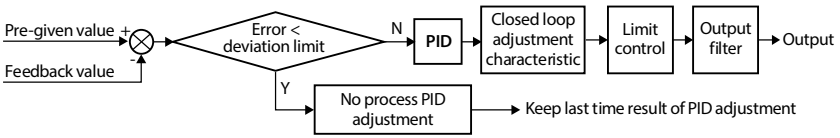
Ref. Code	Function Description	Setting Range [Default]
F03.10	**Frequency switchover of Acc. Time 2 and 1**	**0.00 - F00.08 [0.00Hz]**
	When running frequency is lower than F03.10, speed up in Dec. time 2; Otherwise, speed down in Dec. time 1. • It is invalid when terminals are chosed to Acc. and Dec. time (DI are setted as function 26 and 27).	
F03.11	**S-curve characteristic time at starting Acc.**	**0.00 - 2.50 [0.20s]**
F03.12	**S-curve characteristic time at ending Acc.**	**0.00 - 2.50 [0.20s]**
F03.13	**S-curve characteristic time at starting Dec.**	**0.00 - 2.50 [0.20s]**
F03.14	**S-curve characteristic time at ending Dec.**	**0.00 - 2.50 [0.20s]**
	Refer to F03.00.	
F03.15	**Inching Acc. time**	**0.1 - 6000.0 [6.0s]**
F03.16	**Inching Dec. time**	**0.1 - 6000.0 [6.0s]**
	F03.15, F03.16 define Acc. and Dec. time in inching running.	
F03.17	**Dec. time of emergency stop**	**0.1 - 6000.0 [10.0s]**
	It defines the Dec. time of emergency stop.	

7.6 F04: Process PID Controlling Parameter

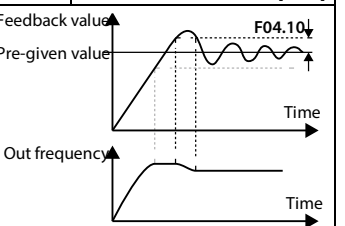
Process PID control is generally used for site pressure, liquid level, temperature and other physical quantities of control.

AI max. analog input value or DI4 max. input pulse frequency (F16.17) corresponds to the max. output frequency (F00.06).

The process is as follows block diagram:



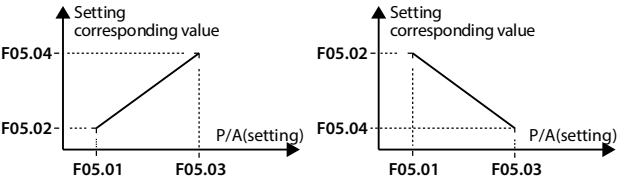
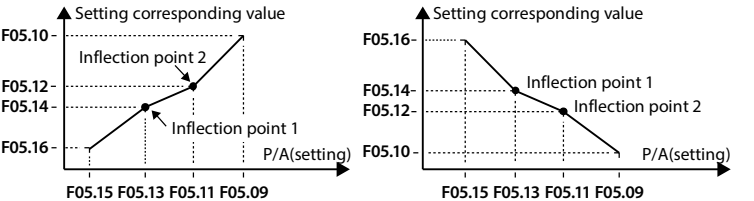
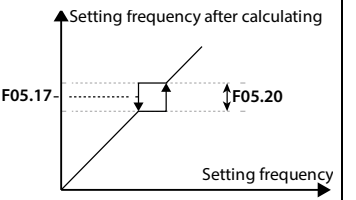
Ref. Code	Function Description	Setting Range [Default]
F04.00	**Process PID function selection**	**0,1 [0]**
	0: PID control invalid. 1: PID control valid.	
F04.01	**Setting channel selection**	**0 - 7 [0]**
	0: Digit setting. • Setting by F04.03. 1: Analog setting. • The analog input voltage is setting, the maximum analog input corresponds to the PID setting 100%, check the F16 group parameters.	

Ref. Code	Function Description	Setting Range [Default]
	2: Terminal pulse setting. • Setting by the terminal pulse input, the maximum input pulse frequency corresponds to the PID setting 100%, check the F16 group parameters. 3: AI1 terminal is setting. 7: Keypad potentiometer is setting.	
F04.02	**Feedback access selection**	**0,1 [0]**
	0: Analogue feedback. • Feedback via terminal AI (F16.01 = 5). 1: Terminal impulse feedback. • Feedback via DI4 terminal (F15.03 = 53).	
F04.03	**Setting para. digital setting**	**-100.0 - 100.0 [0.0%]**
	F04.03 define PID regulator preset. F04.01 = 0 (digital reference) effective.	
F04.04	**Proportional gain (P)**	**0.00 - 10.00 [2.00]**
F04.05	**Integral time (I)**	**0.01 - 10.00 [1.00s]**
F04.06	**Points limit**	**0.00 - F00.08 [50.00Hz]**
F04.07	**Derivative time (D)**	**0.00 - 10.00 [0.00s]**
F04.08	**Differential limiting values**	**0.00 - F00.08 [20.00Hz]**
F04.09	**Sampling period (T)**	**0.01 - 50.00 [0.10s]**
	F04.04, F04.05, F04.07 define process PID parameter. F04.06 defines the upper limit of the process PID integral term. F04.08 define proces PID differential terms up limit. F04.09 define sampling period for feedback quantit. PID regulator will work one time during each period. • F04.07 = 0, differential items invalid.	
F04.10	**Deviation limit**	**0.0 - 20.0 [0.0%]**
	Define max. allowable deviation value. Compared between the system output value and the process PID value. • When feedback is within F04.10, PID regulator stop working. See as right diagram. • Setting up appropriate F04.10 helps to balance the system output accuracy and stability. 	
F04.13	**PID regulator upper limit**	**0.0 - 100.0 [100.0%]**
F04.14	**PID regulator lower limit**	**0.0 - 100.0 [0.0%]**
	Defines the digital setpoint for the upper / lower output of the process PID regulator.	
F04.17	**PID output filter time**	**0.01 - 10.00 [0.05s]**
	Define process PID output filtering time.	

Ref. Code	Function Description	Setting Range [Default]
F04.18	**PID output REV choice**	**0,1 [0]**
	0: PID adjust the inversion is prohibited. • 0 to limit when PID output is negative. 1: PID output is allowed to reversal. • F00.18 = 1 (reverse is prohibited), 0 is the limit.	
F04.19	**PID output inversion frequency limit**	**0.0 - F00.08 [50.0Hz]**
	The upper limit of frequency defined PID inversion. • F04.18 = 1 (PID adjust the allow reversal) valid.	

7.7 F05: External Setting Curve Parameters

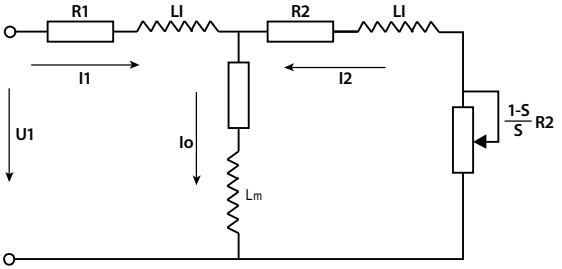
Ref. Code	Function Description	Setting Range [Default]
F05.00	**External setting curve selection**	**0 - 3 [3]**
	AI characteristic curve selection. • 0: Straight line. • 1: Reserved. • 2: Polylines. • 3: No treatment.	
F05.01	**Line Min. setting**	**0.0 - F05.03 [0.0%]**
F05.02	**Line Min. setting corresponding**	**0.0 - 100.0 [0.0%]**
F05.03	**Line Max. setting**	**F05.01 - 100.0 [100.0%]**
F05.04	**Line Max. setting corresponding**	**0.0 - 100.0 [100.0%]**
F05.09	**Max. reference of polyline**	**F05.11 - 100.0 [100.0%]**
F05.10	**Max. reference corresponding value of polyline**	**0.0 - 100.0 [100.0%]**
F05.11	**Inflection point 2 reference of polyline**	**F05.13 - F05.09 [100.0%]**
F05.12	**Inflection point 2 corresponding value**	**0.0 - 100.0 [100.0%]**
F05.13	**Inflection point 1 reference of polyline**	**F05.15 - F05.11 [0.0%]**
F05.14	**Inflection point 1 corresponding value**	**0.0 - 100.0 [0.0%]**
F05.15	**Min. reference of polyline**	**0.0 - F05.13 [0.0%]**
F05.16	**Min. reference corresponding value of polyline**	**0.0 - 100.0 [0.0%]**
	F05.01 - F05.04 define a straight line, F05.09 - F05.16 define a polyline. • All three independently implement the positive and negative characteristics, as shown in the following figure. • This is a straight line if the min. setting of the set curve is the same as the max. setting of the curve. The default frequency is the curve corresponding to the min. setting frequency.	

Ref. Code	Function Description	Setting Range [Default]
	Positive and negative characteristic of line  **Positive and negative characteristic of polyline**  **Picture:** • P is setting by terminal pulse, A is terminal analog reference. • When P is 100% corresponds to the max. input pulse frequency defined by F16.17. When A is 100%, it corresponds to 10V or 20mA.	
F05.17	**Hopping frequency**	**F00.09 - F00.08 [0.00Hz]**
F05.20	**Hopping frequency range**	**0.00 - 30.00 [0.00Hz]**
	Hopping frequency setting can let converter output frequency avoid mechanical load resonance frequency points. • The inverter is prohibited to run at constant speed within the skip frequency range, and the set frequency will be automatically updated. • When the set frequency skips, the output frequency of the inverter does not suddenly change, but changes smoothly according to the setting of the Acc. / Dec. curve. • Skip frequency setting is invalid during process PID control. 	

7.8 F06: Multistage Speed Function

Ref. Code	Function Description	Setting Range [Default]
F06.00	Multiple frequency instruction 1	F00.09 – F00.08 [5.00Hz]
F06.01	Multiple frequency instruction 2	F00.09 – F00.08 [5.00Hz]
F06.02	Multiple frequency instruction 3	F00.09 – F00.08 [5.00Hz]
F06.03	Multiple frequency instruction 4	F00.09 – F00.08 [5.00Hz]
F06.04	Multiple frequency instruction 5	F00.09 – F00.08 [5.00Hz]
F06.05	Multiple frequency instruction 6	F00.09 – F00.08 [5.00Hz]
F06.06	Multiple frequency instruction 7	F00.09 – F00.08 [5.00Hz]
	Define the multistage speed operation mode in the speed of initial value.	

7.9 F08: Motor Parameter



R1=F08.07 (Stator resistance) LI=F08.09 (Leakage inductance)
R2=F08.08 (Rotor resistance) Lm=F08.10 (Mutual inductance)
Io=F08.11 (Excitation current) S=Slip ratio

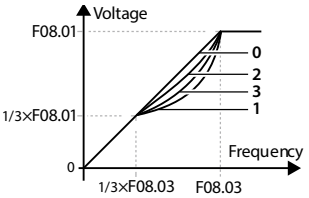
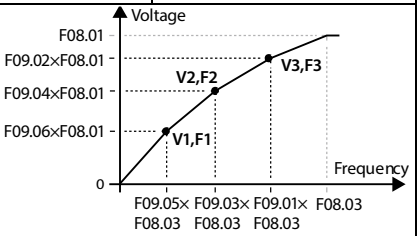
Mutual inductance is calculated by the following formula:

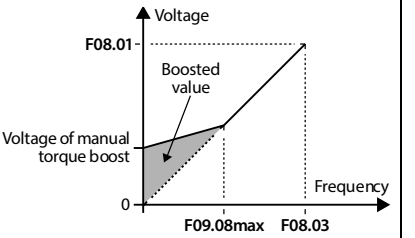
$$\text{Mutual inductance F08.10} = \frac{\text{F08.01} / \sqrt{3}}{2\pi \times \text{F08.03} \times \text{F08.11}} - \text{F08.09}$$

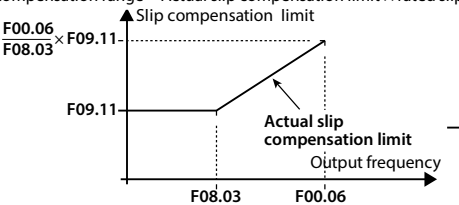
Ref. Code	Function Description	Setting Range [Default]
F08.00	Motor rated power	0.2 - 5.5kW [Type confirmed]
F08.01	Motor rated voltage	0 - 999V [Type confirmed]
F08.02	Motor rated current	0.01 - 99.99A [Type confirmed]
F08.03	Motor rated frequency	1.0 - 400.0 [50.0Hz]
F08.04	Motor rated RPM	1 - 24000rpm [Type confirmed]
	F08.00 - F08.04 motor rated parameters need to be in accordance with the motor nameplate.	

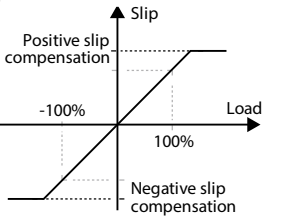
Ref. Code	Function Description	Setting Range [Default]
F08.06	**Motor parameters self-tuning**	**0 - 3 [0]**
	Note: Motor parameter auto-tuning can only be started in the keypad control (F00.11 = 0) mode. 0: No action. 1: Motor static self-tuning. • The motor is at standstill and the motor stator resistance, rotor resistance and leakage inductance are automatically measured. The measured parameters are automatically written to F08.07, F08.08 and F08.09 accordingly. 2: Motor rotation self-tuning. • The motor is at a standstill first, where the stator resistance, rotor resistance, and leakage inductance of the motor are automatically measured. The motor is then rotated to automatically measure the mutual inductance of the motor, the no-load excitation current, the rated slip, and the flux saturation factor The measured parameters are automatically written to F08.05, F08.07 - F08.16. • During motor rotation, oscillation or overcurrent may occur. Press the key ▽ or the key STOP immediately to stop the parameter setting. Adjust F09.15 and F09.16 (Suppression shock coefficient) appropriately to reduce the possible oscillation. 3: Motor stator resistance measurement. • The motor is at standstill and the motor stator resistance is measured automatically and the measured parameters are automatically written to F08.07 accordingly. **Motor parameters self-tuning setps:** 1. Set F08.00 - F08.04 in according to motor nameplate. 2. When F08.06 = 2 is selected, set a reasonable Acc. time (F03.01) and Dec. time (F03.02) and take the motor shaft out of the load and carefully check its safety. 3. Set F08.06 to 1 or 2 or 3. After pressing the key ↵, press the key ▭ or key PRG to return to the speed limit of the stop parameter, then press the key ◇ or the key RUN to start self-tuning. The operation keypad displays "tunE". 4. When the operation indicator on the operation keypad flashes, it indicates that the auto-tuning is finished and returns to the stop status display. F08.06 will automatically reset to 0.	
F08.07	**Motor stator resistance**	**0.00 - 99.99Ω [Type confirmed]**
F08.08	**Motor rotor resistance**	**0.00 - 99.99Ω [Type confirmed]**
F08.09	**Motor leakage inductance**	**0.0 - 5000.0mH [Type confirmed]**
F08.10	**Mutual inductance motor**	**0.0 - 5000.0mH [Type confirmed]**
F08.11	**Motor no-load excitation current**	**0.00 - 99.99A [Type confirmed]**
F08.12	**Motor core saturation factor 1**	**0.00 - 1.00 [1.00]**
F08.13	**Motor core saturation factor 2**	**0.00 - 1.00 [1.00]**
F08.14	**Motor core saturation factor 3**	**0.00 - 1.00 [1.00]**
F08.15	**Motor core saturation factor 4**	**0.00 - 1.00 [1.00]**
F08.16	**Motor core saturation factor 5**	**0.00 - 1.00 [1.00]**

7.10 F09: V/f Controlling Parameter

Ref. Code	Function Description	Setting Range [Default]
F09.00	**Motor V/f curve setting**	**0 - 4 [0]**
	Define a variety of V/f settings to meet different load characteristics. • 4 fixed curves and one custom curve can be selected. 0: Straight line. 0 in the picture. 1: Square curve. Figure 1. 2: 1.2 power curve. Figure 2. 3: 1.7 power curve. Figure 3. 4: User-defined curve. 	
F09.01	**Motor V/f frequency values F3**	**F09.03 - 100.0% [80.0%]**
F09.02	**Motor V/f voltage values V3**	**F09.04 - 100.0% [80.0%]**
F09.03	**Motor V/f frequency values F2**	**F09.05 - F09.01 [50.0%]**
F09.04	**Motor V/f voltage values V2**	**F09.06 - F09.02 [50.0%]**
F09.05	**Motor V/f frequency values F1**	**0.0 - F09.03 [0.0%]**
F09.06	**Motor V/f voltage values V1**	**0.0 - F09.04 [0.0%]**
	F09.01 - F09.06 is customized V/f curve. • F09.00 = 4 (user setting curve) is valid. • Using V1/f1, V2/f2, V3/f3 three-point line way to define V/f curve, in order to apply to special load characteristic. 	
F09.07	**The motor torque incrase**	**0.0 - 30.0 [2.0%]**
F09.08	**Cut-off points of motor torque increase manually**	**0.0 - 50.0 (F08.03) [30.0%]**
	To compensate for the low frequency torque characteristics, we can make some improvement on output voltage compensation. • Torque boost is valid in any V/f curve set by F09.00. • F09.07 ≠ 0, select manual torque boost mode.	

<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td></td><td colspan="2">
• F09.07 = 0, the automatic torque boost mode is meant.
• In this case, the motor rated frequency (F08.03) should be correctly set according to the motor nameplate parameter.
• The rated motor speed (F08.04) should be set according to the motor nameplate or by rotating autotuning. And the accurate motor stator resistance (F08.07);
• Set the slip compensation gain (F09.09) = 100.0%, to enable slip compensation; In order to obtain a good carrying capacity.
• F09.08 is percentage cpmpared to motor rated frequency (F08.03).


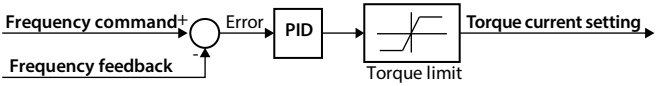
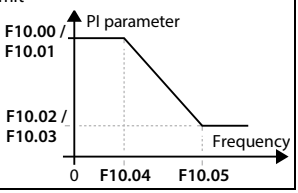
</td></tr>
<tr><td>F09.09</td><td>Motor slip compensation gain</td><td>0.0 - 300.0 [0.0%]</td></tr>
<tr><td>F09.10</td><td>Motor slip compensation filtering time</td><td>0.01 - 10.00 [0.10s]</td></tr>
<tr><td>F09.11</td><td>Motor slip compensation limit</td><td>0.0 - 250.0 [200.0%]</td></tr>
<tr><td></td><td colspan="2">
Motor load torque changes will affect the motor running slip, resulting in changes of motor speed. This effect can be reduced by slip compensation (automatically adjusting the inverter output frequency based on the motor load torque).
• The motorized state (actual speed < set speed), power generation status (actual speed > set speed) can increase the compensation gain gradually (F09.09).
• Slip compensation is limited within a constant torque range (frequency command ≤ motor nominal frequency) as a fixed value, which increases proportionately with the output frequency over a constant power range.
• The amount of automatic slip compensation is related to the rated slip of the motor. When used, set the motor rated frequency (F08.03) and rated speed (F08.04) correctly.
Slip compensation range = Actual slip compensation limit × rated slip.




</td></tr>
<tr><td>F09.12</td><td>Motor iron loss</td><td>0.000 - 9.999kW [Type confirmed]</td></tr>
<tr><td></td><td colspan="2">
It is used for V/f control torque compensation. It is determined according to the rated power of the motor when it leaves the factory.
Generally, it is not necessary to change. If accurate iron loss can be obtained from the motor test report, set F09.12 to this value.
</td></tr>
</table>

Ref. Code	Function Description	Setting Range [Default]
F09.14	**AVR function (automatic voltage rugulator)**	**0 - 2 [1]**
	This parameter is valid only in V/f control mode. AVR is always on during open-loop vector control. 0: No action. 1: Constant action. 2: Only Dec. and no action. • When the input voltage deviates from the rated value, the AVR function keeps the output voltage constant, so the AVR should operate normally under normal conditions, especially when the input voltage is higher than the rated value. • When slowing down, the energy feedbacks to inverter from load, busbar voltage rise, F09.14 = 0 or 2, running current is larger; F09.14 = 1, motor slowdown and steady, running current is smaller.	
F09.15	**Motor low frequency suppression shock coefficient**	**0 - 200 [50]**
F09.16	**Motor high frequency suppression shock coefficient**	**0 - 200 [20]**
	It is used to restrain the natural oscillation generated when the inverter is matched with the motor. When the parameters are set unreasonably, it may cause current oscillation. • If the output current repeatedly changes during constant load operation, F09.16 can be set at the factory parameters to eliminate the oscillation and make the motor run smoothly.	

7.11 F10: Motor Vector Control Speed-loop Parameters

Ref. Code	Function Description	Setting Range [Default]
F10.00	**Speed control proportional gain 1 of motor**	**0.1 - 200.0 [10.0]**
F10.01	**Speed control integral time 1 of motor**	**0.00 - 10.00 [0.20s]**
F10.02	**Speed control proportional gain 2 of motor**	**0.1 - 200.0 [10.0]**
F10.03	**Speed control integral time 2 of motor**	**0.00 - 10.00 [0.20s]**
F10.04	**Speed-loop PI switching frequency 1 of motor**	**0.00 - 50.00 [10.00Hz]**
F10.05	**Speed-loop PI switching frequency 2 of motor**	**0.00 - 50.00 [15.00Hz]**
	F10.00 - F10.05, F10.07 set PID parameters of speed regulator (ASR). Block diagram of the speed regulator as shown below:  As shown on the right: • When running in the 0 - F10.04 interval, the vector control PI is F10.00, F10.01; • When running at the frequency above F10.05, the vector control PI is F10.02, F10.03; 	

Ref. Code	Function Description	Setting Range [Default]
	• When operating in the frequency range between F10.04 - F10.05, the vector control P parameter is the intermediate linear interpolation of F10.00 and F10.02 and the vector control I parameter is the mid-linearity of F10.01 and F10.03 Interpolation. • Increase the ASR proportional gain P to speed up the dynamic response of the system; However, P is too large and oscillates easily. • Reducing the ASR integral time constant Ti accelerates the system's dynamic response; However, Ti is too small for oscillations and large overshoots. • If the integral time constant is set to 0, there is no integral effect and the speed loop is simply a proportional regulator. • Generally, adjust the proportional gain P first, and try to increase P if the system does not oscillate. Then adjust the integral time constant Ti to make the system have fast response characteristics and little overshoot. • Low frequency operation to improve the dynamic response, increase the proportional gain P and decrease the integral time constant Ti.	
F10.06	**Motor speed loop integral limit**	**0.0 - 200.0 (F08.02) [180.0%]**
	The max. integrated value of the integral of speed vector control loop is limited.	
F10.07	**Motor speed loop differential time**	**0.00 - 1.00 [0.00s]**
	Defines the vector control speed loop differential time. • Normally not required. When you need to speed up the dynamic response can be set properly. • F10.07 = 0, there is no differential term in the speed loop.	
F10.08	**Motor speed loop output filter time**	**0.000 - 1.000 [0.010s]**
	The output of the ASR (speed loop) regulator is filtered. • F10.08 = 0, the speed loop is not filtered.	
F10.09	**Motor torque limit lock selection**	**0,1 [0]**
	0: Not locked. 1: All torque limits are in line with the limits of FWD electric torque.	
F10.10	**Motor torque limit channel**	**0000 - 2222 [0000]**
	Unit: Forward electric torque setting channel **Ten: REV electric torque setting channel** **Hundred: Forward regenerative torque setting channel** **Thousand: Reverse regenerative torque setting channel** • 0: The torque limit is set digitally. • 1: The torque limit is determined by the analog input. • 2: The torque limit is setting by the terminal pulse.	
F10.11	**Motor torque limitation when motor is FWD**	**0.0 - 250.0 (F08.02) [180.0%]**
F10.12	**Motor torque limitation when motor is REV**	
F10.13	**Recreated torque limitation when motor is FWD**	
F10.14	**Recreated torque limitation when motor is REV**	
	Please be careful to set F10.11 - F10.14, setting too large may damage the motor.	

7.12 F11: Motor Vector Control Current Loop Parameter

Ref. Code	Function Description	Setting Range [Default]
F11.00	**Motor current loop KP**	**1 - 2000 [800]**
F11.01	**Motor current loop KI**	**1 - 2000 [200]**
	Defines the PI parameters for a setting current loop regulator (ACR). • Normally, it is recommended not to adjust the current loop parameters.	
F11.02	**Motor current loop output filter times**	**0 - 31 [3]**
	The output of the current loop regulator is filtered.	
F11.03	**Motor current loop feedforward enabled**	**0,1 [0]**
	The output voltage feedforward of current loop feedforward is calculated in real time based on the motor parameters and the detected field current and torque current. • When the motor parameters are accurate, the current loop feedFWD can boost the dynamic response of the entire system. • When the motor parameters are not accurate, please disable the current loop feedforward. 0: Feedforward is prohibited. 1: Enable feedforward.	
F11.04	**Motor excitation boost setting**	**0.0 - 30.0 [0.0%]**
	Setting range 0.0 - 30.0% motor no-load excitation current. Motor load frequency within the rated frequency range, improve the motor carrying capacity by increasing the motor excitation current.	
F11.05	**Motor field orientation optimization setting**	**0,1 [0]**
	0: Field orientation correction is forbidden. 1: Enables magnetic field orientation correction.	

7.13 F15: Digital Input / Output Terminals Parameter

Ref. Code	Function Description	Setting Range [Default]
F15.00	**DI1 function**	**0 - 86 [2]**
F15.01	**DI2 function**	**0 - 86 [3]**
F15.02	**DI3 function**	**0 - 86 [0]**
F15.03	**DI4 function**	**0 - 86 [0]**
F15.44	**AI terminal (ADI) option**	**0 - 86 [0]**
	0: Reserved. Set terminal in a non-functional state, even if there is signal. • Unused DI terminals can be set to 0 (reserved), in case of error or false action. 1: Inverter enable. • Enable, the inverter can work. Invalid, prohibit operation in stop condition and stop freely. • DI terminal set to 1 (inverter enable), the default frequency converter is effective.	

Ref. Code	Function Description	Setting Range [Default]

2,3: FWD / REV enable.

- DI termials can be set freely for FWD / REV terminal to control frequency converter start-stop, specific see F15.16.
- Only valid under terminal control mode (F00.11 = 1).

4: Three-wire system operation control.

- Specific see F15.16.

8: Frequency switched to the simulation.

- Effective, frequency setting channel is forced to be switched to the simulation setting.
- Frequency set the channel selection priority: Frequency switched to simulation (function 8) > multistage frequency terminal 1-3 (function 13-15) > F00.10 set frequency set channels.

11: Command switching terminals.

- Enable, running command channel is forced to be switched to the terminal running command channel.
- Running command channel selection priority: Command switched to the terminal (function 11) > F00.11 set running command channel.
- Only valid in stop.

13 - 15: Multistage frequency terminals 1 - 3 (K1 - K3).

- Through the logic combination of the terminals, the frequency converter can finally run at any frequencies defined by the frequency specified channel and the 7-segment frequency.
- Set 3 terminal, can realize switching operation control between frequency specified channel and 7 segment frequency.
- Set 2 terminal, can realize switching operation control between frequency specified channel and 3 segment frequency.
- A terminal is set to switch the frequency determined by the frequency reference channel and multistage frequency.
- See the table below. K1 corresponds to multistage frequency terminal 1, K2 corresponds to multistage frequency terminal 2, and K3 corresponds to multistage frequency terminal 3.

K3 (No 15)	K2 (No 14)	K1 (No 13)	Frequency setting
0	0	0	F00.10 set frequency
0	0	1	Multiple frequency instruction 1 (F06.00)
0	1	0	Multiple frequency instruction 2 (F06.01)
0	1	1	Multiple frequency instruction 3 (F06.02)
1	0	0	Multiple frequency instruction 4 (F06.03)
1	0	1	Multiple frequency instruction 5 (F06.04)
1	1	0	Multiple frequency instruction 6 (F06.05)
1	1	1	Multiple frequency instruction 7 (F06.06)

Ref. Code	Function Description	Setting Range [Default]

17,18: Increasing (UP) / decreasing frequency (DN) instructions.

- By controlling the terminal to realize the frequency increasing or decreasing, replace keypad for remoting control, see the table below. The rate of increase or decrease is set by F15.12.
- Frequency (F00.10 = 1) is valid only through the terminal setting frequency (F00.10 = 1).

UP (No 17)	DN (No 18)	The frequency change trend
0	0	Keep the current set frequency
0	1	Set frequency decrease
1	0	Set frequency increased
1	1	Keep the current set frequency

20,21: FWD / REV point move command control input (JOGF / JOGR).

- Use terminal control to realize the dynamic running of point control, need to set F00.15 running frequency (point).

JOGR (No 21)	JOGF (No 20)	Running commands
0	0	Spot command invalid
1	0	Spot REV
0	1	Spot positive
1	1	Spot commamd invalid

26,27: Acc. / Dec. time choose terminals 1, 2.

- Dec. time priority: Terminal 26, 27 function determine the Dec. time > F03.09, F03.10 Dec. time is determined.
- Through the Dec. time terminals 1, 2, logical combination, can realize Dec. time 1 - 4 choices. See the table below.
- Set 2 Dec. time terminal function, can realize the choice of four groups of Dec. time.
- Set a Dec. time terminal function, can realize the choice of 2 groups of Dec. time.

Acc. / Dec. terminal 2 (No 27)	Acc. / Dec. terminal 1(No 26)	Acc. and Dec. time selection
0	0	Acc. and Dec. time 1
0	1	Acc. and Dec. time 2
1	0	Acc. and Dec. time 3
1	1	Acc. and Dec. time 4

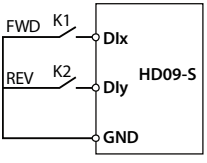
30: Switch to normal running mode.

- When valid, the frequency command (including the multi-speed function, simple PLC function, etc.) forcefully switched to normal mode running.

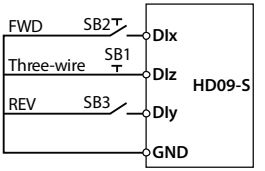
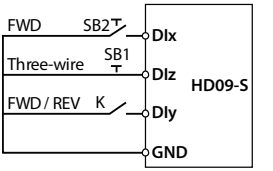
41,42: Free down normally open / closed input.

- Frequency converter receiving terminal command, immediately put an end to the output, load stop freely according to the mechanical inertia.

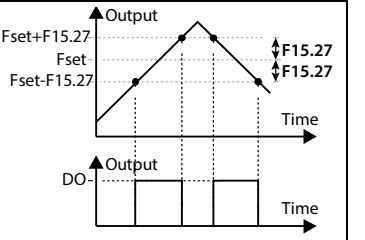
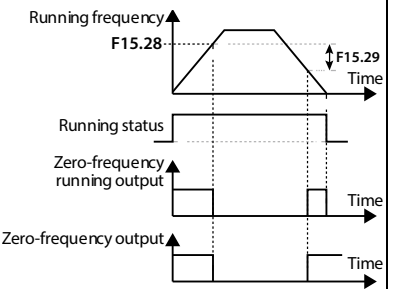
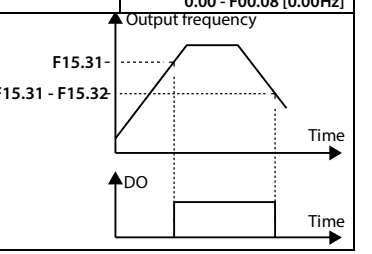
Ref. Code	Function Description	Setting Range [Default]
	43: Emergency stop. • The inverter decelerates to stop after it receives the terminal command. The Dec. time is set according to F03.17 (Dec. time of emergency stop). 44,45: The external input fault normally open / closed. • The inverter can detect the fault signal of the external device through the terminals. Fault signal is normally open or normally closed. • After receiving an external fault signal, converter will stop freely down, at the same time, display external equipment failure (E0024). 46: External reset input. • When the fault alarm is occurred in inverter, this DI terminal can reset fault. • It has the same function as the keypad ▽ or key STOP reset function. 50: Counter reset signal input. • 51 function should be used together to reset converter built-in counter. 51: Counter trigger signal input. • Built-in counter counts pulse input port, when power off , the current count value can be stored. • The highest frequency pulse: 200Hz. Specific see F15.37, F15.38. 53: Pulse frequency input (DI4). • DI4 terminal can receive the pulse signal as a frequency setting, the relationship between input pulse frequency and the set frequency see F05.01 - F05.04. 86: Terminal stop DC brake. • After the inverter receives the stop command, if the stop mode is Dec. stop + DC brake (F02.13 = 2) and the running frequency is lower than the starting frequency of stopping DC braking (F02.16), the inverter will start DC brake. • The braking current is set by F02.04. The braking time is the longer time between the terminal function holding time and the stopping DC braking time (F02.18).	
F15.12	**Terminal UP / DOWN of the rate of Acc. and Dec.**	**0.00 - 99.99 [1.00Hz/s]**
	Define DI terminals as the UP / DN terminals (17/18 function), modified chaneing rate of set frequency.	
F15.13	**Terminal detection interval time**	**0 - 2 [0]**
	0: 2ms. 1: 4ms. 2: 8ms.	
F15.14	**Number of terminal detection filter**	**0 - 10000 [4]**
	Delay, confirm DI terminal signals to prevent DI terminal misoperation.	

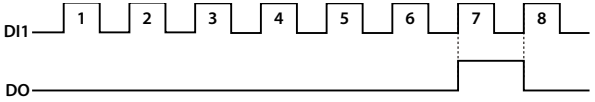
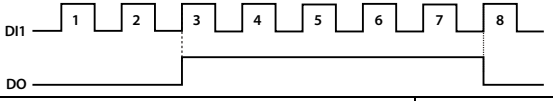
<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td>F15.15</td><td>Positive and negative terminal input logic setting</td><td>0000 - 100F [0000]</td></tr>
<tr><td></td><td colspan="2">Define positive and negative logic of DI terminal, each unit (binary) of F15.15 represents different DI terminals, shown in the following table.
• 0: Positive logic:
• DI terminal and the corresponding public ones are valid in connection and invalid in disconnection.
• AI input voltage ≥ 6V, input is valid, AI input voltage ≤ 4V, invalid.
• 1: Negetive logic:
• DI terminal and the corresponding public ones are valid in disconnection and valid in connection.
• AI input voltage ≥ 6V, input is invalid, AI input voltage ≤ 4V, valid.
<table>
<tr><th>Bit12</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th></tr>
<tr><td>AI</td><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td></tr>
</table></td></tr>
<tr><td>F15.16</td><td>FWD / REV operation mode setting</td><td>0 - 3 [0]</td></tr>
<tr><td></td><td colspan="2">Define four different ways of DI terminal control converter.
• F15.00 - F15.03 set as 2, mean DI terminal as "FWD" function, indicates in Dlc below diagram.
• F15.00 - F15.03 set as 3, mean DI terminal as "REV" function, indicates in Dly below diagram.
• F15.00 - F15.03 set as 4, mean DI terminal as "Three-wire system operation control" function, indicates in Dlz below diagram.
0,1: Two line operation mode 1, 2.
• Under terminal control mode, although DI terminal is effective, but when the stop command is produced by other sources (fixed-length stop, terminal external stop command input valid, terminal free stop command input valid, inverter fault active or external fault active) to stop the inverter when, even if terminal FWD / REV is still valid, running will not be ordered.
• If you want to run inverter again, it is necessary to trigger again for DI terminal FWD / REV effective state, shown in the diagram below.
 

<table>
<tr><th colspan="2">Terminal disconnected is 0, closed is 1</th><th colspan="2">Run command</th></tr>
<tr><th>K2</th><th>K1</th><th>F15.16=0</th><th>F15.16=1</th></tr>
<tr><td>0</td><td>0</td><td>Stop</td><td>Stop</td></tr>
<tr><td>1</td><td>0</td><td>Reversal</td><td>Stop</td></tr>
<tr><td>0</td><td>1</td><td>Forward</td><td>Forward</td></tr>
<tr><td>1</td><td>1</td><td>Stop</td><td>Reversal</td></tr>
</table>
2: Three line operation mode 1.
• No effective transformation occurs in SB2, SB3, maintain the current running direction.
3: Three line operation mode 2.
• SB2 is from effective to invalid, frequency converter running state remains unchanged.</td></tr>
</table>

Ref. Code	Function Description	Setting Range [Default]
	F15.16=2  • SB1: Normally closed stopping button (falling edge effective) • SB2: Normally open FWD button (rising edge effective) • SB3: Normally open REV button (rising edge effective) **F15.16=3**  • K: Direction selection terminals (PMCSx) • K = 0 (forward) K=1 (reverse) • SB1: Normally closed stopping button (falling edge effective) • SB2: Normally open running button (rising edge effective)	
F15.19	**DO function**	**0 - 38 [2]**
F15.20	**Relay function**	**0 - 31 [31]**
	0: Reserved. • So that the output terminal in a non-functional state, nor make any action. 2: The inverter is running (RUN). • When the inverter is running, the indicator output. 3: The inverter is running FWD. • The inverter FWD running instruction signal. 4: The inverter is running reversely. • Inverter reverses operation indication signal. 5: DC brake. • Inverter DC brake indication signal. 6: Zero-frequency inverter status. • When the inverter output frequency is within zero frequency range (including stop status), it will output indication signal. • See parameters F15.28, F15.29. 7: Zero-frequency inverter operation. • When the inverter output frequency is within the zero frequency range, it will output the indication signal. • See parameters F15.28, F15.29. 9: Frequency level detection signal (FDT). • See parameters F15.31, F15.32. 11: Frequency arrival (FAR). • When the output frequency of the inverter is within the positive and negative detection widths of the set frequency, output the indication signal. • The detection width is set by F15.27 (Frequency reach (FAR) width detection).	

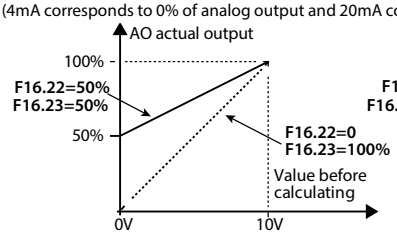
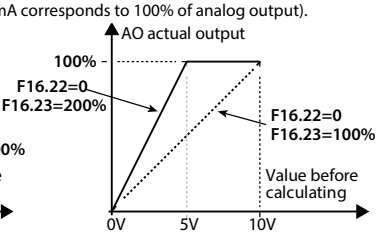
<table>
<tr><th>Ref. Code</th><th>Function Description</th><th>Setting Range [Default]</th></tr>
<tr><td></td><td colspan="2">12: Max. frequency limit.
• When setting frequency ≥ upper limit frequency, output indication signal.
13: Frequency lower limit.
• Set the frequency ≤ lower limit frequency, the output indicator.
20: Data output by SCI communication.
• There is a SCI communication that directly controls the DO or relay output indication signal.
21: Set run time arrive.
• See F15.36 for details.
23: Set the count value arrive. See F15.37, F15.38 for details.
24: Specifies the count value arrive. See F15.37, F15.38 for details.
29: Undervoltage lockout is stopped.
• When the inverter has under-voltage fault alarm, the output signal. The LED on the operation keypad shows "-Lu-".
30: Overload detection signal.
• The output current of the inverter exceeds 150.0% of the rated current of the inverter and outputs the indication signal for more than 5s.
31: Inverter failure.
• When the inverter is failed, the indicator output.
32: External fault.
• When the inverter detects the external device fault signal through the terminal, it outputs the indicating signal.
33: Frequency inverter fault automatically reset period.
• The inverter is in the fault auto-reset period, the output signal.
38: Pulse output (DO only).
• DO as a pulse output, see F16.21 for details.</td></tr>
<tr><td>F15.24</td><td>Positive and negative output terminal logic settings</td><td>0 - F [0]</td></tr>
<tr><td></td><td colspan="2">Define the positive and negative logic of the output terminal. Each bit (binary) of F15.24 represents a different output terminal as shown in the following table.
• 0: Positive logic. The output terminal is connected with the corresponding common terminal effectively. Disconnection is invalid.
• 1: Inverted logic. The output terminal is not connected to the corresponding common terminal, the disconnection is effective.
<table>
<tr><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th></tr>
<tr><td>Reserved</td><td>RLY1</td><td>DO</td><td>Reserved</td></tr>
</table></td></tr>
</table>

Ref. Code	Function Description	Setting Range [Default]
F15.27	**Frequency reach (FAR) width detection**	0.00 - 100.00 [2.50Hz]
	When the output frequency of converter is within plus or minus detection width of setting frequency (right diagram Fset). DO output pulse signal is shown in the picture on the right. 	
F15.28	**Zero-frequency signal detection value**	0.00 - F00.08 [0.00Hz]
F15.29	**Zero frequency**	0.00 - F00.08 [0.00Hz]
	F15.28 and F15.29 define the zero-frequency output control function. As shown on the right. 	
F15.31	**FDT electrical level**	0.00 - F00.08 [50.00Hz]
F15.32	**FDT delay**	0.00 - F00.08 [0.00Hz]
	When the output frequency exceeds F15.31 frequency, the DO output indicating signals, until the output frequency drops to a certain frequency (F15.31 - F15.32), as shown on the right. 	

Ref. Code	Function Description	Setting Range [Default]
F15.36	**Set running time**	**0 - 65535 [0h]**
	When running total time of the inverter reaches F15.36, DO or relay will output 500ms width pulse guiding signal. Output terminal / relay selection No.21 function (set run time arrival), the inverter controls the correct status output according to the internal flag.	
F15.37	**Setted count value reach preset**	**F15.38 - 9999 [0]**
F15.38	**Specified count value reach preset**	**0 - F15.37 [0]**
	F15.37 define the number of pulses entered by the DI terminal (function No.51). The DO or relay outputs an indication signal and the external counter is automatically cleared. F15.38 define the number of pulses entered by the DI terminal (function No.51). The DO or relay outputs an indication signal until the set count value is reached. **Example:** F15.37 is set to 7, F15.38 is set to 3, DI1 is set as counter trigger signal input (F15.00 = 51). • DO is set to set the counter arrival (F15.19 = 23). When DI1 inputs the 7th pulse, DO outputs an indication signal. When DI1 inputs the 8th pulse, the DO output signal returns to low level, as shown in the following figure.  • DO is set to the specified counter arrival (F15.19 = 24). When DI1 inputs the third pulse, DO outputs an indication signal until the set count reaches 7, as shown in the following figure.  	
F15.43	**The output terminal delay**	**0.0 - 100.0 [0.0s]**

7.14 F16: Analogue Input / Output Terminal Parameter

Ref. Code	Function Description	Setting Range [Default]
F16.00	Keypad potentiometer function	0 - 12 [0]
F16.01	AI function	0 - 12 [2]
	0: Resevered. 2: Frequency setting. • F00.10 = 3 (the channel is set by the analog input setting frequency), the setting frequency will be set by the corresponding input voltage value of the analog channel whose function is selected. 3: Auxiliary frequency setting. • F19.00 = 4 (setting by the analog auxiliary frequency setting, the auxiliary frequency setting will be set by the corresponding input voltage value of the analog channel whose function is selected. 4: Process PID setting. • When F04.01 = 1 (setting by the analog setting process PID), the process PID setting will be set by the corresponding input voltage value with the analog channel that selects this function. 5: PID feedback process. • F04.02 = 0 (feedback from analog input process PID), the process PID feedback will be set by the corresponding input voltage value of the analog channel whose function is selected. 9: Motor FWD rotation torque limit. • F10.09 tens = 1 (the motor limits the motor FWD rotation by analog input), the motor FWD torque limit is set by the corresponding input voltage value of the analog channel whose function is selected. 10: Motor reversing motor torque limit. • F10.09 tens = 1 (the motor reverses the motor torque limit channel by analog setting), the motor REV motor torque limit is set by the corresponding input voltage value of the analog channel whose function is selected. 11: Motor FWD regenerative torque limit. • F10.10 bits = 1 (the channel is set by analog setting FWD rotation regenerative torque), the limit of motor FWD rotation regenerative torque is set by the corresponding input voltage value of the analog channel whose function is selected. 12: Motor REV regenerative torque limit. • F10.10 tens = 1 (defined by the analog setting motor REV regenerative torque limit channel), the motor REV regenerative torque limit is set by the input voltage value corresponding to the analog channel whose function is selected.	
F16.05	AI offset	-100.0 - 100.0 [0.1%]
F16.06	AI gain	-10.00 - 10.00 [0.01]

Ref. Code	Function Description	Setting Range [Default]
F16.07	**AI filter time**	**0.01 - 10.00 [0.01s]**
	AI input is selected as open-loop frequency setting channel, the analog input needs to be filtered, offset, gain calculation processed, only to get the actual analog, as shown below. • The relationship between the AI input and the set frequency is set by F05.01 - F05.04. • **Calculation formula:** Calculated value = F16.06 × AI actual input + F16.05. AI actual input → Filter **F16.07** → Gain **F16.06** offset **F16.05** → Value after caculating F16.07 defines the filter time of the channel and filters the input signal. • The longer the filtering time, the stronger the anti-interference ability, but the slower the response. The shorter the filtering time is, the faster the response time becomes.	
F16.17	**Max. input pulse frequency**	**0 - 50000 [10000Hz]**
	Define DI4 terminals as the max. input pulse frequency when the input pulse.	
F16.18	**Enter the pulse filter time**	**0 - 500 [10ms]**
	To filter the DI4 terminals of the input pulse frequency, to filter out pulse frequency of small fluctuations.	
F16.19	**AO function**	**0 - 14 [2]**
F16.21	**DO function**	**0 - 14 [0]**
	0: Reserved. 2: Preset frequency (0 - max. output frequency). 3: Motor rpm (0 - the max. output frequency corresponds to the speed). 5: Output current (0 - 2 times the motor rated current). 11: Output voltage (0 - 1.2 times the inverter rated voltage). 12: DC bus voltage (0 - 2.2 times the inverter rated voltage). 14: AI input (after processing).	
F16.22	**AO offset**	**-100.0 - 100.0 [0.0%]**
F16.23	**AO gain**	**0.0 - 200.0 [100.0%]**
	If the user needs to adjust the AO output proportional relationship, can be achieved through the output gain. • **Calculation formula:** AO actual output = F16.23 × calculated value + F16.22. • 4 - 20mA current signal output: 20.0% of analog output bias, 80.0% of analog output gain (4mA corresponds to 0% of analog output and 20mA corresponds to 100% of analog output).  	

Ref. Code	Function Description	Setting Range [Default]
F16.26	**DO terminal output max. pulse frequency**	**0.01 - 50.00 [10.00kHz]**
	Defines the DO terminal for the largest output pulse frequency pulse output.	

7.15 F17: SCI Communication Parameter

Ref. Code	Function Description	Setting Range [Default]
F17.00	**Data format**	**0 - 6 [0]**
	0: 1-8-2 format, no parity, RTU. • 1-8-2 format indicates that the communication format is: 1 bit start bit, 8 bits data bit, 2 bit stop bit. 1: 1-8-1 format, even parity, RTU. • 1-8-1 format indicates that the communication format is: 1 bit start bit, 8 bits data bit, 1 bit stop bit. 2: 1-8-1 format, odd parity, RTU. • 1-8-1 format indicates that the communication format is: 1 bit start bit, 8 bits data bit, 1 bit stop bit. 6: 1-8-1 format, no parity, RTU. • 1-8-1 format indicates that the communication format is: 1 bit start bit, 8 bits data bit, 1 bit stop bit.	
F17.01	**Baud rate choice**	**0 - 8 [3]**
	0: 1200bps. 1: 2400bps. 2: 4800bps. 3: 9600bps. 4: 19200bps. 5: 38400bps. 6: 57600bps. 7: 76800bps. 8: 115200bps.	
F17.02	**The machine address**	**0 - 247 [2]**
	F17.02 = 0, it is represented as a broadcast address.	
F17.03	**This machine response time**	**0 - 1000 [1ms]**
	The machine response time refers to a communication port of a frequency inverter receiving a frame of communication data, waiting for the time set by F17.03 to begin processing the received data. During this waiting period, this communication port will no longer receive communication commands.	
F17.04	**LAN communication timeout detection time**	**0.0 - 600.0 [0.0s]**
	When the time interval between the two returns to the local data continues to exceed F17.04, the E0028 failure (SCI communication timeout) is reported and the inverter continues to run. • F17.04 = 0, the drive does not detect the communication timeout.	
F17.05	**Communication error detection time**	**0.0 - 600.0 [0.0s]**
	When the communication error occurs more than F17.05, reported E0029 failure (SCI communication error), the inverter continues to run. • F17.05 = 0, the inverter does not detect communication error.	

Ref. Code	Function Description	Setting Range [Default]
F17.06	**Communication overtime action choice**	**0 - 3 [3]**
F17.07	**Communication error action selection**	**0 - 3 [3]**
F17.08	**Communication external device fault action selection**	**0 - 3 [1]**
	F17.06 defines the protection action selection when communication timeout detection. F17.07 defines the protection action selection when communication error is detected. F17.08 defines the selection of protection action when external communication fault occurs in communication command setting mode. 0: Freewheel stop. 1: Emergency stop. 2: Dec. stop. 3: Continue to run.	
F17.09	**Communication write function parameter saving EEPROM choice**	**00 - 11 [01]**
	Unit: Except of F00.13, F19.03 function parameter, communication EEPROM storage options **Ten: F00.13, F19.03 function parameter communication EEPROM storage options** 0: Not save. 1: Save. *Note:* *1. When 10 is set to 1, it may damage the inverter. Please exercise caution!* *2. Only when using the communication function parameters, the function code is 0x06 or 0x10 is valid.*	
F17.10	**Network communication timeout detection time**	**0.0 - 600.0 [0.0s]**
	When the interval between two receptions of correct data (including local or non-native) continues to exceed F17.10, the communication timeout is considered to be detected. • The drive continues to run after a timeout has expired and an E0028 fault (SCI communication timeout) has been reported. • F17.10 = 0, do not detecte fault time.	

7.16 F18: Display Control Parameter

Ref. Code	Function Description	Setting Range [Default]
F18.02	Running display parameter 1 setting	0 - 49 [8]
F18.03	Running display parameter 2 setting	0 - 49 [7]
F18.04	Running display parameter 3 setting	0 - 49 [9]
F18.05	Running display parameter 4 setting	0 - 49 [13]
F18.06	Running display parameter 5 setting	0 - 49 [14]
F18.07	Running display parameter 6 setting	0 - 49 [18]
F18.08	Stopping display parameter 1 setting	0 - 49 [7]
F18.09	Stopping display parameter 2 setting	0 - 49 [18]
F18.10	Stopping display parameter 3 setting	0 - 49 [20]
F18.11	Stopping display parameter 4 setting	0 - 49 [19]
F18.12	Stopping display parameter 5 setting	0 - 49 [43]
F18.13	Stopping display parameter 6 setting	0 - 49 [44]
	Defines display contents of keypad. • The operating parameters (F18.02 - F18.07) or the stop parameters (F18.08 - F18.13) can be cycled display through the key of the keypad. • Cycle through the keys ▶▶ of the operator keypad. 0: Reserved. 1: Inverter rated current. 3: Inverter status. • See d00.10 for details. 4: Main set frequency channel. 5: Main set frequency. 7: Set frequency. 8: Setting frequency (after Acc. and Dec.). 9: Output frequency. • The Hz lamp flashes while running. 10: Set the speed. 11: Running rpm. • The RPM lamp flashes while running. 13: Output voltage. 14: Output current. 15: Torque reference. 16: Output torque. 17: Output power. 18: DC bus voltage. 19: Keypad potentiometer input voltage. 20: AI input voltage. 21: AI input voltage (after processing). 28: DI4 terminal pulse input frequency. 29: AO output. 32: Radiator temperature. 33: Set the line speed. 34: Setting line speed. 42: External count value. 43: Input terminal status. • Bit0-Bit3 corresponds to DI1 - DI4. • Bit12 corresponds to AI. 44: Output terminal status. • Bit0 - Bit2 corresponds to reserved, DO, RLY. 48: Power-on time accumulated (hours). 49: Run time accumulated (hours).	
F18.15	Max. line velocity	0 - 65535 [1000]
F18.16	Line speed display accuracy	0 - 3 [0]
	0: Integer. 1: A decimal. 2: Two decimal places. 3: Three decimal places. *Note: The max. linear velocity must be newly set after the display accuracy is changed.*	

7.17 F19: Enhancement Parameters

Auxiliary frequency setting channel (F19.00 - F19.06)

The final setting frequency of HD09-S can be composed of main setting frequency and auxiliary setting frequency.

F19.00 is used to define the auxiliary frequency setting channel. When the auxiliary frequency setting channel is the same as the main frequency setting channel except the analog setting, the auxiliary setting channel is invalid.

Ref. Code	Function Description	Setting Range [Default]
F19.00	**Auxiliary frequency setting channel selection**	**0 - 6 [0]**
	Define the auxiliary frequency setting channel. • Set 1, 2, the initial value is set by F19.03. • Set 4 and 5, set by actual analog input, see F05.00 for the frequency characteristic curve selection. • Set 6 to set the auxiliary frequency according to the relationship between PID reference and feedback. 0: No auxiliary channel. 1: Operation keypad setting. Through the control keypad ▲, ▼ to adjust. 2: Terminal setting. Adjust with terminal UP / DN. 3: SCI communication settings. Initial value is 0. 4: Analog setting. 5: Terminal pulse setting. 6: PID output setting.	
F19.01	**Main and auxiliary setting operation**	**0,1 [0]**
	Define the relationship between the final set frequency and the primary and secondary frequencies. 0: Main setting + auxiliary setting. 1: Main Settings - auxiliary settings.	
F19.02	**Auxiliary setting coefficient**	**0.00 - 9.99 [1.00]**
	First use F19.02 for gain calculation, and then calculate the auxiliary frequency according to the frequency characteristic curve defined by F05 group. • F19.00 = 4 and 5 are valid.	
F19.03	**Digital auxiliary frequency initial value**	**0.00 - F00.06 [0.00Hz]**
	It is valid only for F19.00 = 1 and 2, and is the initial value set for the auxiliary frequency in these two modes.	
F19.04	**Digital auxiliary frequency control selection**	**00 - 11 [00]**
	Valid only for F19.00 = 1, 2. **Unit: Power-down storage options** • 0: Auxiliary frequency is not stored when power is lost. • 1: Power down stores the auxiliary frequency. **Ten: Stop frequency processing** • 0: Maintain auxiliary frequency after stop. • 1: Auxiliary frequency returns to F19.03 after stop.	

Ref. Code	Function Description	Setting Range [Default]
F19.05	Set the frequency ratio adjustment selection	0 - 2 [1]
F19.06	Set the frequency scaling factor	0.0 - 200.0 [100.0%]
	F19.05, F19.06 Define the adjustment method of the set frequency (the frequency after the main set frequency and auxiliary set frequency are calculated, referred to as the synthesized frequency). 0: Do not adjust. • Set frequency = Composite frequency. 1: Relative max. output frequency (F00.06) adjustment. • Setting frequency = Composite frequency + F00.06 × (F19.06 – 100%). 2: Relative to the current frequency adjustment. • Setting frequency = Composite frequency × F19.06.	

Fan control function (F19.07, F19.08)

Ref. Code	Function Description	Setting Range [Default]
F19.07	Cooling fan control options	0 - 2 [0]
F19.08	Cooling fan control delay time	0.0 - 600.0 [30.0s]
	F19.07 defines the control mode of the cooling fan. If there is over-temperature protection, the fan keeps running. 0: Auto stop mode. • When the inverter is running and the fan shut downtime reaches the time set by F19.08, if no overtemperature protection occurs, the fan will stop automatically. 1: Immediate stop mode. • When the inverter is running, the fan is running and the fan stops immediately after shutdown. 2: The fan is runningwith power on. • The fan keeps running when the inverter is powered.	

Zero frequency operation (F19.10, F19.11)

See below for details.

Fcmd = Set frequency

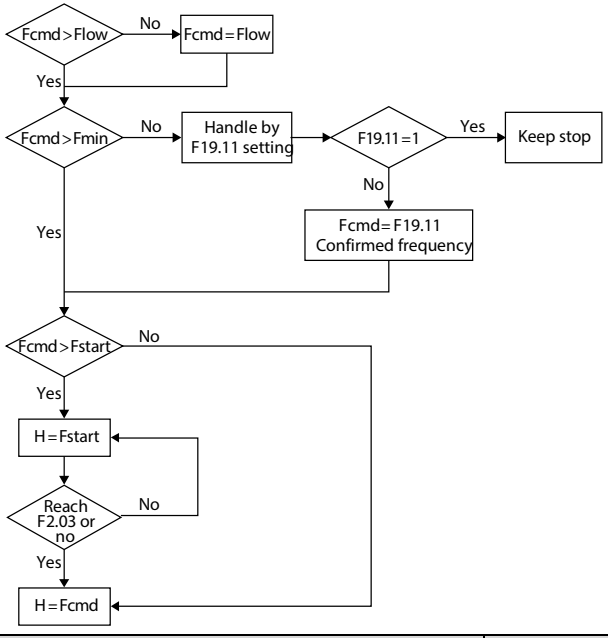
Flow = Lower limit frequency (F00.09)

Fstart = Start DWELL frequency (F02.02)

Fmin = Zero frequency threshold (F19.10)

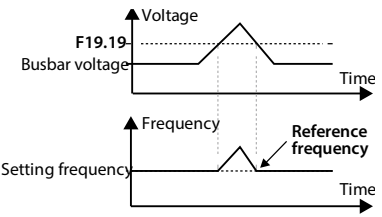
H = Target frequency

F02.03 (Frequency keeping time of DWELL starting)



Ref. Code	Function Description	Setting Range [Default]
F19.10	**Zero-frequency threshold**	**0.00 – F00.08 [1.00Hz]**
F19.11	**Set the frequency below the zero-frequency threshold action selection**	**0 - 3 [0]**
	0: Run according to the frequency command. 1: Keep stop status, inverter has no output. 2: Press zero frequency threshold to run. 3: Run at zero frequency.	

Overvoltage stall function (F19.18, F19.19)

Ref. Code	Function Description	Setting Range [Default]
F19.18	**Overvoltage stalling options**	**0 - 1.000 [0.500]**
	0: No. 0.001 - 1.000: Allow. • During the operation of the inverter, the detected bus voltage is compared with F19.19 and the bus voltage is higher than F19.19 overvoltage stall point, the inverter automatically increases the output frequency to prevent more energy from being fed back to the inverter by the load. • The overvoltage suppression gain is set too small to effectively suppress the DC bus voltage increase. • Setting the overvoltage suppression gain too large may cause the output frequency to fluctuate and cause the entire system to oscillate. During Dec., the Acc. and Dec. time may be appropriate to avoid system oscillation caused by overvoltage stall. *Note: When the overvoltage stall condition is held for more than 1 minute, the inverter reports an overvoltage stall failure (E0007) and stops the output.*	
F19.19	**Overvoltage speed lose point**	**0 - 1200V [Type confirmed]**
	During overvoltage during operation, the inverter may appropriately increase overvoltage stalling gain and reduce overvoltage stalling point. • The factory setting for a 220V model is 390V; The factory setting for a 380V model is 740V. Over-voltage stall and brake components with the use of: • Normally an overvoltage stall should be disabled (F19.18 = 0). when the drive is installed with a brake unit. • However, when the feedback energy is heavy at the moment of load and the braking component can not discharge the feedback energy in time, over-voltage protection may occur in the inverter. In this case, over-voltage protection can be avoided by enabling over-voltage stall. Pressure stall point (F19.19) setting value should be greater than the brake component of the operating voltage point.  △F = F19.18 × (VDC - F19.19)	

Automatic current limit function (F19.20 - F19.22)

Ref. Code	Function Description	Setting Range [Default]
F19.20	**Automatic current limiting gain**	**0 - 1.000 [0.500]**

	When the inverter output current exceeds F19.21, the inverter automatically suppresses the output current to further increase to avoid over-current protection.
	• Automatic current limiting gain should be adjusted appropriately according to actual load conditions:
	  • Automatic current limiting gain setting is too small, can not effectively inhibit the output current increase;
	  • Setting the auto-current-limiting gain too large may cause the output frequency to fluctuate and cause the entire system to oscillate.
	• F19.20 = 0, automatic current limiting is disabled.	

Ref. Code	Function Description	Setting Range [Default]
F19.21	**Automatic current limit level**	**20.0 - 200.0 [150.0%]**
	The current threshold for the automatic current limiting operation is defined as the percentage relative to the rated current of the drive. • If the F19.21 setting is low when the automatic current limit is active, the inverter overload capacity may be affected.	
F19.22	**Automatic current limiting integral time constant**	**0 - 1.000 [0.020]**
	F19.22 is set too small, can not effectively inhibit the output current increase; F19.22 is set too large may cause the output frequency to fluctuate and cause the entire system to oscillate.	

Other functions (F19.23 - F19.24, F19.44)

Ref. Code	Function Description		Setting Range [Default]
F19.23	**Power-on instantaneous terminal detection**		**0,1 [0]**
	Valid only for 2-wire terminal control. 0: Rising edge effective. • Suitable for use after power-on, in the absence of human intervention and does not allow automatic operation, to prevent damage to equipment and protect personal safety. • These situations need to be started when the inverter is powered on and the run command is completed. 1: Electrical level. • Suitable for ensured equipment and personal safety, in order to improve the automation and efficiency of equipment, the need for the inverter to run immediately on power. • In these cases, the drive will operate immediately as long as the command is setting to the terminal, regardless of whether the run command is setting before the inverter is powered up or after power-up.		
F19.24	**Action voltage of brake unit**	**380V inverter:**	**630 - 750V [Type confirmed]**
		220V inverter:	**380 - 450V [Type confirmed]**
	Note: Only for drives with built-in brake unit that bleed energy through the braking resistor and that the energy drain is only active when the drive is running.		
F19.39	**Input voltage selection**		**00 - 12 [00]]**
	Unit: Model 380V input voltage selection • 0: 380 - 460V. • 1: 260 - 460V. • 2: 200 - 460V.	**Ten: Model 220V input voltage selection** • 0: 200 - 240V. • 1: 140 - 240V.	
	Note: Low voltage input, the inverter needs to derate the use, the actual output current does not exceed the rated output current of the inverter.		
F19.44	**LCD display time**		**0.0 - 999.9 [5.0min]**
	Defines the display time of keypad LCD backlight when there is no operation. • Normally on in 0. Normally on in fault. • In no fault, more than F19.44 time, LCD backlight will be off. If any button press operation keypad at this time, only to open the backlight and not execute the command.		

7.18 F20: Fault Protection Parameter

Overload protection (F20.00)

Ref. Code	Function Description	Setting Range [Default]
F20.00	**Overload alarm selection**	**00000 - 30000 [00000]**
	Unit / ten / hundred / one thousand: Reserved **Ten thousand place: Overload protection choice** • 0: Enables inverter overload protection and motor overload protection. • 1: Enable inverter overload protection to shield motor overload protection. • 2: Shield inverter overload protection, enable motor overload protection. • 3: Shield inverter overload protection, motor overload protection.	

Output phase fault (F20.10, F20.11)

Ref. Code	Function Description	Setting Range [Default]
F20.10	**Detecting datum for output phase fault**	**0 - 50 [20%]**
F20.11	**Detecting time for output phase fault**	**0.00 - 20.00 [3.00s]**
	F20.10 is percentage compared to rated current. When the inverter output detects current has not reached a certain phase detecting datum (F20.10), and duration is greater than the testing time (F20.11), frequency converter will give E0016 (Fault of output phase). • F20.10 = 0 or F20.11 = 0, converter do not detect output phase fault.	

Fault self-recovery function and fault relay action (F20.18, F20.19)

The function can recovery fault occurred in running and which is set in times (F20.18) and interval (F20.19) automatically. In interval, output is locked and after finishing recovering, if running command is valid, automatic running will start.

No recovery function in below fault:

E0010: Braking unit failure
E0014: Fault of current detection circuit
E0021: Access fault of control board EEPROM
E0023: Parameter setting error
E0024: External equipment failure

Ref. Code	Function Description	Setting Range [Default]
F20.18	**Automatic reset number**	**0 - 100 [0]**
	When set to 0, it means that automatic reset is disabled and fault protection is performed immediately. • The fault auto reset count is automatically cleared when no fault is detected within 5 minutes. • When an external fault is reset, the fault auto reset count is cleared.	
F20.19	**Automatic reset interval**	**2.0 - 20.0 [5.0s/times]**

Fault records (F20.21 - F20.37)

Ref. Code	Function Description	Setting Range [Default]
F20.21	Fifth (last) type of fault	[Actual value]
F20.22	Preset frequency of the latest failure	
F20.23	Running frequency of the latest failure	
F20.24	DC bus voltage of the latest failure	
F20.25	Output voltage of the latest failure	
F20.26	Output current of the latest failure	
F20.27	Input terminal status at the latest fault	
F20.28	Output terminal status at the latest fault	
F20.29	Interval time of the latest failure	
F20.30	The fourth fault type	
F20.31	Fourth fault interval	
F20.32	The third fault type	
F20.33	The third fault interval	
F20.34	Fault type of second time	
F20.35	Interval time of the second time failure	
F20.36	Fault type of first time	
F20.37	Interval time of the first time failure	
	F20.22 - F20.29 Record inverter state parameters in the latest failure moment. F20.30 - F20.37 Record fault type of the last four times and interval times of each fault. Time interval unit is 0.1 hour.	

7.19 F23: PWM Controlling Parameter

Ref. Code	Function Description	Setting Range [Default]
F23.00	**Carrier frequency setting**	**1 - 8 [8kHz]**
	Define carrier frequency of converter output PWM wave. • Carrier frequency will affect motor running noise. Higher the carrier frequency, less noise. Please set it reasonably.	
F23.01	**Carrier frequency is automatically adjusted**	**0,1 [1]**
	0: Automatic adjustment of carrier frequency is forbidden. 1: Enable automatic adjustment of carrier frequency. • When automatic adjustment of carrier frequency is enabled, the inverter automatically adjusts the carrier frequency based on the output frequency and the radiator temperature. • Only for carrier frequency F23.00 setpoint > 3kHz. • The carrier frequency auto-tuning is invalid during torque control.	
F23.02	**PWM over modulation enabled**	**0,1 [1]**
	0: Invalid. 1: Valid.	
F23.03	**PWM modulation mode**	**0,1 [0]**
	0: Two-phase modulation / three-phase modulation switching. 1: Three-phase modulation.	
F23.04	**PWM modulation mode switching point 1**	**Type confirmed - F23.05 - 2Hz [Type confirmed]**
F23.05	**PWM modulation mode switching point 2**	**F23.04 + 2Hz - 50.00Hz [Type confirmed]**
	PWM modulation mode switching is only applicable to the V/f control, carrier frequency > 3kHz conditions; The inverter automatically selects three-phase modulation when the open-loop vector or carrier frequency ≤ 3kHz. • F23.04 sets the switching frequency of two-phase modulation → three-phase modulation; • 2.2kW and below models (including 380V and 220V) factory default value 10.00Hz, the lower limit of 10.00Hz. • Other models default value 5.00Hz, lower limit 5.00Hz. • F23.05 sets the switching frequency of three-phase modulation → two-phase modulation; • 2.2kW and below models (including 380V and 220V) factory value of 15.00Hz. • Other models default setting 10.00Hz.	

7.20 R02: AI Correction Parameters

Ref. Code	Function Description	Setting Range [Default]
R02.00	AI display voltage 1	0.00 - 10.00V [Default]
R02.01	AI measured voltage 1	0.00 - 10.00V [Default]
R02.02	AI display voltage 2	0.00 - 10.00V [Default]
R02.03	AI measured voltage 2	0.00 - 10.00V [Default]
	R02.00 - R02.03 used to correct the AI input signal. **Step:** 1. Before correcting, please set R02.00 - R02.03 to zero to get the value of original input AI. 2. Enter a 0 - 10V signal, view d00.27 and measure the actual input value with a multimeter, record both values. 3. Enter another 0 - 10V signal, continue to d00.27 and measure the actual input value with a multimeter, record both values. 4. Input the above two measured parameters into R02.00 - R02.01 and R02.02 - R02.03, respectively, to complete the manual correction. *Note: The above parameters have been factory calibrated, the user generally do not need to be calibrated again.*	

Chapter 8 Troubleshooting and Maintenance

8.1 Troubleshooting

HD09-S has inbuilt protective and warning self-diagnostic functions. If a fault occurs, the fault code will be displayed on the display keypad. At the same time, fault relay acts, accordingly the inverter stops output and the motor coasts to stop.

When fault or alarm occurs, please record the fault details and take proper actions according to the below table. If you need some technical help, please contact to the suppliers or directly call Shenzhen Hpmont Technology Co., Ltd..

After the fault is eliminated, please reset the inverter by any of the following methods:

1. Display keypad. Press ▽ (standard) / STOP (optional).

2. External reset terminal (DI terminal set as No.46 function).

3. Communication.

4. Switching on the inverter after switching off.

Fault		Fault reasons	Counter-measures
-Lu-	DC bus undervoltage	• At the begining of powering on and at the end of powering off • Input voltage is too low • Improper wiring leads to undervoltage of hardware	• It is normal status of powering on and powering off • Please check input power voltage • Please check wiring and wire the inverter properly
E0001	Inverter output over current (Acc. process)	• Improper connection between inverter and motor • Improper motor parameters • The rating of the used inverter is too small • Acc. / Dec. time is too short • Vector control, no motor self-tuning	• Connect the inverter and motor properly • Please set correct motor parameters (F08.00 - F08.04) • Select inverter with higher rating • Please set proper Acc. time and Dec. time (F03.01 - F03.08) • Perform parameter self-tuning (F08.06)
E0002	Inverter output over current (Dec. process)		
E0003	Inverter output over current (constant speed process)		
E0004	DC bus overvoltage (Acc. process)	• Input voltage is too high • Deceleartion time is too short • Improper wiring leads to overvoltage of hardware • Improper selection of the braking devices	• Please check power input • Please set a proper value for Dec. time (F03.02, F03.04, F03.06, F03.08) • Please check wiring and wire the inverter properly • Select the brake assembly as described in section 5.2
E0005	DC bus overvoltage (Dec. process)		
E0006	DC bus overvoltage (constant speed process)		

Fault		Fault reasons	Counter-measures
E0007	Stall overvoltage	• Bus voltage is too high • The setting of stall overvoltage is too low	• Please check power input or the function of brake • Set the value of stall overvoltage properly (F19.19)
E0009	Heatsink overheat	• Ambient temperature is too high • Inverter external ventilation is not good • Fan fault • Fault occurs to temperature detection circuit	• Please use inverter with higher power capacity • Improve the ventilation around the inverter • Replace the cooling fan • Please seek technical support
E0010	Braking unit failure	• Braking circuit defective	• Seek technical support
E0012	Parameters auto-tuning fault	• Parameter auto-tuning is time out	• Please check the motor's connection • Input the correct motor parameters (F08.01 - F08.04) • Please seek technical support
E0014	Fault of current detection circuit	• Current detection circuit is damaged	• Please contact the supplier for repairing
E0016	Fault of output phase	• Output phase disconnection or loss • Heavy imbalance of inverter's three-phase load	• Please check the connection between inverter and motor • Please check the quality of motor
E0017	Inverter overload	• Acc. time is too short • The motor parameters are not set correctly • Improper setting of V/f curve or torque boost leads to over current • Vector control, no parameter auto-tuning of the motor • Mains supply voltage is too low • Motor load is too high	• Adjust Acc. time (F03.01, F08.03, F08.05, F08.07) • Set the correct motor parameters (F08.00 - F08.04) • Adjust V/f curve (F09.01 - F09.06) or torque boost (F09.07, F09.08) • Perform parameter self-tuning (F08.06) • Please check mains supply voltage • Please use inverter with proper power rating
E0019	Motor overload	• Improper setting of V/f curve • Mains supply voltage is too low • Normal motor runs for a long time with heavy load at low speed • Motor runs with blocked torque or load is too heavy	• Adjust the setting of V/f curve (F09.01 - F09.06) • Check the power input • Long-term low-speed high-load operation, the replacement of variable frequency motor • Please check the load and mechanical transmission devices

Fault		Fault reasons	Counter-measures
E0021	Access fault of control board EEPROM	• Memory circuit fault of control board EEPROM	• Please contact the supplier for repairing
E0022	Operation keypad EEPROM read and write problems	• The control keypad EEPROM memory circuit has failed	• Replace the operator keypad • Contact factory maintenance
E0023	Parameter setting error	• The motor rated power is far from the drive's rated power • Improper motor parameter setting	• Select a motor that matches the drive power • Set the correct motor parameters (F08.00 - F08.04)
E0024	External equipment failure	• Fault terminal of external equipment operates	• Please check external equipment
E0028	SCI communication time-out	• Connection fault of communication cable • Disconnected or not well connected	• Please check the connection
E0029	SCI communication error	• Connection fault of communication cable • Disconnected or not well connected • Communication setting error • Communication data error	• Please check the connection • Please check the connection • Please correctly set the communication format (F17.00), and the baud rate (F17.01)

Note:

E0022 does not affect the inverter's normal operation.

8.2 Maintenance

Danger

- Must be maintained by professionally trained and authorized professionals.
- Before the inverter is inspected and maintained, the input power of the inverter is completely disconnected. See check that the input power is fully disconnected, page 9.

Warning

- For a converter with a storage time of more than 2 years, the power supply should be boosted by the regulator.
- Do not leave metal objects such as wires, tools, screws, etc. inside the drive.
- Do not modify the inverter internally.
- Do not touch the IC device with static-sensitive IC device inside the inverter.

Daily Maintenance

The user should do the daily maintenance work according to the following table, in order to find the anomalies in time and prolong the service life of the inverter.

Items	Content	Criteria
Running environment	Temperature and humidity	-10 - +40°C, derating at 40 - 50°C Less than 95%RH, non-condensing
	Dust and water dripping	No conductive dust accumulating, no water dripping
	Gas	No strange smell
HD09-S	Oscillation and heating	Stable oscillation and proper temperature
	Noise	No abnormal sound
Motor	Heating	No overheat
	Noise	Low and regular noise
Running status parameters	Output current	Within rated range
	Output voltage	Within rated range

Periodical Maintenance

According to the environment, the user can inspect for each 3-6 months on the HD09-S a regular routine to eliminate the hidden dangers to ensure long-term high-performance equipment and stable operation.

Check the contents:

- The control terminal screws are not loosened and, if loosened, use the available torque and the appropriate screwdriver to tighten;
- Strong contact of power terminals, no overheating traces at copper or cable connections;
- Damage of power cable, control cable, especially surface in contact with the metal whether have cutting traces;
- The nose of power cord and control signal line, insulation tape does not fall off or rupture;
- Clean the dust on the circuit board and duct, and better to use a vacuum cleaner.

Note:

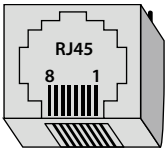
1. Inverter factory has passed the pressure test, the user does not have to do the pressure test, or improper test will damage the inverter.

2. When the motor is tested for insulation, the U / V / W terminal of the inverter must be disconnected and the motor should be tested separately. Otherwise, the inverter will be damaged.

3. Long-term storage of the inverter must be carried out within 2 years of a power test. Use the regulator to slowly raise the input voltage of the inverter to the rated value for at least 5 hours.

Chapter 9 MODBUS Communication Protocol

9.1 Communication Terminal

Type	Name	Terminal Description	
	SCI communication terminal	**Communication port pin**	**Communication port signal**
		1,3	+5V
		2	485+
		4,5,6	GND
		7	485-
		8	Reserved

9.2 The Transmitted Value Corresponding to Calibration Relationship

Except parameters in the remarks, other function codes should refer to the user manual column "Minimum modification unit" description and determine the calibration relationship of the specified function code.

Note:

1. F04.03, F16.05, F16.06, F16.22 communication data 0 - 2000 corresponding data -100.0% - +100.0%.

2. Status parameter 0x3318 communication data 0 - 16000 corresponding data -8000 - +8000.

3. Status parameters: Process PID setting, process PID feedback, process PID error, process PID integral term and process PID output communication data 0 - 2000 corresponding data -100.0% - + 100.0%.

9.3 Protocol Functions

9.3.1 Support Functions

Supported function	Code	Instructions
Read the drive function parameters or status parameters	0x03	
Rewrite the inverter with a single function parameter or control parameter	0x06	Power-down is saved by F17.09
Read the drive function parameters or status parameters	0x10	Power-down is saved by F17.09

9.3.2 Read the Inverter Function Parameters or Status Parameters

Function code 0x03, request frame and response frame are shown in the table below, taking RTU mode as an example.

Request frame	Add	Function code	Start register address	Number of registers	CRC / LRC check
Number of data frame bytes	1	1	2	2	2/1
Value or range	0 - 247	0x03	0x0000 - 0xFFFF	0x0001 - 0x000C	

Response frame	Add	Function code	Answer number of bytes	Number of registers	CRC / LRC check
Number of data frame bytes	1	1	1	2* No of registers	2/1
Value or range	1 - 247	0x03	2* No of registers		

9.3.3 Rewrite the Inverter a Single Function Parameters or Control Parameters

Function code 0x06 (whether data is saved after power-off is decided by para F17.09), the request frame and response frame are shown in the table below, taking RTU mode as an example.

Request frame	Add	Function code	Register address	Content of registers	CRC / LRC check
Number of data frame bytes	1	1	2	2	2/1
Value or range	0 - 247	0x06	0x0000 - 0xFFFF	0x0000 - 0xFFFF	

Response frame	Add	Function code	Register address	Content of registers	CRC / LRC check
Number of data frame bytes	1	1	2	2	2/1
Value or range	1 - 247	0x06	0x0000 - 0xFFFF	0x0000 - 0xFFFF	

9.3.4 Rewrite the Inverter Multiple Functional Parameters or Control Parameters

Function code 0x10 (whether data is saved after power-off is decided by para F17.09), the request frame and response frame are shown in the table below, taking RTU mode as an example.

Request frame	Add	Function code	Start register address	No of operation registers	Register contents bytes	Register contents	CRC / LRC check
No of data frame bytes	1	1	2	2	1	2* No of operation registers	2/1
Value or range	0 - 247	0x10	0x0000 - 0xFFFF	0x0000 - 0x0004	2* No of operation registers		

Response frame	Add	Function code	Start register address	No of operation registers	CRC check
No of data frame bytes	1	1	2	2	2/1
Value or range	1 - 247	0x10	0x0000 - 0xFFFF	0x0000 - 0x0004	

The request rewrites the contents of the contiguous data unit starting from the starting register address.

9.3.5 Error and Exception Code

If the operation request fails, the answer is an error code, the error code is function code + 0x80. The exception code is shown in the table below.

Exception code	Instructions
0x01	Illegal function parameters.
0x02	Illegal register address.
0x03	Data fault. Data is exceeded the upper / lower limit.
0x04	Slave operation fails (including fault caused by data invalid).
0x16	Unsupported operation (unsupported to read the attributes, factory default and upper / lower limit for the control parameter and status parameter).
0x17	The register number of command frame is fault.
0x18	Incorrect information frame, including incorrect information length and incorrect checking.
0x20	Parameters cannot be modified.
0x21	Parameters are unchangeable when the controller is in running status.
0x22	Parameters are protected by password.

9.4 Address Mapping Relationship

9.4.1 Function Parameters Address Mapping

HD09-S function parameter group number is mapped to the high byte of the register address, and the index within the group is mapped to the low byte of the register address.

F00 - F09 group register address high byte is 0x00 - 0x09, F10 - F15 group register address high byte is 0x0a - 0x0f, F16 - F23 group register address high byte is 0x10 - 0x17, R02 group register address high byte is 0x1b.

For example: The register address of para F03.02 is 0x0302, and the register address of inverter function parameter F16.01 is 0x1001.

9.4.2 Control Parameters (0x32) Address Mapping

The control group number (0x32) is mapped to the high byte of the register address, and the index in the group is as follows:

Register address	Parameter	Saving or not when power off
0x3200	Control command bit	Not saving
0x3201	Running frequency setting	Whether it is saved is up to 3rd bit of F00.14 after power off
0x3202	Auxiliary running frequency setting	Not saving
0x3204	Virtual terminal control setting	Not saving

The control command byte (0x3200) is defined in the table below.

Control Bit	Value and definition		Description
Bit0	0: Run command is invalid	1: Run command is valid	Inverter start&stop control (edge trigger mode)
Bit1	0: Forward	1: Reverse	Running direction, the forward / reverse rotation of the terminal is valid
Bit2	0: Reserved	1: The stop mode is deceleration stop	Inverter deceleration stop control (edge trigger mode)
Bit3	0: Reserved	1: The stop mode is emergency stop	Inverter emergency stop control (edge trigger mode)
Bit4	0: Reserved	1: The stop mode is freely stop	Inverter freely stop control (edge trigger mode)
Bit5	0: Reserved	1: External fault signal	The inverter displays an external fault and it stops or continues to run as set by F17.08
Bit6	0: Press and go forward stop	1: Press and go forward	Press and go forward control

Control Bit	Value and definition		Description
Bit7	0: Press and go reverse stop	1: Press and go reverse	Press and go reverse control
Bit8	0: Fault reset is invalid	1: Fault reset is valid	Inverter fault reset control
Bit9 - Bit11	0: Reserved		
Bit12	0: Current control is invalid	1: Current control is valid	Whether the currently issued control byte is valid or not

The contents of the register can be defined as the control commands as shown in the below table, that is, the logical combination of control command bits.

Register contents	Control commands	Register contents	Control commands	Register contents	Control commands
0x1001	Forward command	0x1008	Emergency stop	0x1040	Press and go forward
0x1003	Reverse command	0x1010	Freely stop	0x1080	Press and go reverse
0x1004	Deceleration stop	0x1020	External error stop	0x1100	Reset error

Virtual terminal control settings (0x3204) the bits are defined in the table as below:

Control bit	Value and definition	
Bit0	Reserved	Reserved
Bit1	0: DO invalid output	1: DO valid output
Bit2	0: RLY1 invalid output	1: RLY1 valid output

9.4.3 Status Parameter (0x33) Address Mapping

The group number (0x33) of the status parameter is mapped to the high byte of Register address. The index of the group is shown in the following table:

Address	Parameter	Address	Parameter
0x3300	Inverter series	0x331B	AI input voltage
0x3301	Control board software version	0x331C	AI input voltage (after processing)
0x3303	Control board software non-standard version	0x3323	DI4 terminal pulse input frequency
0x3305	Keypad software version	0x3324	AO output
0x3306	Customized serial number	0x3326	High speed output pulse frequency
0x3307	Motor and control mode selection	0x3327	Heat sink temperature
0x3308	Inverter rated current	0x3328	Setting the linear speed
0x330A	Inverter status	0x3329	Setting linear speed
0x330B	Main setting frequency channel	0x332C	Process PID setting
0x330C	Main setting frequency	0x332D	Process PID feedback
0x330D	Auxiliary setting frequency	0x332E	Process PID error
0x330E	Setting frequency	0x332F	Process PID integral
0x330F	Setting frequency (after acceleration and deceleration)	0x3330	Process PID output
0x3310	Output frequency	0x3331	External count value
0x3311	Setting speed	0x3332	Input terminal status
0x3312	Running speed	0x3333	Output terminal status
0x3314	The output voltage	0x3337	Power-on time accumulation
0x3315	The output current	0x3338	Running time accumulation
0x3316	Torque setting	0x3339	High bit motor accumulated energy consumption
0x3317	Output torque	0x333A	Low bit motor accumulated energy consumption
0x3318	Output Power	0x333B	High bit motor energy consumption of this time
0x3319	DC bus voltage	0x333C	Low bit motor energy consumption of this time
0x331A	Keypad potentiometer input voltage	0x333D	Current error code

Chapter 10 Parameter

Property modification:

"×": Can not be modified during operation.

"○": Can be modified during operation.

"*": The actual parameters can not be changed.

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
d00: Status Display Parameters						
d00.00	Series of the inverter		Actual		*	
d00.01	Software version of the control board		Actual		*	
d00.03	Special software version of the control board		Actual		*	
d00.05	Software version of the keypad		Actual		*	
d00.06	Customized series No.		Actual		*	
d00.07	Control mode	00: V/f contorl without PG 20: Vector control without PG	Actual		*	
d00.08	Rated current of the inverter		Actual		*	
d00.10	Inverter status	Unit: Bit0: Inverter fault Bit1: Run / stop Bit2: FWD / REV Bit3: Zero speed running Ten: Bit1&Bit0: Acc. / Dec. / constant Bit3: DC braking Hundred: Bit0: Parameter auto-tuning Bit2: Speed limiting value Thousand: Bit0: Stall overvoltage Bit1: Current limiting	Actual		*	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
d00.11	Master setting frequency source	0: Keypad set 1: Terninal set 2: Communicaiton set 3: Analogue set 4: Terminal pulse set 6: AI1 terminal setting 10: Keyapd potentiometer setting 11: PID 12: Multi-speed	Actual		*	
d00.12	Master setting frequency		Actual		*	
d00.13	Auxiliary setting frequency		Actual		*	
d00.14	Setting frequency		Actual		*	
d00.15	Reference frequency (after Acc. / Dec.)		Actual		*	
d00.16	Output frequency		Actual		*	
d00.17	Setting RPM		Actual		*	
d00.18	Running RPM		Actual		*	
d00.20	Output voltage		Actual		*	
d00.21	Output current		Actual		*	
d00.22	Torque setting		Actual		*	
d00.23	Output torque		Actual		*	
d00.24	Output power		Actual		*	
d00.25	DC bus voltage		Actual		*	
d00.26	Potentiometer input voltage of the keypad		Actual		*	
d00.27	AI input		Actual		*	
d00.28	AI input (after disposal)		Actual		*	
d00.35	DI4 terminal pulse input frequency		Actual		*	
d00.36	AO output		Actual		*	
d00.38	High-speed output pulse frequency		Actual		*	
d00.39	Heatsink temperature		Actual		*	
d00.40	Setting line speed		Actual		*	
d00.41	Reference line speed		Actual		*	
d00.44	Process PID reference		Actual		*	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
d00.45	Process PID feedback		Actual		*	
d00.46	Process PID tolerance		Actual		*	
d00.47	Process PID integral item		Actual		*	
d00.48	Process PID output		Actual		*	
d00.49	External counting value		Actual		*	
d00.50	Input terminal status		Actual		*	
d00.51	Output terminal status		Actual		*	
d00.55	Total time at power-on		Actual		*	
d00.56	Total time at operation		Actual		*	
d00.57	High bit of motor total energy consumption		Actual		*	
d00.58	Low bit of motor total energy consumption		Actual		*	
d00.59	High bit of energy consumption at this time running		Actual		*	
d00.60	Low bit of energy consumption at this time running		Actual		*	
d00.61	Present fault		Actual		*	
F00: Basic Parameter						
F00.01	Control mode selection	0: V/f control without PG 2: PG without vector control	0	1	×	
F00.06	Max. output frequency	50.00 - 400.00Hz	50.00Hz	0.01Hz	×	
F00.08	Max. operating frequency	0.00Hz - F00.06	50.00Hz	0.01Hz	×	
F00.09	Min. operating frequency	0.00Hz - F00.08	0.00Hz	0.01Hz	×	
F00.10	Frequency setting access selection	0: Keypad digital setting 1: Terminal digital setting 2: SCI communication setting 3: Analogue setting 4: Terminal impulse setting 6: AI1 terminal setting 11: Keypad potentiometer setting	0	1	×	
F00.11	Operation command access selection	0: Keypad operation command 1: Terminal operation command 2: SCI communication command	0	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F00.13	Original operation frequency digital setting	0.00Hz - F00.08	50.00Hz	0.01Hz	○	
F00.14	UP / DOWN digital setting control	Unit: Storage option of set frequency when power down 0: Not saved 1: Save in F00.13 Ten: Options of set frequency in stop 0: Frequency hold 1: The set frequency returns to F00.13 when stopped Hundred: Options of set frequency in communication 0: Not saved 1: Save in F00.13 Thousand: Options of set frequency in frequency channel switching 0: Do not save 1: Save	1001	1	×	
F00.15	Inching operation frequency digital setting	0.00Hz - F00.08	5.00Hz	0.01Hz	○	
F00.17	Running direction selection	0: Same direction 1: Contrary direction	0	1	×	
F00.18	Anti-REV operation	0: Reverse allowed 1: Do not REV	0	1	×	
F00.19	Dead time between positive and negative rotation	0.0 - 3600.0s	0.0s	0.1s	×	
F00.20	External keypad potentiometer enabled	0: Enable 1: Invalid	0	1	○	
F01: Parameter Protection Function						
F01.00	User password	00000 - 65535	00000	1	○	
F01.01	Menu mode selection	0: Standard menu mode 1: Verifying menu mode	0	1	○	
F01.02	Function code parameter initialization (parameter download)	0: No action 1: Restore the factory parameter	0	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
		2/3: Cope the storaged parameter 1/2 of keypad to controller board for current function code value updating 4: Clear out fault records 5/6: Keypad storage parameters 1/2 is copied to the control keypad and update the current function code setting (including motor parameters)				
F01.03	Copy the parameters to keypad	0: No action 1/2: Current function code value is copied to keypad storage parameter 1/2	0	1	×	
F02: Start and Stop Controlling Parameter						
F02.00	Start mode selection	0: Start from starting DWELL frequency 1: Brake firstly and then start from DWELL frequency	1	1	×	
F02.01	Starting delay time	0.00 - 10.00s	0.00s	0.01s	×	
F02.02	Frequency setting of DWELL starting	0.00Hz - F00.08	0.00Hz	0.01Hz	×	
F02.03	Frequency keeping time of DWELL starting	0.00 - 10.00s	0.00s	0.01s	×	
F02.04	DC brake current setting	0 - 100% (inverter rated current)	50%	1%	×	
F02.05	Starting DC braking time	0.00 - 60.00s	0.00s	0.01s	×	
F02.13	Stoping mode selection	0: Reserved 1: Stop freely 2: Dec. stop + DC brake	2	1	×	
F02.14	DWELL frequency setting in stopping	0.00Hz - F00.08	0.00Hz	0.01Hz	×	
F02.15	DWELL frequency keeping time in stopping	0.00 - 10.00s	0.00s	0.01s	×	
F02.16	Starting frequency of stopping DC braking	0.00 - 50.00Hz	0.50Hz	0.01Hz	×	
F02.17	DC braking waiting time at stop	0.00 - 10.00s	0.00s	0.01s	×	
F02.18	Stopping DC braking time	0.00 - 60.00s	0.00s	0.01s	×	
F02.19	Jog control mode	0: The jog functions of start and stop mode etc are invalid 1: The jog functions of start and stop mode etc are enabled	0	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F02.20	Pre-excitation time	0.00 - 0.50s	0.01s	0.01s	×	
F03: Acc. and Dec. Parameter						
F03.00	Acc. / Dec. mode selection	0: Linear Acc. / Dec. 1: S curve Acc. and Dec.	0	1	○	
F03.01	Acc.time 1	0.1 - 6000.0s	10.0s	0.1s	○	
F03.02	Dec.time 1	0.1 - 6000.0s	10.0s	0.1s	○	
F03.03	Acc.time 2	0.1 - 6000.0s	10.0s	0.1s	○	
F03.04	Dec.time 2	0.1 - 6000.0s	10.0s	0.1s	○	
F03.05	Acc.time 3	0.1 - 6000.0s	10.0s	0.1s	○	
F03.06	Dec.time 3	0.1 - 6000.0s	10.0s	0.1s	○	
F03.07	Acc.time 4	0.1 - 6000.0s	10.0s	0.1s	○	
F03.08	Dec.time 4	0.1 - 6000.0s	10.0s	0.1s	○	
F03.09	Frequency switchover of Acc. time 2 and 1	0.00Hz - F00.08	0.00Hz	0.01Hz	×	
F03.10	Frequency switchover of Acc. time 2 and 1	0.00Hz - F00.08	0.00Hz	0.01Hz	×	
F03.11	S-curve characteristic time at starting Acc.	0.00 - 2.50s	0.20s	0.01s	○	
F03.12	S-curve characteristic time at ending Acc.	0.00 - 2.50s	0.20s	0.01s	○	
F03.13	S-curve characteristic time at starting Dec.	0.00 - 2.50s	0.20s	0.01s	○	
F03.14	S-curve characteristic time at ending Dec.	0.00 - 2.50s	0.20s	0.01s	○	
F03.15	Inching Acc. time	0.1 - 6000.0s	6.0s	0.1s	○	
F03.16	Inching Dec. time	0.1 - 6000.0s	6.0s	0.1s	○	
F03.17	Dec. time of emergency stop	0.1 - 6000.0s	10.0s	0.1s	○	
F04: Process PID Controlling Parameter						
F04.00	Process PID function selection	0: PID control invalid 1: PID control valid	0	1	×	
F04.01	Setting channel selection	0: Digit setting 1: Analog setting 2: Terminal pulse setting 3: AI1 terminal is setting 7: Keypad potentiometer is setting	0	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F04.02	Feedback access selection	0: Analogue feedback 1: Terminal impulse feedback	0	1	×	
F04.03	Setting para. digital setting	-100.0 - 100.0%	0.0%	0.1%	○	
F04.04	Proportional gain (P)	0.00 - 10.00	2.00	0.01	○	
F04.05	Integral time (I)	0.01 - 10.00s	1.00s	0.01s	○	
F04.06	Points limit	0.00Hz - F00.08	50.00Hz	0.01Hz	○	
F04.07	Derivative time (D)	0.00 - 10.00s	0.00s	0.01s	○	
F04.08	Differential limiting values	0.00Hz - F00.08	20.00Hz	0.1Hz	○	
F04.09	Sampling period (T)	0.01 - 50.00s	0.10s	0.01s	○	
F04.10	Deviation limit	0.0 - 20.0%	0.0%	0.1%	○	
F04.13	PID regulator upper limit	0.0 - 100.0%	100.0%	0.1%	×	
F04.14	PID regulator lower limit	0.0 - 100.0%	0.0%	0.1%	×	
F04.17	PID output filter time	0.01 - 10.00s	0.05s	0.01s	○	
F04.18	PID output REV choice	0: PID adjust the inversion is prohibited 1: PID output is allowed to reversal	0	1	×	
F04.19	PID output inversion frequency limit	0.00Hz - F00.08	50.00Hz	0.01Hz	×	
F05: External Setting Curve Parameters						
F05.00	External setting curve selection	0: Straight line 1: Reserved 2: Polylines 3: No treatment	3	1	○	
F05.01	Line Min. setting	0.0% - F05.03	0.0%	0.1%	○	
F05.02	Line Min. setting corresponding	0.0 - 100.0%	0.0%	0.1%	○	
F05.03	Line Max. setting	F05.01 - 100.0%	100.0%	0.1%	○	
F05.04	Line Max. setting corresponding	0.0 - 100.0%	100.0%	0.1%	○	
F05.09	Max. reference of polyline	F05.11 - 100.0%	100.0%	0.1%	○	
F05.10	Max. reference corresponding value of polyline	0.0 - 100.0%	100.0%	0.1%	○	
F05.11	Inflection point 2 reference of polyline	F05.13 - F05.09	100.0%	0.1%	○	
F05.12	Inflection point 2 corresponding value	0.0 - 100.0%	100.0%	0.1%	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F05.13	Inflection point 1 reference of polyline	F05.15 - F05.11	0.0%	0.1%	○	
F05.14	Inflection point 1 corresponding value	0.0 - 100.0%	0.0%	0.1%	○	
F05.15	Min. reference of polyline	0.0% - F05.13	0.0%	0.1%	○	
F05.16	Min. reference corresponding value of polyline	0.0 - 100.0%	0.0%	0.1%	○	
F05.17	Hopping frequency	F00.09 - F00.08	0.00Hz	0.01Hz	×	
F05.20	Hopping frequency range	0.00 - 30.00Hz	0.00Hz	0.01Hz	×	
F06: Multistage Speed Function						
F06.00	Multiple frequency instruction 1	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F06.01	Multiple frequency instruction 2	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F06.02	Multiple frequency instruction 3	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F06.03	Multiple frequency instruction 4	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F06.04	Multiple frequency instruction 5	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F06.05	Multiple frequency instruction 6	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F06.06	Multiple frequency instruction 7	F00.09 - F00.08	5.00Hz	0.01Hz	○	
F08: Motor Parameter						
F08.00	Motor rated power	0.2 - 5.5kW	Type confirmed	0.1kW	×	
F08.01	Motor rated voltage	0 - 999V		1V	×	
F08.02	Motor rated current	0.01 - 99.99A		0.01A	×	
F08.03	Motor rated frequency	1.0 - 400.0Hz	50.0Hz	0.1Hz	×	
F08.04	Motor rated RPM	1 - 24000rpm	Type confirmed	1rpm	×	
F08.06	Motor parameters self-tuning	0: No action 1: Motor static self-tuning 2: Motor rotation self-tuning 3: Motor stator resistance measurement	0	1	×	
F08.07	Motor stator resistance	0.00 - 99.99Ω		0.01Ω	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F08.08	Motor rotor resistance	0.00 - 99.99Ω	Type confirmed	0.01Ω	×	
F08.09	Motor leakage inductance	0.0 - 5000.0mH		0.1mH	×	
F08.10	Mutual inductance motor	0.0 - 5000.0mH		0.1mH	×	
F08.11	Motor no-load excitation current	0.00 - 99.99A		0.01A	×	
F08.12	Motor core saturation factor 1	0.00 - 1.00	1.00	0.01	×	
F08.13	Motor core saturation factor 2	0.00 - 1.00	1.00	0.01	×	
F08.14	Motor core saturation factor 3	0.00 - 1.00	1.00	0.01	×	
F08.15	Motor core saturation factor 4	0.00 - 1.00	1.00	0.01	×	
F08.16	Motor core saturation factor 5	0.00 - 1.00	1.00	0.01	×	
F09: V/f Controlling Parameter						
F09.00	Motor V/f curve setting	0: Straight line 1: Square curve 2: 1.2 power curve 3: 1.7 power curve 4: User-defined curve	0	1	×	
F09.01	Motor V/f frequency values F3	F09.03 - 100.0% (F08.03)	80.0%	0.1%	×	
F09.02	Motor V/f voltage values V3	F09.04 - 100.0% (F08.01)	80.0%	0.1%	×	
F09.03	Motor V/f frequency values F2	F09.05 - F09.01 (F08.03)	50.0%	0.1%	×	
F09.04	Motor V/f voltage values V2	F09.06 - F09.02 (F08.01)	50.0%	0.1%	×	
F09.05	Motor V/f frequency values F1	0.0% - F09.03 (F08.03)	0.0%	0.1%	×	
F09.06	Motor V/f voltage values V1	0.0% - F09.04 (F08.01)	0.0%	0.1%	×	
F09.07	The motor torque incrase	0.0 - 30.0%	2.0%	0.1%	○	
F09.08	Cut-off points of motor torque increase manually	0.0 - 50.0% (F08.03)	30.0%	0.1%	○	
F09.09	Motor slip compensation gain	0.0 - 300.0%	0.0%	0.1%	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F09.10	Motor slip compensation filtering time	0.01 - 10.00s	0.10s	0.01s	○	
F09.11	Motor slip compensation limit	0.0 - 250.0%	200.0%	0.1%	×	
F09.12	Motor iron loss	0.000 - 9.999kW	Type confirmed	0.001 kW	×	
F09.14	AVR function (automatic voltage rugulator)	0: No action 1: Constant action 2: Only Dec. and no action	1	1	○	
F09.15	Motor low frequency suppression shock coefficient	0 - 200	50	1	○	
F09.16	Motor high frequency suppression shock coefficient	0 - 200	20	1	○	
F10: Motor Vector Control Speed-loop Parameters						
F10.00	Speed control proportional gain 1 of motor	0.1 - 200.0	10.0	0.1	○	
F10.01	Speed control integral time 1 of motor	0.00 - 10.00s	0.20s	0.01s	○	
F10.02	Speed control proportional gain 2 of motor	0.1 - 200.0	10.0	0.1	○	
F10.03	Speed control integral time 2 of motor	0.00 - 10.00s	0.20s	0.01s	○	
F10.04	Speed-loop PI switching frequency 1 of motor	0.00 - 50.00Hz	10.00Hz	0.01Hz	○	
F10.05	Speed-loop PI switching frequency 2 of motor	0.00 - 50.00Hz	15.00Hz	0.01Hz	○	
F10.06	Motor speed loop integral limit	0.0 - 200.0% (F08.02)	180.0%	0.1%	○	
F10.07	Motor speed loop differential time	0.00 - 1.00s	0.00s	0.01s	○	
F10.08	Motor speed loop output filter time	0.000 - 1.000s	0.010s	0.001s	○	
F10.09	Motor torque limit lock selection	0: Not locked 1: All torque limits are in line with the limits of FWD electric torque	0	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F10.10	Motor torque limit channel	Unit: Forward electric torque setting channel Ten: REV electric torque setting channel Hundred: Forward regenerative torque setting channel Thousand: Reverse regenerative torque setting channel 0: The torque limit is set digitally. 1: The torque limit is determined by the analog input. 2: The torque limit is setting by the terminal pulse	0000	1	○	
F10.11	Motor torque limitation when motor is FWD	0.0 - 250.0% (F08.02)	180.0%	0.1%	○	
F10.12	Motor torque limitation when motor is REV	0.0 - 250.0% (F08.02)	180.0%	0.1%	○	
F10.13	Recreated torque limitation when motor is FWD	0.0 - 250.0% (F08.02)	180.0%	0.1%	○	
F10.14	Recreated torque limitation when motor is REV	0.0 - 250.0% (F08.02)	180.0%	0.1%	○	
F11: Motor Vector Control Current Loop Parameter						
F11.00	Motor current loop KP	1 - 2000	800	1	○	
F11.01	Motor current loop KI	1 - 1000	200	1	○	
F11.02	Motor current loop output filter times	0 - 31	3	1	○	
F11.03	Motor current loop feedforward enabled	0: Feedforward is prohibited 1: Enable feedforward	0	1	×	
F11.04	Motor excitation boost setting	0.0 - 30.0%	0.0%	0.1%	×	
F11.05	Motor field orientation optimization setting	0: Field orientation correction is forbidden 1: Enables magnetic field orientation correction	0	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F15: Digital Input / Output Terminals Parameter						
F15.00	DI1 function	0: Reserved 1: Inverter enable 2,3: FWD / REV enable 4: Three-wire system operation control 8: Frequency switched to the simulation 11: Command switching terminals 13 - 15: Multistage frequency terminals 1 - 3 17,18: Increasing (UP) / decreasing frequency (DN) instructions 20,21: FWD / REV point move command control input (JOGF / JOGR) 26,27: Acc. / Dec. time choose terminals 1, 2 30: Switch to normal running mode 41,42: Free down normally open / closed input 43: Emergency stop 44,45: The external input fault normally open / closed 46: External reset input 50: Counter reset signal input 51: Counter trigger signal input 53: Pulse frequency input (DI4) 86: Terminal stop DC brake	2	1	×	
F15.01	DI2 function		3	1	×	
F15.02	DI3 function		0	1	×	
F15.03	DI4 function		0	1	×	
F15.44	AI terminal (ADI) function		0	1	×	
F15.12	Terminal UP / DOWN of the rate of Acc. and Dec.	0.00 - 99.99Hz/s	1.00 Hz/s	0.01 Hz/s	×	
F15.13	Terminal detection interval time	0: 2ms 1: 4ms 2: 8ms	0	1	○	
F15.14	Number of terminal detection filter	0 - 10000	4	1	○	
F15.15	Positive and negative terminal input logic setting	Bit0 - Bit3 is corresponding to DI1 - DI4 Bi12 is corresponding to AI Bitx: Diy, AI terminal input positive and negative logic 0: Positive logic 1: Negetive logic	00	1	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F15.16	FWD / REV operation mode setting	0: Two line operation mode 1 1: Two line operation mode 2 2: Three line operation mode 1 3: Three line operation mode 2	0	1	×	
F15.19	DO function	0: Reserved 2: The inverter is running (RUN) 3: The inverter is running FWD 4: The inverter is running reversely 5: DC brake 6: Zero-frequency inverter status 7: Zero-frequency inverter operation 9: Frequency level detection signal (FDT) 11: Frequency arrival (FAR) 12: Max. frequency limit 13: Frequency lower limit 20: Data output by SCI communication 21: Set run time arrive 23: Set the count value arrive 24: Specifies the count value arrive 29: Undervoltage lockout is stopped 30: Overload detection signal 31: Inverter failure 32: External fault 33: Frequency inverter fault automatically reset period 38: Pulse output (DO only)	2	1	×	
F15.20	RLY1 function		31	1	×	
F15.24	Positive and negative output terminal logic settings	Bit1 is corresponding to DO Bit2 is corresponding to RLY1 0: Positive logic 1: Negative logic	0	1	○	
F15.27	Frequency reach (FAR) width detection	0.00 - 100.00Hz	2.50Hz	0.01Hz	○	
F15.28	Zero-frequency signal detection value	0.00Hz - F00.08	0.00Hz	0.01Hz	○	
F15.29	Zero frequency	0.00Hz - F00.08	0.00Hz	0.01Hz	○	
F15.31	FDT electrical level	0.00Hz - F00.08	5.00Hz	0.01Hz	○	
F15.32	FDT delay	0.00Hz - F00.08	0.00Hz	0.01Hz	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F15.36	Set running time	0 - 65535h *0: Preset operating time is disabled*	0h	1h	○	
F15.37	Setted count value reach preset	F15.38 - 9999	0	1	○	
F15.38	Specified count value reach preset	0 - F15.37	0	1	○	
F15.43	The output terminal delay	0.0 - 100.0s	0.0s	0.1s	×	
F16: Analogue Input / Output Terminal Parameter						
F16.00	Keypad potentiometer function	0: Resevered 2: Frequency setting 3: Auxiliary frequency setting 4: Process PID setting 5: PID feedback process 9: Motor FWD rotation torque limit 10: Motor reversing motor torque limit 11: Motor FWD regenerative torque limit 12: Motor REV regenerative torque limit	0	1	×	
F16.01	AI function		2	1	×	
F16.05	AI offset	-100.0 - 100.0%	0.0%	0.1%	○	
F16.06	AI gain	0.00 - 10.00	1.00	0.01	○	
F16.07	AI filter time	0.01 - 10.00s	0.05s	0.01s	○	
F16.17	Max. input pulse frequency	0 - 50000Hz	10000Hz	1Hz	○	
F16.18	Enter the pulse filter time	0.01 - 10.00s	0.05s	0.01s	○	
F16.19	AO function	0: Reserved 2: Preset frequency (0 - max. output frequency) 3: Motor rpm (0 - the max. output frequency corresponds to the speed) 5: Output current (0 - 2 times the motor rated current) 11: Output voltage (0 - 1.2 times the inverter rated voltage) 12: DC bus voltage (0 - 2.2 times the inverter rated voltage) 14: AI input (after processing)	2	1	○	
F16.21	DO function		0	1	○	
F16.22	AO offset	-100.0 - 100.0%	0.0%	0.1%	○	
F16.23	AO gain	0.0 - 200.0%	100.0%	0.1%	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F16.26	DO terminal output max. pulse frequency	0.01 - 50.00kHz	10.00 kHz	0.01 kHz	○	
F17: SCI Communication Parameter						
F17.00	Data format	0: 1-8-2 format, no parity, RTU 1: 1-8-1 format, even parity, RTU 2: 1-8-1 format, odd parity, RTU 6: 1-8-1 format, no parity, RTU	0	1	×	
F17.01	Baud rate choice	0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps 6: 57600bps 7: 76800bps 8: 115200bps	3	1	×	
F17.02	The machine address	0 - 247	2	1	×	
F17.03	This machine response time	0 - 1000ms	1ms	1ms	×	
F timeout	LAN communication timeout detection time	0.0 - 600.0s	0.0s	0.1s	×	
F17.05	Communication error detection time	0.0 - 600.0s	0.0s	0.1s	×	
F17.06	Communication overtime action choice	0: Freewheel stop 1: Emergency stop 2: Dec. stop 3: Continue to run	3	1	×	
F17.07	Communication error action selection		3	1	×	
F17.08	Communication external device fault action selection		1	1	×	
F17.09	Communication write function parameter saving EEPROM choice	Unit: Except of F00.13, F19.03 function parameter, communication EEPROM storage options Ten: F00.13, F19.03 function parameter communication EEPROM storage options 0: Not save 1: Save	01	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F17.10	Network communication timeout detection time	0.0 - 600.0s	0.0s	0.1s	×	
F18: Display Control Parameter						
F18.02	Running display parameter 1 setting	0: Reserved 1: Inverter rated current 3: Inverter status 4: Main set frequency channel 5: Main set frequency 7: Set frequency 8: Setting frequency (after Acc. and Dec.) 9: Output frequency 10: Set the speed 11: Running rpm 13: Output voltage 14: Output current 15: Torque reference 16: Output torque 17: Output power 18: DC bus voltage 19: Keypad potentiometer input voltage 20: AI input voltage 21: AI input voltage (after processing) 28: DI4 terminal pulse input frequency 29: AO output 32: Radiator temperature 33: Set the line speed 34: Setting line speed 42: External count value 43: Input terminal status 44: Output terminal status 48: Power-on time accumulated (hours) 49: Run time accumulated (hours)	8	1	○	
F18.03	Running display parameter 2 setting		7	1	○	
F18.04	Running display parameter 9 setting		9	1	○	
F18.05	Running display parameter 4 setting		13	1	○	
F18.06	Running display parameter 5 setting		14	1	○	
F18.07	Running display parameter 6 setting		18	1	○	
F18.08	Stopping display parameter 1 setting		7	1	○	
F18.09	Stopping display parameter 2 setting		18	1	○	
F18.10	Stopping display parameter 3 setting		20	1	○	
F18.11	Stopping display parameter 4 setting		19	1	○	
F18.12	Stopping display parameter 5 setting		43	1	○	
F18.13	Stopping display parameter 6 setting		44	1	○	
F18.15	Max. line velocity	0 - 65535	1000	1	○	
F18.16	Line speed display accuracy	0: Interger 1: A decimal 2: Two decimal places 3: Three decimal places	0	1	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F19: Enhancement Parameters						
F19.00	Auxiliary frequency setting channel selection	0: No auxiliary channel 1: Operation keypad setting 2: Terminal setting 3: SCI communication settings 4: Analog setting 5: Terminal pulse setting 6: PID output setting	0	1	○	
F19.01	Main and auxiliary setting operation	0: Main setting + auxiliary setting 1: Main Settings - auxiliary settings	0	1	○	
F19.02	Auxiliary setting coefficient	0.00 - 9.99	1.00	0.01	○	
F19.03	Digital auxiliary frequency initial value	0.00 - F00.06	0.00Hz	0.01Hz	○	
F19.04	Digital auxiliary frequency control selection	Unit: Power-down storage options 0: Auxiliary frequency is not stored when power is lost 1: Power down stores the auxiliary frequency Ten: Stop frequency processing 0: Maintain auxiliary frequency after stop 1: Auxiliary frequency returns to F19.03 after stop	00	1	○	
F19.05	Set the frequency ratio adjustment selection	0: Do not adjust 1: Relative max. output frequency (F00.06) adjustment 2: Relative to the current frequency adjustment	1	1	○	
F19.06	Set the frequency scaling factor	0.0 - 200.0%	100.0%	0.1%	○	
F19.07	Cooling fan control options	0: Auto stop mode 1: Immediate stop mode 2: The fan is runningwith power on	0	1	○	
F19.08	Cooling fan control delay time	0.0 - 600.0s	60.0s	0.1s	○	
F19.10	Zero-frequency threshold	0.00Hz - F00.08	1.00Hz	0.01Hz	○	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F19.11	Set the frequency below the zero-frequency threshold action selection	0: Run according to the frequency command 1: Keep stop status, inverter has no output 2: Press zero frequency threshold to run 3: Run at zero frequency	0	1	×	
F19.18	Overvoltage stalling options	0 - 1.000	0.500	0.001	○	
F19.19	Overvoltage speed lose point	0 - 1200V	Type confirmed	1V	×	
F19.20	Automatic current limiting gain	0 - 1.000	0.500	0.001	○	
F19.21	Automatic current limit level	20.0 - 200.0%	150.0%	0.1%	×	
F19.22	Automatic current limiting integral time constant	0 - 1.000	0.020	0.001	○	
F19.23	Power-on instantaneous terminal detection	0: Rising edge effective 1: Electrical level	0	1	○	
F19.24	Action voltage of brake unit	220V inverter: 380 - 450V	380V	1V	×	
		380V inverter: 630 - 750V	720V	1V	×	
F19.39	Input voltage selection	Unit: Model 380V input voltage selection 0: 380 - 460V 1: 260 - 460V 2: 200 - 460V Ten: Model 220V input voltage selection 0: 200 - 240V 1: 120 - 240V	00	1	×	
F19.44	LCD display time	0.0 - 999.9min	5.0min	0.1min	○	
F20: Fault Protection Parameter						
F20.00	Overload alarm selection	Unit / ten / hundred / one thousand: Reserved Ten thousand place: Overload protection choice 0: Enables inverter overload protection and motor overload protection	00000	1	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
		1: Enable inverter overload protection to shield motor overload protection 2: Shield inverter overload protection, enable motor overload protection 3: Shield inverter overload protection, motor overload protection				
F20.10	Detecting datum for output phase fault	0 - 50%	20%	1%	×	
F20.11	Detecting time for output phase fault	0.00 - 20.00s	3.00s	0.01s	×	
F20.18	Automatic reset number	0 - 100	0	1	×	
F20.19	Automatic reset interval	2.0 - 20.0s/times	5.0 s/times	0.1 s/times	×	
F20.21	Fifth (last) type of fault	-Lu-: DC bus undervoltage E0001: Inverter output over current (Acc. process) E0002: Inverter output over current (Dec. process) E0003: Inverter output over current (constant speed process) E0004: DC bus overvoltage (Acc. process) E0005: DC bus overvoltage (Dec. process) E0006: DC bus overvoltage (constant speed process) E0007: Stall overvoltage E0009: Heatsink overheat E0010: Braking unit failure E0012: Parameters auto-tuning fault E0014: Fault of current detection circuit E0016: Fault of output phase E0017: Inverter overload E0019: Motor overload E0021: Access fault of control board EEPROM E0022: Operation keypad EEPROM read and write problems E0023: Parameter setting error E0024: External equipment failure	0	1	*	
F20.30	The fourth fault type		0	1	*	
F20.32	The third fault type		0	1	*	
F20.34	Fault type of second time		0	1	*	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F20.36	Fault type of first time	E0028: SCI communication time-out E0029: SCI communication error	0	1	*	
F20.22	Preset frequency of the latest failure	0.00 - 150.00Hz	0.00Hz	0.01Hz	*	
F20.23	Running frequency of the latest failure	0.00 - 150.00Hz	0.00Hz	0.01Hz	*	
F20.24	DC bus voltage of the latest failure	0 - 999V	0V	1V	*	
F20.25	Output voltage of the latest failure	0 - 999V	0V	1V	*	
F20.26	Output current of the latest failure	0.00 - 99.99A	0.00A	0.01A	*	
F20.27	Input terminal status at the latest fault	0 - 0xF	0	1	*	
F20.28	Output terminal status at the latest fault	0 - 0xF	0	1	*	
F20.29	Interval time of the latest failure	0.0 - 6553.5h	0.0h	0.1h	*	
F20.31	Fourth fault interval	0.0 - 6553.5h	0.0h	0.1h	*	
F20.33	The third fault interval	0.0 - 6553.5h	0.0h	0.1h	*	
F20.35	Interval time of the second time failure	0.0 - 6553.5h	0.0h	0.1h	*	
F20.37	Interval time of the first time failure	0.0 - 6553.5h	0.0h	0.1h	*	
F23: PWM Controlling Parameter						
F23.00	Carrier frequency setting	1 - 8kHz	8kHz	1kHz	×	
F23.01	Carrier frequency is automatically adjusted	0: Automatic adjustment of carrier frequency is forbidden 1: Enable automatic adjustment of carrier frequency	1	1	×	
F23.02	PWM over modulation enabled	0: Invalid 1: Valid	1	1	×	
F23.03	PWM modulation mode	0: Two-phase modulation / three-phase modulation switching 1: Three-phase modulation	1	1	×	
F23.04	PWM modulation mode switching point 1	Type confirmed - F23.05 - 2Hz	Type confirmed	0.01Hz	×	

Ref. Code	Function	Setting Range	Default	Unit	Attribute	Setting
F23.05	PWM modulation mode switching point 2	F23.04 + 2Hz - 50.00Hz	Type confirmed	0.01Hz	×	
R02: AI Correction Parameters						
R02.00	AI display voltage 1	0.00 - 10.00V	Default	0.01V	○	
R02.01	AI measured voltage 1	0.00 - 10.00V	Default	0.01V	○	
R02.02	AI display voltage 2	0.00 - 10.00V	Default	0.01V	○	
R02.03	AI measured voltage 2	0.00 - 10.00V	Default	0.01V	○	