Preface

Thank you for purchasing the H300 series AC drive developed by our company.

The H300 series AC drive is a general-purpose high-performance current vector control AC drive. It is an upgrade product based on H200 and can implement the control of asynchronous motor . It increases the user programmable function, background monitoring software and communication bus function. It is used to drive various automation production equipment involving textile, paper-making, wiredrawing, machine tool, packing, food, fan and pump.

This manual describes the correct use of the H300 series AC drive, including selection, parameter setting, commissioning, maintenance & inspection. Read and understand the manual before use and forward the manual to the end user.

<div style="text-align:center">Notes</div>

- The drawings in the manual are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- The drawings in the manual are shown for description only and may not match the product you purchased.
- The instructions are subject to change, without notice, due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the manual.
- Contact our agents or customer service center if you have problems during the use.

Introduction

The newly added functions of the H300 series AC drive are described as below:

Function	Description
Virtual I/O	It can implement various simple logic functions.
Restoring user parameters	It allows you to save or restore the parameters set by yourself.
Higher-accuracy AI/AO	The AI/AO accuracy can reach almost 20 mv via factory correction or on-site correction.
Customized parameter display	You can customize the parameters that need to be displayed.
Modified parameter display	You can view the modified parameters.
Operation selection at fault occurrence	You can select the reaction of the AC drive to a fault occurring, based on the actual need. The reactions are as below: • Coast to stop • Decelerate to stop • Continue to run You can also select the frequency at which the AC drive continues to run.
PID parameters switchover	Two groups of PID parameters can be switched over via terminals or can be automatically switched over according to deviation.
PID feedback loss detection	The PID feedback loss value can be set to realize PID protection.
DI/DO positive or negative logic	You can set the DI/DO positive or negative logic.
DI/DO response delay	You can set DI/DO response delay time.
Power dip ride through	It ensures that the AC drive continues to run for a short time when an instantaneous power failure or sudden voltage reduction occurs.
Timing operation	The AC drive supports timing operation for 6500 minutes at maximum.
Rapid current limit	It helps to avoid frequent occurrence of overcurrent faults of the AC drive.
Load allocation	Load allocation can be implemented between two H300 series AC drives through point-to-point communication.

Product Checking

Upon unpacking, check:

- Whether the nameplate model and AC drive ratings are consistent with your order. The box contains the AC drive, certificate of conformity, user manual and warranty card.

- Whether the AC drive is damaged during transportation. If you find any omission or damage, contact our company or your supplier immediately.

First-time Use

For the users who use this product for the first time, read the manual carefully. If in doubt concerning some functions or performances, contact the technical support personnel of our company to ensure correct use.

Contents

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Safety Information and Precautions

Chapter 1 Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:

- ⚠ **DANGER** indicates that failure to comply with the notice will result in severe personal injury or even death.

- ⚠**WARNING** indicates that failure to comply with the notice will result in personal injury or property damage.

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. our company will assume no liability or responsibility for any injury or loss caused by improper operation.

1.1 Safety Information

Use Stage	Safety Grade	Precautions
Before installation	⚠ **DANGER**	• Do not install the equipment if you find water seepage, component missing or damage upon unpacking. • Do not install the equipment if the packing list does not conform to the product you received.
	⚠**WARNING**	• Handle the equipment with care during transportation to prevent damage to the equipment. • Do not use the equipment if any component is damaged or missing. Failure to comply will result in personal injury. • Do not touch the components with your hands. Failure to comply will result in static electricity damage.
During installation	⚠ **DANGER**	• Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire. • Do not loosen the fixed screws of the components, especially the screws with red mark.
	⚠**WARNING**	• Do not drop wire end or screw into the AC drive. Failure to comply will result in damage to the AC drive. • Install the AC drive in places free of vibration and direct sunlight. • When two AC drives are laid in the same cabinet, arrange the installation positions properly to ensure the cooling effect.

Use Stage	Safety Grade	Precautions
At wiring	⚠ **DANGER**	• Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. • A circuit breaker must be used to isolate the power supply and the AC drive. Failure to comply may result in a fire. • Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. • Tie the AC drive to ground properly by standard. Failure to comply may result in electric shock.
	⚠ **WARNING**	• Never connect the power cables to the output terminals (U, V, W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the AC drive. • Never connect the braking resistor between the DC bus terminals (+) and (-). Failure to comply may result in a fire. • Use wire sizes recommended in the manual. Failure to comply may result in accidents. • Use a shielded cable for the encoder, and ensure that the shielding layer is reliably grounded.
Before power-on	⚠ **DANGER**	• Check that the following requirements are met: – The voltage class of the power supply is consistent with the rated voltage class of the AC drive. – The input terminals (R, S, T) and output terminals (U, V, W) are properly connected. – No short-circuit exists in the peripheral circuit. – The wiring is secured. Failure to comply will result in damage to the AC drive • Do not perform the voltage resistance test on any part of the AC drive because such test has been done in the factory. Failure to comply will result in accidents.
	⚠ **WARNING**	• Cover the AC drive properly before power-on to prevent electric shock. • All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents
After power-on	⚠ **DANGER**	• Do not open the AC drive's cover after power-on. Failure to comply may result in electric shock. • Do not touch any I/O terminal of the AC drive. Failure to comply may result in electric shock.
	⚠ **WARNING**	• Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accidents. • Do not change the default settings of the AC drive. Failure to comply will result in damage to the AC drive.

Use Stage	Safety Grade	Precautions
During operation	⚠ **DANGER**	• Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt. • Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the AC drive.
	⚠**WARNING**	• Avoid objects falling into the AC drive when it is running. Failure to comply will result in damage to the AC drive. • Do not start/stop the AC drive by turning the contactor ON/OFF. Failure to comply will result in damage to the AC drive.
During maintenance	⚠ **DANGER**	• Repair or maintenance of the AC drive may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the AC drive. • Do not repair or maintain the AC drive at power-on. Failure to comply will result in electric shock. • Repair or maintain the AC drive only ten minutes after the AC drive is powered off. This allows for the residual voltage in the capacitor to discharge to a safe value. Failure to comply will result in personal injury. • Ensure that the AC drive is disconnected from all power supplies before starting repair or maintenance on the AC drive. • Set and check the parameters again after the AC drive is replaced. • All the pluggable components must be plugged or removed only after power-off. • The rotating motor generally feeds back power to the AC drive. As a result, the AC drive is still charged even if the motor stops, and the power supply is cut off. Thus ensure that the AC drive is disconnected from the motor before starting repair or maintenance on the AC drive.

1.2 General Precautions

1) Requirement on residual current device (RCD)

The AC drive generates high leakage current during running, which flows through the protective earthing (PE) conductor. Thus install a type-B RCD at primary side of the power supply. When selecting the RCD, you should consider the transient and steady-state leakage current to ground that may be generated at startup and during running of the AC drive. You can select a specialized RCD with the function of suppressing high harmonics or a general-purpose RCD with relatively large residual current.

2) High leakage current warning

The AC drive generates high leakage current during running, which flows through the PE conductor. Earth connection must be done before connection of power supply. Earthing shall comply with local regulations and related IEC standards.

3)   Motor insulation test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the AC drive. The motor must be disconnected from the AC drive during the insulation test. A 500-V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.
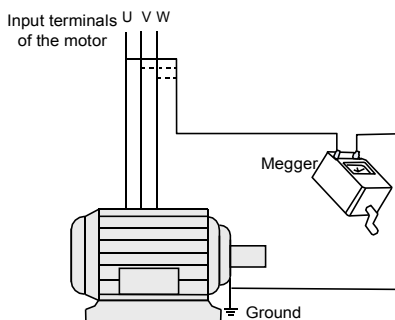
4)   Thermal protection of motor

If the rated capacity of the motor selected does not match that of the AC drive, especially when the AC drive's rated power is greater than the motor's, adjust the motor protection parameters on the operation panel of the AC drive or install a thermal relay in the motor circuit for protection.

5)   Running at over 50 Hz

The AC drive provides frequency output of 0 to 1000 Hz (Up to 300 Hz is supported if the AC drive runs in SVC mode). If the AC drive is required to run at over 50 Hz, consider the capacity of the machine.

6)   Vibration of mechanical device

The AC drive may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency.

7)   Motor heat and noise

The output of the AC drive is pulse width modulation (PWM) wave with certain harmonic frequencies, and therefore, the motor temperature, noise, and vibration are slightly greater than those when the AC drive runs at power frequency (50 Hz).

8) Voltage-sensitive device or capacitor on output side of the AC drive

Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.
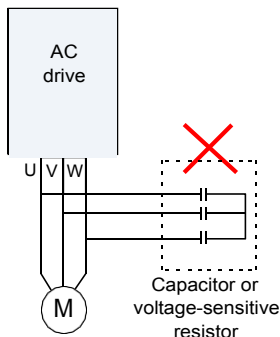
9) Contactor at the I/O terminal of the AC drive

When a contactor is installed between the input side of the AC drive and the power supply, the AC drive must not be started or stopped by switching the contactor on or off. If the AC drive has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the AC drive.

When a contactor is installed between the output side of the AC drive and the motor, do not turn off the contactor when the AC drive is active. Otherwise, modules inside the AC drive may be damaged.
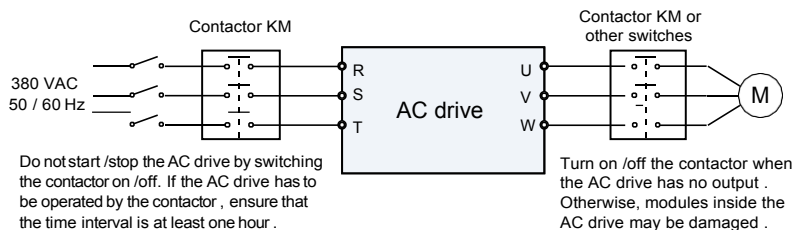
10) When external voltage is out of rated voltage range

The AC drive must not be used outside the allowable voltage range specified in this manual. Otherwise, the AC drive's components may be damaged. If required, use a corresponding voltage step-up or step-down device.

11) Prohibition of three-phase input changed into two-phase input

Do not change the three-phase input of the AC drive into two-phase input. Otherwise, a fault will result or the AC drive will be damaged.

12) Surge suppressor

The AC drive has a built-in voltage dependent resistor (VDR) for suppressing the surge voltage generated when the inductive loads (electromagnetic contactor, electromagnetic relay, solenoid valve, electromagnetic coil and electromagnetic brake) around the AC drive are switched on or off. If the inductive loads generate a very high surge voltage, use a surge suppressor for the inductive load or also use a diode.

―――――――――――――――――――――― **Note** ――――――――――――――――――――――

Do not connect the surge suppressor on the output side of the AC.

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13) Altitude and de-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the AC drive. Contact our company for technical support.

14) Some special usages

If wiring that is not described in this manual such as common DC bus is applied, contact the agent or our company for technical support.

15) Disposal

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

16) Adaptable Motor

- The standard adaptable motor is adaptable four-pole squirrel-cage asynchronous induction motor. For other types of motor, select a proper AC drive according to the rated motor current.

- The cooling fan and rotor shaft of non-variable-frequency motor are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor overheats easily.

- The standard parameters of the adaptable motor have been configured inside the AC drive. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.

- The AC drive may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested parts.

2

Product Information

Chapter 2 Product Information

2.1 Designation Rules and Nameplate of the H300

Figure 2-1 Designation rules and nameplate of the H300

H300 - T 0.75 G B

| AC drive series |

Vlotage class	
S	Single-phase 220V
T	Three-phase 380V

Adaptable motor
Unit: KW

Braking unit	
B	Yes
NC	No

Type of adaptable motor	
G	General type
P	Fan pump type

Company	→	GuangZhou Coreken Electric Co.,LTD.
Drive model	→	MODEL:H300-T0.75GB IP20
Power class	→	POWER:0.75KW
Rated input	→	INPUT: 3PH AC 380V ±15% 50/60Hz
Rated output	→	OUTPUT: 3PH AC 0～380V ±15% 0～1000Hz
S/N	→	
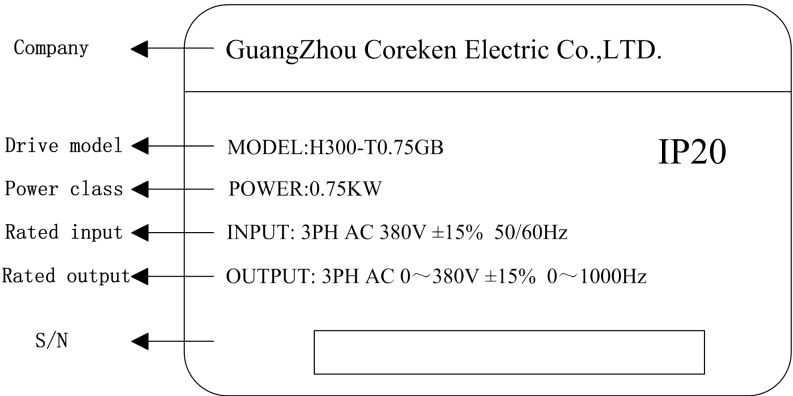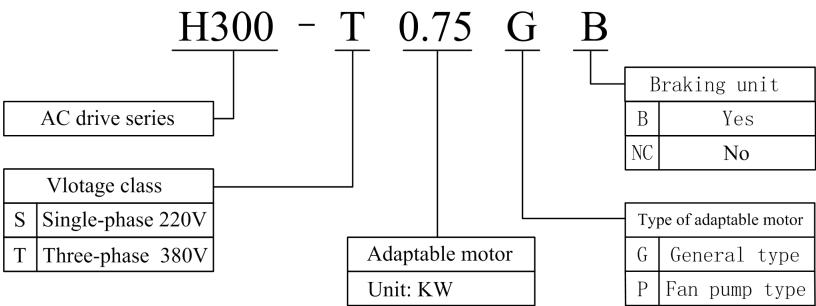
2.2 Components of the H300

The H300 series AC drives have two housing types, plastic housing and sheet metal housing, according to different voltage and power classes.

Figure 2-3 Components of the H300 series AC drive (sheet metal housing)
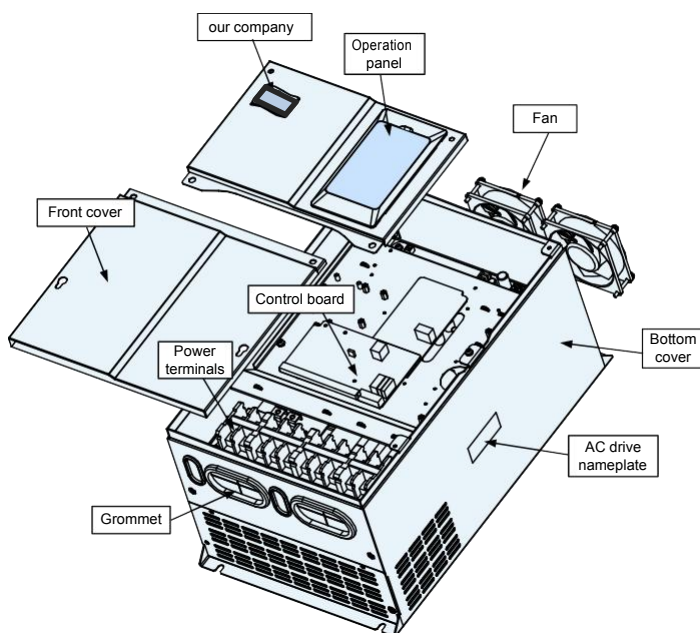
2.3 Technical Specifications

Table 2-2 Technical specifications of the H300

Item		Specifications
Standard functions	Maximum frequency	• Vector control: 0–300 Hz • V/F control: 0–1000 Hz
	Carrier frequency	0.5–16 kHz The carrier frequency is automatically adjusted based on the load features.
	Input frequency resolution	Digital setting: 0.01 Hz Analog setting: maximum frequency x 0.025%
	Control mode	• Sensorless flux vector control (SVC) • Voltage/Frequency (V/F) control
	Startup torque	• G type: 0.5 Hz/150% (SVC); • P type: 0.5 Hz/100%
	Speed range	1:100 (SVC)
	Speed stability accuracy	$\pm$ 0.5% (SVC)
	Torque control accuracy	± 5% (SVC)
	Overload capacity	• G type: 60s for 150% of the rated current, 3s for 180% of the rated current • P type: 60s for 120% of the rated current, 3s for 150% of the rated current
	Torque boost	• Fixed boost • Customized boost 0.1%–30.0%
	V/F curve	• Straight-line V/F curve • Multi-point V/F curve • N-power V/F curve (1.2-power, 1.4-power, 1.6-power, 1.8-power, square)
	V/F separation	Two types: complete separation; half separation
	Ramp mode	• Straight-line ramp • S-curve ramp Four groups of acceleration/deceleration time with the range of 0.0–6500.0s
	DC braking	DC braking frequency: 0.00 Hz to maximum frequency Braking time: 0.0–36.0s Braking action current value: 0.0%–100.0%
	JOG control	JOG frequency range: 0.00–50.00 Hz JOG acceleration/deceleration time: 0.0–6500.0s
	Onboard multiple preset speeds	It implements up to 16 speeds via the simple PLC function or combination of DI terminal states.

Item		Specifications
Standard functions	Onboard PID	It realizes process-controlled closed loop control system easily.
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes.
	Overvoltage/ Overcurrent stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to overvoltage/overcurrent.
	Torque limit and control	It can limit the torque automatically and prevent frequent over current tripping during the running process.
Individualized functions	High performance	Control of asynchronous motor are implemented through the high-performance current vector control technology.
	Power dip ride through	The load feedback energy compensates the voltage reduction so that the AC drive can continue to run for a short time.
	Rapid current limit	It helps to avoid frequent overcurrent faults of the AC drive.
	Virtual I/Os	Five groups of virtual DI/Dos can realize simple logic control.
	Timing control	Time range: 0.0–6500.0 minutes
	Supports communication	It supports communication via Modbus-RTU or other type.
RUN	Running command source	• Operation panel • Control terminals • Serial communication port You can perform switchover between these sources in various ways.
	Frequency source	There are a total of 10 frequency sources, such as digital setting, analog voltage setting, analog current setting, pulse setting and serial communication port setting. You can perform switchover between these sources in various ways.
	Auxiliary frequency source	There are ten auxiliary frequency sources. It can implement fine tuning of auxiliary frequency and frequency synthesis.
	Input terminal	6 digital input (DI) terminals, one of which supports up to 100 kHz high-speed pulse input 2 analog input (AI) terminals, one of which only supports 0–10 V voltage input and the other supports 0–10 V voltage input or 4–20 mA current input
	Output terminal	1 high-speed pulse output terminal (open-collector) that supports 0–100 kHz square wave signal output 1 digital output (DO) terminal 2 relay output terminal 2 analog output (AO) terminal that supports 0–20 mA current output or 0–10 V voltage output

Item		Specifications
Display and operation on the operation panel	LED display	It displays the parameters.
	Key locking and function selection	It can lock the keys partially or completely and define the function range of some keys so as to prevent mis-function.
	Protection mode	Motor short-circuit detection at power-on, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection and overload protection
Environment	Installation location	Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil smoke, vapour, drip or salt.
	Altitude	Lower than 1000 m
	Ambient temperature	-10°C to +40°C (de-rated if the ambient temperature is between 40°C and 50°C)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9 m/s2 (0.6 g)
	Storage temperature	-20°C to +60°C
	IP level	IP20
	Pollution degree	PD2
	Power distribution system	TN , TT

2.4 Peripheral Electrical Devices and System Configuration

When the H300 is used to control the asynchronous motor, forming a control system, it is necessary to install various electrical devices on the input and output sides of the AC drive to ensure the system safety and stability.

2.4.1 Description of Peripheral Electrical Devices

Table 2-3 Description of peripheral electrical devices

Part	Mounting Location	Function Description
MCCB	Power receiving side	Interrupt the power supply when overcurrent occurs on downstream devices
Contactor	Between MCCB and AC drive input side	Start and stop the AC drive. Do not start and stop the AC drive frequently by switching the contactor on and off (less than twice per minute) nor use it to directly start the AC drive.
AC input reactor	AC drive input side	• Improve the power factor of the input side. • Eliminate the higher harmonics of the input side effectively and prevent other devices from being damaged due to distortion of the voltage waveform. • Eliminate the input current unbalance due to unbalance between the power phases.

EMC Input filter	AC drive input side	• Reduce the external conduction and radiation interference of the AC drive. • Decrease the conduction interference flowing from the power end to the AC drive and improve the anti-interference capacity of the AC drive.
DC reactor	MD series AC drive of 7.5G and above configured with DC reactor as standard	• Improve the power factor of the input side. • Improve the efficiency and thermal stability of the AC drive. • Eliminate the impact of higher harmonics of the AC drive input side and reduce the external conduction and radiation interference.
AC output reactor	Between AC drive output side and the motor, close to the AC drive	The output side of the AC drive generally has much higher harmonics. When the motor is far from the AC drive, there is much distributed capacitance in the circuit and certain harmonics may cause resonance in the circuit, bringing about the following two impacts: • Degrade the motor insulation performance and damage the motor in the long run. • Generate large leakage current and cause frequent AC drive protection trips. If the distance between the AC drive and the motor is greater than 100 m, install an AC output reactor.

1)   Do not install the capacitor or surge suppressor on the output side of the AC drive. Otherwise, it may cause faults to the AC drive or damage to the capacitor and surge suppressor.

2)   Inputs/Outputs (main circuit) of the AC drive contain harmonics, which may interfere with the communication device connected to the AC drive. Therefore, install an anti-interference filter to minimize the interference.

3)   For more details on peripheral devices, refer to related selection manual.

3

Mechanical and Electrical Installation

Chapter 3 Mechanical and Electrical Installation

3.1 Mechanical Installation

3.1.1 Installation Environment Requirements

Item	Requirements
Ambient temperature	-10°C to +50°C
Heat dissipation	Install the AC drive on the surface of an incombustible object, and ensure that there is sufficient space around for heat dissipation. Install the AC drive vertically on the support using screws.
Mounting location	Free from direct sunlight, high humidity and condensation
	Free from corrosive, explosive and combustible gas
	Free from oil dirt, dust and metal powder
Vibration	Less than 0.6 g Far away from the punching machine or the like
Protective enclosure	The H300 series AC drives of plastic housing are the whole unit built-in products operated through remote control and need to be installed in the final system.The final system must have the required fireproof cover, electrical protective cover and mechanical protective cover, and satisfy the regional laws & regulations and related IEC requirements.

The H300 series AC drive dissipates heat from the bottom to the top. When multiple AC drives are required to work together, install them side by side.

For application installing multiple AC drives, if one row of AC drives need to be installed above another row, install an insulation guide plate to prevent AC drives in the lower row from heating those in the upper row and causing faults.

Figure 3-2 Installation of the insulation guide plate
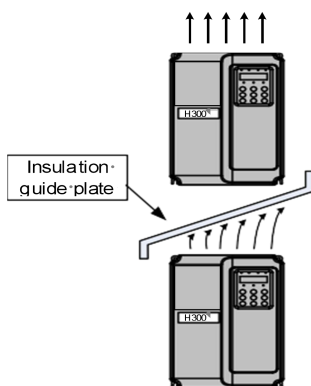
3.1.2 Mechanical Installation Method and Process

The H300 series AC drives have two housing types, plastic housing and sheet metal housing, according to different voltage and power classes. The H300 supports both wall-mounting installation and embedded installation in different applications.

Figure 3-7 Wall-mounting installation of the H300
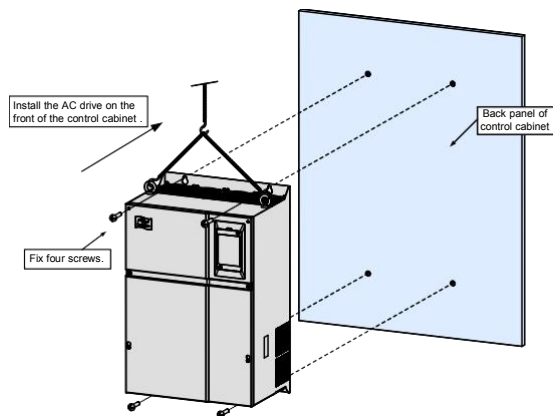
■   Installation Precautions

1)   Reserve the installation clearances as specified in Figure 3-1 to ensure sufficient space for heat dissipation. Take heat dissipation of other parts in the cabinet into consideration.

2)   Install the AC drives upright to facilitate heat dissipation. If multiple AC drives are installed in the cabinet, install them side by side. If one row of AC drives need to be installed above another row, install an insulation guide plate, as shown in Figure 3-2.

3)   Use incombustible hanging bracket.

4)   In scenarios with heavy metal powder, install the heatsink outside the cabinet, and ensure that the room inside the fully-sealed cabinet is as large as possible.

3.2 Electrical Installation

3.2.1   Description of Main Circuit Terminals

■   Description of Main Circuit Terminals of Single-phase AC drive
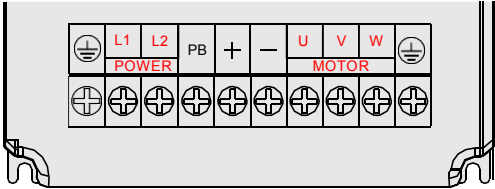
Table 3-1 Description of main circuit terminals of single-phase AC drive

Terminal	Name	Description
L1, L2	Single-phase power supply input terminals	Connect to the single-phase 220 VAC power supply.
(+), (-)	Positive and negative terminals of DC bus	Common DC bus input point.
(+), PB	Connecting terminals of braking resistor	Connect to a braking resistor.
U, V, W	AC drive output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.

■   Description of Main Circuit Terminals of Three-phase AC drive
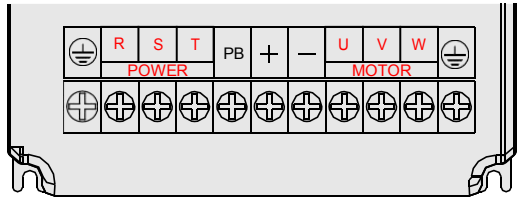
Table 3-2 Description of main circuit terminals of three-phase AC drive

Terminal	Name	Description
R, S, T	Three-phase power supply input terminals	Connect to the three-phase AC power supply
(+), (-)	Positive and negative terminals of DC bus	Common DC bus input point Connect the external braking unit to the AC drive of 18.5 kW and above (220 V) and 37 kW and above (other voltage classes).
(+), PB	Connecting terminals of braking resistor	Connect to the braking resistor for the AC drive of 15 kW and below (220 V) and 30 kW and below (other voltage classes).
P, (+)	Connecting terminals of external reactor	Connect to an external reactor.
U, V, W	AC drive output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.

■   Precautions on the Wiring

1)   Power input terminals L1, L2 or R, S, T

– The cable connection on the input side of the AC drive has no phase sequence requirement.

– The specification and installation method of external power cables must comply with the local safety regulations and related IEC standards.

– Use copper conductors of a proper size as power cables according to the recommended values in section 8.3.

2)   DC bus terminals (+), (-)

– Terminals (+) and (-) of DC bus have residual voltage after the AC drive is switched off. After indicator CHARGE goes off, wait at least 10 minutes before touching the equipment Otherwise, you may get electric shock.

– connecting external braking components for the AC drive of 18.5 kW and above (220 V) and 37 kW and above (other voltage classes), do not reverse poles (+) and (-). Otherwise, it may damage the AC drive and even cause a fire.

– The cable length of the braking unit shall be no longer than 10 m. Use twisted pair wire or pair wires for parallel connection.

– Do not connect the braking resistor directly to the DC bus. Otherwise, it may damage the AC drive and even cause fire.

3)   Braking resistor connecting terminals (+), PB

– The connecting terminals of the braking resistor are effective only for the AC configured with the built-in braking unit.

– The cable length of the braking resistor shall be less than 5 m. Otherwise, it may damage the AC drive.

4)   External reactor connecting terminals P, (+)

For the AC drive of 37 kW and above (220 V) and 75 kW and above (other voltage classes), remove the jumper bar across terminals P and (+) and install the reactor between the two terminals.

5)   AC drive output terminals U, V, W

– The specification and installation method of external power cables must comply with the local safety regulations and related IEC standards.

– Use copper conductors of a proper size as power cables according to the recommended values in section 8.3.

– The capacitor or surge absorber cannot be connected to the output side of the AC drive. Otherwise, it may cause frequent AC drive fault or even damage the AC drive.

– If the motor cable is too long, electrical resonance will be generated due to the impact of distributed capacitance. This will damage the motor insulation   or generate higher leakage current, causing the AC drive to trip in overcurrent protection. If the motor cable is greater than 100 m long, an AC output reactor must be installed close to the AC drive.

6)   Terminal ⊕ PE

– This terminal must be reliably connected to the main earthing conductor. Otherwise, it may cause electric shock, mal-function or even damage to the AC drive.

- – Do not connect the earthing terminal to the neutral conductor of the power supply.
- – The impedance of the PE conductor must be able to withstand the large short-circuit current that may arise when a fault occurs.
- – Select the size of the PE conductor according to the following table:

Cross-sectional Area of a Phase Conductor (S)	Min. Cross-sectional Area of Protective Conductor (Sp)
$S \leq 16$ mm^2	S
16 mm^2 < S $\leq$ 35 mm^2	16 mm^2
35 mm^2 < S	S/2

- – You must use a yellow/green cable as the PE conductor.
7) Requirements on upstream protection device
  - – Install upstream protection device on the input power circuit. The protection device must provide the protections on overcurrent, short-circuit and electrical isolation.
  - – When selecting the protective device, you should consider the current capacity of the power cable, system overload capacity and short-circuit capacity of the upstream power distribution of the equipment. Generally, make selection according to the recommended values in section 8.4.

3.2.2 Description of Control Circuit Terminals

■ Terminal Arrangement of Control Circuit

485+	485–	AI1	AI2	GND	S1	S2	S3	S4	S5	S6	T/A	T/B	T/C
+10V	AO1	AO2	GND	+24V	OP	COM	COM	CME	DO1	FM	T/A2	T/B2	T/C2

■ Description of Control Circuit Terminals

Table 3-3 Description of control circuit terminals

Type	Terminal	Name	Function Description
Power supply	+10V-GND	External +10V power supply	Provide +10 V power supply to external unit. Generally, it provides power supply to external potentiometer with resistance range of 1–5 kΩ. Maximum output current: 10 mA
	+24V-COM	External +24V power supply	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. Maximum output current: 200 mA
	OP	Input terminal of external power supply	Connect to +24 V by default. When DI1-DI5 need to be driven by external signal, OP needs to be connected to external power supply and be disconnected from +24 V.

Type	Terminal	Name	Function Description
Analog input	AI1-GND	Analog input 1	Input voltage range: 0–10 VDC Impedance: 22 kΩ
Analog input	AI2-GND	Analog input 2	Input range: 0–10 VDC/4–20 mA, decided by jumper J8 on the control board Impedance: 22 kΩ (voltage input), 500 Ω (current input)
Digital input	S1- OP	Digital input 1	Optical coupling isolation, compatible with dual polarity input Impedance: 2.4 kΩ Voltage range for level input: 9–30 V
Digital input	S2- OP	Digital input 2	
Digital input	S3- OP	Digital input 3	
Digital input	S4- OP	Digital input 4	
Digital input	S6- OP	Digital input 6	
Digital input	S5- OP	High-speed pulse input	Besides features of DI1–DI4, it can be used for high-speed pulse input. Maximum input frequency: 100 kHz
Analog output	AO1-GND	Analog output 1	Voltage or current output decided by jumper J5. Output voltage range: 0–10 V Output current range: 0–20 mA
Analog output	AO2-GND	Analog output 2	Voltage or current output decided by jumper J12 Output voltage range: 0–10 V Output current range: 0–20 mA
Digital output	DO1-CME	Digital output 1	Optical coupling isolation, dual polarity open collector output Output voltage range: 0–24 V Output current range: 0–50 mA Note that CME and COM are internally insulated, but they are shorted by jumper J10 externally. In this case DO1 is driven by +24 V by default. If you want to drive DO1 by external power supply, remove the jumper J10.
Digital output	FM- COM	High-speed pulse output	It is limited by F5-00 (FM terminal output mode selection). As high-speed pulse output, the maximum frequency hits 100 kHz. As open-collector output, its specification is the same as that of DO1
Relay output	T/A-T/B	NC terminal	Contact driving capacity: 250 VAC, 3 A, COSø = 0.4 30 VDC, 1 A Applying to Overvoltage Category II circuit
Relay output	T/A2-T/B2	NC terminal	
Relay output	T/A-T/C	NO terminal	
Relay output	T/A2-T/C2	NO terminal	
Communication	485+ 485-	Communication terminal	RS485 Communication terminal, Support Modbus communication protocol ,short 1,2 pins of J14 can match 100R terminal resistance

3.2.3 Wiring of AC Drive Control Circuit

Figure 3-14 Wiring mode of the AC drive control circuit
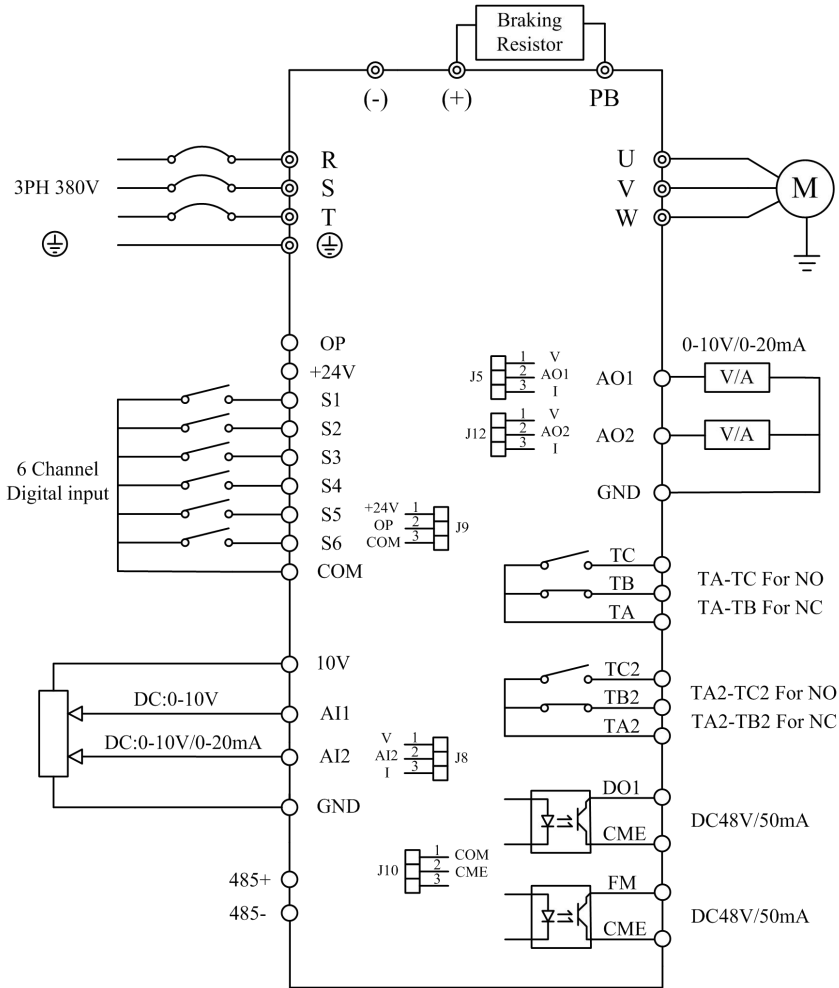
Note

- All H300 series AC drives have the same wiring mode. The figure here shows the wiring of single-phase 220 VAC drive. ◎ indicates main circuit terminal, while ○ indicates control circuit terminal.

- When the external operation panel is connected, the display of the operation panel on the H300 goes off.

■   Description of Wiring of Signal Terminals

1)   Wiring of AI terminals

Weak analog voltage signals are easy to suffer external interference, and therefore the shielded cable must be used and the cable length must be less than 20 m, as shown in following figure.

Figure 3-15 Wiring mode of AI terminals
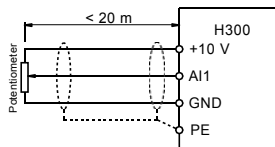
In applications where the analog signal suffers severe interference, install filter capacitor or ferrite magnetic core at the analog signal source.

Figure 3-16 Install filter capacitor or ferrite magnetic core
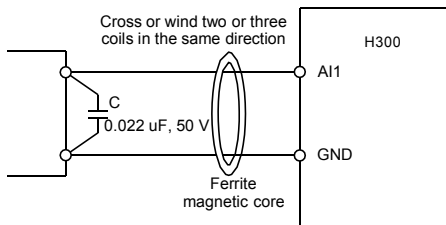
2)   Wiring of DI terminals

Generally, select shielded cable no longer than 20 m. When active driving is adopted, necessary filtering measures shall be taken to prevent the interference to the power supply. It is recommended to use the contact control mode.

   a.   SINK wiring

Figure 3-17 Wiring in SINK mode
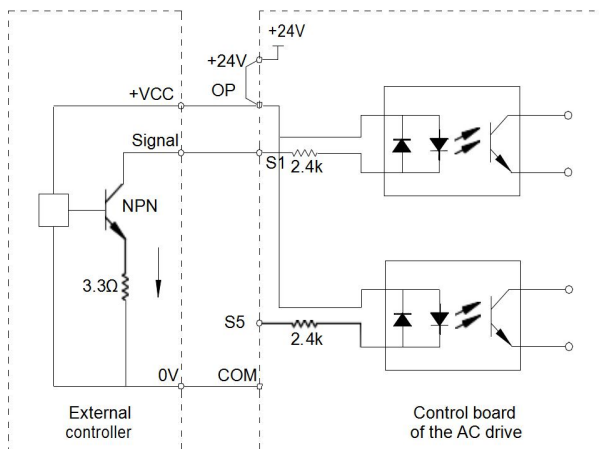
This is the most commonly used wiring mode. To apply external power supply, remove jumpers between +24 V and OP and between COM and CME, and connect the positive pole of external power supply to OP and negative pole to CME.

In such wiring mode, the DI terminals of different AC drives cannot be connected in parallel. Otherwise, DI mal-function may result.

b. SOURCE wiring

In such wiring mode, remove the jumper between +24 V and OP. Connect +24 V to the common port of external controller and meanwhile connect OP to COM. If external power supply is applied, remove the jumper between CME and COM.

Figure 3-19 Wiring in SOURCE mode
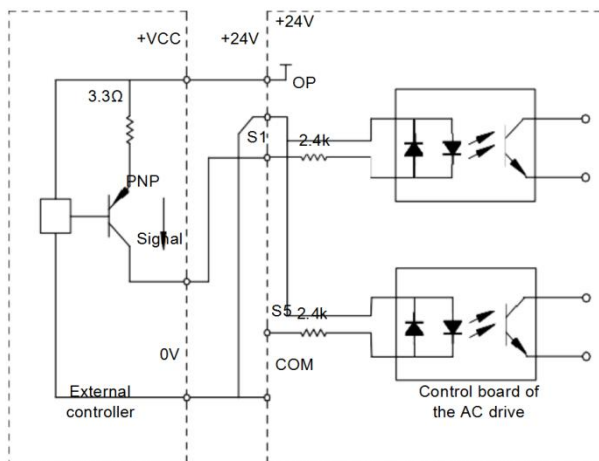
3) Wiring of DO terminal

When the digital output terminal needs to drive the relay, an absorption diode shall be installed between two sides of the relay coil. Otherwise, it may cause damage to the 24 VDC power supply. The driving capacity is not more than 50 mA.

_____ **Note** _____

Do not reverse the polarity of the absorption diode during installation, as shown in Figure 3-11. Otherwise, the 24 VDC power supply will be damaged immediately once there is digital output.

Figure 3-20 DO terminal wiring diagram

4
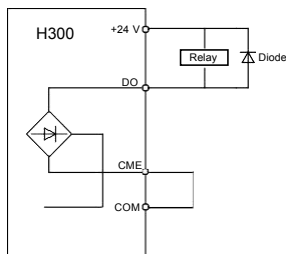
Operation, Display and Application Examples

Chapter 4 Operation, Display and Application Examples

4.1 Operation Panel

You can modify the parameters, monitor the working status and start or stop the H300 by operating the operation panel, as shown in the following figure.

Figure 4-1 Diagram of the operation panel

4.1.1 Description of Indicators

•   RUN

ON indicates that the AC drive is in the running state, and OFF indicates that the AC drive is in the stop state.

•   LOCAL/REMOT

It indicates whether the AC drive is operated by means of operation panel, terminals or communication.

◯LOCAL/REMOT: OFF	Operation panel control
●LOCAL/REMOT: ON	Terminal control
◑LOCAL/REMOT: blinking	Communication control

- FWD/REV

  ON indicates reverse rotation, and OFF indicates forward rotation.

- Unit Indicators

  ● means that the indicator is ON, and ○ means that the indicator is OFF.

  Hz: unit of frequency

  A: unit of current

  V: unit of voltage

- Digital Display

  The 5-digit LED display is able to display the set frequency, output frequency, monitoring data and fault codes.

4.1.2 Description of Keys on the Operation Panel

Table 4-1 Description of keys on the operation panel

Key	Name	Function
PRGM	Programming	Enter or exit Level I menu
ENT	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting
△	Increment	Increase data or function code
▽	Decrement	Decrease data or function code
>>	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters
RUN	RUN	Start the AC drive in the operation panel control mode
STOP /RESET	Stop/Reset	Stop the AC drive when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted in F7-02
MF.K	Multifunction	Perform function switchover (such as quick switchover of command source or direction) according to the setting of F7-01

4.2 Viewing and Modifying Function Codes

The operation panel of the H300 adopts three-level menu.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.

Figure 4-2 Operation procedure on the operation panel
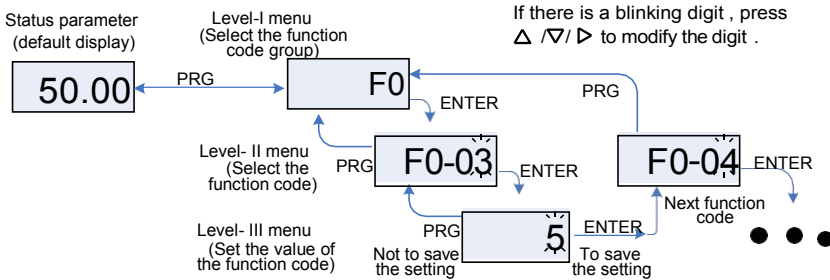
You can return to Level II menu from Level III menu by pressing PRG or ENTER .

• After you press ENTER , the system saves the parameter setting first, and then goes back to Level II menu and shifts to the next function code.

• After you press PRG , the system does not save the parameter setting, but directly returns to Level II menu and remains at the current function code.

Here is an example of changing the value of F3-02 to 15.00 Hz.

Figure 4-3 Example of changing the parameter value
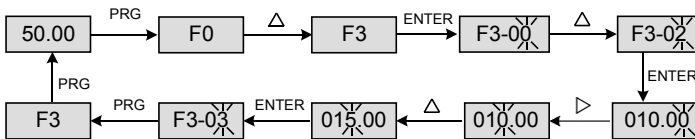
In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

- Such a function code is only readable, such as, AC drive model, actually detected parameter and running record parameter.

- Such a function code cannot be modified in the running state and can only be changed at stop.

4.3 Structure of Function Codes

The H300, an advanced product based on H200, groups A and U, and new function codes to group F.

Function Code Group	Function	Description
F0 to F9, FA to FE, FP	Standard AC drive function code group	Compatible with H200 series function codes and adding some function codes.
U0	Running state function code group	Display of AC drive basic parameters

In the function code display state, select the required function code by pressing the key △ or ▽, as shown in the following figure.

Figure 4-4 Selecting the required function code
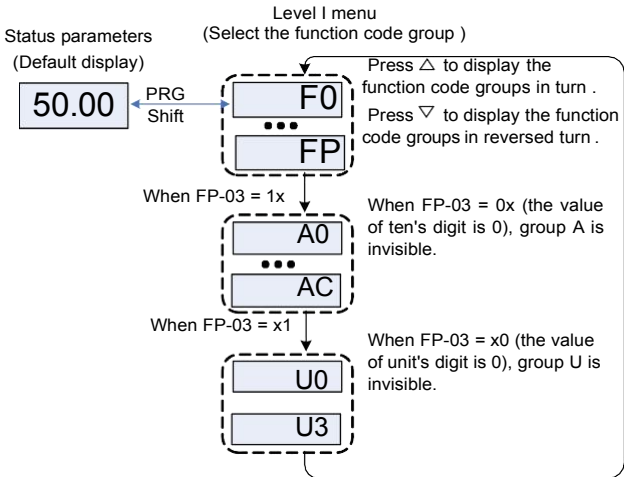
FP-03 is used to determine whether group A and group U a.

Function Code	Parameter Name	Setting Range	Default
FP-03	AC drive parameter display property	Unit's digit (group U display selection)	01
		0: Not display 1: Display	
		Ten's digit (group A display selection)	
		0: Not display 1: Display	

4.4 Definition and Operation of the Multifunction Key (MF.K)

You can define the function (command source switchover or rotation direction switchover) of the multifunction key in F7-01. For details, see the description of F7-01.

4.5 Viewing Status Parameters

In the stop or running state, you can press ▷ on the operation panel to display status parameters. Whether parameters are displayed is determined by the binary bits of values converted from the values of F7-02, F7-03, and F7-04 in the hexadecimal format.

In stop state, a total of 13 status parameters can be displayed, as listed in the following table.

In running state, five running status parameters are displayed by default, and you can set whether other parameters are displayed by setting F7-02 and F7-03, as listed in the following table.

When the AC drive is powered on again after power failure, the parameters that are selected before power failure are displayed.

Select the required parameters by pressing ▷. Set the values of the parameters by referring to the following example.

1. Determine the parameters to be displayed.

   Running frequency, Bus voltage, Output voltage, Output current, Output frequency, Output torque, PID feedback, Encoder feedback speed

2. Set the binary data.

   F7-02: 0000 0000 0111 1101B, F7-03: 0010 0000 0000 0001B

3. Convert the binary data to hexadecimal data:

   F7-02: 007DH, F7-03: 2001H

   The values displayed on the operation panel are respectively H.1043 and H.2001 respectively for F7-02 and F7-03.

5

Function Code Table

Chapter 5 Function Code Table

If FP-00 is set to a non-zero number, parameter protection is enabled. You must enter the correct user password to enter the menu.

To cancel the password protection function, enter with password and set FP-00 to 0.

Group F and Group A are standard function parameters. Group U includes the monitoring function parameters.

The symbols in the function code table are described as follows:

"☆": The parameter can be modified when the AC drive is in either stop or running state.

"★": The parameter cannot be modified when the AC drive is in the running state.

"●": The parameter is the actually measured value and cannot be modified.

"*": The parameter is factory parameter and can be set only by the manufacturer.

5.1 Standard Function Parameters

Function Code	Parameter Name	Setting Range	Default	Property
Group F0: Standard Function Parameters				
F0-00	Motor control mode	0: Sensorless flux vector control (SVC) 1: Voltage/Frequency (V/F) control	0	★
F0-01	Command source selection	0: Operation panel control (LED off) 1: Terminal control (LED on) 2: Communication control (LED blinking)	0	☆
F0-02	Main frequency source X selection	0: Digital setting (non-retentive at power failure) 1: Digital setting (retentive at power failure) 2: AI1 3: AI2 4: Operation panel potentiometer (AI3) 5: Pulse setting (S5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication setting	0	★

Function Code	Parameter Name	Setting Range	Default	Property
F0-02	Main frequency source X selection		0	★
F0-03	Auxiliary frequency source Y selection	The same as F0-02 (Main frequency source X selection)	0	★
F0-04	Range of auxiliary frequency Y for X and Y operation	0: Relative to maximum frequency 1: Relative to main frequency X	0	☆
F0-05	Range of auxiliary frequency Y for X and Y operation	0%–150%	100%	☆
F0-06	Frequency source selection	Unit's digit (Frequency source selection) 0: Main frequency source X 1: X and Y operation (operation relationship determined by ten's digit) 2: Switchover between X and Y 3: Switchover between X and "X and Y operation" 4: Switchover between Y and "X and Y operation" Ten's digit (X and Y operation relationship) 0: X+Y 1: X-Y 2: Maximum 3: Minimum	00	☆
F0-07	Preset frequency	0.00 to maximum frequency (valid when frequency source is digital setting)	50.00 Hz	☆
F0-08	Rotation direction	0: Same direction 1: Reverse direction	0	☆
F0-09	Maximum frequency	50.00Hz～320.00Hz (F0-22=2) 50.0Hz ～1000.0Hz (F0-22=1)	50.00 Hz	★
F0-10	Source of frequency upper limit	0: Set by F0-12 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting	0	★

Function Code	Parameter Name	Setting Range	Default	Property
F0-11	Frequency upper limit	Frequency lower limit (F0-13 to maximum frequency (F0-09)	50.00 Hz	☆
F0-12	Frequency upper limit offset	0.00 Hz to maximum frequency (F0-09)	0.00 Hz	☆
F0-13	Frequency lower limit	0.00 Hz to frequency upper limit (F0-11)	0.00 Hz	☆
F0-14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0	☆
F0-15	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Set frequency	0	★
F0-16	Retentive of digital setting frequency upon power failure	0: Not retentive 1: Retentive	0	☆
F0-17	Acceleration time 1	0.00–650.00s (F0-19 = 2) 0.0–6500.0s (F0-19 = 1) 0–65000s (F0-19 = 0)	Model dependent	☆
F0-18	Deceleration time 1	0.00–650.00s (F0-19 = 2) 0.0–6500.0s (F0-19 = 1) 0–65000s (F0-19 = 0)	Model dependent	☆
F0-19	Acceleration/Deceleration time unit	0:1s 1: 0.1s 2: 0.01s	1	★
F0-20	Carrier frequency	0.5–16.0 kHz	Model dependent	☆
F0-21	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆
F0-22	Frequency reference resolution	1: 0.1 Hz 2: 0.01 Hz	2	★

Function Code	Parameter Name	Setting Range	Default	Property
Group F1: Start/Stop Control				
F1-00	Start mode	0: Direct start 1: Rotational speed tracking restart 2: Pre-excited start (asynchronous motor)	0	☆
F1-01	Rotational speed tracking mode	0: From frequency at stop 1: From power frequency 2: From maximum frequency	0	★
F1-02	Rotational speed tracking speed	1–100	20	☆
F1-03	Startup frequency	0.00–10.00 Hz	0.00 Hz	☆
F1-04	Startup frequency holding time	0.0–100.0s	0.0s	★
F1-05	Startup DC braking current/ Pre-excited current	0%–100%	0%	★
F1-06	Startup DC braking time/ Pre-excited time	0.0–100.0s	0.0s	★
F1-07	Acceleration/Deceleration mode	0: Linear acceleration/ deceleration 1: S-curve acceleration/ deceleration A 2: S-curve acceleration/ deceleration B	0	★
F1-08	Time proportion of S-curve start segment	0.0% to (100.0% – F1-09)	30.0%	★
F1-09	Time proportion of S-curve end segment	0.0% to (100.0% – F1-08)	30.0%	★
F1-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
F1-11	Initial frequency of stop DC braking	0.00 Hz to maximum frequency	0.00 Hz	☆
F1-12	Waiting time of stop DC braking	0.0–36.0s	0.0s	☆
F1-13	Stop DC braking current	0%–100%	0%	☆
F1-14	Stop DC braking time	0.0–36.0s	0.0s	☆
F1-15	Brake use ratio	0%–100%	100%	☆
F1-16	Brake Threshold Voltage	310.0V–800.0V	S:368V T:720V	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F2: Motor 1 Parameters				
F2-00	G/P type selection	1: G type (constant torque load) 2: P type (variable torque load e.g. fan and pump)	Model dependent	●
F2-01	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	1	★
F2-02	Rated motor power	0.1–1000.0 kW	Model dependent	★
F2-03	Rated motor voltage	1–2000 V	Model dependent	★
F2-04	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★
F2-05	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
F2-06	Rated motor rotational speed	1–65535 RPM	Model dependent	★
F2-07	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
F2-08	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
F2-09	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
F2-10	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01–-655.35 mH (AC drive power > 55 kW)	Model dependent	★
F2-11	No-load current (asynchronous motor)	0.01 to F2-04 (AC drive power ≤ 55 kW) 0.1 to F2-04 (AC drive power > 55 kW)	Model dependent	★
F2-12	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning 3: Asynchronous motor static complete auto-tuning	0	★

Function Code	Parameter Name	Setting Range	Default	Property
		Group F3: Vector Control Parameters		
F3-00	Speed loop proportional gain 1	0–100	30	☆
F3-01	Speed loop integral time 1	0.01–10.00s	0.50s	☆
F3-02	Switchover frequency 1	0.00 to F3-05	5.00 Hz	☆
F3-03	Speed loop proportional gain 2	0–100	20	☆
F3-04	Speed loop integral time 2	0.01–10.00s	1.00s	☆
F3-05	Switchover frequency 2	F3-02 to maximum output frequency	10.00 Hz	☆
F3-06	Vector control slip gain	50%–200%	100%	☆
F3-07	Time constant of speed loop filter	0.000–0.100s	0.000s	☆
F3-08	Vector control over-excitation gain	0–200	64	☆
F3-09	Torque upper limit source in speed control mode	0: F3-10 1: AI1 2: AI2 3: Reserve 4: Pulse setting (S5) 5: Communication setting The full range of value 1-5 corresponds to the digital setting of F3-10	0	☆
F3-10	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆
F3-13	Excitation adjustment proportional gain	0–20000	2000	☆
F3-14	Excitation adjustment integral gain	0–20000	1300	☆
F3-15	Torque adjustment proportional gain	0–20000	2000	☆
F3-16	Torque adjustment integral gain	0–20000	1300	☆
F3-17	Speed loop integral property	Unit's digit: integral separation 0: Disabled 1: Enabled	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F3(part2): Torque Control and Restricting Parameters				
F3-18	Speed/Torque control selection	0: Speed control 1: Torque control	0	★
F3-19	Torque setting source in torque control	0: Digital setting (F3-21) 1: AI1 2: AI2 3: AI3 4: Pulse setting (S5) 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) Full range of values 1–7 corresponds to the digital setting of F3-21.	0	★
F3-21	Torque digital setting in torque control	-200.0%–200.0%	150.0%	☆
F3-23	Forward maximum frequency in torque control	0.00 Hz to maximum frequency (F0-09)	50.00 Hz	☆
F3-24	Reverse maximum frequency in torque control	0.00 Hz to maximum frequency (F0-09)	50.00 Hz	☆
F3-25	Acceleration time in torque control	0.00–65000s	0.00s	☆
F3-26	Deceleration time in torque control	0.00–65000s	0.00s	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F4: V/F Control Parameters				
F4-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2-9: Reserved 10: V/F complete separation 11: V/F half separation	0	★
F4-01	Torque boost	0.0% (No torque boost) 0.1%–30.0%	Model dependent	☆
F4-02	Cut-off frequency of torque boost	0.00 Hz to maximum output frequency	50.00 Hz	★
F4-03	Multi-point V/F frequency 1 (F1)	0.00 Hz to F4-05	5.00 Hz	★
F4-04	Multi-point V/F voltage 1 (V1)	0.0%–100.0%	20.0%	★

Function Code	Parameter Name	Setting Range	Default	Property
F4-05	Multi-point V/F frequency 2 (F2)	F4-03 to F4-07	25.00 Hz	★
F4-06	Multi-point V/F voltage 2 (V2)	0.0%–100.0%	50.0%	★
F4-07	Multi-point V/F frequency 3 (F3)	F4-05 to rated motor frequency (F2-05)	50.00 Hz	★
F4-08	Multi-point V/F voltage 3 (V3)	0.0%–100.0%	100.0%	★
F4-09	V/F slip compensation gain	0%–200.0%	0.0%	☆
F4-10	V/F over-excitation gain	0–200	64	☆
F4-11	V/F oscillation suppression gain	0–100	Model dependent	☆
F4-12	Voltage source for V/F separation	0: Digital setting (F4-13) 1: AI1 2: AI2 3: AI3 4: Pulse setting (S5) 5: Multi-reference 6: Simple PLC 7: PID 8: Communication setting 100.0% corresponds to the rated motor voltage (F2-03).	0	☆
F4-13	Voltage digital setting for V/F separation	0 V to rated motor voltage	0 V	☆
F4-14	Voltage rise time of V/F separation	0.0–1000.0s It indicates the time for the voltage rising from 0 V to rated motor voltage.	0.0s	☆
F4-15	DPWM switchover frequency upper limit	0.00–15.00 Hz	12.00 Hz	☆
F4-16	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
F4-17	Random PWM depth	0: Random PWM invalid 1–10	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F5: Input Terminals				
F5-00	S1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 3: Three-line control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP	1	★
F5-01	S2 function selection	7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: Normally open (NO) input of external fault 12: Multi-reference terminal 1 13: Multi-reference terminal 2	2	★
F5-02	S3 function selection	14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection	4	★
F5-03	S4 function selection	18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover terminal 1 21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause 25: Counter input 26: Counter reset	9	★
F5-04	S5 function selection	27: Length count input 28: Length reset 29: Torque control prohibited	12	★

Function Code	Parameter Name	Setting Range	Default	Property
F5-05	S6 function selection	30: Pulse input (enabled only for DI5) 31:Reserved 32: Immediate DC braking 33: Normally closed (NC) input of external fault 34: Frequency modification forbidden 35: Reverse PID action direction	13	★
F5-06	S7 function selection	36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral pause	0	★
F5-07	S8 function selection	39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency	0	★
F5-08	S9 function selection	41: Motor selection terminal 1 42: Motor selection terminal 2 43: PID parameter switchover 44: User-defined fault 1	0	★
F5-09	S10 function selection	45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop	0	★
F5-10	VDI1 function selection	48: External STOP terminal 2 49: Deceleration DC braking	0	★
F5-11	VDI1 function selection		0	★
F5-12	VDI1 function selection	50: Clear the current running time	0	★
F5-13	VDI1 function selection	51: Switchover between two-line mode and three-line mode	0	★
F5-14	VDI1 function selection	52–59: Reserved	0	★
F5-15	DI filter time	0.000–1.000s	0.010s	☆
F5-16	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★
F5-17	Terminal UP/DOWN rate	0.01–65.535 Hz/s	1.00 Hz/s	☆
F5-18	DI1 delay time	0.0–3600.0s	0.0s	★
F5-19	DI2 delay time	0.0–3600.0s	0.0s	★
F5-20	DI3 delay time	0.0–3600.0s	0.0s	★

Function Code	Parameter Name	Setting Range	Default	Property
F5-21	DI valid mode selection 1	Unit's digit (S1 valid mode)	00000	★
		0, 1 (same as S1)		
		Ten's digit (S2 valid mode)		
		0, 1 (same as S1)		
		Hundred's digit (S3 state)		
		0, 1 (same as S1)		
		Thousand's digit (S4 valid mode)		
		0, 1 (same as S1)		
		Ten thousand's digit (S5 valid mode)		
		0, 1 (same as S1)		
F5-22	DI valid mode selection 2	Unit's digit (S6 valid mode)	00000	★
		0, 1 (same as S1)		
		Ten's digit (S7 valid mode)		
		0, 1 (same as S1)		
		Hundred's digit (S8 state)		
		0, 1 (same as S1)		
		Thousand's digit (S9 valid mode)		
		0, 1 (same as S1)		
		Ten thousand's digit (S10 valid mode)		
		0, 1 (same as S1)		
F5-23	VDI state setting mode	Unit's digit (VDI1)	00000	★
		0: Decided by state of VDOx 1: Decided by F5-24		
		Ten's digit (VDI2)		
		0, 1 (same as VDI1)		
		Hundred's digit (VDI3)		
		0, 1 (same as VDI1)		
		Thousand's digit (VDI4)		
		0, 1 (same as VDI1)		
		Ten thousand's digit (VDI5)		
		0, 1 (same as VDI1)		
F5-24	VDI state selection	Unit's digit (VDI1)	00000	★
		0: Invalid 1: Valid		
		Ten's digit (VDI2)		
		0, 1 (same as VDI1)		
		Hundred's digit (VDI3)		

		0, 1 (same as VDI1)		
		Thousand's digit (VDI4)		
		0, 1 (same as VDI1)		
		Ten thousand's digit (VDI5)		
		0, 1 (same as VDI1)		
F5-25	AI curve 1 minimum input	0.00 V to F-27	0.00 V	☆
F5-26	Corresponding setting of AI curve 1 minimum input	-100.00%–100.0%	0.0%	☆
F5-27	AI curve 1 maximum input	F5-25 to 10.00 V	10.00 V	☆
F5-28	Corresponding setting of AI curve 1 maximum input	-100.00%–100.0%	100.0%	☆
F5-29	AI1 filter time	0.00–10.00s	0.10s	☆
F5-30	AI curve 2 minimum input	0.00 V to F5-32	0.00 V	☆
F5-31	Corresponding setting of AI curve 2 minimum input	-100.00%–100.0%	0.0%	☆
F5-32	AI curve 2 maximum input	F5-30 to 10.00 V	10.00 V	☆
F5-33	Corresponding setting of AI curve 2 maximum input	-100.00%–100.0%	100.0%	☆
F5-34	AI2 filter time	0.00–10.00s	0.10s	☆
F5-39	Operation panel potentiometer(AI3) filter time	0.00–10.00s	0.10s	☆
F5-40	Pulse minimum input	0.00 kHz to F5-42	0.00 kHz	☆
F5-41	Corresponding setting of pulse minimum input	-100.00%–100.0%	0.0%	☆
F5-42	Pulse maximum input	F5-40 to 50.00 kHz	50.00 kHz	☆
F5-43	Corresponding setting of pulse maximum input	-100.00%–100.0%	100.0%	☆
F5-44	Pulse filter time	0.00–10.00s	0.10s	☆
F5-45	Setting for AI less than minimum input	Unit's digit (Setting for AI1 less than minimum input)	000	☆
		0: Minimum value 1: 0.0%		
		Ten's digit (Setting for AI2 less than minimum input)		
		0, 1 (same as AI1)		
		Hundred's digit (Setting for AI3 less than minimum input)		
		0, 1 (same as AI1)		

Function Code	Parameter Name	Setting Range	Default	Property
Group F6: Output Terminals				
F6-00	FM terminal output mode	0: Pulse output (FMP) 1: Switch signal output (FMR)	0	☆
F6-01	FMR function (open-collector output terminal)	0: No output 1: AC drive running	0	☆
F6-02	Relay function (T/A-T/B-T/C)	2: Fault output (stop) 3: Frequency-level detection FDT1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle complete 12: Accumulative running time reached 13: Frequency limited	2	☆
F6-03	Relay function (T/A2-T/B2-T/C2)	14: Torque limited 15: Ready for RUN 16: AI1 larger than AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage state output 20: Communication setting 21: Reserved 22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached	0	☆

		28: Current 1 reached		
		29: Current 2 reached		
		30: Timing reached		
		31: AI1 input limit exceeded		
		32: Load becoming 0		
		33: Reverse running		
		34: Zero current state		
		35: Module temperature reached		
F6-04	DO1 function selection (open-collector output terminal)	36: Software current limit exceeded	1	☆
		37: Frequency lower limit reached (having output at stop)		
		38: Alarm output		
		39: Motor overheat warning		
		40: Current running time reached		
		41: Fault output (There is no output if it is the coast to stop fault and undervoltage occurs.)		
F6-06	VDO1 function selection	0: Short with physical DIx internally 1–40: Refer to function selection of physical DO in group F6.	0	☆
F6-07	VDO2 function selection	0: Short with physical DIx internally 1–40: Refer to function selection of physical DO in group F6.	0	☆
F6-08	VDO3 function selection	0: Short with physical Dix internally 1–40: Refer to function selection of physical DO in group F6.	0	☆
F6-09	VDO4 function selection	0: Short with physical Dix internally 1–40: Refer to function selection of physical DO in group F5.	0	☆
F6-10	VDO5 function selection	0: Short with physical Dix internally 1–40: Refer to function selection of physical DO in group F6.	0	☆
F6-11	FMR output delay time	0.0–3600.0s	0.0s	☆
F6-12	Relay 1 output delay time	0.0–3600.0s	0.0s	☆
F6-13	Relay 2 output delay time	0.0–3600.0s	0.0s	☆
F6-14	DO1 output delay time	0.0–3600.0s	0.0s	☆
F6-16	VDO1 output delay	0.0–3600.0s	0.0s	☆
F6-17	VDO2 output delay	0.0–3600.0s	0.0s	☆
F6-18	VDO3 output delay	0.0–3600.0s	0.0s	☆
F6-19	VDO4 output delay	0.0–3600.0s	0.0s	☆
F6-20	VDO5 output delay	0.0–3600.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
F6-21	DO valid mode selection	Unit's digit (FMR valid mode)	00000	☆
		0: Positive logic 1: Negative logic		
		Ten's digit (Relay 1 valid mode)		
		0, 1 (same as FMR)		
		Hundred's digit (Relay 2 valid mode)		
		0, 1 (same as FMR)		
		Thousand's digit (DO1 valid mode)		
		0, 1 (same as FMR)		
		Ten thousand's digit (DO2 valid mode)		
		0, 1 (same as FMR)		
F6-22	VDO valid mode selection	Unit's digit (VDO1 valid mode)	00000	☆
		0: Positive logic 1: Negative logic		
		Ten's digit (VDO2 valid mode)		
		0, 1 (same as VDO1)		
		Hundred's digit (VDO3 valid mode)		
		0, 1 (same as VDO1)		
		Thousand's digit (VDO4 valid mode)		
		0, 1 (same as VDO1)		
		Ten thousand's digit (VDO5 valid mode)		
		0, 1 (same as VDO1)		

Function Code	Parameter Name	Setting Range	Default	Property
F6-23	FMP function selection	0: Running frequency	0	☆
F6-24	AO1 function selection	1: Set frequency	0	☆
F6-25	AO2 function selection	2: Output current 3: Output torque (absolute value) 4: Output power 5: Output voltage 6: Pulse input 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current 15: Output voltage 16: Output torque (actual value)	1	☆
F6-26	Maximum FMP output frequency	0.01–100.00 kHz	50.00 kHz	☆
F6-27	AO1 offset coefficient	-100.0%–100.0%	0.0%	☆
F6-28	AO1 gain	-10.00–10.00	1.00	☆
F6-29	AO2 offset coefficient	-100.0%–100.0%	0.00%	☆
F6-30	AO2 gain	-10.00–10.00	1.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
		Group F7: Operation Panel and Display		
F7-00	MF.K Key function selection	0: MF.K key disabled 1: Switchover between operation panel control and remote command control (terminal or communication) 2: Switchover between forward rotation and reverse rotation 3: Forward JOG 4: Reverse JOG	0	★
F7-01	STOP/RESET key function	0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode	1	☆
F7-02	LED display running parameters 1	0000–FFFF Bit00: Running frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status	1F	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-02	LED display running parameters 1	Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1F	☆
F7-03	LED display running parameters 2	0000–FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Pulse setting frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remaining running time Bit05: AI1 voltage before correction (V) Bit06: AI2 voltage before correction (V) Bit07: AI3 voltage before correction (V) Bit08: Linear speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Pulse setting frequency (Hz) Bit12: Communication setting value Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-04	LED display stop parameters	0000–FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: AI3 voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: Pulse setting frequency (kHz)	33	☆
F7-05	Heatsink temperature of inverter module	0.0–100.0°C	-	●
F7-06	Load speed display coefficient	0.0001–6.5000	1.0000	☆
F7-07	Number of decimal places for load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1	☆
F7-08	Accumulative running time	0–65535 h	-	●
F7-09	Accumulative power-on time	0–65535 h	0 h	●
F7-10	Accumulative power consumption	0–65535 kWh	-	●
F7-11	Product number	-	-	●
F7-12	Software version	-	-	●
Group F8: Auxiliary Functions				
F8-00	JOG running frequency	0.00 Hz to maximum frequency	2.00 Hz	☆
F8-01	JOG acceleration time	0.0–6500.0s	20.0s	☆
F8-02	JOG deceleration time	0.0–6500.0s	20.0s	☆
F8-03	Acceleration time 2	0.0–6500.0s	Model dependent	☆
F8-04	Deceleration time 2	0.0–6500.0s	Model dependent	☆

Function Code	Parameter Name	Setting Range	Default	Property
F8-05	Acceleration time 3	0.0–6500.0s	Model dependent	☆
F8-06	Deceleration time 3	0.0–6500.0s	Model dependent	☆
F8-07	Acceleration time 4	0.0–500.0s	Model dependent	☆
F8-08	Deceleration time 4	0.0–6500.0s	Model dependent	☆
F8-09	Jump frequency 1	0.00 Hz to maximum frequency	0.00 Hz	☆
F8-10	Jump frequency 2	0.00 Hz to maximum frequency	0.00 Hz	☆
F8-11	Frequency jump amplitude	0.00 Hz to maximum frequency	0.00 Hz	☆
F8-12	Forward/Reverse rotation dead-zone time	0.0–3000.0s	0.0s	☆
F8-13	Reverse control	0: Enabled 1: Disabled	0	☆
F8-14	Cooling fan control	0: Fan working during running 1: Fan working continuously	0	☆
F8-15	Droop control	0.00–10.00 Hz	0.00 Hz	☆
F8-16	Accumulative power-on time threshold	0–65000 h	0 h	☆
F8-17	Accumulative running time threshold	0–65000 h	0 h	☆
F8-18	Startup protection	0: No 1: Yes	0	☆
F8-19	Frequency detection value (FDT1)	0.00 Hz to maximum frequency	50.00 Hz	☆
F8-20	Frequency detection hysteresis (FDT hysteresis 1)	0.0%–100.0% (FDT1 level)	5.0%	☆
F8-21	Detection range of frequency reached	0.00–100% (maximum frequency)	0.0%	☆
F8-22	Jump frequency during acceleration/deceleration	0: Disabled1: Enabled	0	☆
F8-25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 Hz to maximum frequency	0.00 Hz	☆
F8-26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to maximum frequency	0.00 Hz	☆
F8-27	Terminal JOG preferred	0: Disabled1: Enabled	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
F8-28	Frequency detection value (FDT2)	0.00 to maximum frequency	50.00 Hz	☆
F8-29	Frequency detection hysteresis (FDT hysteresis 2)	0.0%–100.0% (FDT2 level)	5.0%	☆
F8-30	Any frequency reaching detection value 1	0.00 Hz to maximum frequency	50.00 Hz	☆
F8-31	Any frequency reaching detection amplitude 1	0.0%–100.0% (maximum frequency)	0.0%	☆
F8-32	Any frequency reaching detection value 2	0.00 Hz to maximum frequency	50.00 Hz	☆
F8-33	Any frequency reaching detection amplitude 2	0.0%–100.0% (maximum frequency)	0.0%	☆
F8-34	Zero current detection level	0.0%–300.0% (rated motor current)	5.0%	☆
F8-35	Zero current detection delay time	0.00–600.00s	0.10s	☆
F8-36	Output overcurrent threshold	0.0 % (no detection) 0.1 %–300.0% (rated motor current)	200.0%	☆
F8-37	Output overcurrent detection delay time	0.00–600.00s	0.00s	☆
F8-38	Any current reaching 1	0.0%–300.0% (rated motor current)	100.0%	☆
F8-39	Any current reaching 1 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆
F8-40	Any current reaching 2	0.0%–300.0% (rated motor current)	100.0%	☆
F8-41	Any current reaching 2 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆
F8-42	Timing function	0: Disabled 1: Enabled	0	☆
F8-43	Timing duration source	0: F8-44 1: AI1 2: AI2 3: AI3 (100% of analog input corresponds to the value of F8-44)	0	☆
F8-44	Timing duration	0.0–6500.0 min	0.0 min	☆
F8-45	AI1 input voltage lower limit	0.00 V to F8-46	3.10 V	☆
F8-46	AI1 input voltage upper limit	F8-45 to 10.00 V	6.80 V	☆

Function Code	Parameter Name	Setting Range	Default	Property
F8-47	Module temperature threshold	0–100°C	75°C	☆
F8-48	Current running time reached	0.0–6500.0 min	0.0 min	☆
Group F9: Process Control PID Function				
F9-00	PID setting source	0: FA-01 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting 6: Multi-reference	0	☆
F9-01	PID digital setting	0.0%–100.0%	50.0%	☆
F9-02	PID feedback source	0: AI1 1: AI2 2: AI3 3: AI1 – AI2 4: Pulse setting (DI5) 5: Communication setting 6: AI1 + AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	0	☆
F9-03	PID action direction	0: Forward action 1: Reverse action	0	☆
F9-04	PID setting feedback range	0–65535	1000	☆
F9-05	Proportional gain Kp1	0.0–100.0	20.0	☆
F9-06	Integral time Ti1	0.01–10.00s	2.00s	☆
F9-07	Differential time Td1	0.00–10.000	0.000s	☆
F9-08	Cut-off frequency of PID reverse rotation	0.00 to maximum frequency	0.00 Hz	☆
F9-09	PID deviation limit	0.0%–100.0%	0.0%	☆
F9-10	PID differential limit	0.00%–100.00%	0.10%	☆
F9-11	PID setting change time	0.00–650.00s	0.00s	☆
F9-12	PID feedback filter time	0.00–60.00s	0.00s	☆
F9-13	PID output filter time	0.00–60.00s	0.00s	☆
F9-14	Proportional gain Kp2	0.0–100.0	20.0	☆
F9-15	Integral time Ti2	0.01–10.00s	2.00s	☆
F9-16	Differential time Td2	0.000–10.000s	0.000s	☆

Function Code	Parameter Name	Setting Range	Default	Property
F9-17	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Automatic switchover based on deviation	0	☆
F9-18	PID parameter switchover deviation 1	0.0% to F9-19	20.0%	☆
F9-19	PID parameter switchover deviation 2	F9-18 to 100.0%	80.0%	☆
F9-20	PID initial value	0.0%–100.0%	0.0%	☆
F9-21	PID initial value holding time	0.00–650.00s	0.00s	☆
F9-22	Maximum deviation between two PID outputs in forward direction	0.00%–100.00%	1.00%	☆
F9-23	Maximum deviation between two PID outputs in reverse direction	0.00%–100.00%	1.00%	☆
F9-24	PID integral property	Unit's digit (Integral separated) 0: Invalid 1: Valid Ten's digit (Whether to stop integral operation when the output reaches the limit) 0: Continue integral operation 1: Stop integral operation	00	☆
F9-25	Detection value of PID feedback loss	0.0%: Not judging feedback loss 0.1%–100.0%	0.0%	☆
F9-26	Detection time of PID feedback loss	0.0–20.0s	0.0s	☆
F9-27	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0	☆
F9-28	PID sleep mode	0: No sleep 1: sleep use frequency mode 2: sleep use PID error mode	0	☆
F9-29	Deviation value of PID feedback when sleep	0.0%–F9-32 (The full range corresponds to the PID setting)	5.0%	☆
F9-30	Dormant frequency	0.00 Hz to max frequency	0.00 Hz	☆
F9-31	Dormant delay time	0.0–6500.0s	10.0s	☆
F9-32	Deviation value of PID feedback when wake up	F9-29–100.0% (The full range corresponds to the PID setting)	20.0%	☆
F9-33	Wakeup delay time	0.0–6500.0s	3.0s	☆
F9-34	Sleep rate	1–10 (use when PID sleep use PID error mode)	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
		Group FA: Fault and Protection		
FA-00	Motor overload protection selection	0: Disabled 1: Enabled	1	☆
FA-01	Motor overload protection gain	0.20–10.00	1.00	☆
FA-02	Motor overload warning coefficient	50%–100%	80%	☆
FA-03	Overvoltage stall gain	0 (no stall overvoltage)–100	0	☆
FA-04	Overvoltage stall protective voltage	120%–150%	130%	☆
FA-05	Overcurrent stall gain	0–100	20	☆
FA-06	Overcurrent stall protective current	100%–200%	150%	☆
FA-07	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	1	☆
FA-08	Rapid current limit	0: Disabled1: Enabled	1	☆
FA-09	Fault auto reset times	0–20	0	☆
FA-10	DO action during fault auto reset	0: Not act 1: Act	0	☆
FA-11	Time interval of fault auto reset	0.1s–100.0s	1.0s	☆
FA-12	Input phase loss protection/ contactor energizing protection selection	Unit's digit: Input phase loss protection Ten's digit: Contactor energizing protection 0: Disabled 1: Enabled	11	☆
FA-13	Output phase loss protection selection	0: Disabled 1: Enabled	1	☆
FA-16	Fault protection action selection 1	Unit's digit (Motor overload, Err11) 0: Coast to stop 1: Stop according to stop mode 2: Continue to run Ten's digit (Power input phase loss, Err12) Same as unit's digit Hundred's digit (Power output phase loss, Err13) Same as unit's digit Thousand's digit (External equipment fault, Err15) Same as unit's digit	00000	☆

		Ten thousand's digit (Communication fault, Err16)		
		Same as unit's digit		
FA-17	Fault protection action selection 2	Unit's digit (Reserved)	00000	☆
		0: Coast to stop 1: Stop according to the stop mode		
		Ten's digit (EEPROM read-write fault, Err21)		
		0: Coast to stop 1: Stop according to the stop mode		
		Hundred's digit (Reserved)		
		Reserved		
		Thousand's digit (Motor overheat, Err25)		
		Same as unit's digit		
		Ten thousand's digit (Accumulative running time reached, Err26)		
		Same as unit's digit		
FA-18	Fault protection action selection 3	Unit's digit (User-defined fault 1, Err27)	00000	☆
		Same as unit's digit in F9-47		
		Ten's digit (User-defined fault 2, Err28)		
		Same as unit's digit in F9-47		
		Hundred's digit (Accumulative power-on time reached, Err29)		
		Same as unit's digit in F9-47		
		Thousand's digit (Load becoming 0, Err30)		
		0: Coast to stop		
		1: Stop according to the stop mode		
		2: Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers		
		Ten thousand's digit (PID feedback lost during running, Err31)		
		Same as unit's digit in F9-47		
FA-21	Frequency selection for continuing to run upon fault	0: Current running frequency	0	☆
		1: Set frequency		
		2: Frequency upper limit		
		3: Frequency lower limit		
		4: Backup frequency upon abnormality		

Function Code	Parameter Name	Setting Range	Default	Property
FA-22	Backup frequency upon abnormality	0.0%–100.0% (maximum frequency)	100.0%	☆
FA-23	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
FA-24	Action pause judging voltage at instantaneous power failure	80.0%–100.0%	90.0%	☆
FA-25	Voltage rally judging time at instantaneous power failure	0.00–100.00s	0.50s	☆
FA-26	Action judging voltage at instantaneous power failure	60.0%–100.0% (standard bus voltage)	80.0%	☆
FA-27	Protection upon load becoming 0	0: Disabled 1: Enabled	0	☆
FA-28	Detection level of load becoming 0	0.0%–100.0% (rated motor current)	10.0%	☆
FA-29	Detection time of load becoming 0	0.0–60.0s	1.0s	☆
FA-33	Detection value of too large speed deviation	0.0%–50.0% (maximum frequency)	20.0%	☆
FA-34	Detection time of too large speed deviation	0.0–60.0s	5.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group FB: Swing Frequency, Fixed Length and Count				
FB-00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆
FB-01	Swing frequency amplitude	0.0%–100.0%	0.0%	☆
FB-02	Jump frequency amplitude	0.0%–50.0%	0.0%	☆
FB-03	Swing frequency cycle	0.0–3000.0s	10.0s	☆
FB-04	Triangular wave rising time coefficient	0.0%–100.0%	50.0%	☆
FB-05	Set length	0–65535 m	1000 m	☆
FB-06	Actual length	0–65535 m	0 m	☆
FB-07	Number of pulses per meter	0.1–6553.5	100.0	☆
FB-08	Set count value	1–65535	1000	☆
FB-09	Designated count value	1–65535	1000	☆

Function Code	Parameter Name	Setting Range	Default	Property
		Group FC: Communication Parameters		
FC-00	Baud rate	Unit's digit (Modbus baud rate)	5	☆
		0: 300 BPs		
		1: 600 BPs		
		2: 1200 BPs		
		3: 2400 BPs		
		4: 4800 BPs		
		5: 9600 BPs		
		6: 19200 BPs		
		7: 38400 BPs		
		8: 57600 BPs		
		9: 115200 BPs		
FC-01	Data format	0: No check, data format <8,N,2>	0	☆
		1: Even parity check, data format <8,E,1>		
		2: Odd Parity check, data format <8,O,1>		
		3: No check, data format <8,N,1>		
		Valid for Modbus		
FC-02	Local address	0: Broadcast address	1	☆
		1–247		
		Valid for Modbus, PROFIBUS-DP and CANlink		
FC-03	Response delay	0–20 ms	2 ms	☆
		Valid for Modbus		
FC-04	Communication timeout	0.0s (invalid)	0.0s	☆
		0.1–60.0s		
FC-05	Modbus protocol selection	Unit's digit: Modbus protocol	30	☆
		0: Non-standard Modbus protocol		
		1: Standard Modbus protocol		
FC-06	Communication reading current resolution	0: 0.01A	0	☆
		1: 0.1A		

Function Code	Parameter Name	Setting Range	Default	Property
		Group FD: Multi-Reference and Simple PLC Function		
FD-00	Reference 0	-100.0%–100.0%	0.0%	☆
FD-01	Reference 1	-100.0%–100.0%	0.0%	☆
FD-02	Reference 2	-100.0%–100.0%	0.0%	☆
FD-03	Reference 3	-100.0%–100.0%	0.0%	☆
FD-04	Reference 4	-100.0%–100.0%	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
FD-05	Reference 5	-100.0%–100.0%	0.0%	☆
FD-06	Reference 6	-100.0%–100.0%	0.0%	☆
FD-07	Reference 7	-100.0%–100.0%	0.0%	☆
FD-08	Reference 8	-100.0%–100.0%	0.0%	☆
FD-09	Reference 9	-100.0%–100.0%	0.0%	☆
FD-10	Reference 10	-100.0%–100.0%	0.0%	☆
FD-11	Reference 11	-100.0%–100.0%	0.0%	☆
FD-12	Reference 12	-100.0%–100.0%	0.0%	☆
FD-13	Reference 13	-100.0%–100.0%	0.0%	☆
FD-14	Reference 14	-100.0%–100.0%	0.0%	☆
FD-15	Reference 15	-100.0%–100.0%	0.0%	☆
FD-16	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0	☆
FD-17	Simple PLC retentive selection	Unit's digit (Retentive upon power failure) 0: No 1: Yes Ten's digit (Retentive upon stop) 0: No 1: Yes	00	☆
FD-18	Running time of simple PLC reference 0	0.0–6553.5s (h)	0.0s (h)	☆
FD-19	Acceleration/deceleration time of simple PLC reference 0	0–3	0	☆
FD-20	Running time of simple PLC reference 1	0.0–6553.5s (h)	0.0s (h)	☆
FD-21	Acceleration/deceleration time of simple PLC reference 1	0–3	0	☆
FD-22	Running time of simple PLC reference 2	0.0–6553.5s (h)	0.0s (h)	☆
FD-23	Acceleration/deceleration time of simple PLC reference 2	0–3	0	☆
FD-24	Running time of simple PLC reference 3	0.0–6553.5s (h)	0.0s (h)	☆
FD-25	Acceleration/deceleration time of simple PLC reference 3	0–3	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
FD-26	Running time of simple PLC reference 4	0.0–6553.5s (h)	0.0s (h)	☆
FD-27	Acceleration/deceleration time of simple PLC reference 4	0–3	0	☆
FD-28	Running time of simple PLC reference 5	0.0–6553.5s (h)	0.0s (h)	☆
FD-29	Acceleration/deceleration time of simple PLC reference 5	0–3	0	☆
FD-30	Running time of simple PLC reference 6	0.0–6553.5s (h)	0.0s (h)	☆
FD-31	Acceleration/deceleration time of simple PLC reference 6	0–3	0	☆
FD-32	Running time of simple PLC reference 7	0.0–6553.5s (h)	0.0s (h)	☆
FD-33	Acceleration/deceleration time of simple PLC reference 7	0–3	0	☆
FD-34	Running time of simple PLC reference 8	0.0–6553.5s (h)	0.0s (h)	☆
FD-35	Acceleration/deceleration time of simple PLC reference 8	0–3	0	☆
FD-36	Running time of simple PLC reference 9	0.0–6553.5s (h)	0.0s (h)	☆
FD-37	Acceleration/deceleration time of simple PLC reference 9	0–3	0	☆
FD-38	Running time of simple PLC reference 10	0.0–6553.5s (h)	0.0s (h)	☆
FD-39	Acceleration/deceleration time of simple PLC reference 10	0–3	0	☆
FD-40	Running time of simple PLC reference 11	0.0–6553.5s (h)	0.0s (h)	☆
FD-41	Acceleration/deceleration time of simple PLC reference 11	0–3	0	☆
FD-42	Running time of simple PLC reference 12	0.0–6553.5s (h)	0.0s (h)	☆
FD-43	Acceleration/deceleration time of simple PLC reference 12	0–3	0	☆
FD-44	Running time of simple PLC reference 13	0.0–6553.5s (h)	0.0s (h)	☆
FD-45	Acceleration/deceleration time of simple PLC reference 13	0–3	0	☆
FD-46	Running time of simple PLC reference 14	0.0–6553.5s (h)	0.0s (h)	☆

Function Code	Parameter Name	Setting Range	Default	Property
FD-47	Acceleration/deceleration time of simple PLC reference 14	0–3	0	☆
FD-48	Running time of simple PLC reference 15	0.0–6553.5s (h)	0.0s (h)	☆
FD-49	Acceleration/deceleration time of simple PLC reference 15	0–3	0	☆
FD-50	Time unit of simple PLC running	0: s (second)1:h (hour)	0	☆
FD-51	Reference 0 source	0: Set by FC-00 1: AI1 2: AI2 3: AI3 4: Pulse setting 5: PID 6: Set by preset frequency (F0-08), modified via terminal UP/ DOWN	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group FE: Error record				
FE-00	1st fault type	0: No fault	-	●
FE-01	2nd fault type	1: Reserved 2: Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Buffer resistance overload 9: Undervoltage 10: AC drive overload 11: Motor overload 12:Power input phase loss 13: Power output phase loss 14: Module overheat 15: External equipment fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Encoder/PG card fault 21: EEPROM read-write fault 22: AC drive hardware fault 23: Short circuit to ground 24: Reserved 25: Reserved 26: Accumulative running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Accumulative power-on time reached 30: Load becoming 0 31: PID feedback lost during running 40: With-wave current limit fault 41: Motor switchover fault during running 42: Too large speed deviation	-	●

Function Code	Parameter Name	Setting Range	Default	Property
FE-02	3rd (latest) fault type		-	●
FE-03	Frequency upon 3rd fault	-	-	●
FE-04	Current upon 3rd fault	-	-	●
FE-05	Bus voltage upon 3rd fault	-	-	●
FE-06	DI status upon 3rd fault	-	-	●
FE-07	Output terminal status upon 3rd fault	-	-	●
FE-08	AC drive status upon 3rd fault	-	-	●
FE-09	Power-on time upon 3rd fault	-	-	●
FE-10	Running time upon 3rd fault	-	-	●
FE-11	Frequency upon 2nd fault	-	-	●
FE-12	Current upon 2nd fault	-	-	●
FE-13	Bus voltage upon 2nd fault	-	-	●
FE-14	DI status upon 2nd fault	-	-	●
FE-15	Output terminal status upon 2nd fault	-	-	●
FE-16	AC drive status upon 2rd fault	-	-	●
FE-17	Power-on time upon 2rd fault	-	-	●
FE-18	Running time upon 2rd fault	-	-	●
FE-19	Frequency upon 1st fault	-	-	●
FE-20	Current upon 1st fault	-	-	●
FE-21	Bus voltage upon 1rd fault	-	-	●
FE-22	DI status upon 1st fault	-	-	●
FE-23	Output terminal status upon 1st fault	-	-	●
FE-24	AC drive status upon 1rd fault	-	-	●
FE-25	Power-on time upon 1rd fault	-	-	●
FE-26	Running time upon 1rd fault	-	-	●

Group FP: Function Code Management				
FP-00	User password	0–65535	0	☆
FP-01	Restore default settings	0: No operation 01: Restore factory settings except motor parameters 02: Clear records 04: Restore user backup parameters 501: Back up current user parameters	0	★
FP-02	AC drive parameter display property	Unit's digit (Group U display selection)	11	★
		0: Not display		
		1: Display		
		Ten's digit (Group A display selection)		
		0: Not display		
		1: Display		

5.2 Monitoring Parameters

Function Code	Parameter Name	Min. Unit	Communication Address
Group U0: Standard Monitoring Parameters			
U0-00	Running frequency (Hz)	0.01 Hz	7000H
U0-01	Set frequency (Hz)	0.01 Hz	7001H
U0-02	Bus voltage	0.1 V	7002H
U0-03	Output voltage	1 V	7003H
U0-04	Output current	0.01 A	7004H
U0-05	Output power	0.1 kW	7005H
U0-06	Output torque	0.1%	7006H
U0-07	DI state	1	7007H
U0-08	DO state	1	7008H
U0-09	AI1 voltage (V)	0.01 V	7009H
U0-10	AI2 voltage (V)/current (mA)	0.01 V/0.01 mA	700AH
U0-11	AI3 voltage (V)	0.01 V	7007BH
U0-12	Count value	1	700CH
U0-13	Length value	1	700DH
U0-14	Load speed	1	700EH
U0-15	PID setting	1	700FH
U0-16	PID feedback	1	7010H
U0-17	PLC stage	1	7011H
U0-18	Input pulse frequency (Hz)	0.01 kHz	7012H
U0-19	Feedback speed	0.01 Hz	7013H
U0-20	Remaining running time	0.1 Min	7014H
U0-21	AI1 voltage before correction	0.001 V	7015H
U0-22	AI2 voltage (V)/current (mA) before correction	0.01 V/0.01 mA	7016H
U0-23	AI3 voltage before correction	0.001 V	7017H
U0-24	Linear speed	1 m/Min	7018H
U0-25	Accumulative power-on time	1 Min	7019
U0-26	Accumulative running time	0.1 Min	701AH
U0-27	Pulse input frequency	1 Hz	701BH
U0-28	Communication setting value	0.01%	701CH
U0-29	Encoder feedback speed	0.01 Hz	701DH
U0-30	Main frequency X	0.01 Hz	701EH
U0-31	Auxiliary frequency Y	0.01 Hz	701FH

Function Code	Parameter Name	Min. Unit	Communication Address
Group U0: Standard Monitoring Parameters			
U0-32	Viewing any register address value	1	7020H
U0-35	Target torque	0.1%	7023H
U0-39	Target voltage upon V/F separation	1 V	7027H
U0-40	Output voltage upon V/F separation	1V	7028H
U0-41	DI state visual display	1	7029H
U0-42	DO state visual display	1	702AH
U0-43	DI function state visual display 1	1	702BH
U0-44	DI function state visual display 2	1	702CH
U0-45	Fault information	1	702DH

6

Description of Function Codes

Chapter 6 Description of Function Codes

Group F0: Basic Parameters

Function Code	Parameter Name	Setting Range	Default
F0-00	Motor control mode	0: Sensorless flux vector control (SVC) 1: Voltage/Frequency (V/F) control	0

• 0: Sensorless flux vector control (SVC)

It indicates open-loop vector control, and is applicable to high-performance control applications such as machine tool, centrifuge, wire drawing machine and injection moulding machine. One AC drive can operate only one motor.

• 1: Voltage/Frequency (V/F) control

It is applicable to applications with low load requirements or applications where one AC drive operates multiple motors, such as fan and pump.

―――――――――――――――――   **Note**   ―――――――――――――――――

• If vector control is used, motor auto-tuning must be performed because the advantages of vector control can only be utilized after correct motor parameters are obtained.
• Better performance can be achieved by adjusting speed regulator parameters in group F3 .

Function Code	Parameter Name	Setting Range	Default
F0-01	Command source selection	0: Operation panel control (LED off) 1: Terminal control (LED on) 2: Communication control (LED blinking)	0

It is used to determine the input channel of the AC drive control commands, such as run, stop, forward rotation, reverse rotation and jog operation. You can input the commands in the following three channels:

• 0: Operation panel control ("LOCAL/REMOT" indicator off)

Commands are given by pressing keys （RUN） （STOP/RES） on the operation panel.

- 1: Terminal control ("LOCAL/REMOT" indicator on)

Commands are given by means of multifunctional input terminals with functions such as FWD, REV, JOGF, and JOGR.

- 2: Communication control ("LOCAL/REMOT" indicator blinking)

Commands are given from host computer.

Function Code	Parameter Name	Setting Range	Default
F0-02	Main frequency source X selection	0: Digital setting (non-retentive at power failure) 1: Digital setting (retentive at power failure) 2: AI1 3: AI2 4: Operation panel potentiometer (AI3) 5: Pulse setting (S5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication setting	4

It is used to select the setting channel of the main frequency. You can set the main frequency in the following 10 channels:

- 0: Digital setting (non-retentive at power failure)

  The initial value of the set frequency is the value of F0-08 (Preset frequency). You can change the set frequency by pressing △ and ▽ on the operation panel (or using the UP/DOWN function of input terminals).

  When the AC drive is powered on again after power failure, the set frequency reverts to the value of F0-07.

- 1: Digital setting (retentive at power failure)

  The initial value of the set frequency is the value of F0-08 (Preset frequency). You can change the set frequency by pressing keys △ and ▽ on the operation panel (or using the UP/DOWN function of input terminals).

  When the AC drive is powered on again after power failure, the set frequency is the value memorized at the moment of the last power failure.

  Note that F0-16 (Retentive of digital setting frequency upon power failure) determines whether the set frequency is memorized or cleared when the AC drive stops. It is related to stop rather than power failure.

- 2: AI1 (0–10 V voltage input)

- 3: AI2 (0–10 V voltage input or 4–20 mA current input, determined by jumper J8)

- 4: AI3 (Operation panel potentiometer)

  The frequency is set by analog input. The H300 control board provides two analog

input (AI) terminals (AI1, AI2). Another AI terminal AI3 is provided by the operation panel potentiometer.

The H300 provides five curves indicating the mapping relationship between the input voltage of AI1, AI2 and the target frequency, three of which are linear (point- point) correspondence and two of which are four-point correspondence curves. You can set the curves by using function codes F5-25 to F5-34 .

When AI is used as the frequency setting source, the corresponding value 100% of the voltage/current input corresponds to the value of F0-09 (Maximum frequency).

- 5: Pulse setting (S5)

The frequency is set by S5 (high-speed pulse). The signal specification of pulse setting is 9–30 V (voltage range) and 0–100 kHz (frequency range). The corresponding value 100% of pulse setting corresponds to the value of F0-09 (Maximum frequency).

- 6: Multi-reference

In multi-reference mode, combinations of different DI terminal states correspond to different set frequencies. The H300 supports a maximum of 16 speeds implemented by 16 state combinations of four DI terminals (allocated with functions 12 to 15) in Group Fd. The multiple references indicate percentages of the value of F0-09 (Maximum frequency).

If a DI terminal is used for the multi-reference function, you need to perform related setting in group F5.

- 7: Simple PLC

When the simple programmable logic controller (PLC) mode is used as the frequency source, the running frequency of the AC drive can be switched over among the 16 frequency references. You can set the holding time and acceleration/deceleration time of the 16 frequency references. For details, refer to the descriptions of Group Fd.

- 8: PID

The output of PID control is used as the running frequency. PID control is generally used in on-site closed-loop control, such as constant pressure closed-loop control and constant tension closed-loop control.

When applying PID as the frequency source, you need to set parameters of PID function in group F9.

- 9: Communication setting

The frequency is set by means of communication.

Data is given by the host computer through the communication address 0x1000. The data format is -100.00% to 100.00%. 100.00% corresponds to the value of F0-09 (Maximum frequency).

The H300 supports four host computer communication protocols: Modbus-RTU.

Function Code	Parameter Name	Setting Range	Default
F0-03	Auxiliary frequency source Y selection	0: Digital setting (non-retentive at power failure) 1: Digital setting (retentive at power failure) 2: AI1 3: AI2 4: Operation panel potentiometer(AI3) 5: Pulse setting (S5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication setting	0

When used as an independent frequency input channel (frequency source switched over from X to Y), the auxiliary frequency source Y is used in the same way as the main frequency source X (refer to F0-02).

When the auxiliary frequency source is used for operation (frequency source is "X and Y operation"), pay attention to the following aspects:

1) If the auxiliary frequency source Y is digital setting, the preset frequency (F0-07) does not take effect. You can directly adjust the set main frequency by pressing keys △

and ▽ on the operation panel (or using the UP/DOWN function of input terminals).

2) If the auxiliary frequency source is analog input (AI1, AI2 and AI3) or pulse setting, 100% of the input corresponds to the range of the auxiliary frequency Y (set in F0-04 and F0-05).

3) If the auxiliary frequency source is pulse setting, it is similar to analog input.

───────────── **Note** ─────────────

The main frequency source X and auxiliary frequency source Y must not use the same channel. That is, F0-02 and F0-03 cannot be set to the same value.

Function Code	Parameter Name	Setting Range	Default
F0-04	Range of auxiliary frequency Y for X and Y operation	0: Relative to maximum frequency 1: Relative to main frequency X	0
F0-05	Range of auxiliary frequency Y for X and Y operation	0%–150%	0

If X and Y operation is used, F0-04 and F0-05 are used to set the adjustment range of the auxiliary frequency source.

You can set the auxiliary frequency to be relative to either maximum frequency or main frequency X. If relative to main frequency X, the setting range of the auxiliary frequency Y varies according to the main frequency X.

Function Code	Parameter Name	Setting Range	Default
F0-06	Frequency source selection	**Unit's digit (Frequency source selection)**	0
		0: Main frequency source X	
		1: X and Y operation	
		(operation relationship determined by ten's digit)	
		2: Switchover between X and Y	
		3: Switchover between X and "X and Y operation"	
		4: Switchover between Y and "X and Y operation"	
		Ten's digit (X and Y operation relationship)	
		0: X+Y	
		1: X-Y	
		2: Maximum	
		3: Minimum	

It is used to select the frequency setting channel. If the frequency source involves X and Y operation, you can set the frequency offset in F0-21 for superposition to the X and Y operation result, flexibly satisfying various requirements.

Figure 6-1 Frequency setting based on main frequency source X and auxiliary frequency source Y
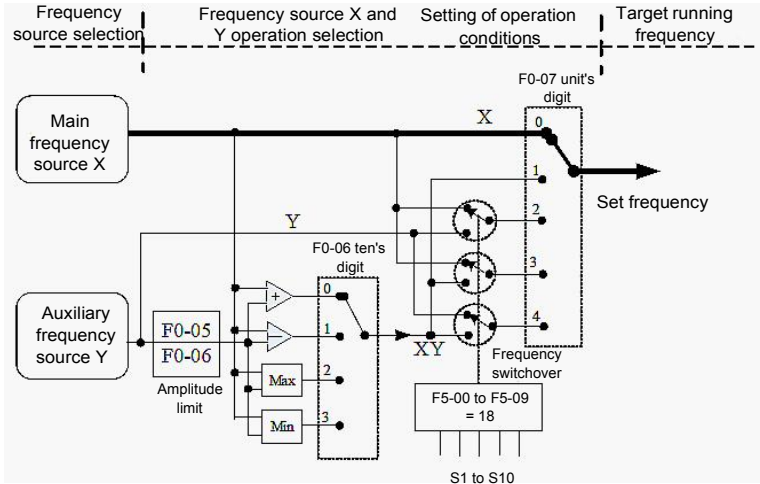
Function Code	Parameter Name	Setting Range	Default
F0-07	Preset frequency	0.00 to maximum frequency (valid when frequency source is digital setting)	50 Hz

If the frequency source is digital setting or terminal UP/DOWN, the value of this parameter is the initial frequency of the AC drive (digital setting).

Function Code	Parameter Name	Setting Range	Default
F0-08	Rotation direction	0: Same direction 1: Reverse direction	0

You can change the rotation direction of the motor just by modifying this parameter without changing the motor wiring. Modifying this parameter is equivalent to exchanging any two of the motor's U, V, W wires.

───────────────── **Note** ─────────────────

The motor will resume running in the original direction after parameter initialization. Do not use this function in applications where changing the rotating direction of the motor is prohibited after system commissioning is complete.

Function Code	Parameter Name	Setting Range	Default
F0-09	Maximum frequency	50.00–320.00 Hz (F0-22 = 2) 50.0–1000.0 Hz (F0-22 = 1)	50.00 Hz

When the frequency source is AI, pulse setting (S5), or multi-reference, 100% of the input corresponds to the value of this parameter.

The output frequency of the H300 can reach up to 1000 Hz. To take both frequency reference resolution and frequency input range into consideration, you can set the number of decimal places for frequency reference in F0-22.

- If F0-22 is set to 1, the frequency reference resolution is 0.1 Hz. In this case, the setting range of F0-10 is 50.0 to 1000.0 Hz.

- If F0-22 is set to 2, the frequency reference resolution is 0.01 Hz. In this case, the setting range of F0-10 is 50.00 to 320.00 Hz.

───────────────── **Note** ─────────────────

After the value of F0-22 is modified, the frequency resolution of all frequency related function codes change accordingly.

Function Code	Parameter Name	Setting Range	Default
F0-10	Source of frequency upper limit	0: Set by F0-11 1: AI1 2: AI2 3: Operation panel(AI3) 4: Pulse setting (S5) 5: Communication setting	0

It is used to set the source of the frequency upper limit, including digital setting (F0-11), AI, pulse setting or communication setting. If the frequency upper limit is set by means of AI1, AI2, AI3, S5 or communication, the setting is similar to that of the main frequency source X. For details, see the description of F0-02.

For example, to avoid runaway in torque control mode in winding application, you can set the frequency upper limit by means of analog input. When the AC drive reaches the upper limit, it will continue to run at this speed.

Function Code	Parameter Name	Setting Range	Default
F0-11	Frequency upper limit	Frequency lower limit (F0-13) to maximum frequency (F0-09)	50.00 Hz

This parameter is used to set the frequency upper limit.

Function Code	Parameter Name	Setting Range	Default
F0-12	Frequency upper limit offset	0.00 Hz to maximum frequency (F0-09)	0.00 Hz

If the source of the frequency upper limit is analog input or pulse setting, the final frequency upper limit is obtained by adding the offset in this parameter to the frequency upper limit set in F0-11.

Function Code	Parameter Name	Setting Range	Default
F0-13	Frequency lower limit	0.00 Hz to frequency upper limit (F0-11)	0.00 Hz

If the frequency reference is lower than the value of this parameter, the AC drive can stop, run at the frequency lower limit, or run at zero speed, determined by F0-14.

Function Code	Parameter Name	Setting Range	Default
F0-14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0

It is used to set the AC drive running mode when the set frequency is lower than the frequency lower limit. The H300 provides three running modes to satisfy requirements of various applications.

Function Code	Parameter Name	Setting Range	Default
F0-17	Acceleration time 1	0.00–650.00s (F0-19 = 2) 0.0–6500.0s (F0-19 = 1) 0–65000s (F0-19 = 0)	Model dependent
F0-18	Deceleration time 1	0.00–650.00s (F0-19 = 2) 0.0–6500.0s (F0-19 = 1) 0–65000s (F0-19 = 0)	Model dependent

Acceleration time indicates the time required by the AC drive to accelerate from 0 Hz to "max frequency" (F0-09), that is, t1 in Figure 6-2.

Deceleration time indicates the time required by the AC drive to decelerate from "max frequency" (F0-09) to 0 Hz, that is, t2 in Figure 6-2.

Figure 6-2 Acceleration/Deceleration time
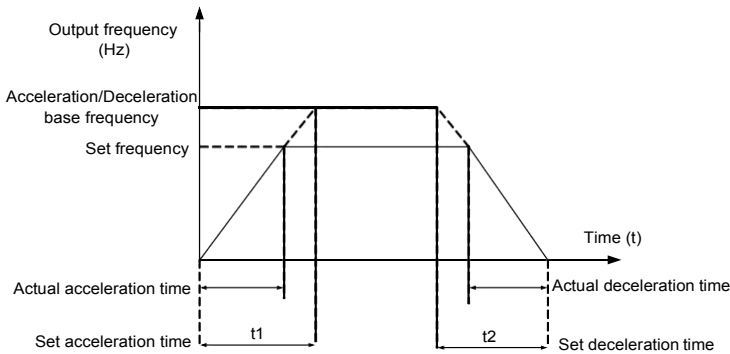
The H300 provides totally four groups of acceleration/deceleration time for selection. You can perform switchover by using a DI terminal.

- Group 1: F0-17, F0-18
- Group 2: F8-03, F8-04
- Group 3: F8-05, F8-06
- Group 4: F8-07, F8-08

Function Code	Parameter Name	Setting Range	Default
F0-19	Acceleration/Deceleration time unit	0:1s 1: 0.1s 2: 0.01s	1

To satisfy requirements of different applications, the H300 provides three acceleration/deceleration time units, 1s, 0.1s and 0.01s.

──────────────── **Note** ────────────────

Modifying this parameter will make the displayed decimal places change and corresponding acceleration/deceleration time also change.

Function Code	Parameter Name	Setting Range	Default
F0-20	Carrier frequency	0.5–16.0 kHz	Model dependent

It is used to adjust the carrier frequency of the AC drive, helping to reduce the motor noise, avoiding the resonance of the mechanical system, and reducing the leakage current to the earth and interference generated by the AC drive.

If the carrier frequency is low, output current has high harmonics, and the power loss and temperature rise of the motor increase.

If the carrier frequency is high, power loss and temperature rise of the motor declines. However, the AC drive has an increase in power loss, temperature rise and interference.

Adjusting the carrier frequency will exert influences on the aspects listed in the following table.

Table 6-1 Influences of carrier frequency adjustment

Carrier frequency	Low	High
Motor noise	Large	Small
Output current waveform	Bad	Good
Motor temperature rise	High	Low
AC drive temperature rise	Low	High
Leakage current	Small	Large
External radiation interference	Small	Large

The factory setting of carrier frequency varies with the AC drive power. If you need to modify the carrier frequency, note that if the set carrier frequency is higher than factory setting, it will lead to an increase in temperature rise of the AC drive's heatsink. In this case, you need to de-rate the AC drive. Otherwise, the AC drive may overheat and alarm.

Function Code	Parameter Name	Setting Range	Default
F0-21	Carrier frequency adjustment with temperature	0: No 1: Yes	1

It is used to set whether the carrier frequency is adjusted based on the temperature. The AC drive automatically reduces the carrier frequency when detecting that the heatsink temperature is high. The AC drive resumes the carrier frequency to the set value when the heatsink temperature becomes normal. This function reduces the overheat alarms.

Function Code	Parameter Name	Setting Range	Default
F0-22	Frequency reference resolution	1: 0.1 Hz 2: 0.01 Hz	2

It is used to set the resolution of all frequency-related parameters.

If the resolution is 0.1 Hz, the H300 can output up to 1000 Hz. If the resolution is 0.01 Hz, the H300 can output up to 320.00 Hz.

Note

- Modifying this parameter will make the decimal places of all frequency-related parameters change and corresponding frequency values change.
- This parameter is not resumed when factory setting is resumed.

Group F1: Start/Stop Control

Function Code	Parameter Name	Setting Range	Default
F1-00	Start mode	0: Direct start 1: Rotational speed tracking restart 2: Pre-excited start (asynchronous motor)	0

- 0: Direct start

    – If the DC braking time is set to 0, the AC drive starts to run at the startup frequency.

    – If the DC braking time is not 0, the AC drive performs DC braking first and then starts to run at the startup frequency. It is applicable to small-inertia load application where the motor is likely to rotate at startup.

- 1: Rotational speed tracking restart

    The AC drive judges the rotational speed and direction of the motor first and then starts at the tracked frequency. Such smooth start has no impact on the rotating motor. It is applicable to the restart upon instantaneous power failure of large-inertia load. To ensure the performance of rotational speed tracking restart, set the motor parameters in group F2 correctly.

- 2: Pre-excited start (asynchronous motor)

    It is valid only for asynchronous motor and used for building the magnetic field before the motor runs. For pre-excited current and pre-excited time, see parameters of F1-05 and F1-06.

    – If the pre-excited time is 0, the AC drive cancels pre-excitation and starts to run at startup frequency.

    – If the pre-excited time is not 0, the AC drive pre-excites first before startup, improving the dynamic response of the motor.

Function Code	Parameter Name	Setting Range	Default
F1-01	Rotational speed tracking mode	0: From frequency at stop 1: From zero speed 2: From maximum frequency	0

To complete the rotational speed tracking process within the shortest time, select the proper mode in which the AC drive tracks the motor rotational speed.

- 0: From frequency at stop

  It is the commonly selected mode.

- 1: From zero frequency

  It is applicable to restart after a long time of power failure.

- 2: From the maximum frequency

  It is applicable to the power-generating load.

Function Code	Parameter Name	Setting Range	Default
F1-02	Rotational speed tracking speed	1–100	20

In the rotational speed tracking restart mode, select the rotational speed tracking speed. The larger the value is, the faster the tracking is. However, too large value may cause unreliable tracking.

Function Code	Parameter Name	Setting Range	Default
F1-03	Startup frequency	0.00–10.00 Hz	0.00 Hz
F1-04	Startup frequency holding time	0.0–100.0s	0.0s

To ensure the motor torque at AC drive startup, set a proper startup frequency. In addition, to build excitation when the motor starts up, the startup frequency must be held for a certain period.

The startup frequency (F1-03) is not restricted by the frequency lower limit. If the set target frequency is lower than the startup frequency, the AC drive will not start and stays in the standby state.

During switchover between forward rotation and reverse rotation, the startup frequency holding time is disabled. The holding time is not included in the acceleration time but in the running time of simple PLC.

Example 1:

F0-02 = 0	The frequency source is digital setting.
F0-07 = 2.00 Hz	The digital setting frequency is 2.00 Hz.
F1-03 = 5.00 Hz	The startup frequency is 5.00 Hz.
F1-04 = 2.0s	The startup frequency holding time is 2.0s.

In this example, the AC drive stays in the standby state and the output frequency is 0.00 Hz.

Example 2:

F0-02 = 0	The frequency source is digital setting.
F0-07 = 10.0 0 Hz	The digital setting frequency is 10.00 Hz.
F1-03 = 5.00 Hz	The startup frequency is 5.00 Hz.
F1-04 = 2.0s	The startup frequency holding time is 2.0s.

In this example, the AC drive accelerates to 5.00 Hz, and then accelerates to the set frequency 10.00 Hz after 2s.

Function Code	Parameter Name	Setting Range	Default
F1-05	Startup DC braking current/Pre-excited current	0%–100%	0%
F1-06	Startup DC braking time/Pre-excited time	0.0–100.0s	0.0s

Startup DC braking is generally used during restart of the AC drive after the rotating motor stops. Pre-excitation is used to make the AC drive build magnetic field for the asynchronous motor before startup to improve the responsiveness.

Startup DC braking is valid only for direct start (F1-00 = 0). In this case, the AC drive performs DC braking at the set startup DC braking current. After the startup DC braking time, the AC drive starts to run. If the startup DC braking time is 0, the AC drive starts directly without DC braking. The larger the startup DC braking current is, the larger the braking force is.

If the startup mode is pre-excited start (F1-00 = 3), the AC drive builds magnetic field based on the set pre-excited current. After the pre-excited time, the AC drive starts to run. If the pre-excited time is 0, the AC drive starts directly without pre-excitation.

The startup DC braking current or pre-excited current is a percentage relative to the base value.

- If the rated motor current is less than or equal to 80% of the rated AC drive current, the base value is the rated motor current.

- If the rated motor current is greater than 80% of the rated AC drive current, the base value is 80% of the rated AC drive current.

Function Code	Parameter Name	Setting Range	Default
F1-07	Acceleration/ Deceleration mode	0: Linear acceleration/deceleration 1: S-curve acceleration/deceleration A 2: S-curve acceleration/deceleration B	0

It is used to set the frequency change mode during the AC drive start and stop process.

- 0: Linear acceleration/deceleration

  The output frequency increases or decreases in linear mode. The H300 provides four group of acceleration/deceleration time, which can be selected by using F4-00 to F4-08.

- 1: S-curve acceleration/deceleration A

  The output frequency increases or decreases along the S curve. This mode is generally used in the applications where start and stop processes are relatively smooth, such as elevator and conveyor belt. F1-08 and F1-09 respectively define the time proportions of the start segment and the end segment.

- 2: S-curve acceleration/deceleration B

  In this curve, the rated motor frequency f_b is always the inflexion point. This mode is usually used in applications where acceleration/deceleration is required at the speed higher than the rated frequency.

When the set frequency is higher than the rated frequency, the acceleration/deceleration time is:

$$t = (\frac{4}{9} \times (\frac{f}{f_b})^2 + \frac{5}{9}) \times T$$

In the formula, f is the set frequency, fb is the rated motor frequency and T is the acceleration time from 0 Hz to f_b.

Function Code	Parameter Name	Setting Range	Default
F1-08	Time proportion of S-curve start segment	0.0% to (100.0% – F1-09)	30.0%
F1-09	Time proportion of S-curve end segment	0.0% to (100.0% – F1-08)	30.0%

These two parameters respectively define the time proportions of the start segment and the end segment of S-curve acceleration/deceleration. They must satisfy the requirement: F1-08 + F1-09 ≤ 100.0%.

In Figure 6-12, t1 is the time defined in F1-08, within which the slope of the output frequency change increases gradually. t2 is the time defined in F1-09, within which the slope of the output frequency change gradually decreases to 0. Within the time between t1 and t2, the slope of the output frequency change remains unchanged, that is, linear acceleration/deceleration.

Figure 6-12 S-curve acceleration/deceleration A
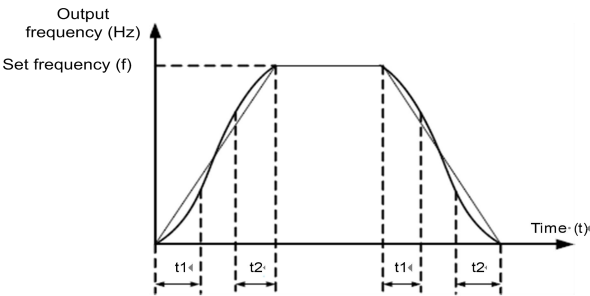
Figure 6-13 S-curve acceleration/deceleration B
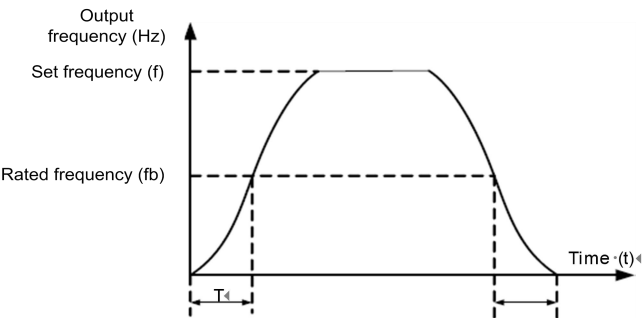
Function Code	Parameter Name	Setting Range	Default
F1-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0

- 0: Decelerate to stop

  After the stop command is enabled, the AC drive decreases the output frequency according to the deceleration time and stops when the frequency decreases to zero.

- 1: Coast to stop

  After the stop command is enabled, the AC drive immediately stops the output. The motor will coast to stop based on the mechanical inertia.

Function Code	Parameter Name	Setting Range	Default
F1-11	Initial frequency of stop DC braking	0.00 Hz to maximum frequency	0.00 Hz
F1-12	Waiting time of stop DC braking	0.0–36.0s	0.0s
F1-13	Stop DC braking current	0%–100%	0%
F1-14	Stop DC braking time	0.0–36.0s	0.0s

- F1-11 (Initial frequency of stop DC braking)

  During the process of decelerating to stop, the AC drive starts DC braking when the running frequency is lower than the value set in F1-11.

- F1-12 (Waiting time of stop DC braking)

  When the running frequency decreases to the initial frequency of stop DC braking, the AC drive stops output for a certain period and then starts DC braking. This prevents faults such as overcurrent caused due to DC braking at high speed.

- F1-13 (Stop DC braking current)

  This parameter specifies the output current at DC braking and is a percentage relative to the base value.

  – If the rated motor current is less than or equal to 80% of the rated AC drive current, the base value is the rated motor current.

  – If the rated motor current is greater than 80% of the rated AC drive current, the base value is 80% of the rated AC drive current.

- F1-14 (Stop DC braking time)

  This parameter specifies the holding time of DC braking. If it is set to 0, DC braking is cancelled.

The stop DC braking process is shown in the following figure.

Figure 6-14 Stop DC braking process
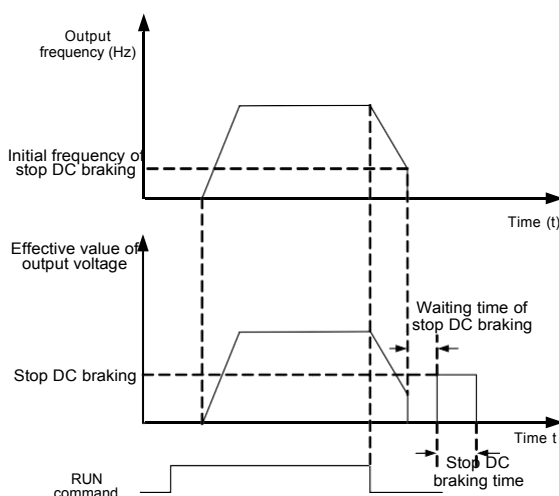
Function Code	Parameter Name	Setting Range	Default
F1-15	Brake use ratio	0%–100%	100%

It is valid only for the AC drive with internal braking unit and used to adjust the duty ratio of the braking unit. The larger the value of this parameter is, the better the braking result will be. However, too larger value causes great fluctuation of the AC drive bus voltage during the braking process.

Function Code	Parameter Name	Setting Range	Default
F1-16	Brake start voltage	310.0–800.0V	S:368V T:720V

It is valid only for the AC drive with internal braking unit and used to adjust the start working threshold of the braking unit. The lower the value of this parameter is, the better the braking result will be. However, too lower value causes great fluctuation of the AC drive bus voltage during the braking process.

Group F2: Motor Parameters

Function Code	Parameter Name	Setting Range	Default
F2-00	G/P type select	1: G type (constant torque load) 2: P type (variable torque load e.g. fan and pump)	Model dependent

This parameter is used to select the drive model and can be modified.

1: Applicable to constant torque load with rated parameters specified

2: Applicable to variable torque load (fan and pump) with rated parameters specified

Function Code	Parameter Name	Setting Range	Default
F2-01	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnetic synchronous motor	1
F2-02	Rated motor power	0.1–1000.0 kW	Model dependent
F2-03	Rated motor voltage	1–2000 V	Model dependent
F2-04	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)	Model dependent
F2-05	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent
F2-06	Rated motor rotational speed	1–65535 RPM	Model dependent

Set the parameters according to the motor nameplate no matter whether V/F control or vector control is adopted.

To achieve better V/F or vector control performance, motor auto-tuning is required. The motor auto-tuning accuracy depends on the correct setting of motor nameplate parameters.

Function Code	Parameter Name	Setting Range	Default
F2-07	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent
F2-08	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent
F2-09	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent

Function Code	Parameter Name	Setting Range	Default
F2-10	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01-–655.35 mH (AC drive power > 55 kW)	Model dependent
F2-11	No-load current (asynchronous motor)	0.01 to F2-04 (AC drive power ≤ 55 kW) 0.1 to F2-04 (AC drive power > 55 kW)	Model dependent

The parameters in F2-07 to F-11 are asynchronous motor parameters. These parameters are unavailable on the motor nameplate and are obtained by means of motor auto-tuning. Only F2-07 to F2-09 can be obtained through static motor auto-tuning.

Each time "Rated motor power" (F2-02) or "Rated motor voltage" (F2-03) is changed, the AC drive automatically restores values of F2-07 to F2-11 to the parameter setting for the common standard Y series asynchronous motor.

If it is impossible to perform motor auto-tuning onsite, manually input the values of these parameters according to data provided by the motor manufacturer.

Function Code	Parameter Name	Setting Range	Default
F2-12	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning 3: Asynchronous motor static complete auto-tuning	0

• 0: No auto-tuning

Auto-tuning is prohibited.

• 1: Asynchronous motor static auto-tuning

It is applicable to scenarios where complete auto-tuning cannot be performed because the asynchronous motor cannot be disconnected from the load.

Before performing static auto-tuning, properly set the motor type and motor nameplate parameters of F2-01 to F2-06 first. The AC drive will obtain parameters of F2-07 to F2-09 by static auto-tuning.

Set this parameter to 1, and press "RUN". Then, the AC drive starts static auto-tuning.

• 2: Asynchronous motor complete auto-tuning

To perform this type of auto-tuning, ensure that the motor is disconnected from the load. During the process of complete auto-tuning, the AC drive performs static auto-tuning first and then accelerates to 80% of the rated motor frequency within the acceleration time set in F0-17. The AC drive keeps running for a certain period and then decelerates to stop within deceleration time set in F0-18.

Before performing complete auto-tuning, properly set the motor type, motor nameplate parameters of F2-01 to F2-06 first.

The AC drive will obtain motor parameters of F2-07 to F2-11, vector control current loop PI parameters of F3- 13 to F3-16 by complete auto-tuning.

Set this parameter to 2, and press "RUN", Then, the AC drive starts complete auto-tuning.

―――――――――   **Note**   ―――――――――

Motor auto-tuning can be performed only in operation panel mode.

Group F3: Vector Control Parameters

Group F3 is valid for vector control, and invalid for V/F control.

Function Code	Parameter Name	Setting Range	Default
F3-00	Speed loop proportional gain 1	0–100	30
F3-01	Speed loop integral time 1	0.01–10.00s	0.50s
F3-02	Switchover frequency 1	0.00 to F2-05	5.00 Hz
F3-03	Speed loop proportional gain 2	0–100	20

Function Code	Parameter Name	Setting Range	Default
F3-04	Speed loop integral time 2	0.01–10.00s	1.00s
F3-05	Switchover frequency 2	F2-02 to maximum output frequency	10.00 Hz

Speed loop PI parameters vary with running frequencies of the AC drive.

- If the running frequency is less than or equal to "Switchover frequency 1" (F3-02), the speed loop PI parameters are F3-00 and F3-01.

- If the running frequency is equal to or greater than "Switchover frequency 2" (F3-05), the speed loop PI parameters are F3-03 and F3-04.

- If the running frequency is between F3-02 and F3-05, the speed loop PI parameters are obtained from the linear switchover between the two groups of PI parameters, as shown in Figure 6-3.

Figure 6-3 Relationship between running frequencies and PI parameters
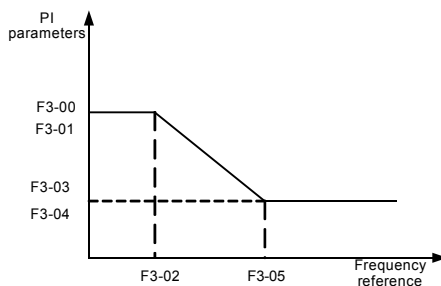
The speed dynamic response characteristics in vector control can be adjusted by setting the proportional gain and integral time of the speed regulator.

To achieve a faster system response, increase the proportional gain and reduce the integral time. Be aware that this may lead to system oscillation.

The recommended adjustment method is as follows:

If the factory setting cannot meet the requirements, make proper adjustment. Increase the proportional gain first to ensure that the system does not oscillate, and then reduce the integral time to ensure that the system has quick response and small overshoot.

────────────────── **Note** ──────────────────

Improper PI parameter setting may cause too large speed overshoot, and overvoltage fault may even occur when the overshoot drops.

Function Code	Parameter Name	Setting Range	Default
F3-06	Vector control slip gain	50%–200%	100%

For SVC, it is used to adjust speed stability accuracy of the motor. When the motor with load runs at a very low speed, increase the value of this parameter; when the motor with load runs at a very large speed, decrease the value of this parameter.

Function Code	Parameter Name	Setting Range	Default
F3-07	Time constant of speed loop filter	0.000–0.100s	0.000s

In the vector control mode, the output of the speed loop regulator is torque current reference. This parameter is used to filter the torque references. It need not be adjusted generally and can be increased in the case of large speed fluctuation. In the case of motor oscillation, decrease the value of this parameter properly.

If the value of this parameter is small, the output torque of the AC drive may fluctuate greatly, but the response is quick.

Function Code	Parameter Name	Setting Range	Default
F3-08	Vector control over-excitation gain	0–200	64

During deceleration of the AC drive, over-excitation control can restrain rise of the bus voltage to avoid the overvoltage fault. The larger the over-excitation gain is, the better the restraining effect is.

Increase the over-excitation gain if the AC drive is liable to overvoltage error during deceleration. Too large over-excitation gain, however, may lead to an increase in output current. Therefore, set this parameter to a proper value in actual applications.

Set the over-excitation gain to 0 in applications of small inertia (the bus voltage will not rise during deceleration) or where there is a braking resistor.

Function Code	Parameter Name	Setting Range	Default
F3-09	Torque upper limit source in speed control mode	0: F3-10 1: AI1 2: AI2 3: AI3	0

		4: Pulse setting (DI5)	
		5: Communication setting	
F3-10	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%

In the speed control mode, the maximum output torque of the AC drive is restricted by F3-09. If the torque upper limit is analog, pulse or communication setting, 100% of the setting corresponds to the value of F3-10, and 100% of the value of F3-10 corresponds to the AC drive rated torque.

For details on the AI1, AI2 and AI3 setting, see the description of the AI curves in group F5.

For details on the pulse setting, see the description of F5-40 to F5-44.

When the AC drive is in communication with the master, if F3-09 is set to 5 "communication setting", F3-10 "Digital setting of torque upper limit in speed control mode" can be set via communication from the master.

In other conditions, the host computer writes data -100.00% to 100.00% by the communication address 0x1000, where 100.0% corresponds to the value of F3-10. The communication protocol can be Modbus.

Function Code	Parameter Name	Setting Range	Default
F3-13	Excitation adjustment proportional gain	0–20000	2000
F3-14	Excitation adjustment integral gain	0–20000	1300
F3-15	Torque adjustment proportional gain	0–20000	2000
F3-16	Torque adjustment integral gain	0–20000	1300

These are current loop PI parameters for vector control. These parameters are automatically obtained through "Asynchronous motor complete auto-tuning" or "Synchronous motor no-load auto-tuning", and need not be modified.

The dimension of the current loop integral regulator is integral gain rather than integral time.

Note that too large current loop PI gain may lead to oscillation of the entire control loop. Therefore, when current oscillation or torque fluctuation is great, manually decrease the proportional gain or integral gain here.

Function Code	Parameter Name	Setting Range	Default
F3-18	Speed/Torque control selection	0: Speed control 1: Torque control	0

It is used to select the AC drive's control mode: speed control or torque control.

The H300 provides DI terminals with two torque related functions, function 29 (Torque control prohibited) and function 46 (Speed control/Torque control switchover). The two DI terminals need to be used together with F3-18 to implement speed control/torque control switchover.

If the DI terminal allocated with function 46 (Speed control/Torque control switchover) is OFF, the control mode is determined by F3-18. If the DI terminal allocated with function 46 is ON, the control mode is reverse to the value of F3-18.

However, if the DI terminal with function 29 (Torque control prohibited) is ON, the AC drive is fixed to run in the speed control mode.

Function Code	Parameter Name	Setting Range	Default
F3-19	Torque setting source in torque control	0: Digital setting (F3-21) 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)	0
F3-21	Torque digital setting in torque control	-200.0%–+200.0%	150.0%

F3-19 is used to set the torque setting source. There are a total of eight torque setting sources.

The torque setting is a relative value. 100.0% corresponds to the AC drive's rated torque. The setting range is -200.0% to 200.0%, indicating the AC drive's maximum torque is twice of the AC drive's rated torque.

If the torque setting is positive, the AC drive rotates in forward direction. If the torque setting is negative, the AC drive rotates in reverse direction.

- 1: Digital setting (F3-21)

    The target torque directly uses the value set in F3-21.

- 2: AI1

- 3: AI2

- 4: AI3

    The target torque is decided by analog input. The H300 control board provides two AI terminals (AI1, AI2). Another AI terminal (AI3) is provided by the I/O extension card. AI1 is 0–10 V voltage input, AI2 is 0–10 V voltage input or 4–20 mA current input decided by jumper J8 on the control board, and AI3 is -10 V to +10 V voltage input.

    The H300 provides five curves indicating the mapping relationship between the input voltage of AI1, AI2 and AI3 and the target frequency, three of which are linear (point-point) correspondence and two of which are four-point correspondence curves. You can set the curves by using function codes F4-13 to F4-27 and function codes in group A6, and select curves for AI1, AI2 and AI3 in F4-33.

    When AI is used as frequency setting source, the corresponding value 100% of voltage/current input corresponds to the value of F3-21.

- 5: Pulse setting (DI5)

    The target torque is set by DI5 (high-speed pulse). The pulse setting signal specification is 9–30 V (voltage range) and 0–100 kHz (frequency range). The pulse can only be input via DI5. The relationship (which is a two-point line) between DI5 input pulse frequency and the corresponding value is set in F4-28 to F4-31. The corresponding value 100.0% of pulse input corresponds to the value of F3-21.

- 5: Communication setting

    The target torque is set by means of communication.

In other conditions, data is given by host computer through the communication address 0x1000. The data format is -100.00% to 100.00%. 100% corresponds to the value of F3-21.

The H300 supports four host computer communication protocols: Modbus,

Function Code	Parameter Name	Setting Range	Default
F3-23	Forward maximum frequency in torque control	0.00 Hz to maximum frequency (F0-10)	50.00 Hz
F3-24	Reverse maximum frequency in torque control	0.00 Hz to maximum frequency (F0-10)	50.00 Hz

 two parameters are used to set the maximum frequency in forward or reverse rotation in torque control mode.

In torque control, if the load torque is smaller than the motor output torque, the motor's rotational speed will rise continuously. To avoid runaway of the mechanical system, the motor maximum rotating speed must be limited in torque control.

You can implement continuous change of the maximum frequency in torque control dynamically by controlling the frequency upper limit.

Function Code	Parameter Name	Setting Range	Default
F3-25	Acceleration time in torque control	0.00–65000s	0.00s
F3-26	Deceleration time in torque control	0.00–65000s	0.00s

In torque control, the difference between the motor output torque and the load torque determines the speed change rate of the motor and load. The motor rotational speed may change quickly and this will result in noise or too large mechanical stress. The setting of acceleration/deceleration time in torque control makes the motor rotational speed change softly.

However, in applications requiring rapid torque response, set the acceleration/deceleration time in torque control to 0.00s. For example, two AC drives are connected to drive the same load. To balance the load allocation, set one AC drive as master in speed control and the other as slave in torque control. The slave receives the master's output torque as the torque command and must follow the master rapidly. In this case, the acceleration/deceleration time of the slave in torque control is set to 0.0s.

Group F4: V/F Control Parameters

Group F4 is valid only for V/F control.

The V/F control mode is applicable to low load applications (fan or pump) or applications where one AC drive operates multiple motors or there is a large difference between the AC drive power and the motor power.

Function Code	Parameter Name	Setting Range	Default
F4-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0

- 0: Linear V/F

  It is applicable to common constant torque load.

- 1: Multi-point V/F

  It is applicable to special load such as dehydrator and centrifuge. Any such V/F curve can be obtained by setting parameters of F4-03 to F4-08.

- 2: Square V/F

  It is applicable to centrifugal loads such as fan and pump.

- 3 to 8: V/F curve between linear V/F and square V/F

- 10: V/F complete separation

  In this mode, the output frequency and output voltage of the AC drive are independent. The output frequency is determined by the frequency source, and the output voltage is determined by "Voltage source for V/F separation" (F4-13).

  It is applicable to induction heating, inverse power supply and torque motor control.

- 11: V/F half separation

  In this mode, V and F are proportional and the proportional relationship can be set in F4-13. The relationship between V and F are also related to the rated motor voltage and rated motor frequency in Group F2.

  Assume that the voltage source input is X (0 to 100%), the relationship between V and F is:

  V/F = 2 x X x (Rated motor voltage)/(Rated motor frequency)

Function Code	Parameter Name	Setting Range	Default
F4-01	Torque boost	0.0%–30%	Model dependent
F4-02	Cut-off frequency of torque boost	0.00 Hz to maximum output frequency	50.00 Hz

To compensate the low frequency torque characteristics of V/F control, you can boost the output voltage of the AC drive at low frequency by modifying F4-01.

If the torque boost is set to too large, the motor may overheat, and the AC drive may suffer overcurrent.

If the load is large and the motor startup torque is insufficient, increase the value of F4-01. If the load is small, decrease the value of F4-01. If it is set to 0.0, the AC drive performs automatic torque boost. In this case, the AC drive automatically calculates the torque boost value based on motor parameters including the stator resistance.

F4-02 specifies the frequency under which torque boost is valid. Torque boost becomes invalid when this frequency is exceeded, as shown in the following figure.

Figure 6-4 Manual torque boost
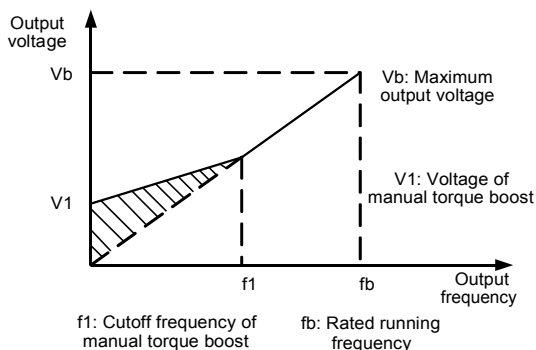
Function Code	Parameter Name	Setting Range	Default
F4-03	Multi-point V/F frequency 1 (F1)	0.00 Hz to F4-05	0.00 Hz
F4-04	Multi-point V/F voltage 1 (V1)	0.0%–100.0%	0.0%
F4-05	Multi-point V/F frequency 2 (F2)	F4-03 to F4-07	0.00 Hz
F4-06	Multi-point V/F voltage 2 (V2)	0.0%–100.0%	0.0%
F4-07	Multi-point V/F frequency 3 (F3)	F4-05 to rated motor frequency (F2-04)	0.00 Hz
F4-08	Multi-point V/F voltage 3 (V3)	0.0%–100.0%	0.0%

These six parameters are used to define the multi-point V/F curve.

The multi-point V/F curve is set based on the motor's load characteristic. The relationship between voltages and frequencies is:

V1 < V2 < V3, F1 < F2 < F3

At low frequency, higher voltage may cause overheat or even burnt out of the motor and overcurrent stall or overcurrent protection of the AC drive.

Figure 6-5 Setting of multi-point V/F curve
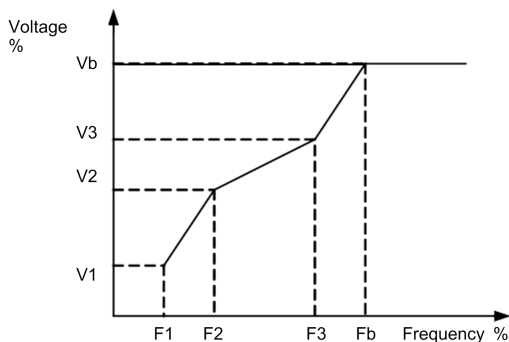
V1-V3: 1st, 2nd and 3rd voltage percentages of multi -point V/F

Vb: Rated motor voltage

F1-F3: 1st, 2nd and 3rd frequency percentages of multi -point V/F

Fb: Rated motor running frequency

Function Code	Parameter Name	Setting Range	Default
F4-09	V/F slip compensation gain	0%–200.0%	0.0%

This parameter is valid only for the asynchronous motor.

It can compensate the rotational speed slip of the asynchronous motor when the load of the motor increases, stabilizing the motor speed in case of load change. If this parameter is set to 100%, it indicates that the compensation when the motor bears rated load is the rated motor slip. The rated motor slip is automatically obtained by the AC drive through calculation based on the rated motor frequency and rated motor rotational speed in group F2.

Generally, if the motor rotational speed is different from the target speed, slightly adjust this parameter.

Function Code	Parameter Name	Setting Range	Default
F4-10	V/F over-excitation gain	0–200	64

During deceleration of the AC drive, over-excitation can restrain rise of the bus voltage, preventing the overvoltage fault. The larger the over-excitation is, the better the restraining result is.

Increase the over-excitation gain if the AC drive is liable to overvoltage error during deceleration. However, too large over-excitation gain may lead to an increase in the output current. Set F4-09 to a proper value in actual applications.

Set the over-excitation gain to 0 in the applications where the inertia is small and the bus voltage will not rise during motor deceleration or where there is a braking resistor.

Function Code	Parameter Name	Setting Range	Default
F4-11	V/F oscillation suppression gain	0–100	Model dependent

Set this parameter to a value as small as possible in the prerequisite of efficient oscillation suppression to avoid influence on V/F control.

Set this parameter to 0 if the motor has no oscillation. Increase the value properly only when the motor has obvious oscillation. The larger the value is, the better the oscillation suppression result will be.

When the oscillation suppression function is enabled, the rated motor current and no-load current must be correct. Otherwise, the V/F oscillation suppression effect will not be satisfactory.

Function Code	Parameter Name	Setting Range	Default
F4-12	Voltage source for V/F separation	0: Digital setting (F4-13) 1: AI1 2: AI2 3: AI3 4: Pulse setting (S5) 5: Multi-reference 6: Simple PLC 7: PID 8: Communication setting 100.0% corresponds to the rated motor voltage (F1-02).	0
F4-13	Voltage digital setting for V/F separation	0 V to rated motor voltage	0 V

V/F separation is generally applicable to scenarios such as induction heating, inverse power supply and motor torque control.

If V/F separated control is enabled, the output voltage can be set in F4-13 or by means of analog, multi-reference, simple PLC, PID or communication. If you set the output voltage by means of non-digital setting, 100% of the setting corresponds to the rated motor voltage. If a negative percentage is set, its absolute value is used as the effective value.

- 0: Digital setting (F4-13)

    The output voltage is set directly in F4-13.

- 1: AI1; 2: AI2; 3: AI3

    The output voltage is set by AI terminals.

- 4: Pulse setting (S5)

    The output voltage is set by pulses of the terminal S5.

Pulse setting specification: voltage range 9–30 V, frequency range 0–100 kHz

- 5: Multi-reference

  If the voltage source is multi-reference, parameters in group F5 and FC must be set to determine the corresponding relationship between setting signal and setting voltage. 100.0% of the multi-reference setting in group FC corresponds to the rated motor voltage.

- 6: Simple PLC

  If the voltage source is simple PLC mode, parameters in group FC must be set to determine the setting output voltage.

- 7: PID

  The output voltage is generated based on PID closed loop. For details, see the description of PID in group F9.

- 8: Communication setting

  The output voltage is set by the host computer by means of communication.

The voltage source for V/F separation is set in the same way as the frequency source. For details, see F0-02. 100.0% of the setting in each mode corresponds to the rated motor voltage. If the corresponding value is negative, its absolute value is used.

Function Code	Parameter Name	Setting Range	Default
F4-14	Voltage rise time of V/F separation	0.0–1000.0s	0.0s

F3-15 indicates the time required for the output voltage to rise from 0 V to the rated motor voltage shown as t1 in the following figure.

F3-16 indicates the time required for the output voltage to decline from the rated motor voltage to 0 V, shown as t2 in the following figure.

Figure 6-6 Voltage of V/F separation
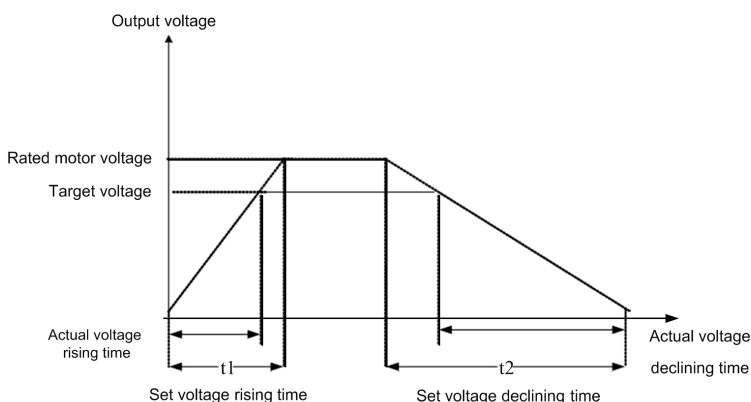
Function Code	Parameter Name	Setting Range	Default
F4-15	DPWM switchover frequency upper limit	0.00–15.00 Hz	12.00 Hz

This parameter is valid only for V/F control.

It is used to determine the wave modulation mode in V/F control of asynchronous motor. If the frequency is lower than the value of this parameter, the waveform is 7-segment continuous modulation. If the frequency is higher than the value of this parameter, the waveform is 5-segment intermittent modulation.

The 7-segment continuous modulation causes more loss to switches of the AC drive but smaller current ripple. The 5-segment intermittent modulation causes less loss to switches of the AC drive but larger current ripple. This may lead to motor running instability at high frequency. Do not modify this parameter generally.

Function Code	Parameter Name	Setting Range	Default
F4-16	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0

This parameter is valid only for V/F control.

Synchronous modulation indicates that the carrier frequency varies linearly with the change of the output frequency, ensuring that the ratio of carrier frequency to output frequency remains unchanged. Synchronous modulation is generally used at high output frequency, which helps improve the output voltage quality.

At low output frequency (100 Hz or lower), synchronous modulation is not required. This is because asynchronous modulation is preferred when the ratio of carrier frequency to output frequency is high.

Synchronous modulation takes effect only when the running frequency is higher than 85 Hz. If the frequency is lower than 85 Hz, asynchronous modulation is always used.

Function Code	Parameter Name	Setting Range	Default
F4-17	Random PWM depth	0: Random PWM invalid 1–10	0

The setting of random PWM depth can make the shrill motor noise softer and reduce the electromagnetic interference. If this parameter is set to 0, random PWM is invalid.

Group F5: Input Terminals

The H300 provides five DI terminals (DI5 can be used for high-speed pulse input) and two analog input (AI) terminals. The optional extension card provides another five DI terminals (DI6 to DI10) and an AI terminal (AI3).

Function Code	Parameter Name	Default	Remark
F5-00	DI1 function selection	1: Forward RUN (FWD)	Standard
F5-01	DI2 function selection	2: Reverse RUN (REV)	Standard
F5-02	DI3 function selection	4: Forward JOG (FJOG)	Standard
F5-03	DI4 function selection	9: Fault reset (RESET)	Standard
F5-04	DI5 function selection	12: Multi-reference terminal 1	Standard
F5-05	DI6 function selection	13: Multi-reference terminal 2	Extended
F5-06	DI7 function selection	0	Extended
F5-07	DI8 function selection	0	Extended
F5-08	DI9 function selection	0	Extended
F5-09	DI10 function selection	0	Extended

The following table lists the functions available for the DI terminals.

Function Code	Parameter Name	Setting Range	Default
A1-00	VDI1 function selection	0–59	0
A1-01	VDI2 function selection	0–59	0
A1-02	VDI3 function selection	0–59	0
A1-03	VDI4 function selection	0–59	0
A1-04	VDI5 function selection	0–59	0

VDI1 to VDI5 have the same functions as DI terminals on the control board and can be used for digital input.

Table 6-1 Functions of DI terminals

Value	Function	Description
0	No function	Set 0 for reserved terminals to avoid malfunction.
1	Forward RUN (FWD)	The terminal is used to control forward or reverse RUN of the AC drive.
2	Reverse RUN (REV)	
3	Three-line control	The terminal determines three-line control of the AC drive. For details, see the description of F5-11.
4	Forward JOG (FJOG)	FJOG indicates forward JOG running, while RJOG indicates reverse JOG running. The JOG frequency, acceleration time and deceleration time are described respectively in F8-00, F8-01 and F8-02.
5	Reverse JOG (RJOG)	
6	Terminal UP	If the frequency is determined by external terminals, the

7	Terminal DOWN	terminals with the two functions are used as increment and decrement commands for frequency modification. When the frequency source is digital setting, they are used to adjust the frequency.
8	Coast to stop	The AC drive blocks its output, the motor coasts to rest and is not controlled by the AC drive. It is the same as coast to stop described in F1-10.
9	Fault reset (RESET)	The terminal is used for fault reset function, the same as the function of RESET key on the operation panel. Remote fault reset is implemented by this function.

Value	Function	Description
10	RUN pause	The AC drive decelerates to stop, but the running parameters are all memorized, such as PLC, swing frequency and PID parameters. After this function is disabled, the AC drive resumes its status before stop.
11	Normally open (NO) input of external fault	If this terminal becomes ON, the AC drive reports Err15 and performs the fault protection action. For more details, see the description of FA-47.
12	Multi-reference terminal 1	The setting of 16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.
13	Multi-reference terminal 2	
14	Multi-reference terminal 3	
15	Multi-reference terminal 4	
16	Terminal 1 for acceleration/deceleration time selection	Totally four groups of acceleration/deceleration time can be selected through combinations of two states of these two terminals.
17	Terminal 2 for acceleration/deceleration time selection	
18	Frequency source switchover	The terminal is used to perform switchover between two frequency sources according to the setting in F0-06.
19	UP and DOWN setting clear (terminal, operation panel)	If the frequency source is digital setting, the terminal is used to clear the modification by using the UP/DOWN function or the increment/decrement key on the operation panel, returning the set frequency to the value of F0-07.
20	Command source switchover terminal	If the command source is set to terminal control (F0-01 = 1), this terminal is used to perform switchover between terminal control and operation panel control. If the command source is set to communication control (F0-01 = 2), this terminal is used to perform switchover between communication control and operation panel control.
21	Acceleration/Deceleration prohibited	It enables the AC drive to maintain the current frequency output without being affected by external signals (except the STOP command).
22	PID pause	PID is invalid temporarily. The AC drive maintains the current frequency output without supporting PID adjustment of frequency source.
23	PLC status reset	The terminal is used to restore the original status of PLC control for the AC drive when PLC control is started again after a pause.
24	Swing pause	The AC drive outputs the central frequency, and the swing frequency function pauses.
25	Counter input	This terminal is used to count pulses.
26	Counter reset	This terminal is used to clear the counter status.
27	Length count input	This terminal is used to count the length.
28	Length reset	This terminal is used to clear the length.

Value	Function	Description
29	Torque control prohibited	The AC drive is prohibited from torque control and enters the speed control mode.
30	Pulse input (enabled only for DI5)	DI5 is used for pulse input.
31	Reserved	Reserved.
32	Immediate DC braking	After this terminal becomes ON, the AC drive directly switches over to the DC braking state.
33	Normally closed (NC) input of external fault	After this terminal becomes ON, the AC drive reports Err15 and stops.
34	Frequency modification forbidden	After this terminal becomes ON, the AC drive does not respond to any frequency modification.
35	Reverse PID action direction	After this terminal becomes ON, the PID action direction is reversed to the direction set in F9-03.
36	External STOP terminal 1	In operation panel mode, this terminal can be used to stop the AC drive, equivalent to the function of the STOP key on the operation panel.
37	Command source switchover terminal 2	It is used to perform switchover between terminal control and communication control. If the command source is terminal control, the system will switch over to communication control after this terminal becomes ON.
38	PID integral pause	After this terminal becomes ON, the integral adjustment function pauses. However, the proportional and differentiation adjustment functions are still valid.
39	Switchover between main frequency source X and preset frequency	After this terminal becomes ON, the frequency source X is replaced by the preset frequency set in F0-07.
40	Switchover between auxiliary frequency source Y and preset frequency	After this terminal is enabled, the frequency source Y is replaced by the preset frequency set in F0-07.
41	Motor selection terminal 1	Switchover among the four groups of motor parameters can be implemented through the four state combinations of these two terminals.
42	Motor selection terminal 2	
43	PID parameter switchover	If the PID parameters switchover performed by means of DI terminal (F9-18 = 1), the PID parameters are F9-05 to F9-07 when the terminal becomes OFF; the PID parameters are F9-15 to F9-17 when this terminal becomes ON.
44	User-defined fault 1	If these two terminals become ON, the AC drive reports Err27 and Err28 respectively, and performs fault protection actions based on the setting in FA-49.
45	User-defined fault 2	
46	Speed control/Torque control switchover	This terminal enables the AC drive to switch over between speed control and torque control. When this terminal becomes OFF, the AC drive runs in the mode set in A0-00. When this terminal becomes ON, the AC drive switches over to the other control mode.

Value	Function	Description
47	Emergency stop	When this terminal becomes ON, the AC drive stops within the shortest time. During the stop process, the current remains at the set current upper limit. This function is used to satisfy the requirement of stopping the AC drive in emergency state.
48	External STOP terminal 2	In any control mode (operation panel, terminal or communication), it can be used to make the AC drive decelerate to stop. In this case, the deceleration time is deceleration time 4.
49	Deceleration DC braking	When this terminal becomes ON, the AC drive decelerates to the initial frequency of stop DC braking and then switches over to DC braking state.
50	Clear the current running time	When this terminal becomes ON, the AC drive's current running time is cleared. This function must be supported by F8-42 and F8-53.
51	Switchover between two-line mode and three-line mode	It is used to perform switchover between two-line control and three-line control. If F5 -11 is set to Two-line mode 1, the system switches over to three-line mode 1 when the DI allocated with this function becomes ON

The four multi-reference terminals have 16 state combinations, corresponding to 16 reference values, as listed in the following table.

Table 6-2 State combinations of the four multi-reference terminals

K4	K3	K2	K1	Reference Setting	Corresponding Parameter
OFF	OFF	OFF	OFF	Reference 0	FD-00
OFF	OFF	OFF	ON	Reference 1	FD-01
OFF	OFF	ON	OFF	Reference 2	FD-02
OFF	OFF	ON	ON	Reference 3	FD-03
OFF	ON	OFF	OFF	Reference 4	FD-04
OFF	ON	OFF	ON	Reference 5	FD-05
OFF	ON	ON	OFF	Reference 6	FD-06
OFF	ON	ON	ON	Reference 7	FD-07
ON	OFF	OFF	OFF	Reference 8	FD-08
ON	OFF	OFF	ON	Reference 9	FD-09
ON	OFF	ON	OFF	Reference 10	FD-10
ON	OFF	ON	ON	Reference 11	FD-11
ON	ON	OFF	OFF	Reference 12	FD-12
ON	ON	OFF	ON	Reference 13	FD-13
ON	ON	ON	OFF	Reference 14	FD-14
ON	ON	ON	ON	Reference 15	FD-15

If the frequency source is multi-reference, the value 100% of FD-00 to FD-15 corresponds to the value of F0-09 (Maximum frequency).

Besides the multi-speed function, the multi-reference can be also used as the PID setting source or the voltage source for V/F separation, satisfying the requirement on switchover of different setting values.

Two terminals for acceleration/deceleration time selection have four state combinations, as listed in the following table.

Table 6-3 State combinations of two terminals for acceleration/deceleration time selection

Terminal 2	Terminal 1	Acceleration/Deceleration Time Selection	Corresponding Parameters
OFF	OFF	Acceleration/Deceleration time 1	F0-17, F0-18
OFF	ON	Acceleration/Deceleration time 2	F8-03, F8-04
ON	OFF	Acceleration/Deceleration time 3	F8-05, F8-06
ON	ON	Acceleration/Deceleration time 4	F8-07, F8-08

Two motor selection terminals have four state combinations, corresponding to four motors, as listed in the following table.

Table 6-4 State combinations of two motor selection terminals

Terminal 2	Terminal 1	Selected Motor	Corresponding Parameters
OFF	OFF	Motor 1	Group F1, Group F2
OFF	ON	Motor 2	Group A2
ON	OFF	Motor 3	Group A3
ON	ON	Motor 4	Group A4

Function Code	Parameter Name	Setting Range	Default
F5-10	DI filter time	0.000–1.000s	0.010s

It is used to set the software filter time of DI terminal status. If DI terminals are liable to interference and may cause malfunction, increase the value of this parameter to enhance the anti-interference capability. However, increase of DI filter time will reduce the response of DI terminals.

Function Code	Parameter Name	Setting Range	Default
F5-11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0

This parameter is used to set the mode in which the AC drive is controlled by external terminals. The following uses DI1, DI2 and DI3 among DI1 to DI10 as an example, with allocating functions of DI1, DI2 and DI3 by setting FD-00 to F5-02.

- 0: Two-line mode 1

  It is the most commonly used two-line mode, in which the forward/reverse rotation of the motor is decided by DI1 and DI2. The parameters are set as below:

Function Code	Parameter Name	Value	Function Description
F5-11	Terminal command mode	0	Two-line 1
F5-00	DI1 function selection	1	Forward RUN (FWD)
F5-01	DI2 function selection	2	Reverse RUN (REV)

Figure 6-7 Setting of two-line mode 1

K1	K2	RUN command
1	0	Forward RUN
0	1	Reverse RUN
1	1	Stop
0	0	Stop
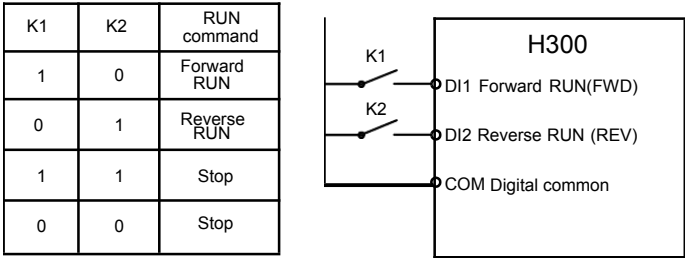
As shown in the preceding figure, when only K1 is ON, the AC drive instructs forward rotation. When only K2 is ON, the AC drive instructs reverse rotation. When K1 and K2 are ON or OFF simultaneously, the AC drive stops.

- 1: Two-line mode 2

  In this mode, DI1 is RUN enabled terminal, and DI2 determines the running direction. The parameters are set as below:

Function Code	Parameter Name	Value	Function Description
F5-11	Terminal command mode	1	Two-line 2
F5-00	DI1 function selection	1	RUN enabled
F5-01	DI2 function selection	2	Forward or reverse direction

Figure 6-8 Setting of two-line mode 2

K1	K2	RUN command
1	0	Forward RUN
1	1	Reverse RUN
0	0	Stop
0	1	Stop
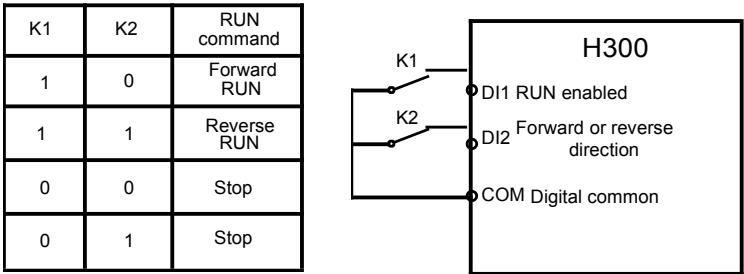
As shown in the preceding figure, if K1 is ON, the AC drive instructs forward rotation when K2 is OFF, and instructs reverse rotation when K2 is ON. If K1 is OFF, the AC drive stops.

• 2: Three-line mode 1

In this mode, DI3 is RUN enabled terminal, and the direction is decided by DI1 and DI2. The parameters are set as below:

Function Code	Parameter Name	Value	Function Description
F5-11	Terminal command mode	2	Three-line 1
F5-00	DI1 function selection	1	Forward RUN (FWD)
F5-01	DI2 function selection	2	Reverse RUN (REV)
F5-02	DI3 function selection	3	Three-line control

Figure 6-9 Setting of three-line mode 1
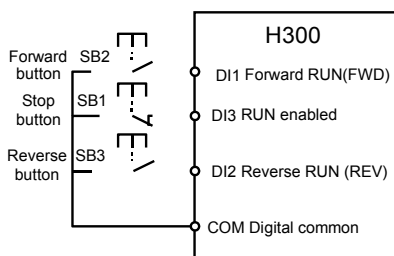
As shown in the preceding figure, if SB1 is ON, the AC drive instructs forward rotation when SB2 is pressed to be ON and instructs reverse rotation when SB3 is pressed to be ON. The AC drive stops immediately after SB1 becomes OFF. During normal startup and running, SB1 must remain ON. The AC drive's running state is determined by the final actions on SB1, SB2 and SB3.

• 3: Three-line mode 2

In this mode, DI3 is RUN enabled terminal. The RUN command is given by DI1 and the direction is decided by DI2. The parameters are set as below:

Function Code	Parameter Name	Value	Function Description
F5-11	Terminal command mode	3	Three-line 2
F5-00	DI1 function selection	1	RUN enabled
F5-01	DI2 function selection	2	Forward or reverse direction
F5-02	DI3 function selection	3	Three-line control

Figure 6-10 Setting of three-line mode 2

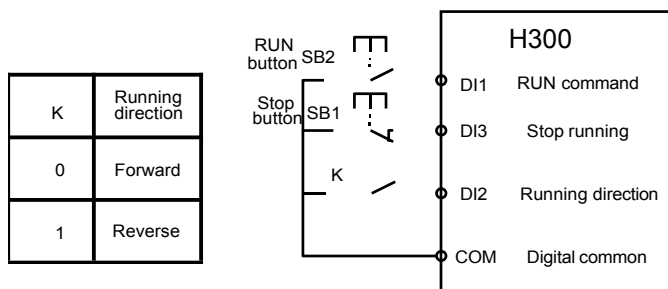As shown in the preceding figure, if SB1 is ON, the AC drive starts running when SB2 is pressed to be ON; the AC drive instructs forward rotation when K is OFF and instructs reverse rotation when K is ON. The AC drive stops immediately after SB1 becomes OFF. During normal startup and running, SB1 must remain ON. The AC drive's running state is determined by the final actions of SB1, SB2 and K.

Function Code	Parameter Name	Setting Range	Default
F5-12	Terminal UP/DOWN rate	0.01–65.535 Hz/s	1.00 Hz/s

It is used to adjust the rate of change of frequency when the frequency is adjusted by means of terminal UP/DOWN.

- If F0-22 (Frequency reference resolution) is 2, the setting range is 0.001–65.535 Hz/s.

- If F0-22 (Frequency reference resolution) is 1, the setting range is 0.01–655.35 Hz/s.

Function Code	Parameter Name	Setting Range	Default
F5-13	AI curve 1 minimum input	0.00 V to F4-15	0.00 V
F5-14	Corresponding setting of AI curve 1 minimum input	-100.00%–100.0%	0.0%
F5-15	AI curve 1 maximum input	F4-13 to 10.00 V	10.00 V
F5-16	Corresponding setting of AI curve 1 maximum input	-100.00%–100.0%	100.0%
F5-17	AI1 filter time	0.00–10.00s	0.10s

These parameters are used to define the relationship between the analog input voltage and the corresponding setting. When the analog input voltage exceeds the maximum value (F5-15), the maximum value is used. When the analog input voltage is less than the minimum value (F5-13), the value set in F5-34 (Setting for AI less than minimum input) is used.

When the analog input is current input, 1 mA current corresponds to 0.5 V voltage.

F5-17 (AI1 filter time) is used to set the software filter time of AI1. If the analog input is liable to interference, increase the value of this parameter to stabilize the detected analog input. However, increase of the AI filter time will slow the response of analog detection. Set this parameter properly based on actual conditions.

In different applications, 100% of analog input corresponds to different nominal values. For details, refer to the description of different applications.

Two typical setting examples are shown in the following figure.

Figure 6-11 Corresponding relationship between analog input and set values
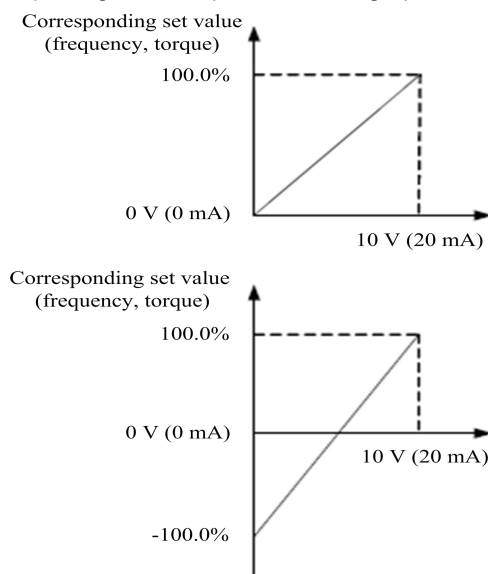
Function Code	Parameter Name	Setting Range	Default
F5-18	AI curve 2 minimum input	0.00 V to F5-20	0.00 V
F5-19	Corresponding setting of AI curve 2 minimum input	-100.00%–100.0%	0.0%
F5-20	AI curve 2 maximum input	F5-18 to 10.00 V	10.00 V
F5-21	Corresponding setting of AI curve 2 maximum input	-100.00%–100.0%	100.0%
F5-22	AI2 filter time	0.00–10.00s	0.10s

Function Code	Parameter Name	Setting Range	Default
F5-23	AI curve 3 minimum input	0.00 V to F5-25	0.00 V
F5-24	Corresponding setting of AI curve 3 minimum input	-100.00%–100.0%	0.0%
F5-25	AI curve 3 maximum input	F5-23 to 10.00 V	10.00 V
F5-26	Corresponding setting of AI curve 3 maximum input	-100.00%–100.0%	100.0%
F5-27	AI3 filter time	0.00–10.00s	0.10s

The method of setting AI2 and AI3 functions is similar to that of setting AI1 function.

Function Code	Parameter Name	Setting Range	Default
F5-28	Pulse minimum input	0.00 kHz to F5-30	0.00 kHz
F5-29	Corresponding setting of pulse minimum input	-100.00%–100.0%	0.0%
F5-30	Pulse maximum input	F5-28 to 50.00 kHz	50.00 kHz
F5-31	Corresponding setting of pulse maximum input	-100.00%–100.0%	100.0%
F5-32	Pulse filter time	0.00–10.00s	0.10s

These parameters are used to set the relationship between DI5 pulse input and corresponding settings. The pulses can only be input by DI5. The method of setting this function is similar to that of setting AI1 function.

Function Code	Parameter Name	Setting Range	Default
F5-33	AI curve selection	Unit's digit (AI1 curve selection)	321
		Curve 1 (2 points, see F5-13 to F5-16)	
		Curve 2 (2 points, see F5-18 to F5-21)	
		Curve 3 (2 points, see F5-23 to F5-26)	
		Curve 4 (4 points, see A6-00 toA6-07)	
		Curve 5 (4 points, see A6-08 to A6-15)	
		Ten's digit (AI2 curve selection)	
		Curve 1 to curve 5 (same as AI1)	
		Hundred's digit (AI3 curve selection)	
		Curve 1 to curve 5 (same as AI1)	

The unit's digit, ten's digit and hundred's digit of this parameter are respectively used to select the corresponding curve of AI1, AI2 and AI3. Any of the five curves can be selected for AI1, AI2 and AI3.

Curve 1, curve 2 and curve 3 are all 2-point curves, set in group F5. Curve 4 and curve 5 are both 4-point curves, set in group A6.

The H300 provides two AI terminals as standard. AI3 is provided by an optional extension card.

Function Code	Parameter Name	Setting Range	Default
F5-34	Setting for AI less than minimum input	Unit's digit (Setting for AI1 less than minimum input)	000
		0: Minimum value	
		1: 0.0%	
		Ten's digit (Setting for AI2 less than minimum input)	
		0, 1 (same as AI1)	
		Hundred's digit (Setting for AI3 less than minimum input)	
		0, 1 (same as AI1)	

This parameter is used to determine the corresponding setting when the analog input voltage is less than the minimum value. The unit's digit, ten's digit and hundred's digit of this parameter respectively correspond to the setting for AI2, AI2 and AI3.

If the value of a certain digit is 0, when analog input voltage is less than the minimum input, the corresponding setting of the minimum input (F5-14, F5-19, F5-24) is used.

If the value of a certain digit is 1, when analog input voltage is less than the minimum input, the corresponding value of this analog input is 0.0%.

Function Code	Parameter Name	Setting Range	Default
F5-35	DI1 delay time	0.0–3600.0s	0.0s
F5-36	DI2 delay time	0.0–3600.0s	0.0s
F5-37	DI3 delay time	0.0–3600.0s	0.0s

These parameters are used to set the delay time of the AC drive when the status of DI terminals changes.

Currently, only DI1, DI2 and DI3 support the delay time function.

Function Code	Parameter Name	Setting Range	Default
F5-38	DI valid mode selection 1	Unit's digit (DI1 valid mode)	00000
		0: High level valid	
		1: Low level valid	
		Ten's digit (DI2 valid mode)	
		0, 1 (same as DI1)	
		Hundred's digit (DI3 valid mode)	
		0, 1 (same as DI1)	
		Thousand's digit (DI4 valid mode)	
		0, 1 (same as DI1)	
		Ten thousand's digit (DI5 valid mode)	
		0, 1 (same as DI1)	
F5-39	DI valid mode selection 2	Unit's digit (DI6 valid mode)	00000
		0, 1 (same as DI1)	
		Ten's digit (DI7 valid mode)	
		0, 1 (same as DI1)	
		Hundred's digit (DI8 state)	
		0, 1 (same as DI1)	
		Thousand's digit (DI9 valid mode)	
		0, 1 (same as DI1)	
		Ten thousand's digit (DI10 valid mode)	
		0, 1 (same as DI1)	

These parameters are used to set the valid mode of DI terminals.

- 0: High level valid

  The DI terminal is valid when being connected with COM, and invalid when being disconnected from COM.

- 1: Low level valid

  The DI terminal is invalid when being connected with COM, and invalid when being disconnected from COM.

Function Code	Parameter Name	Setting Range	Default
F5-40	AI2 input signal selection	0: Voltage signal 1: Current signal	0

AI2 supports voltage/current output, which is determined by jumper. After setting the jumper, perform corresponding setting in F5-40.

Group F6: Output Terminals

The H300 provides an analog output (AO) terminal, a digital output (DO) terminal, a relay terminal and a FM terminal (used for high-speed pulse output or open-collector switch signal output) as standard. If these output terminals cannot satisfy requirements, use an optional I/O extension card that provides an AO terminal (AO2), a relay terminal (relay 2) and a DO terminal (DO2).

Function Code	Parameter Name	Setting Range	Default
F6-00	FM terminal output mode	0: Pulse output (FMP) 1: Switch signal output (FMR)	0

The FM terminal is programmable multiplexing terminal. It can be used for high-speed pulse output (FMP), with maximum frequency of 50 kHz. Refer to F5-06 for relevant functions of FMP. It can also be used as open collector switch signal output (FMR).

Function Code	Parameter Name	Default
F6-01	FMR function (open-collector output terminal)	0
F6-02	Relay function (T/A-T/B-T/C)	2
F6-03	Extension card relay function (P/A-P/B-P/C)	0
F6-04	DO1 function selection (open-collector output terminal)	1
F6-05	Extension card DO2 function	4

These five parameters are used to select the functions of the five digital output terminals. T/A-T/B-T/C and P/A-P/B-P/C are respectively the relays on the control board and the extension card.

The functions of the output terminals are described in the following table.

Table 6-5 Functions of output terminals

Value	Function	Description
0	No output	The terminal has no function.
1	AC drive running	When the AC drive is running and has output frequency (can be zero), the terminal becomes ON.
2	Fault output (stop)	When the AC drive stops due to a fault, the terminal becomes ON.
3	Frequency-level detection FDT1 output	Refer to the descriptions of F8-19 and F8-20.
4	Frequency reached	Refer to the descriptions of F8-21.
5	Zero-speed running (no output at stop)	If the AC drive runs with the output frequency of 0, the terminal becomes ON. If the AC drive is in the stop state, the terminal becomes OFF.
6	Motor overload pre-warning	The AC drive judges whether the motor load exceeds the overload pre-warning threshold before performing the protection action. If the pre-warning threshold is exceeded, the terminal becomes ON. For motor overload parameters, see the descriptions of F9-00 to F9-02.
7	AC drive overload pre-warning	The terminal becomes ON 10s before the AC drive overload protection action is performed.
8	Set count value reached	The terminal becomes ON when the count value reaches the value set in FB-08.
9	Designated count value reached	The terminal becomes ON when the count value reaches the value set in FB-09.
10	Length reached	The terminal becomes ON when the detected actual length exceeds the value set in FB-05.
11	PLC cycle complete	When simple PLC completes one cycle, the terminal outputs a pulse signal with width of 250 ms.
12	Accumulative running time reached	If the accumulative running time of the AC drive exceeds the time set in F8-17, the terminal becomes ON.
13	Frequency limited	If the set frequency exceeds the frequency upper limit or lower limit and the output frequency of the AC drive reaches the upper limit or lower limit, the terminal becomes ON.
14	Torque limited	In speed control mode, if the output torque reaches the torque limit, the AC drive enters the stall protection state and meanwhile the terminal becomes ON.
15	Ready for RUN	If the AC drive main circuit and control circuit become stable, and the AC drive detects no fault and is ready for RUN, the terminal becomes ON.
16	AI1 larger than AI2	When the input of AI1 is larger than the input of AI2, the terminal becomes ON.
17	Frequency upper limit reached	If the running frequency reaches the upper limit, the terminal becomes ON.
18	Frequency lower limit reached (no output at stop)	If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the terminal becomes OFF.

Value	Function	Description
19	Undervoltage state output	If the AC drive is in undervoltage state, the terminal becomes ON.
20	Communication setting	Refer to the communication protocol.
21	Reserved	Reserved.
22	Reserved	Reserved.
23	Zero-speed running 2 (having output at stop)	If the output frequency of the AC drive is 0, the terminal becomes ON. In the state of stop, the signal is still ON.
24	Accumulative power-on time reached	If the AC drive accumulative power-on time (F7-13) exceeds the value set in F8-16, the terminal becomes ON.
25	Frequency level detection FDT2 output	Refer to the descriptions of F8-28 and F8-29.
26	Frequency 1 reached	Refer to the descriptions of F8-30 and F8-31.
27	Frequency 2 reached	Refer to the descriptions of F8-32 and F8-33.
28	Current 1 reached	Refer to the descriptions of F8-38 and F8-39.
29	Current 2 reached	Refer to the descriptions of F8-40 and F8-41.
30	Timing reached	If the timing function (F8-42) is valid, the terminal becomes ON after the current running time of the AC drive reaches the set time.
31	AI1 input limit exceeded	If AI1 input is larger than the value of F8-46 (AI1 input voltage upper limit) or lower than the value of F8-45 (AI1 input voltage lower limit), the terminal becomes ON.
32	Load becoming 0	If the load becomes 0, the terminal becomes ON.
33	Reverse running	If the AC drive is in the reverse running state, the terminal becomes ON.
34	Zero current state	Refer to the descriptions of F8-28 and F8-29.
35	Module temperature reached	If the heatsink temperature of the inverter module (F7-07) reaches the set module temperature threshold (F8-47), the terminal becomes ON.
36	Software current limit exceeded	Refer to the descriptions of F8-36 and F8-37.
37	Frequency lower limit reached (having output at stop)	If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the signal is still ON.
38	Alarm output	If a fault occurs on the AC drive and the AC drive continues to run, the terminal outputs the alarm signal.
39	Motor overheat warning	If the motor temperature reaches the temperature set in F9-58 (Motor overheat warning threshold), the terminal becomes ON. You can view the motor temperature by using U0-34.
40	Current running time reached	If the current running time of AC drive exceeds the value of F8-53, the terminal becomes ON.

Function Code	Parameter Name	Default
F6-06	FMP function selection	0
F6-07	AO1 function selection	0
F6-08	AO2 function selection	1

The output pulse frequency of the FMP terminal ranges from 0.01 kHz to "Maximum FMP output frequency" (F5-09). The value of F5-09 is between 0.01 kHz and 100.00 kHz.

The output range of AO1 and AO2 is 0–10 V or 0–20 mA. The relationship between pulse and analog output ranges and corresponding functions is listed in the following table.

Table 6-6 Relationship between pulse and analog output ranges and corresponding functions

Value	Function	Range (Corresponding to Pulse or Analog Output Range 0.0%–100.0%)
0	Running frequency	0 to maximum output frequency
1	Set frequency	0 to maximum output frequency
2	Output current	0 to 2 times of rated motor current
3	Output torque (absolute value)	0 to 2 times of rated motor torque
4	Output power	0 to 2 times of rated power
5	Output voltage	0 to 1.2 times of rated AC drive voltage
6	Pulse input	0.01–100.00 kHz
7	AI1	0–10 V
8	AI2	0–10 V (or 0–20 mA)
9	AI3	0–0 V
10	Length	0 to maximum set length
11	Count value	0 to maximum count value
12	Communication setting	0.0%–100.0%
13	Motor rotational speed	0 to rotational speed corresponding to maximum output frequency
14	Output current	0.0–1000.0 A
15	Output voltage	0.0–000.0 V
16	Output torque (actual value)	-2 times of rated motor torque to 2 times of rated motor torque

Function Code	Parameter Name	Setting Range	Default
F6-09	Maximum FMP output frequency	0.01–100.00 kHz	50.00 kHz

If the FM terminal is used for pulse output, this parameter is used to set the maximum frequency of pulse output.

Function Code	Parameter Name	Setting Range	Default
F6-10	AO1 offset coefficient	-100.0%–100.0%	0.0%
F6-11	AO1 gain	-10.00–10.00	1.00
F6-12	AO2 offset coefficient	-100.0%–100.0%	0.00%
F6-13	AO2 gain	-10.00–10.00	1.00

These parameters are used to correct the zero drift of analog output and the output amplitude deviation. They can also be used to define the desired AO curve.

If "b" represents zero offset, "k" represents gain, "Y" represents actual output, and "X" represents standard output, the actual output is: $Y = kX + b$.

The zero offset coefficient 100% of AO1 and AO2 corresponds to 10 V (or 20 mA). The standard output refers to the value corresponding to the analog output of 0 to 10 V (or 0 to 20 mA) with no zero offset or gain adjustment.

For example, if the analog output is used as the running frequency, and it is expected that the output is 8 V when the frequency is 0 and 3 V at the maximum frequency, the gain shall be set to -0.50, and the zero offset shall be set to 80%.

Function Code	Parameter Name	Setting Range	Default
F6-17	FMR output delay time	0.0–3600.0s	0.0s
F6-18	Relay 1 output delay time	0.0–3600.0s	0.0s
F6-19	Relay 2 output delay time	0.0–3600.0s	0.0s
F6-20	DO1 output delay time	0.0–3600.0s	0.0s
F6-21	DO2 output delay time	0.0–3600.0s	0.0s

These parameters are used to set the delay time of output terminals FMR, relay 1, relay 2, DO1 and DO2 from status change to actual output.

Function Code	Parameter Name	Setting Range	Default
F6-22	DO valid mode selection	Unit's digit (FMR valid mode)	00000
		0: Positive logic	
		1: Negative logic	
		Ten's digit (Relay 1 valid mode)	
		0, 1 (same as FMR)	
		Hundred's digit (Relay 2 valid mode)	
		0, 1 (same as FMR)	
		Thousand's digit (DO1 valid mode)	
		0, 1 (same as FMR)	
		Ten thousand's digit (DO2 valid mode)	
		0, 1 (same as FMR)	

It is used to set the logic of output terminals FMR, relay 1, relay 2, DO1 and DO2.

- 0: Positive logic

  The output terminal is valid when being connected with COM, and invalid when being disconnected from COM.

- 1: Positive logic

  The output terminal is invalid when being connected with COM, and valid when being disconnected from COM.

Group F7: Operation Panel and Display

Function Code	Parameter Name	Setting Range	Default
F7-01	MF.K Key function selection	0: MF.K key disabled 1: Switchover between operation panel control and remote command control (terminal or communication) 2: Switchover between forward rotation and reverse rotation 3: Forward JOG 4: Reverse JOG	0

MF.K key refers to multifunctional key. You can set the function of the MF.K key by using this parameter. You can perform switchover by using this key both in stop or running state.

- 0: MF.K key disabled

  This key is disabled.

- 1: Switchover between operation panel control and remote command control (terminal or communication)

  You can perform switchover from the current command source to the operation panel control (local operation). If the current command source is operation panel control, this key is invalid.

- 2: Switchover between forward rotation and reverse rotation

  You can change the direction of the frequency reference by using the MF.K key. It is valid only when the current command source is operation panel control.

- 3: Forward JOG

  You can perform forward JOG (FJOG) by using the MF.K key.

- 4: Reverse JOG

  You can perform reverse JOG (FJOG) by using the MF.K key.

Function Code	Parameter Name	Setting Range	Default
F7-02	STOP/RESET key function	0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode	1

Function Code	Parameter Name	Setting Range	Default
F7-03	LED display running parameters 1	0000–FFFF 7 6 5 4 3 2 1 0 Running frequency1 (Hz) Set frequency (Hz) Bus voltage (V) Output voltage (V) Output current (A) Output power (kW) Output torque (%) DI input status (V) 15 14 13 12 11 10 9 8 DO output status AI1 voltage (V) AI2 voltage (V) AI3 voltage (V) Count value Length value Load speed display PID setting If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set F7-03 to the hexadecimal equivalent of this binary number.	1F

Function Code	Parameter Name	Setting Range	Default
F7-04	LED display running parameters 2	0000–FFFF 7 6 5 4 3 2 1 0 — PID feedback — PLC stage — Pulse setting frequency(kHz) — Running frequency2 — Remaining running time — AI1 voltage before correction — AI2 voltage before correction — AI3 voltage before correction 15 14 13 12 11 10 9 8 — Linear speed — Current power-on time (Hour) — Current running time(Minute) — Pulse setting frequency (Hz) — Communication setting value — Encoder feedback speed (Hz) — Main frequency X display (Hz) — Auxiliary frequency Y display (Hz) If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set F7-03 to the hexadecimal equivalent of this binary number.	0

These two parameters are used to set the parameters that can be viewed when the AC drive is in the running state. You can view a maximum of 32 running state parameters that are displayed from the lowest bit of F7-03.

Function Code	Parameter Name	Setting Range	Default
F7-05	LED display stop parameters	0000–FFFF 7 6 5 4 3 2 1 0 — Set frequency (Hz) — Bus voltage (V) — DI input status — DO output status — AI1 voltage (V) — AI2 voltage (V) — AI3 voltage (V) — Count value 15 14 13 12 11 10 9 8 — Length value — PLC stage — Load speed — PID setting — Pulse setting frequency (kHz) — Reserved — Reserved — Reserved If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set F7-05 to the hexadecimal equivalent of this binary number.	0

Function Code	Parameter Name	Setting Range	Default
F7-06	Load speed display coefficient	0.0001–6.5000	1.0000

This parameter is used to adjust the relationship between the output frequency of the AC drive and the load speed. For details, see the description of F7-12.

Function Code	Parameter Name	Setting Range	Default
F7-07	Heatsink temperature of inverter module	0.0–100.0° C	-

It is used to display the insulated gate bipolar transistor (IGBT) temperature of the inverter module, and the IGBT overheat protection value of the inverter module depends on the model.

Function Code	Parameter Name	Setting Range	Default
F7-08	Temporary software version	0.0–100.0° C	-

IIt is used to display the temporary software version of the control board.

Function Code	Parameter Name	Setting Range	Default
F7-09	Accumulative running time	0–65535 h	-

It is used to display the accumulative running time of the AC drive. After the accumulative running time reaches the value set in F8-17, the terminal with the digital output function 12 becomes ON.

Function Code	Parameter Name	Setting Range	Default
F7-10	Product number	AC drive product number	-
F7-11	Software version	Software version of control board	-
F7-12	Number of decimal places for load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1

F7-12 is used to set the number of decimal places for load speed display. The following gives an example to explain how to calculate the load speed:

Assume that F7-06 (Load speed display coefficient) is 2.000 and F7-12 is 2 (2 decimal places). When the running frequency of the AC drive is 40.00 Hz, the load speed is 40.00 x 2.000 = 80.00 (display of 2 decimal places).

If the AC drive is in the stop state, the load speed is the speed corresponding to the set frequency, namely, "set load speed". If the set frequency is 50.00 Hz, the load speed in the stop state is 50.00 x 2.000 = 100.00 (display of 2 decimal places).

Function Code	Parameter Name	Setting Range	Default
F7-13	Accumulative power-on time	0–65535 h	0 h

It is used to display the accumulative power-on time of the AC drive since the delivery. If the time reaches the set power-on time (F8-17), the terminal with the digital output function 24 becomes ON.

Function Code	Parameter Name	Setting Range	Default
F7-14	Accumulative power consumption	0–65535 kWh	/

It is used to display the accumulative power consumption of the AC drive until now.

Group F8: Auxiliary Functions

Function Code	Parameter Name	Setting Range	Default
F8-00	JOG running frequency	0.00 Hz to maximum frequency	2.00 Hz
F8-01	JOG acceleration time	0.0–6500.0s	20.0s
F8-02	JOG deceleration time	0.0–6500.0s	20.0s

These parameters are used to define the set frequency and acceleration/deceleration time of the AC drive when jogging. The startup mode is "Direct start" (F6-00 = 0) and the stop mode is "Decelerate to stop" (F6-10 = 0) during jogging.

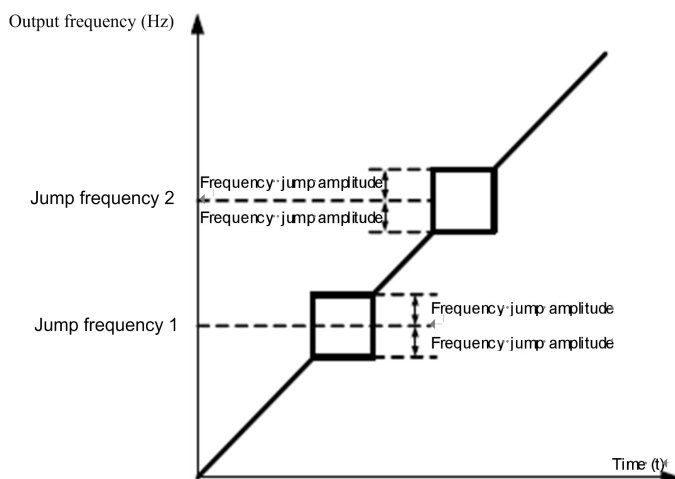| Function Code	Parameter Name	Setting Range	Default
F8-03	Acceleration time 2	0.0–6500.0s	Model dependent
F8-04	Deceleration time 2	0.0–6500.0s	Model dependent
F8-05	Acceleration time 3	0.0–6500.0s	Model dependent
F8-06	Deceleration time 3	0.0–6500.0s	Model dependent
F8-07	Acceleration time 4	0.0–500.0s	Model dependent
F8-08	Deceleration time 4	0.0–6500.0s	Model dependent

The H300 provides a total of four groups of acceleration/deceleration time, that is, the preceding three groups and the group defined by F0-17 and F0-18. Definitions of four groups are completely the same. You can switch over between the four groups of acceleration/deceleration time through different state combinations of DI terminals. For more details, see the descriptions of F4-01 to F4-05.

Function Code	Parameter Name	Setting Range	Default
F8-09	Jump frequency 1	0.00 Hz to maximum frequency	0.00 Hz
F8-10	Jump frequency 2	0.00 Hz to maximum frequency	0.00 Hz
F8-11	Frequency jump amplitude	0.00 Hz to maximum frequency	0.00 Hz

If the set frequency is within the frequency jump range, the actual running frequency is the jump frequency close to the set frequency. Setting the jump frequency helps to avoid the mechanical resonance point of the load.

The H300 supports two jump frequencies. If both are set to 0, the frequency jump function is disabled. The principle of the jump frequencies and jump amplitude is shown in the following figure.

Figure 6-15 Principle of the jump frequencies and jump amplitude

Function Code	Parameter Name	Setting Range	Default
F8-12	Forward/Reverse rotation dead-zone time	0.0–3000.0s	0.0s

It is used to set the time when the output is 0 Hz at transition of the AC drive forward rotation and reverse rotation, as shown in the following figure.

Figure 6-16 Forward/Reverse rotation dead-zone time
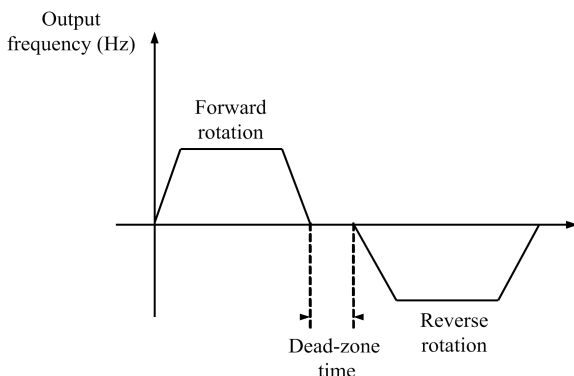
Function Code	Parameter Name	Setting Range	Default
F8-13	Reverse control	0: Enabled 1: Disabled	0

It is used to set whether the AC drive allows reverse rotation. In the applications where reverse rotation is prohibited, set this parameter to 1.

Function Code	Parameter Name	Setting Range	Default
F8-14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0

It is used to set the AC drive running mode when the set frequency is lower than the frequency lower limit. The H300 provides three running modes to satisfy requirements of various applications.

Function Code	Parameter Name	Setting Range	Default
F8-15	Droop control	0.00–10.00 Hz	0.00 Hz

This function is used for balancing the workload allocation when multiple motors are used to drive the same load. The output frequency of the AC drives decreases as the load increases. You can reduce the workload of the motor under load by decreasing the output frequency for this motor, implementing workload balancing between multiple motors.

Function Code	Parameter Name	Setting Range	Default
F8-16	Accumulative power-on time threshold	0–65000 h	0 h

If the accumulative power-on time (F7-13) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

For example, combining virtual DI/DO functions, to implement the function that the AC drive reports an alarm when the actual accumulative power-on time reaches the threshold of 100 hours, perform the setting as follows:

1)   Set virtual DI1 to user-defined fault 1: A1-00 = 44.

2)   Set that the valid state of virtual DI1 is from virtual DO1: A1-05 = 0000.

3)   Set virtual DO1 to power-on time reached: A1-11= 24.

4)   Set the accumulative power-on time threshold to 100 h: F8-16 = 100 h.

Then, the AC drive reports Err27 when the accumulative power-on time reaches 100 hours.

Function Code	Parameter Name	Setting Range	Default
F8-17	Accumulative running time threshold	0–65000 h	0 h

It is used to set the accumulative running time threshold of the AC drive. If the accumulative running time (F7-09) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

Function Code	Parameter Name	Setting Range	Default
F8-18	Startup protection	0: No 1: Yes	0

This parameter is used to set whether to enable the safety protection. If it is set to 1, the AC drive does not respond to the run command valid upon AC drive power-on (for example, an input terminal is ON before power-on). The AC drive responds only after the run command is cancelled and becomes valid again.

In addition, the AC drive does not respond to the run command valid upon fault reset of the AC drive. The run protection can be disabled only after the run command is cancelled.

In this way, the motor can be protected from responding to run commands upon power-on or fault reset in unexpected conditions.

Function Code	Parameter Name	Setting Range	Default
F8-19	Frequency detection value (FDT1)	0.00 Hz to maximum frequency	50.00 Hz
F8-20	Frequency detection hysteresis (FDT hysteresis 1)	0.0%–100.0% (FDT1 level)	5.0%

If the running frequency is higher than the value of F8-19, the corresponding DO terminal becomes ON. If the running frequency is lower than value of F8-19, the DO terminal goes OFF

These two parameters are respectively used to set the detection value of output frequency and hysteresis value upon cancellation of the output. The value of F8-20 is a percentage of the hysteresis frequency to the frequency detection value (F8-19).

The FDT function is shown in the following figure.

Figure 6-17 FDT level
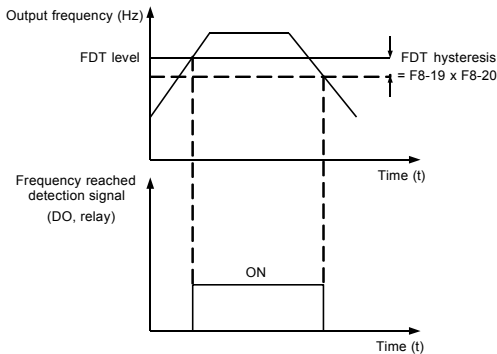
Function Code	Parameter Name	Setting Range	Default
F8-21	Detection range of frequency reached	0.00–100% (maximum frequency)	0.0%

If the AC drive running frequency is within the certain range of the set frequency, the corresponding DO terminal becomes ON.

This parameter is used to set the range within which the output frequency is detected to reach the set frequency. The value of this parameter is a percentage relative to the maximum frequency. The detection range of frequency reached is shown in the following figure.

Figure 6-18 Detection range of frequency reached
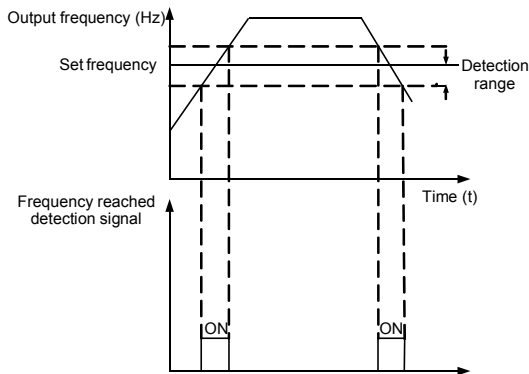
Function Code	Parameter Name	Setting Range	Default
F8-22	Jump frequency during acceleration/deceleration	0: Disabled 1: Enabled	0

It is used to set whether the jump frequencies are valid during acceleration/deceleration.

When the jump frequencies are valid during acceleration/deceleration, and the running frequency is within the frequency jump range, the actual running frequency will jump over the set frequency jump amplitude (rise directly from the lowest jump frequency to the highest jump frequency). The following figure shows the diagram when the jump frequencies are valid during acceleration/deceleration.

Figure 6-19 Diagram when the jump frequencies are valid during acceleration/deceleration
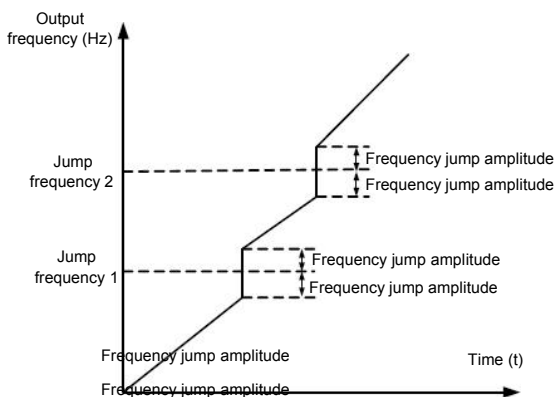
Function Code	Parameter Name	Setting Range	Default
F8-25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 Hz to maximum frequency	0.00 Hz
F8-26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to maximum frequency	0.00 Hz

This function is valid when motor 1 is selected and acceleration/deceleration time switchover is not performed by means of DI terminal. It is used to select different groups of acceleration/deceleration time based on the running frequency range rather than DI terminal during the running process of the AC drive.

Figure 6-20 Acceleration/deceleration time switchover
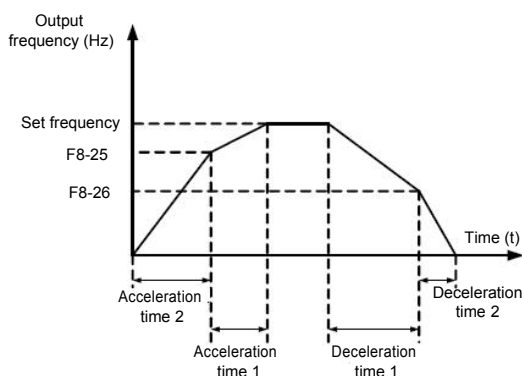
During acceleration, if the running frequency is smaller than the value of F8-25, acceleration time 2 is selected. If the running frequency is larger than the value of F8-25, acceleration time 1 is selected.

During deceleration, if the running frequency is larger than the value of F8-26, deceleration time 1 is selected. If the running frequency is smaller than the value of F8-26, deceleration time 2 is selected.

Function Code	Parameter Name	Setting Range	Default
F8-27	Terminal JOG preferred	0: Disabled 1: Enabled	0

It is used to set whether terminal JOG is preferred.

If terminal JOG is preferred, the AC drive switches to terminal JOG running state when there is a terminal JOG command during the running process of the AC drive.

Function Code	Parameter Name	Setting Range	Default
F8-28	Frequency detection value (FDT2)	0.00 to maximum frequency	50.00 Hz
F8-29	Frequency detection hysteresis (FDT hysteresis 2)	0.0%–100.0% (FDT2 level)	5.0%

The frequency detection function is the same as FDT1 function. For details, refer to the descriptions of F8-19 and F8-20.

Function Code	Parameter Name	Setting Range	Default
F8-30	Any frequency reaching detection value 1	0.00 Hz to maximum frequency	50.00 Hz
F8-31	Any frequency reaching detection amplitude 1	0.0%–100.0% (maximum frequency)	0.0%
F8-32	Any frequency reaching detection value 2	0.00 Hz to maximum frequency	50.00 Hz

Function Code	Parameter Name	Setting Range	Default
F8-33	Any frequency reaching detection amplitude 2	0.0%–100.0% (maximum frequency)	0.0%

If the output frequency of the AC drive is within the positive and negative amplitudes of the any frequency reaching detection value, the corresponding DO becomes ON.

The H300 provides two groups of any frequency reaching detection parameters, including frequency detection value and detection amplitude, as shown in the following figure.

Figure 6-21 Any frequency reaching detection
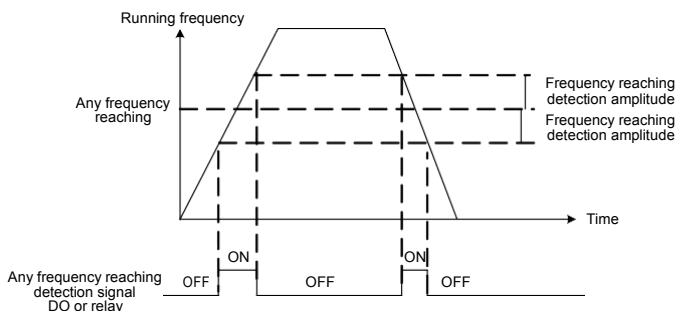
Function Code	Parameter Name	Setting Range	Default
F8-34	Zero current detection level	0.0%–300.0% (rated motor current)	5.0%
F8-35	Zero current detection delay time	0.00–600.00s	0.10s

If the output current of the AC drive is equal to or less than the zero current detection level and the duration exceeds the zero current detection delay time, the corresponding DO becomes ON. The zero current detection is shown in the following figure.

Figure 6-22 Zero current detection
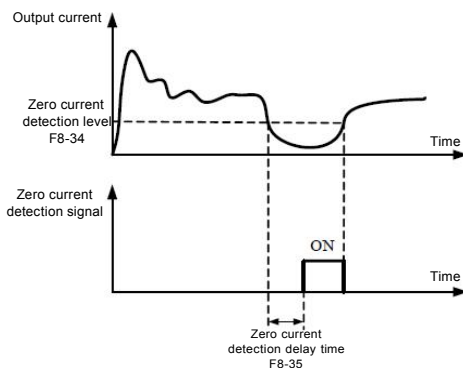
Function Code	Parameter Name	Setting Range	Default
F8-36	Output overcurrent threshold	0.0% (no detection) 0.1%–300.0% (rated motor current)	200.0%
F8-37	Output overcurrent detection delay time	0.00–600.00s	0.00s

If the output current of the AC drive is equal to or higher than the overcurrent threshold and the duration exceeds the detection delay time, the corresponding DO becomes ON. The output overcurrent detection function is shown in the following figure.

Figure 6-23 Output overcurrent detection
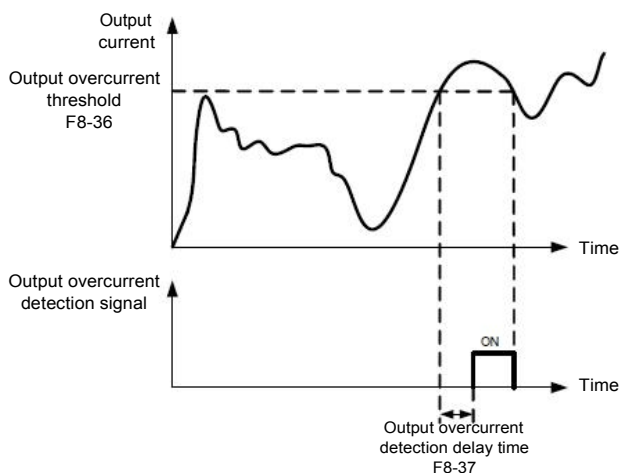
Function Code	Parameter Name	Setting Range	Default
F8-38	Any current reaching 1	0.0%–300.0% (rated motor current)	100.0%
F8-39	Any current reaching 1 amplitude	0.0%–300.0% (rated motor current)	0.0%
F8-40	Any current reaching 2	0.0%–300.0% (rated motor current)	100.0%
F8-41	Any current reaching 2 amplitude	0.0%–300.0% (rated motor current)	0.0%

If the output current of the AC drive is within the positive and negative amplitudes of any current reaching detection value, the corresponding DO becomes ON.

The H300 provides two groups of any current reaching detection parameters, including current detection value and detection amplitudes, as shown in the following figure.

Figure 6-24 Any current reaching detection
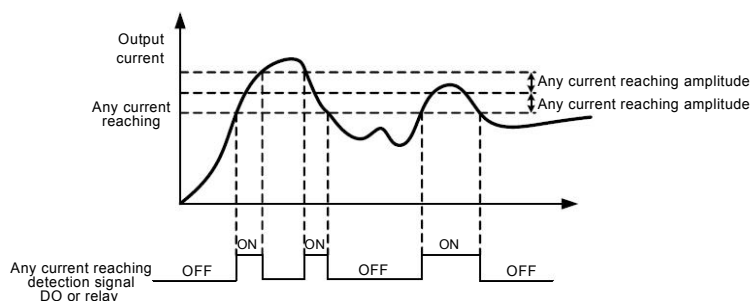
Function Code	Parameter Name	Setting Range	Default
F8-42	Timing function	0: Disabled 1: Enabled	0
F8-43	Timing duration source	0: F8-44 1: AI1 2: AI2 3: AI3 (100% of analog input corresponds to the value of F8-44)	0
F8-44	Timing duration	0.0–6500.0 min	0.0 min

These parameters are used to implement the AC drive timing function.

If F8-42 is set to 1, the AC drive starts to time at startup. When the set timing duration is reached, the AC drive stops automatically and meanwhile the corresponding DO becomes ON.

The AC drive starts timing from 0 each time it starts up and the remaining timing duration can be queried by U0-20.

The timing duration is set in F8-43 and F8-44, in unit of minute.

Function Code	Parameter Name	Setting Range	Default
F8-45	AI1 input voltage lower limit	0.00 V to F8-46	3.10 V
F8-46	AI1 input voltage upper limit	F8-45 to 10.00 V	6.80 V

These two parameters are used to set the limits of the input voltage to provide protection on the AC drive. When the AI1 input is larger than the value of F8-46 or smaller than the value of F8-45, the corresponding DO becomes ON, indicating that AI1 input exceeds the limit.

Function Code	Parameter Name	Setting Range	Default
F8-47	Module temperature threshold	0–75 °C	75 °C

When the heatsink temperature of the AC drive reaches the value of this parameter, the corresponding DO becomes ON, indicating that the module temperature reaches the threshold.

Function Code	Parameter Name	Setting Range	Default
F8-48	Cooling fan control	0: Fan working during running	0
		1: Fan working continuously	

It is used to set the working mode of the cooling fan. If this parameter is set to 0, the fan works when the AC drive is in running state. When the AC drive stops, the cooling fan works if the heatsink temperature is higher than 40°C, and stops working if the heatsink temperature is lower than 40°C.

If this parameter is set to 1, the cooling fan keeps working after power-on.

Function Code	Parameter Name	Setting Range	Default
F8-49	Wakeup frequency	Dormant frequency (F8-51) to maximum frequency (F0-10)	0.00 Hz
F8-50	Wakeup delay time	0.0–6500.0s	0.0s
F8-51	Dormant frequency	0.00 Hz to wakeup frequency (F8-49)	0.00 Hz
F8-52	Dormant delay time	0.0–6500.0s	0.0s

These parameters are used to implement the dormant and wakeup functions in the water supply application.

When the AC drive is in running state, the AC drive enters the dormant state and stops automatically after the dormant delay time (F8-52) if the set frequency is lower than or equal to the dormant frequency (F8-51).

When the AC drive is in dormant state and the current running command is effective, the AC drives starts up after the wakeup delay time (F8-50) if the set frequency is higher than or equal to the wakeup frequency (F8-49).

Generally, set the wakeup frequency equal to or higher than the dormant frequency. If the wakeup frequency and dormant frequency are set to 0, the dormant and wakeup functions are disabled.

When the dormant function is enabled, if the frequency source is PID, whether PID operation is performed in the dormant state is determined by FA-28. In this case, select PID operation enabled in the stop state (FA-28 = 1).

Function Code	Parameter Name	Setting Range	Default
F8-53	Current running time reached	0.0–6500.0 min	0.0 min

If the current running time reaches the value set in this parameter, the corresponding DO becomes ON, indicating that the current running time is reached.

Function Code	Parameter Name	Setting Range	Default
F8-54	Output power correction coefficient	0.00%–200 .0%	100.0%

When the output power (U0-05) is not equal to the required value, you can perform linear correction on output power by using this parameter.

Group F9: Process Control PID Function

PID control is a general process control method. By performing proportional, integral and differential operations on the difference between the feedback signal and the target signal, it adjusts the output frequency and constitutes a feedback system to stabilize the controlled counter around the target value.

It is applied to process control such as flow control, pressure control and temperature control. The following figure shows the principle block diagram of PID control.

Figure 6-27 Principle block diagram of PID control
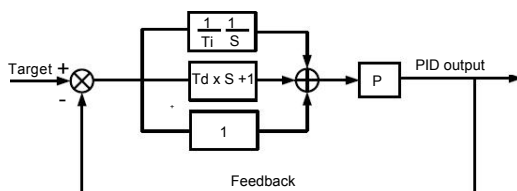
Function Code	Parameter Name	Setting Range	Default
F9-00	PID setting source	0: F9-01 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting 6: Multi-reference	0
F9-01	PID digital setting	0.0%–100.0%	50.0%

F9-00 is used to select the channel of target process PID setting. The PID setting is a relative value and ranges from 0.0% to 100.0%. The PID feedback is also a relative value. The purpose of PID control is to make the PID setting and PID feedback equal.

Function Code	Parameter Name	Setting Range	Default
F9-02	PID feedback source	0: AI1 1: AI2 2: AI3 3: AI1 – AI2 4: Pulse setting (DI5) 5: Communication setting 6: AI1 + AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	0

This parameter is used to select the feedback signal channel of process PID.

The PID feedback is a relative value and ranges from 0.0% to 100.0%.

Function Code	Parameter Name	Setting Range	Default
F9-03	PID action direction	0: Forward action 1: Reverse action	0

• 0: Forward action

When the feedback value is smaller than the PID setting, the AC drive's output frequency rises. For example, the winding tension control requires forward PID action.

• 1: Reverse action

When the feedback value is smaller than the PID setting, the AC drive's output frequency reduces. For example, the unwinding tension control requires reverse PID action.

Note that this function is influenced by the DI function 35 "Reverse PID action direction".

Function Code	Parameter Name	Setting Range	Default
F9-04	PID setting feedback range	0–65535	1000

This parameter is a non-dimensional unit. It is used for PID setting display (U0-15) and PID feedback display (U0-16).

Relative value 100% of PID setting feedback corresponds to the value of F9-04. If F9-04 is set to 2000 and PID setting is 100.0%, the PID setting display (U0-15) is 2000.

Function Code	Parameter Name	Setting Range	Default
F9-05	Proportional gain Kp1	0.0–100.0	20.0
F9-06	Integral time Ti1	0.01–10.00s	2.00s
F9-07	Differential time Td1	0.00–10.000	0.000s

- F9-05 (Proportional gain Kp1)

  It decides the regulating intensity of the PID regulator. The higher the Kp1 is, the larger the regulating intensity is. The value 100.0 indicates when the deviation between PID feedback and PID setting is 100.0%, the adjustment amplitude of the PID regulator on the output frequency reference is the maximum frequency.

- F9-06 (Integral time Ti1)

  It decides the integral regulating intensity. The shorter the integral time is, the larger the regulating intensity is. When the deviation between PID feedback and PID setting is 100.0%, the integral regulator performs continuous adjustment for the time set in FA-06. Then the adjustment amplitude reaches the maximum frequency.

- F9-07 (Differential time Td1)

  It decides the regulating intensity of the PID regulator on the deviation change. The longer the differential time is, the larger the regulating intensity is. Differential time is the time within which the feedback value change reaches 100.0%, and then the adjustment amplitude reaches the maximum frequency.

Function Code	Parameter Name	Setting Range	Default
F9-08	Cut-off frequency of PID reverse rotation	0.00 to maximum frequency	2.00 Hz

In some situations, only when the PID output frequency is a negative value (AC drive reverse rotation), PID setting and PID feedback can be equal. However, too high reverse rotation frequency is prohibited in some applications, and FA-08 is used to determine the reverse rotation frequency upper limit.

Function Code	Parameter Name	Setting Range	Default
F9-09	PID deviation limit	0.0%–100.0%	0.0%

If the deviation between PID feedback and PID setting is smaller than the value of FA-09, PID control stops. The small deviation between PID feedback and PID setting will make the output frequency stabilize, effective for some closed-loop control applications.

Function Code	Parameter Name	Setting Range	Default
F9-10	PID differential limit	0.00%–100.00%	0.10%

It is used to set the PID differential output range. In PID control, the differential operation may easily cause system oscillation. Thus, the PID differential regulation is restricted to a small range.

Function Code	Parameter Name	Setting Range	Default
F9-11	PID setting change time	0.00–650.00s	0.00s

The PID setting change time indicates the time required for PID setting changing from 0.0% to 100.0%. The PID setting changes linearly according to the change time, reducing the impact caused by sudden setting change on the system.

Function Code	Parameter Name	Setting Range	Default
F9-12	PID feedback filter time	0.00–60.00s	0.00s
F9-13	PID output filter time	0.00–60.00s	0.00s

FA-12 is used to filter the PID feedback, helping to reduce interference on the feedback but slowing the response of the process closed-loop system.

FA-13 is used to filter the PID output frequency, helping to weaken sudden change of the AC drive output frequency but slowing the response of the process closed-loop system.

Function Code	Parameter Name	Setting Range	Default
F9-14	Proportional gain Kp2	0.0–100.0	20.0
F9-15	Integral time Ti2	0.01–10.00s	2.00s
F9-16	Differential time Td2	0.000–10.000s	0.000s
F9-17	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Automatic switchover based on deviation	0
F9-18	PID parameter switchover deviation 1	0.0% to F9-19	20.0%
F9-19	PID parameter switchover deviation 2	F9-18 to 100.0%	80.0%

In some applications, PID parameters switchover is required when one group of PID parameters cannot satisfy the requirement of the whole running process.

These parameters are used for switchover between two groups of PID parameters. Regulator parameters F9-14 to F9-16 are set in the same way as F9-05 to F9-07.

The switchover can be implemented either via a DI terminal or automatically implemented based on the deviation.

If you select switchover via a DI terminal, the DI must be allocated with function 43 "PID parameter switchover". If the DI is OFF, group 1 (F9-05 to F9-07) is selected. If the DI is ON, group 2 (F9-14 to F9-16) is selected.

If you select automatic switchover, when the absolute value of the deviation between PID feedback and PID setting is smaller than the value of F9-18, group 1 is selected. When the absolute value of the deviation between PID feedback and PID setting is higher than the value of F9-19, group 2 is selected. When the deviation is between F9-18 and F9-19, the PID parameters are the linear interpolated value of the two groups of parameter values.

Figure 6-28 PID parameters switchover
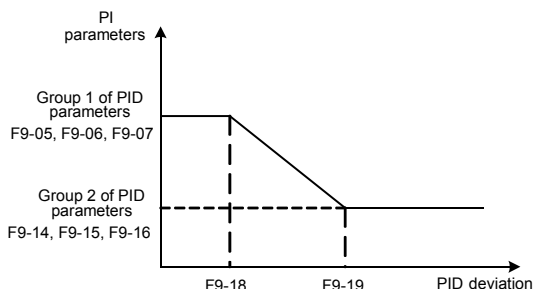
Function Code	Parameter Name	Setting Range	Default
F9-20	PID initial value	0.0%–100.0%	0.0%
F9-21	PID initial value holding time	0.00–650.00s	0.00s

When the AC drive starts up, the PID starts closed-loop algorithm only after the PID output is fixed to the PID initial value (F9-20) and lasts the time set in F9-21.

Figure 6-29 PID initial value function
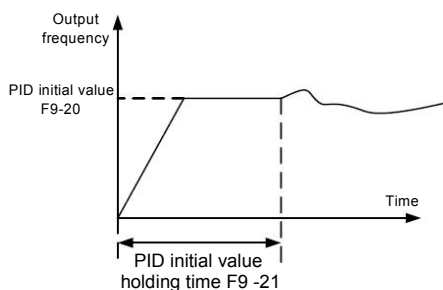
Function Code	Parameter Name	Setting Range	Default
F9-22	Maximum deviation between two PID outputs in forward direction	0.00%–100.00%	1.00%
F9-23	Maximum deviation between two PID outputs in reverse direction	0.00%–100.00%	1.00%

This function is used to limit the deviation between two PID outputs (2 ms per PID output) to suppress the rapid change of PID output and stabilize the running of the AC drive.

F9-22 and F9-23 respectively correspond to the maximum absolute value of the output deviation in forward direction and in reverse direction.

Function Code	Parameter Name	Setting Range	Default
F9-24	PID integral property	Unit's digit (Integral separated)	00
		0: Invalid	
		1: Valid	
		Ten's digit (Whether to stop integral operation when the output reaches the limit)	
		0: Continue integral operation	
		1: Stop integral operation	

•   Integral separated

If it is set to valid, , the PID integral operation stops when the DI allocated with function 38 "PID integral pause" is ON In this case, only proportional and differential operations take effect.

If it is set to invalid, integral separated remains invalid no matter whether the DI allocated with function 38 "PID integral pause" is ON or not.

•   Whether to stop integral operation when the output reaches the limit

If "Stop integral operation" is selected, the PID integral operation stops, which may help to reduce the PID overshoot.

Function Code	Parameter Name	Setting Range	Default
F9-25	Detection value of PID feedback loss	0.0%: Not judging feedback loss 0.1%–100.0%	0.0%
F9-26	Detection time of PID feedback loss	0.0–20.0s	0.0s

These parameters are used to judge whether PID feedback is lost.

If the PID feedback is smaller than the value of F9-25 and the lasting time exceeds the value of F9-26, the AC drive reports Err31 and acts according to the selected fault protection action.

Function Code	Parameter Name	Setting Range	Default
F9-27	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0

It is used to select whether to continue PID operation in the state of stop. Generally, the PID operation stops when the AC drive stops.

Group FA: Fault and Protection

Function Code	Parameter Name	Setting Range	Default
FA-00	Motor overload protection selection	0: Disabled 1: Enabled	1
FA-01	Motor overload protection gain	0.20–10.00	1.00

•   FA-00 = 0

The motor overload protective function is disabled. The motor is exposed to potential damage due to overheating. A thermal relay is suggested to be installed between the AC drive and the motor.

- FA-00 = 1

  The AC drive judges whether the motor is overloaded according to the inverse time-lag curve of the motor overload protection.

  The inverse time-lag curve of the motor overload protection is:

  220% x FA-01 x rated motor current (if the load remains at this value for one minute, the AC drive reports motor overload fault), or

  150% x FA-01 x rated motor current (if the load remains at this value for 60 minutes, the AC drive reports motor overload fault)

Set FA-01 properly based on the actual overload capacity. If the value of FA-01 is set too large, damage to the motor may result because the motor overheats but the AC drive does not report the alarm.

Function Code	Parameter Name	Setting Range	Default
FA-02	Motor overload warning coefficient	50%–100%	80%

This function is used to give a warning signal to the control system via DO before motor overload protection. This parameter is used to determine the percentage, at which pre-warning is performed before motor overload. The larger the value is, the less advanced the pre-warning will be.

When the accumulative output current of the AC drive is greater than the value of the overload inverse time-lag curve multiplied by FA-02, the DO terminal on the AC drive allocated with function 6 (Motor overload pre-warning) becomes ON.

Function Code	Parameter Name	Setting Range	Default
FA-03	Overvoltage stall gain	0 (no stall overvoltage)–100	0
FA-04	Overvoltage stall protective voltage	120%–150%	130%

When the DC bus voltage exceeds the value of FA-04 (Overvoltage stall protective voltage) during deceleration of the AC drive, the AC drive stops deceleration and keeps the present running frequency. After the bus voltage declines, the AC drive continues to decelerate.

FA-03 (Overvoltage stall gain) is used to adjust the overvoltage suppression capacity of the AC drive. The larger the value is, the greater the overvoltage suppression capacity will be.

In the prerequisite of no overvoltage occurrence, set FA-03 to a small value.

For small-inertia load, the value should be small. Otherwise, the system dynamic response will be slow. For large-inertia load, the value should be large. Otherwise, the suppression result will be poor and an overvoltage fault may occur.

If the overvoltage stall gain is set to 0, the overvoltage stall function is disabled. The overvoltage stall protective voltage setting 100% corresponds to the base values in the following table:

Function Code	Parameter Name	Setting Range	Default
FA-05	Overcurrent stall gain	0–100	20
FA-06	Overcurrent stall protective current	100%–200%	150%

When the output current exceeds the overcurrent stall protective current during acceleration/deceleration of the AC drive, the AC drive stops acceleration/deceleration and keeps the present running frequency. After the output current declines, the AC drive continues to accelerate/decelerate.

FA-05 (Overcurrent stall gain) is used to adjust the overcurrent suppression capacity of the AC drive. The larger the value is, the greater the overcurrent suppression capacity will be. In the prerequisite of no overcurrent occurrence, set FA-05 to a small value.

For small-inertia load, the value should be small. Otherwise, the system dynamic response will be slow. For large-inertia load, the value should be large. Otherwise, the suppression result will be poor and overcurrent fault may occur.

If the overcurrent stall gain is set to 0, the overcurrent stall function is disabled.

Figure 6-25 Diagram of the overcurrent stall protection function
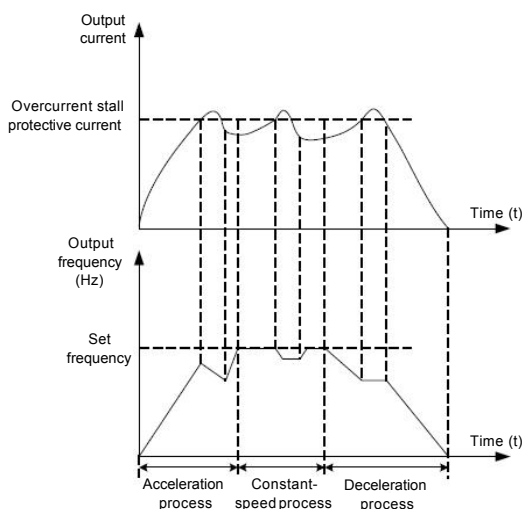
Function Code	Parameter Name	Setting Range	Default
FA-07	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	1

It is used to determine whether to check the motor is short-circuited to ground at power-on of the AC drive. If this function is enabled, the AC drive's UVW will have voltage output a while after power-on.

Function Code	Parameter Name	Setting Range	Default
FA-08	Rapid current limit	0: Disabled 1: Enabled	1

The rapid current limit function can reduce the AC drive's overcurrent faults at maximum, guaranteeing uninterrupted running of the AC drive.
However, long-time rapid current limit may cause the AC drive to overheat, which is not allowed. In this case, the AC drive will report Err40, indicating the AC drive is overloaded and needs to stop.

Function Code	Parameter Name	Setting Range	Default
FA-09	Fault auto reset times	0–20	0

It is used to set the times of fault auto resets if this function is used. After the value is exceeded, the AC drive will remain in the fault state.

Function Code	Parameter Name	Setting Range	Default
FA-10	DO action during fault auto reset	0: Not act 1: Act	0

It is used to decide whether the DO acts during the fault auto reset if the fault auto reset function is selected.

Function Code	Parameter Name	Setting Range	Default
FA-11	Time interval of fault auto reset	0.1s–100.0s	1.0s

It is used to set the waiting time from the alarm of the AC drive to fault auto reset.

Function Code	Parameter Name	Setting Range	Default
FA-12	Input phase loss protection/contactor energizing protection selection	Unit's digit: Input phase loss protection Ten's digit: Contactor energizing protection 0: Disabled 1: Enabled	11

It is used to determine whether to perform input phase loss or contactor energizing protection.

The H300 models that provide this function are listed in the following table.

Table 6-8 H300 models providing the input phase loss or contactor energizing protection function

Voltage Class	Models
Single-phase 220 V	None
Three-phase 220 V	7.5 kW G model
Three-phase 380 V	11 kW G model

For every voltage class, the H300 AC drives of powers equal to or greater than those listed in the preceding table provide the function of input phase loss or contactor energizing protection. The H300 AC drives below the power listed in the table do not have the function no matter whether FA-12 is set to 0 or 1.

Function Code	Parameter Name	Setting Range	Default
FA-13	Output phase loss protection selection	0: Disabled 1: Enabled	1

It is used to determine whether to perform output phase loss protection.

Function Code	Parameter Name	Setting Range	Default
FA-16	Fault protection action selection 1	Unit's digit (Motor overload, Err11)	00000
		0: Coast to stop 1: Stop according to the stop mode 2: Continue to run	
		Ten's digit (Power input phase loss, Err12)	
		Same as unit's digit	
		Hundred's digit (Power output phase loss, Err13)	
		Same as unit's digit	
		Thousand's digit (External equipment fault, Err15)	
		Same as unit's digit	
		Ten thousand's digit (Communication fault, Err16)	
		Same as unit's digit	
FA-17	Fault protection action selection 2	Unit's digit (Encoder fault, Err20)	00000
		0: Coast to stop 1: Switch over to V/F control, stop according to the stop mode 2: Switch over to V/F control, continue to run	
		Ten's digit (EEPROM read-write fault, Err21)	
		0: Coast to stop 1: Stop according to the stop mode	
		Hundred's digit: reserved	
		Thousand's digit (Motor overheat, Err25)	
		Same as unit's digit in F9-47	
		Ten thousand's digit (Accumulative running time reached)	
		Same as unit's digit in F9-47	

Function Code	Parameter Name	Setting Range	Default
FA-18	Fault protection action selection 3	Unit's digit (User-defined fault 1, Err27)	00000
		Same as unit's digit in FA-16	
		Ten's digit (User-defined fault 2, Err28)	
		Same as unit's digit in FA-16	
		Hundred's digit (Accumulative power-on time reached, Err29)	
		Same as unit's digit in FA-16	
		Thousand's digit (Load becoming 0, Err30)	
		0: Coast to stop	
		1: Stop according to the stop mode	
		2: Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers	
		Ten thousand's digit (PID feedback lost during running, Err31)	
		Same as unit's digit in FA-16	
FA-19	Fault protection action selection 4	Unit's digit (Too large speed deviation, Err42)	00000
		Same as unit's digit in FA-16	
		Ten's digit (Motor over-speed, Err43)	
		Same as unit's digit in FA-16	
		Hundred's digit (Initial position fault, Err51)	
		Same as unit's digit in FA-16	
		Thousand's digit (Speed feedback fault, Err52)	
		Same as unit's digit in FA-16	
		Ten thousand's digit: Reserved	

If "Coast to stop" is selected, the AC drive displays Err** and directly stops.

• If "Stop according to the stop mode" is selected, the AC drive displays A** and stops according to the stop mode. After stop, the AC drive displays Err**.

• If "Continue to run" is selected, the AC drive continues to run and displays A**. The running frequency is set in FA-22.

Function Code	Parameter Name	Setting Range	Default
FA-21	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0
FA-22	Backup frequency upon abnormality	0.0%–100.0% (maximum frequency)	100.0%

If a fault occurs during the running of the AC drive and the handling of fault is set to "Continue to run", the AC drive displays A** and continues to run at the frequency set in F9-21.

The setting of F9-22 is a percentage relative to the maximum frequency.

Function Code	Parameter Name	Setting Range	Default
FA-23	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0
FA-24	Action pause judging voltage at instantaneous power failure	80.0%–100.0%	90.0%
FA-25	Voltage rally judging time at instantaneous power failure	0.00–100.00s	0.50s
FA-26	Action judging voltage at instantaneous power failure	60.0%–100.0% (standard bus voltage)	80.0%

Upon instantaneous power failure or sudden voltage dip, the DC bus voltage of the AC drive reduces. This function enables the AC drive to compensate the DC bus voltage reduction with the load feedback energy by reducing the output frequency so as to keep the AC drive running continuously.

- If FA-23 = 1, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates. Once the bus voltage resumes to normal, the AC drive accelerates to the set frequency. If the bus voltage remains normal for the time exceeding the value set in FA-25, it is considered that the bus voltage resumes to normal.

- If FA-23 = 2, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates to stop.

Figure 6-26 AC drive action diagram upon instantaneous power failure
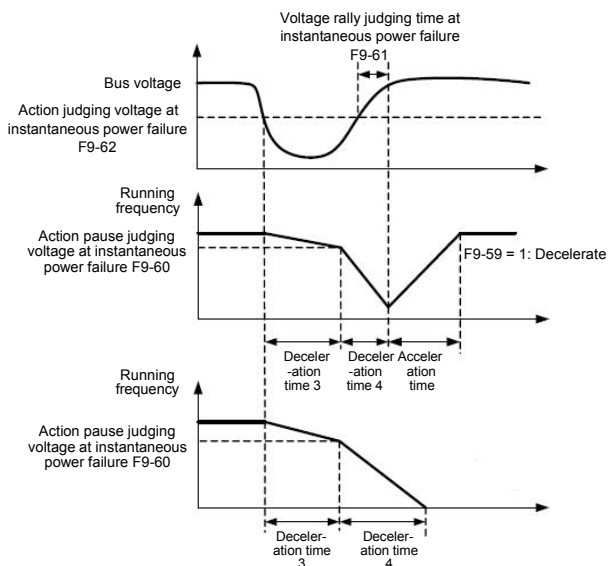
Function Code	Parameter Name	Setting Range	Default
FA-27	Protection upon load becoming 0	0: Disabled 1: Enabled	0
FA-28	Detection level of load becoming 0	0.0%–100.0% (rated motor current)	10.0%
FA-29	Detection time of load becoming 0	0.0–60.0s	1.0s

If protection upon load becoming 0 is enabled, when the output current of the AC drive is lower than the detection level (FA-28) and the lasting time exceeds the detection time (FA-29), the output frequency of the AC drive automatically declines to 7% of the rated frequency. During the protection, the AC drive automatically accelerates to the set frequency if the load resumes to normal.

Function Code	Parameter Name	Setting Range	Default
FA-33	Detection value of too large speed deviation	0.0%–50.0% (maximum frequency)	20.0%
FA-34	Detection time of too large speed deviation	0.0–60.0s	5.0s

This function is valid only when the AC drive runs in the SVC mode.

If the AC drive detects the deviation between the actual motor rotational speed detected by the AC drive and the set frequency is greater than the value of F9-33 and the lasting time exceeds the value of F9-34, the AC drive reports Err42 and according to the selected fault protection action.

If F9-34 (Detection time of too large speed deviation) is 0.0s, this function is disabled.

Group FB: Swing Frequency, Fixed Length and Count

The swing frequency function is applied to the textile and chemical fiber fields and the applications where traversing and winding functions are required.

The swing frequency function indicates that the output frequency of the AC drive swings up and down with the set frequency as the center. The trace of running frequency at the time axis is shown in the following figure.

The swing amplitude is set in FB-00 and FB-01. When FB-01 is set to 0, the swing amplitude is 0 and the swing frequency does not take effect.

Figure 6-30 Swing frequency control
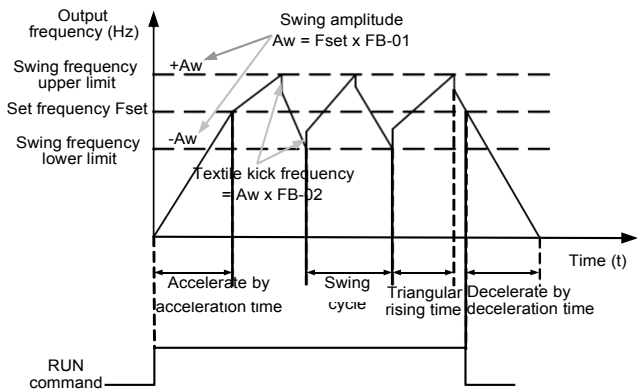
Function Code	Parameter Name	Setting Range	Default
FB-00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0

This parameter is used to select the base value of the swing amplitude.

- 0: Relative to the central frequency (F0-07 frequency source selection)

  It is variable swing amplitude system. The swing amplitude varies with the central frequency (set frequency).

- 1: Relative to the maximum frequency (F0-10 maximum output frequency)

  It is fixed swing amplitude system. The swing amplitude is fixed.

Function Code	Parameter Name	Setting Range	Default
FB-01	Swing frequency amplitude	0.0%–100.0%	0.0%
FB-02	Jump frequency amplitude	0.0%–50.0%	0.0%

This parameter is used to determine the swing amplitude and jump frequency amplitude. The swing frequency is limited by the frequency upper limit and frequency lower limit.

- If relative to the central frequency (FB-00 = 0), the actual swing amplitude AW is the calculation result of F0-07 (Frequency source selection) multiplied by FB-01.

- If relative to the maximum frequency (FB-00 = 1), the actual swing amplitude AW is the calculation result of F0-10 (Maximum frequency) multiplied by FB-01.

Jump frequency = Swing amplitude AW x FB-02 (Jump frequency amplitude).

- If relative to the central frequency (FB-00 = 0), the jump frequency is a variable value.

- If relative to the maximum frequency (FB-00 = 1), the jump frequency is a fixed value.

The swing frequency is limited by the frequency upper limit and frequency lower limit.

Function Code	Parameter Name	Setting Range	Default
FB-03	Swing frequency cycle	0.0–3000.0s	10.0s
FB-04	Triangular wave rising time coefficient	0.0%–100.0%	50.0%

FB-03 specifies the time of a complete swing frequency cycle.

FB-04 specifies the time percentage of triangular wave rising time to FB-03 (Swing frequency cycle).

• Triangular wave rising time = FB-03 (Swing frequency cycle) x FB-04 (Triangular wave rising time coefficient, unit: s)

• Triangular wave falling time = FB-03 (Swing frequency cycle) x (1 – FB-04 Triangular wave rising time coefficient ,unit: s)

Function Code	Parameter Name	Setting Range	Default
FB-05	Set length	0–65535 m	1000 m
FB-06	Actual length	0–65535 m	0 m
FB-07	Number of pulses per meter	0.1–6553.5	100.0

The preceding parameters are used for fixed length control.

The length information is collected by DI terminals. FB-06 (Actual length) is calculated by dividing the number of pulses collected by the DI terminal by FB-07 (Number of pulses each meter).

When the actual length FB-06 exceeds the set length in FB-05, the DO terminal allocated with function 10 (Length reached) becomes ON.

During the fixed length control, the length reset operation can be performed via the DI terminal allocated with function 28. For details, see the descriptions of F4-00 to F4-09.

Allocate corresponding DI terminal with function 27 (Length count input) in applications. If the pulse frequency is high, DI5 must be used.

Function Code	Parameter Name	Setting Range	Default
FB-08	Set count value	1–65535	1000
FB-09	Designated count value	1–65535	1000

The count value needs to be collected by DI terminal. Allocate the corresponding DI terminal with function 25 (Counter input) in applications. If the pulse frequency is high, DI5 must be used.

When the count value reaches the set count value (FB-08), the DO terminal allocated with function 8 (Set count value reached) becomes ON. Then the counter stops counting.

When the counting value reaches the designated counting value (FB-09), the DO terminal allocated with function 9 (Designated count value reached) becomes ON. Then the counter continues to count until the set count value is reached.

FB-09 should be equal to or smaller than FB-08.

Figure 6-31 Reaching the set count value and designated count value
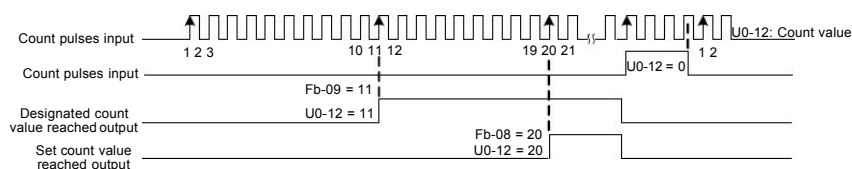
Group FD: Multi-Reference and Simple PLC Function

The H300 multi-reference has many functions. Besides multi-speed, it can be used as the setting source of the V/F separated voltage source and setting source of process PID. In addition, the multi-reference is relative value.

The simple PLC function is different from the H300 user programmable function. Simple PLC can only complete simple combination of multi-reference, while the user programmable function is more practical. For details, see the descriptions of group A7.

Function Code	Parameter Name	Setting Range	Default
FD-00	Reference 0	-100.0%–100.0%	0.0%
FD-01	Reference 1	-100.0%–100.0%	0.0%
FD-02	Reference 2	-100.0%–100.0%	0.0%
FD-03	Reference 3	-100.0%–100.0%	0.0%
FD-04	Reference 4	-100.0%–100.0%	0.0%
FD-05	Reference 5	-100.0%–100.0%	0.0%
FD-06	Reference 6	-100.0%–100.0%	0.0%
FD-07	Reference 7	-100.0%–100.0%	0.0%
FD-08	Reference 8	-100.0%–100.0%	0.0%
FD-09	Reference 9	-100.0%–100.0%	0.0%
FD-10	Reference 10	-100.0%–100.0%	0.0%
FD-11	Reference 11	-100.0%–100.0%	0.0%
FD-12	Reference 12	-100.0%–100.0%	0.0%
FD-13	Reference 13	-100.0%–100.0%	0.0%
FD-14	Reference 14	-100.0%–100.0%	0.0%
FD-15	Reference 15	-100.0%–100.0%	0.0%

Multi-reference can be the setting source of frequency, V/F separated voltage and process PID. The multi-reference is relative value and ranges from -100.0% to 100.0%.

As frequency source, it is a percentage relative to the maximum frequency. As V/F separated voltage source, it is a percentage relative to the rated motor voltage. As process PID setting source, it does not require conversion.

Multi-reference can be switched over based on different states of DI terminals. For details, see the descriptions of group F4.
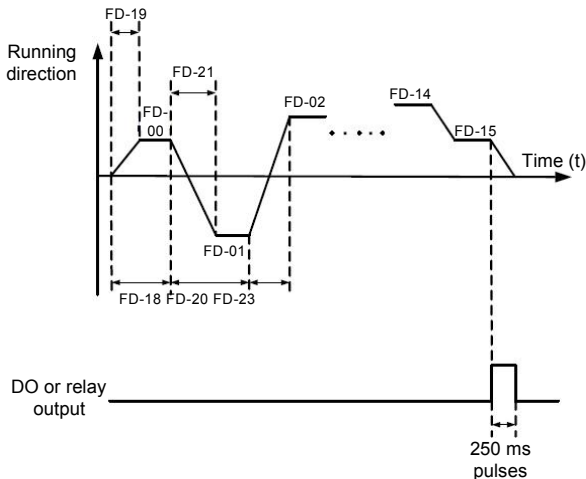
Function Code	Parameter Name	Setting Range	Default
FD-16	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0

- 0: Stop after the AC drive runs one cycle

  The AC drive stops after running one cycle, and will not start up until receiving another command.

- 1: Keep final values after the AC drive runs one cycle

  The AC drive keeps the final running frequency and direction after running one cycle.

- 2: Repeat after the AC drive runs one cycle

  The AC drive automatically starts another cycle after running one cycle, and will not stop until receiving the stop command.

Simple PLC can be either the frequency source or V/F separated voltage source.

When simple PLC is used as the frequency source, whether parameter values of FD-00 to FD-15 are positive or negative determines the running direction. If the parameter values are negative, it indicates that the AC drive runs in reverse direction.

Figure 6-32 Simple PLC when used as frequency source

Function Code	Parameter Name	Setting Range	Default
FD-17	Simple PLC retentive selection	Unit's digit (Retentive upon power failure) 0: No 1: Yes Ten's digit (Retentive upon stop) 0: No 1: Yes	00

PLC retentive upon power failure indicates that the AC drive memorizes the PLC running moment and running frequency before power failure and will continue to run from the memorized moment after it is powered on again. If the unit's digit is set to 0, the AC drive restarts the PLC process after it is powered on again.

PLC retentive upon stop indicates that the AC drive records the PLC running moment and running frequency upon stop and will continue to run from the recorded moment after it starts up again. If the ten's digit is set to 0, the AC drive restarts the PLC process after it starts up again.

Function Code	Parameter Name	Setting Range	Default
FD-18	Running time of simple PLC reference 0	0.0–6553.5s (h)	0.0s (h)
FD-19	Acceleration/deceleration time of simple PLC reference 0	0–3	0
FD-20	Running time of simple PLC reference 1	0.0–6553.5s (h)	0.0s (h)
FD-21	Acceleration/deceleration time of simple PLC reference 1	0–3	0
FD-22	Running time of simple PLC reference 2	0.0–6553.5s (h)	0.0s (h)
FD-23	Acceleration/deceleration time of simple PLC reference 2	0–3	0
FD-24	Running time of simple PLC reference 3	0.0–6553.5s (h)	0.0s (h)
FD-25	Acceleration/deceleration time of simple PLC reference 3	0–3	0
FD-26	Running time of simple PLC reference 4	0.0–6553.5s (h)	0.0s (h)
FD-27	Acceleration/deceleration time of simple PLC reference 4	0–3	0
FD-28	Running time of simple PLC reference 5	0.0–6553.5s (h)	0.0s (h)
FD-29	Acceleration/deceleration time of simple PLC reference 5	0–3	0
FD-30	Running time of simple PLC reference 6	0.0–6553.5s (h)	0.0s (h)
FD-31	Acceleration/deceleration time of simple PLC reference 6	0–3	0
FD-32	Running time of simple PLC reference 7	0.0–6553.5s (h)	0.0s (h)
FD-33	Acceleration/deceleration time of simple PLC reference 7	0–3	0

Function Code	Parameter Name	Setting Range	Default
FD-34	Running time of simple PLC reference 8	0.0–6553.5s (h)	0.0s (h)
FD-35	Acceleration/deceleration time of simple PLC reference 8	0–3	0
FD-36	Running time of simple PLC reference 9	0.0–6553.5s (h)	0.0s (h)
FD-37	Acceleration/deceleration time of simple PLC reference 9	0–3	0
FD-38	Running time of simple PLC reference 10	0.0–6553.5s (h)	0.0s (h)
FD-39	Acceleration/deceleration time of simple PLC reference 10	0–3	0
FD-40	Running time of simple PLC reference 11	0.0–6553.5s (h)	0.0s (h)
FD-41	Acceleration/deceleration time of simple PLC reference 11	0–3	0
FD-42	Running time of simple PLC reference 12	0.0–6553.5s (h)	0.0s (h)
FD-43	Acceleration/deceleration time of simple PLC reference 12	0–3	0
FD-44	Running time of simple PLC reference 13	0.0–6553.5s (h)	0.0s (h)
FD-45	Acceleration/deceleration time of simple PLC reference 13	0–3	0
FD-46	Running time of simple PLC reference 14	0.0–6553.5s (h)	0.0s (h)
FD-47	Acceleration/deceleration time of simple PLC reference 14	0–3	0
FD-48	Running time of simple PLC reference 15	0.0–6553.5s (h)	0.0s (h)
FD-49	Acceleration/deceleration time of simple PLC reference 15	0–3	0
FD-50	Time unit of simple PLC running	0: s (second) 1: h (hour)	0

Function Code	Parameter Name	Setting Range	Default
FD-51	Reference 0 source	0: Set by FD-00 1: AI1 2: AI2 3: AI3 4: Pulse setting 5: PID 6: Set by preset frequency (F0-07), modified via terminal UP/DOWN	0

It determines the setting channel of reference 0. You can perform convenient switchover between the setting channels. When multi-reference or simple PLC is used as frequency source, the switchover between two frequency sources can be realized easily.

Group FE: Error Record Function Codes

Function Code	Name	Setting Range
FE-00	1st fault type	
FE-01	2nd fault type	0–99
FE-02	3rd (latest) fault type	

It is used to record the types of the most recent three faults of the AC drive. 0 indicates no fault. For possible causes and solution of each fault, refer to Chapter 8.

Function Code	Parameter Name	Description
FE-03	Frequency upon 3rd fault	It displays the frequency when the latest fault occurs.
FE-04	Current upon 3rd fault	It displays the current when the latest fault occurs.
FE-05	Bus voltage upon 3rd fault	It displays the bus voltage when the latest fault occurs.

Function Code	Parameter Name	Description
FE-06	DI status upon 3rd fault	It displays the status of all DI terminals when the latest fault occurs. The sequence is as follows: | BIT9	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
DI0	DI9	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1	 If a DI is ON, the setting is 1. If the DI is OFF, the setting is 0. The value is the equivalent decimal number converted from the DI status..
FE-07	Output terminal status upon 3rd fault	It displays the status of all output terminals when the latest fault occurs. The sequence is as follows: 	BIT4	BIT3	BIT2	BIT1	BIT0
DO2	DO1	REL2	REL1	FMP	 If an output terminal is ON, the setting is 1. If the output terminal is OFF, the setting is 0. The value is the equivalent decimal number converted from the DI statuses.
FE-08	AC drive status upon 3rd fault	Reserved
FE-09	Power-on time upon 3rd fault	It displays the present power-on time when the latest fault occurs.
FE-10	Running time upon 3rd fault	It displays the present running time when the latest fault occurs.
FE-11	Frequency upon 2nd fault	Same as F9-17–F9-24.
FE-12	Current upon 2nd fault	
FE-13	Bus voltage upon 2nd fault	
FE-14	DI status upon 2nd fault	
FE-15	Output terminal status upon 2nd fault	
FE-16	AC drive status upon 2nd fault	
FE-17	Power-on time upon 2nd fault	
FE-18	Running time upon 2nd fault	
FE-19	Frequency upon 1st fault	Same as F9-17–F9-24.
FE-20	Current upon 1st fault	
FE-21	Bus voltage upon 1st fault	
FE-22	DI status upon 1st fault	
FE-23	Output terminal upon 1st fault	
FE-24	AC drive status upon 1st fault	
FE-25	Power-on time upon 1st fault	
FE-26	Running time upon 1st fault	

Group FP: User Password

Function Code	Parameter Name	Setting Range	Default
FP-00	User password	0–65535	0

If it is set to any non-zero number, the password protection function is enabled. After a password has been set and taken effect, you must enter the correct password in order to enter the menu. If the entered password is incorrect you cannot view or modify parameters.

If FP-00 is set to 00000, the previously set user password is cleared, and the password protection function is disabled.

Function Code	Parameter Name	Setting Range	Default
FP-01	Restore default settings	0: No operation 1: Restore factory settings except motor parameters 2: Clear records 4: Restore user backup parameters 501: Back up current user parameters	0

- 1: Restore default settings except motor parameters

  If FP-01 is set to 1, most function codes are restored to the default settings except motor parameters, frequency reference resolution (F0-22), fault records, accumulative running time (F7-09), accumulative power-on time (F7-13) and accumulative power consumption (F7-14).

- 2: Clear records

  If FP-01 is set to 2, the fault records, accumulative running time (F7-09), accumulative power-on time (F7-13) and accumulative power consumption (F7-14) are cleared.

- 501: Back up current user parameters

  If FP-01 is set to 501, the current parameter settings are backed up, helping you to restore the setting if incorrect parameter setting is performed.

- 4: Restore user backup parameters

  If FP-01 is set to 4, the previous backup user parameters are restored.

Function Code	Parameter Name	Setting Range	Default
FP-02	AC drive parameter display property	Unit's digit (Group U display selection)	11
		0: Not display	
		1: Display	
		Ten's digit (Group A display selection)	
		0: Not display	
		1: Display	
FP-03	Individualized parameter display property	Unit's digit (User-defined parameter display selection)	00
		0: Not display	
		1: Display	
		Ten's digit (User-modified parameter display selection)	
		0: Not display	
		1: Display	

The setting of parameter display mode aims to facilitate you to view different types of parameters based on actual requirements. The H300 provides the following three parameter display modes.

Table 6-9 Three parameter display modes provided by H300

Name	Description
AC drive parameter display	Display function codes of the AC drive in sequence of F0 to FF, A0 to AF and U0 to UF.
User-defined parameter display	Display a maximum of 32 user-defined parameters included in group FE.
User-modified parameter display	Display the parameters that are modified.

If one digit of FP-03 is set to 1, you can switch over to different parameter display modes by pressing key QUICK . By default, the AC drive parameter display mode is used.

The display codes of different parameter types are shown in the following table.

Table 6-10 Display codes of different parameter types

Parameter Type	Display Code
AC drive parameter	-bASE
User-defined parameter	-USEr
User-modified parameter	--C--

The H300 provides display of two types of individualized parameters: user-defined parameters and user-modified parameters.

*   You-defined parameters are included in group FE. You can add a maximum of 32 parameters, convenient for commissioning.

    In user-defined parameter mode, symbol "u" is added before the function code. For example, F1-00 is displayed as uF1-00.

*   You-modified parameters are grouped together, convenient for on-site troubleshooting. In you-modified parameter mode, symbol "c" is added before the function code. For example, F1-00 is displayed as cF1-00.

Function Code	Name	Setting Range	Default
FP-04	Parameter modification property	0: Modifiable 1: Not modifiable	0

It is used to set whether the parameters are modifiable to avoid mal-function. If it is set to 0, all parameters are modifiable. If it is set to 1, all parameters can only be viewed.

Group U0: Monitoring Parameters

Group U0 is used to monitor the AC drive's running state. You can view the parameter values by using operation panel, convenient for on-site commissioning, or from the host computer by means of communication (address: 0x7000-0x7044).

U0-00 to U0-31 are the monitoring parameters in the running and stop state defined by F7-03 and F7-04. For more details, see Table 6-1.

Function Code	Parameter Name	Display Range
U0-00	Running frequency	0.00–320.00 Hz (F0-22 = 2)
U0-01	Set frequency	0.00–3200.0 Hz (F0-22 = 1)

These two parameters display the absolute value of theoretical running frequency and set frequency. For the actual output frequency of the AC drive, see U0-19.

Function Code	Parameter Name	Display Range
U0-02	Bus voltage	0.0–3000.0 V

It displays the AC drive's bus voltage.

Function Code	Parameter Name	Display Range
U0-03	Output voltage	0–1140 V

It displays the AC drive's output voltage in the running state.

Function Code	Parameter Name	Display Range
U0-04	Output current	0.00–655.35 A (AC drive power ≤ 55 kW)
		0.0–6553.5 A (AC drive power > 55 kW)

It displays the AC drive's output current in the running state.

Function Code	Name	Display Range
U0-05	Output power	0–32767

It displays the AC drive's output power in the running state.

Function Code	Parameter Name	Display Range
U0-06	Output torque	-200.0%–200.0%

It displays the AC drive's output torque in the running state.

Function Code	Parameter Name	Display Range
U0-07	DI state	0–32767

It displays the current state of DI terminals. After the value is converted into a binary number, each bit corresponds to a DI. "1" indicates high level signal, and "0" indicates low level signal. The corresponding relationship between bits and DIs is described in the following table.

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit8	Bit9
DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	DI9	DI10
Bit10	Bit11	Bit12	Bit13	Bit10	Bit11	Bit12	Bit13	Bit14	Bit15
VDI1	VDI2	VDI3	VDI4	VDI1	VDI2	VDI3	VDI4	VDI5	

Function Code	Parameter Name	Display Range
U0-08	DO state	0–1023

It indicates the current state of DO terminals. After the value is converted into a binary number, each bit corresponds to a DO. "1" indicates high level signal, and "0" indicates low level signal. The corresponding relationship between bits and DOs is described in the following table.

Table 6-15 Corresponding relationship between bits and DOs

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5
DO3	Relay 1	Relay 2	DO1	DO2	VDO1
Bit6	Bit7	Bit8	Bit9	Bit10	Bit11
VDO2	VDO3	VDO4	VDO5		

Function Code	Parameter Name	Display Range
U0-10	AI2 voltage (V)/current (mA)	0.00–10.57 V 0.00–20.00 mA

When F4-40 is set to 0, AI2 samplin g data is displayed in the unit of V.

When F4-40 is set to 1, AI2 sampling data is displayed in the unit of mA.

Function Code	Parameter Name	Display Range
U0-14	Load speed	0–65535

For more details, see the description of F7-12.

Function Code	Parameter Name	Display Range
U0-15	PID setting	0–65535
U0-16	PID feedback	0–65535

They display the PID setting value and PID feedback value.

- PID setting = PID setting (percentage) x FA-04
- PID feedback = PID feedback (percentage) x FA-04

Function Code	Parameter Name	Display Range
U0-18	Input pulse frequency	0.00–100.00 kHz

It displays the high-speed pulse sampled frequency of DI5, in minimum unit of 0.01 kHz.

Function Code	Parameter Name	Display Range
U0-19	Feedback speed	-320.00–320.00 Hz -3200.0–3200.0 Hz

It displays the actual output frequency of the AC drive.

- If F0-22 (Frequency reference resolution) is set to 1, the display range is -3200.00–3200.00 Hz.
- If F0-22 (Frequency reference resolution) is set to 2, the display range is -320.00Hz–320.00 Hz.

Function Code	Parameter Name	Display Range
U0-20	Remaining running time	0.0–6500.0 min

It displays the remaining running time when the timing operation is enabled. For details on timing operation, refer to F8-42 to F8-44.

Function Code	Parameter Name	Display Range
U0-21	AI1 voltage before correction	0.00–10.57 V
U0-22	AI2 voltage (V)/ current (mA) before correction	0.00–10.57 V 0.00–20.00 mA
U0-23	AI3 voltage before correction	-10.57–10.57 V

They display the AI sampleing voltage/current value of AI. The actually used voltage/current is obtained after linear correction to reduce the deviation between the sampled voltage/current and the actual input voltage/current.

For actual corrected voltage, see U0-09, U0-10 and U0-11. Refer to group AC for the correction mode.

Function Code	Parameter Name	Display Range
U0-24	Linear speed	0–65535 m/min

It displays the linear speed of the DI5 high-speed pulse sampling. The unit is meter/minute.

The linear speed is obtained according to the actual number of pulses sampled per minute and FB-07 (Number of pulses per meter).

Function Code	Parameter Name	Display Range
U0-27	Pulse input frequency	0–65535 Hz

It displays the DI5 high-speed pulse sampling frequency, in minimum unit of 1 Hz. It is the same as U0-18, except for the difference in units.

Function Code	Parameter Name	Display Range
U0-28	Communication setting value	-100.00%–100.00%

It displays the data written by means of the communication address 0x1000.

Function Code	Name	Display Range
U0-30	Main frequency X	0.00–320.00 Hz 0.0–3200.0 Hz

It displays the setting of main frequency X.

- If F0-22 (Frequency reference resolution) is 1, the display range is -3200.0–3200.0 Hz.

- If F0-22 (Frequency reference resolution) is 2, the display range is -320.00–320.00 Hz.

Function Code	Parameter Name	Display Range
U0-31	Auxiliary frequency Y	0.00–320.00 Hz 0.0–3200.0 Hz

It displays the setting of auxiliary frequency Y.

Function Code	Parameter Name	Display Range
U0-35	Target torque	-200.0%–200.0%

It displays the current torque upper limit.

Function Code	Parameter Name	Display Range
U0-39	Target voltage upon V/F separation	0 V to rated motor voltage
U0-40	Output voltage upon V/F separation	0 V to rated motor voltage

They display the target output voltage and current actual output voltage in the V/F separation state. For V/F separation, see the descriptions of group F4.

Function Code	Parameter Name	Display Range
U0-41	DI state visual display	-

It displays the DI state visually and the display format is shown in the following figure.

Figure 6-34 Display format of the DI state
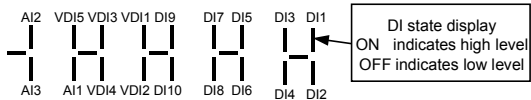
Function Code	Parameter Name	Display Range
U0-42	DO state visual display	-

It displays the DO state visually and the display format is shown in the following figure.

Figure 6-35 Display format of the DO state
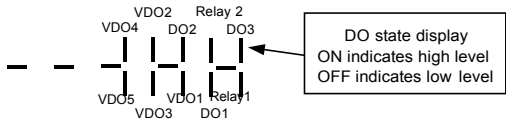
Function Code	Parameter Name	Display Range
U0-43	DI function state visual display 1	-

It displays whether the DI functions 1-40 are valid. The operation panel has five 7-segment LEDs and each 7-segment LED displays the selection of eight functions. The 7-segment LED is defined in the following figure.

Figure 6-36 Definition of 7-segment LED
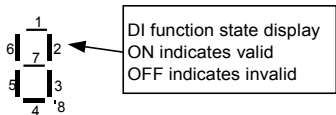
The 7-segment LED display functions 1-8, 9-16, 17-24, 25-32 and 33-40 respectively from right to left.

Function Code	Parameter Name	Display Range
U0-44	DI function state visual display 2	-

It displays whether the DI functions 41–59 are valid. The display format is similar to U0-43. The 7-segment LEDs display functions 41–48, 49–56 and 57–59, respectively from right to left.

7

Communication protocol

Chapter 7 Communication protocol

H300 drive supports modbus-RTU slave communication protocol, which has the following functions:

- View and modify the parameters.
- View various running status parameters.
- Send run command and frequency reference to AC Drive from host computer.

7.1 About Modbus Communication Protocol

The protocol defines content and format of transmitted messages during serial communications, including master polling (or broadcasting) format and master coding method (function code for the action, transmission data, and error check). the slave uses the same structure in response, including action confirmation, data returning and error check. If and error occurs when the slave receives a message, or the salve can not complete the action required by the master, the slave returns a fault message as a response to the master.

7.2 Application

The AC drive is connected to a "single master multi-slave" PC/PLC control network with RS485 bus.

7.3 Bus Structure

(1) Interface mode

RS232/RS485 hardware .

(2) Topological structure

The system consists of a single master and multiple slaves. In the network, each communication device has a unique slave address. A device is the master (can be a PC, a PLC or an HMI) and initiates communication to perform parameter read or write operations on slaves. The other devices (slaves) provide data to respond to query or operations from the master. At the same moment, either the master or the slave transmits data and the other can only receives data.

The address range of the slaves is 1 to 247, and 0 is broadcast address. A slave address must be unique in the network.

(3) Transmission mode

The asynchronous serial and half-duplex transmission mode is used. During asynchronous serial communication, data is sent frame by frame in the form of message. In modbus-RTU protocol, and interval of t least 3.5-byte time marks the end of the previous message. A new message starts to be sent after this interval.

The communication protocol used by the drive is the Modbus-RTU slave communication protocol, which allows the drive to provide data to respond to "query/command" from the master or execute the action according to "query/command" from the master.

The master can be a PC, and industrial device, or a PLC. The master can communicate with a single slave or send broadcast messages to all slaves. When the master communicates with a single slave, the slave needs to return a message (response) to "query/command" from the master. For a broadcast message sent by the master, the slaves need not return a response.

7.4 Data Format

The drive supports reading and writing of word-type parameters only. Reading command is 0x03 and writing command is 0x06. It does not support reading and writing of bytes or bits .

The modbus-RTU protocol communication data format of the drive is as follows:
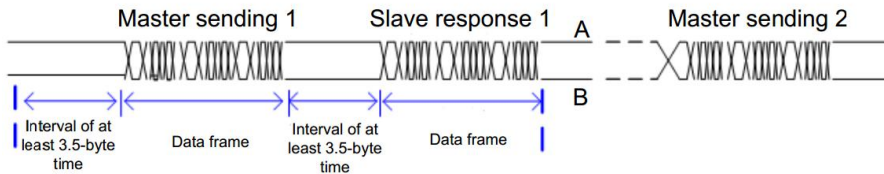
In theory, host computer can read several consecutive parameters (n can reach up to 12) but the last parameter it reads must not jump to the next parameter group. Otherwise, an error occurs on response.

RTU Frame Format：

Frame header (START)	3.5 byte of idle time
Slave Address (ADR)	1~247
Command code (CMD)	03：Read; 06：Write
Data（N-1）	
Data（N-2）	Number of byte (2n)
……	
Data (0)	
CRC Check Low bytes	2 bytes
CRC Check High bytes	
END	3.5 byte of idle time

For example, read 2 function code value (address start at F002) from the drive (slave address is 01) :

Master Query Frame Information

Slave Address (ADR)	01H
Command code (CMD)	03H
Function code start address(H)	F0H
Function code start address(L)	02H
Number of function codes (H)	00H
Number of function codes (L)	02H
CRC CHK (L)	To be calculate
CRC CHK (H)	

Slave Response Frame Information

FC-05 is set to 0：

ADR	01H
CMD	03H
Data byte number (H)	00H
Data byte number (L)	04H
Data(F002) value (H)	00H
Data(F002) value (L)	00H
Data(F003) value (H)	00H
Data(F003) value (L)	01H
CRC CHK (L)	To be calculate
CRC CHK (H)	

FC-05 is set to 1:

ADR	01H
CMD	03H
Data byte number	04H
Data(F002) value (H)	00H
Data(F002) value (L)	00H
Data(F003) value (H)	00H
Data(F003) value (L)	01H
CRC CHK (L)	To be calculate
CRC CHK (H)	

For example, ：write value 5000（1388H）to function code F00A of the drive (slave address is 02H)

Master Query Frame Information

ADR	02H
CMD	06H
Parameter address (H)	F0H
Parameter address (L)	0AH
Parameter value (H)	13H
Parameter value (L)	88H
CRC CHK (L)	To be calculate
CRC CHK (H)	

Slave Response Frame Information

ADR	02H
CMD	06H
Parameter address (H)	F0H
Parameter address (L)	0AH
Parameter value (H)	13H
Parameter value (L)	88H
CRC CHK (L)	To be calculate
CRC CHK (H)	

7.5 Definition of Communication Parameter Addresses

Read and written parameters

Function parameters can be read and written (except those which cannot be changed because they are only for the factory use or for monitoring).

Parameter group No. and parameter identifying No. are used to express parameter address.

● High-order bytes: F0-FF(groups F), 70-7F(group U)

● Low-order bytes: 00-FF

For example, to read parameter F3-12, communication address of F3-12 is expressed as 0xF30C.

Note：

● Group FF: They are factory parameters. The parameters cannot be read or changed.

● Group U: These parameters can only be read.

● Some parameters cannot be modified when the AC drive is running. Some parameter cannot be modified regardless of status of AC drive. In addition, pay attention to setting range, unit and description of parameters when modifying them.

● Frequent storage to EEPROM rdduces its service life. Therefore, in communication mode, users can change values of certain parameters in RAM rather than storing the

setting. For groups F parameters, users only need to change high order F of the function code address to 0.

- For example, if function code F3-12 is not stored into EEPROM, the address is expressed as 030C;

Stop/RUN Parameters:

Para. Address	Description
1000	Communication setting value（-10000~10000）（Decimal）
1001	Running frequency
1002	Bus voltage
1003	Output voltage
1004	Output current
1005	Output power
1006	Output torque
1007	Running speed
1008	DI input indication
1009	DO output indication
100A	AI1 voltage
100B	AI2 voltage
100C	Operation panel potentiometer (AI3) voltage
100D	Counting value input
100E	Length value input
100F	Load speed
1010	PID reference
1011	PID feedback
1012	PLC process
1013	Pulse input frequency, unit 0.01kHz
1014	Feedback speed, unit 0.1Hz
1015	Remaining running time
1016	AI1 voltage before correction
1017	AI2 voltage before correction
1018	Operation panel potentiometer (AI3) voltage before correction
1019	Linear speed
101A	Current power-on time
101B	Current running time
101C	Pulse input frequency, unit 1Hz
101D	Communication reference
101E	Actual feedback speed
101F	Main frequency reference display
1020	Auxiliary frequency reference display

Note：

Communication setting value indicates percentage: 10000 corresponds to 100.00%, and -10000 corresponds to -100.00%。

With regard to frequency, communication reference is a percentage of F0-09 (maximum frequency).

Control command input to AC drive：（write-only）

Command word address	Command word function
2000H	0001：Forward run
	0002：Reverse run
	0003：Forward jog
	0004：Reverse jog
	0005：Coast to stop
	0006：Decelerate to stop
	0007：Fault reset

Read AC drive state ：（read-only）

Command word address	Command word function
3000H	0001：Forward run state
	0002：Reverse run state
	0003：stop state

Parameter lock password check：

(if "8888H" is returned, it indicates that password check is passed)

Password Address	Password Content
1F00H	*****

DO terminal control：（write-only）

Command Address	Command Content
2001H	BIT0：DO1 control
	BIT1：DO2 control
	BIT2：RELAY1 control
	BIT3：RELAY2 control
	BIT4：FMR control
	BIT5：VDO1
	BIT6：VDO2
	BIT7：VDO3
	BIT8：VDO4
	BIT9：VDO5

AO1 control：（write-only）

Command Address	Command Content
2002H	0～7FFF indicates 0％～100％

AO2 control：（write-only）

Command Address	Command Content
2003H	0～7FFF indications 0％～100％

Pulse output control：（write-only）

Command Address	Command Content
2004H	0～7FFF indications 0％～100％

AC drive fault description：

AC Drive Fault Address	AC Drive Fault Information
8000H	0000：No fault 0001：Reserved 0002：Over current during acceleration 0003：Over current during deceleration 0004：Over current at constant speed 0005：Over voltage during acceleration 0006：Over voltage during deceleration 0007：Over voltage at constant speed 0008：Buffer resistor overload 0009：Under voltage 000A：AC drive overload 000B：Motor overload 000C：Power input phase lost 000D：Power output phase lost 000E：IGBT overheat 000F：External fault 0010：Communication fault 0011：Contactor fault 0012：Current detection fault 0013：Motor auto-tuning fault 0015：EEPROM fault 0016：AC drive hardware fault 0017：Motor short circuit to earth 001A：Accumulative running time reached 001B: User define fault 1 001C: User define fault 2

	001D: Accumulative power-on time reached 001E：load lost 001F：PID feedback lost during running 0028：Fast current limit timeout

Communication Fault Description（Error Code）：

Communication Fault Address	Fault Description
8001H	0000：No fault 0001：Password is uncorrected 0002：Command word is uncorrected 0003：CRC check word is uncorrected 0004：Address is invalid 0005：The parameter is invalid 0006：Can not change the parameter 0007：AC drive is lock 0008：AC drive is processing EEPROM

8

Selection and Dimensions

Chapter 8 Selection and Dimensions

8.1 Electrical Specifications of the H300

Table 8-1 Models and technical data of the H300

Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Adaptable Motor (kW, HP)		Thermal Power Consumption (kW)
Single-phase 220 V, 50/60 Hz						
H300S0.7GB	1.5	8.2	4	0.75	1	0.030
H300S1.5GB	3	14	7	1.5	2	0.055
H300S2.2GB	4	23	9.6	2.2	3	0.072
Three-phase 380 V, 50/60 Hz						
H300T0.7GB	1.5	3.4	2.1	0.75	1	0.027
H300T1.5GB	3	5	3.8	1.5	2	0.050
H300T2.2GB	4	5.8	5.1	2.2	3	0.066
H300T3.7GB	5.9	10.5	9	3.7	5	0.120
H300T5.5GB	8.9	14.6	13	5.5	7.5	0.195
H300T7.5GB	11	20.5	17	7.5	10	0.262
H300T11GB	17	26	25	11	15	0.445
H300T15GB	21	35	32	15	20	0.553
H300T18.5G	24	38.5	37	18.5	25	0.651
H300T22G	30	46.5	45	22	30	0.807
H300T30G	40	62	60	30	40	1.01
H300T37G	57	76	75	37	50	1.20
H300T45G	69	92	91	45	60	1.51
H300T55G	85	113	112	55	75	1.80
H300T75G	114	157	150	75	100	1.84
H300T90G	134	180	176	90	125	2.08
H300T110G	160	214	210	110	150	2.55
H300T132G	192	256	253	132	200	3.06
H300T160G	231	307	304	160	250	3.61
H300T200G	250	385	377	200	300	4.42
H300T220G	280	430	426	220	300	4.87
H300T250G	355	468	465	250	400	5.51
H300T280G	396	525	520	280	370	6.21
H300T315G	445	590	585	315	500	7.03
H300T355G	500	665	650	355	420	7.81
H300T400G	565	785	725	400	530	8.51

8.2 Physical Appearance and Overall Dimensions of the H300

Figure 8-1 Physical appearance and overall dimensions of the H300 (plastic housing)
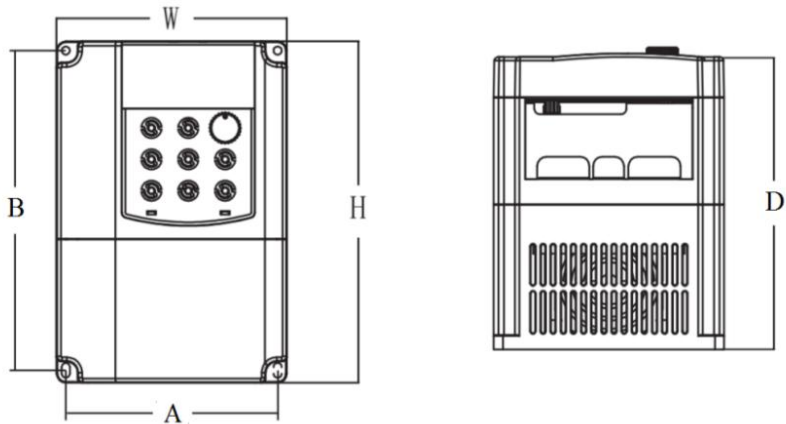

Figure 8-2 Physical appearance and overall dimensions of the H300 (sheet metal housing)
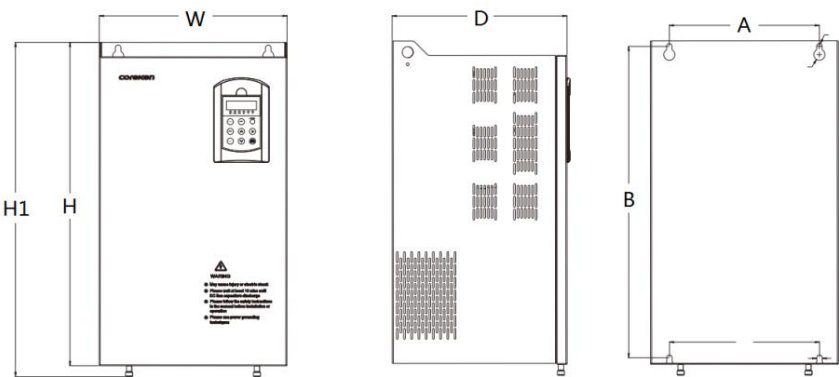
Table 8-2 Overall dimensions and mounting hole dimensions of the H300

Model	Mounting Hole (mm)		Overall Dimensions (mm)				Mounting Hole Diameter (mm)	Weight (kg)
	A	B	H	H1	W	D		
H300S0.75GB	115	174	185	/	125	160	Ø4.0	/
H300S1.5GB								
H300S2.2GB								
H300T0.75GB								
H300T1.5GB								
H300T2.2GB								
H300T3.7GB								
H300T4GB/5.5PB	136	230	245	/	150	176	ø5.0	/
H300T5.5GB/7.5PB								
H300T7.5GB								
H300T11SGB/15SPB	205	309	320	/	218	204	ø6.0	/
H300T15SGB/18.5SPB								
H300T18.5SGB/22SPB								
H300T22SGB/30SPB								
H300T11GB/15PB	156	331	348	360	182	197	ø6.0	/
H300T15GB/18.5PB								
H300T18.5GB/22PB	156	356	373	385	219	197	ø6.0	/
H300T22GB/30PB								
H300T30G/37P	199	414	430	442	256	228	Ø7.0	/
H300T37G/45P								
H300T45G/55P	245	524	545	557	300	283	Ø10.0	/
H300T55G/75P								
H300T75G/90P	270	560	582	597	338	322	Ø10.0	/
H300T90G/110P								
H300T110G/132P								
H300T132G/160P	343	741	765	780	473	327	Ø10.0	/
H300T160G/185P								
H300T185G/200P	449	903	927	1359	580	384	Ø10.0	/
H300T200G/220P								
H300T220G/250P								
H300T250G/280P	420	1162	1132	1482	680	400	Ø12.0	/
H300T280G/315P								
H300T315G/355P	520	1300	1355	1765	800	392	Ø14.0	/
H300T355G/400P								
H300T400G/450P								

8.3 Selection of Peripheral Electrical Devices

Table 8-14 Selection of peripheral electrical devices of the H300

AC Drive Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm²)	Cable of Output Side Main Circuit (mm²)	Cable of Control Circuit (mm²)
Single-phase 220 V					
H300S0.7GB	10	12	0.75	0.75	0.5
H300S1.5GB	16	18	1.5	1.5	0.5
H300S2.2GB	25	25	2.5	2.5	0.5
Three-phase 380 V					
H300T0.7GB	4	9	0.75	0.75	0.5
H300T1.5GB	6	9	0.75	0.75	0.5
H300T2.2GB	10	12	0.75	0.75	0.5
H300T3.7GB	16	18	1.5	1.5	0.5
H300T5.5 GB	20	25	2.5	2.5	0.75
H300T7.5 GB	25	25	4.0	4.0	0.75
H300T11 GB	32	32	6.0	6.0	0.75
H300T15GB	40	40	6.0	6.0	0.75
H300T18.5G	50	50	10	10	1.0
H300T22G	50	50	10	10	1.0
H300T30G	63	63	16	16	1.0
H300T37G	80	80	25	25	1.0
H300T45G	100	115	35	35	1.0
H300T55G	125	125	50	50	1.0
H300T75G	160	185	70	70	1.0
H300T90G	200	225	95	95	1.0
H300T110G	225	225	120	120	1.0
H300T132G	315	330	120	120	1.0
H300T160G	350	400	150	150	1.0
H300T200G	400	400	185	185	1.0
H300T220G	500	500	240	240	1.0
H300T250G	500	500	120 x 2	120 x 2	1.0
H300T280G	630	630	120 x 2	120 x 2	1.0
H300T315G	630	630	150 x 2	150 x 2	1.0
H300T355G	700	800	185 x 2	185 x 2	1.0
H300T400G	800	800	240 x 2	240 x 2	1.0

8.4 Physical Dimensions of External Operation Panel

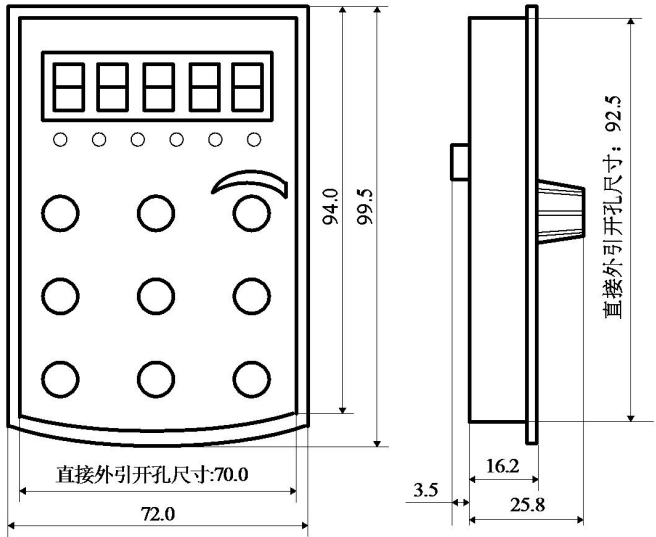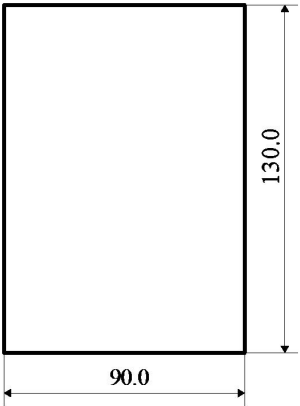Figure 8-16 Physical dimensions of external operation panel without pedestal

Figure 8-16 Physical dimensions of external operation panel with pedestal

8.5 Selection of Braking Unit and Braking Resistor

8.5.1 Physical Dimensions of External DC Reactor

The motor and load's regenerative energy is almost completely consumed on the braking resistor when braking.

According to the formula U x U/R = Pb:

- U refers to the braking voltage at system stable braking.

  Different systems select different braking voltages. The 380 VAC system usually selects 700 V braking voltage.

- Pb refers to the braking power.

8.5.2 Selection of Power of Braking Resistor

In theory, the power of the braking resistor is consistent with the braking power. But in consideration that the de-rating is 70%, you can calculate the power of the braking resistor according to the formula 0.7 x Pr = Pb x D.

- Pr refers to the power of resistor.

- D refers to the braking frequency (percentage of the regenerative process to the whole working process)

Application	Elevator	Winding and unwinding	Centrifuge	Occasional braking load	General application
Braking Frequency	20%–30%	20%–30%	50%–60%	5%	10%

Table 8-14 below provides data for reference. You can select different resistance and power based on actual needs. However, the resistance must not be lower than the recommended value. The power may be higher than the recommended value.

The braking resistor model is dependent on the generation power of the motor in the actual system and is also related to the system inertia, deceleration time and potential energy load. For systems with high inertia, and/or rapid deceleration times, or frequent braking sequences, the braking resistor with higher power and lower resistance value should be selected.

Table 8-16 Recommended values of braking resistor

Model	Recommended Power	Recommended Resistance	Braking Unit	Remark
Single-phase 220 V				
H300S0.7GB	80 W	≥ 150 Ω		
H300S1.5GB	100 W	≥ 100 Ω		
H300S2.2GB	100 W	≥ 70 Ω		

Model	Recommended Power	Recommended Resistance	Braking Unit	Remark
Three-phase 380 V				
H300T0.7GB	150 W	≥ 300 Ω	Built-in (standard)	
H300T1.5GB	150 W	≥ 220 Ω		
H300T2.2GB	250 W	≥ 200 Ω		
H300T3.7GB	300 W	≥ 130 Ω		
H300T5.5GB	400 W	≥ 90 Ω		
H300T7.5GB	500 W	≥ 65 Ω		
H300T11GB	800 W	≥ 43 Ω		
H300T15GB	1000 W	≥ 32 Ω		
H300T18.5GB	1300 W	≥ 25 Ω		
H300T22GB	1500 W	≥ 22 Ω		
H300T30G	2500 W	≥ 16 Ω	External	
H300T37G	3.7 kW	≥ 16.0 Ω	External	
H300T45G	4.5 kW	≥ 16 Ω	External	
H300T55G	5.5 kW	≥ 8 Ω	External	
H300T75G	7.5 kW	≥ 8 Ω	External	
H300T90G	4.5 kW x 2	≥ 8 Ω x 2	External	
H300T110G	5.5 kW x 2	≥ 8 Ω x 2	External	
H300T132G	6.5 kW x 2	≥ 8 Ω x 2	External	
H300T160G	16 kW	≥ 2.5 Ω	External	
H300T200G	20 kW	≥ 2.5 Ω	External	
H300T220G	22 kW	≥ 2.5 Ω	External	
H300T250G	12.5 kW x 2	≥ 2.5 Ω x 2	External	
H300T280G	14 kW x 2	≥ 2.5 Ω x 2	External	
H300T315G	16 kW x 2	≥ 2.5 Ω x 2	External	
H300T355G	17 kW x 2	≥ 2.5 Ω x 2	External	
H300T400G	14 kW x 3	≥ 2.5 Ω x 3	External	

Note

- " x 2" indicates that two braking units with their respective braking resistor are connected in parallel.
- " x 3" means the same.

9

Maintenance and Troubleshooting

Chapter 9 Maintenance and Troubleshooting

9.1 Routine Repair and Maintenance of the H300

9.1.1 Routine Maintenance

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the devices in the AC drive, which may cause potential faults or reduce the service life of the AC drive. Therefore, it is necessary to carry out routine and periodic maintenance.

Routine maintenance involves checking:

- Whether the motor sounds abnormally during running
- Whether the motor vibrates excessively during running
- Whether the installation environment of the AC drive changes.
- Whether the AC drive's cooling fan works normally
- Whether the AC drive overheats

Routine cleaning involves:

- Keep the AC drive clean all the time.
- Remove the dust, especially metal powder on the surface of the AC drive, to prevent the dust from entering the AC drive.
- Clear the oil stain on the cooling fan of the AC drive.

9.1.2 Periodic Inspection

Perform periodic inspection in places where inspection is difficult.

Periodic inspection involves:

Check and clean the air duct periodically.

Check whether the screws become loose.

Check whether the AC drive is corroded.

Check whether the wiring terminals show signs of arcing;

Main circuit insulation test

Prompt	Before measuring the insulating resistance with megameter (500 VDC megameter recommended), disconnect the main circuit from the AC drive. Do not use the insulating resistance meter to test the insulation of the control circuit. The high voltage test need not be performed again because it has been completed before delivery.

9.1.3 Replacement of Vulnerable Components

The vulnerable components of the AC drive are cooling fan and filter electrolytic capacitor. Their service life is related to the operating environment and maintenance status. Generally, the service life is shown as follows:

Component	Service Life	Possible Damage Reason	Judging Criteria
Fan	2 to 3 years	• Bearing worn • Blade aging	• Whether there is crack on the blade • Whether there is abnormal vibration noise upon startup
Electrolytic capacitor	4 to 5 years	• Input power supply in poor quality • High ambient temperature • Frequent load jumping • Electrolytic aging	• Whether there is liquid leakage. • Whether the safe valve has projected. • Measure the static capacitance. • Measure the insulating resistance.

9.1.4 Storage of the AC Drive

For storage of the AC drive, pay attention to the following two aspects:

1) Pack the AC drive with the original packing box provided by our company.

2) Long-term storage degrades the electrolytic capacitor. Thus, the AC drive must be energized once every 2 years, each time lasting at least 5 hours. The input voltage must be increased slowly to the rated value with the regulator.

9.2 Warranty Agreement

1) Free warranty only applies to the AC drive itself.

2) our company will provide 18-month warranty (starting from the leave-factory date as indicated on the barcode) for the failure or damage under normal use conditions. If the equipment has been used for over 18 months, reasonable repair expenses will be charged.

3) Reasonable repair expenses will be charged for the damages due to the following causes:

   • Improper operation without following the instructions

   • Fire, flood or abnormal voltage.

   • Using the AC drive for non-recommended function

4) The maintenance fee is charged according to our company's uniform standard. If there is an agreement, the agreement prevails.

9.3 Faults and Solutions

The H300 provides a total of 24 pieces of fault information and protective functions. After a fault occurs, the AC drive implements the protection function, and displays the fault code on the operation panel (if the operation panel is available).

Before contacting our company for technical support, you can first determine the fault type, analyze the causes, and perform troubleshooting according to the following tables. If the fault cannot be rectified, contact the agent or our company.

Figure 9-1 Solutions to the faults of the H300

Fault Name	Display	Possible Causes	Solutions
Inverter unit protection	Err01	1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5: The main control board is faulty. 6: The drive board is faulty. 7: The inverter module is faulty.	1: Eliminate external faults. 2: Install a reactor or an output filter. 3: Check the air filter and the cooling fan. 4: Connect all cables properly. 5: Contact the agent or our company.
Overcurrent during acceleration	Err02	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an AC drive of higher power class.
Overcurrent during deceleration	Err03	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.

Fault Name	Display	Possible Causes	Solutions
Overcurrent at constant speed	Err04	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
Overvoltage during acceleration	Err05	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.
Overvoltage during deceleration	Err06	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 3: Increase the deceleration time. 4: Install the braking unit and braking resistor.
Overvoltage at constant speed	Err07	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Control power supply fault	Err08	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range.
Undervoltage	Err09	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are faulty. 5: The drive board is faulty. 6: The main control board is faulty.	1: Reset the fault. 2: Adjust the voltage to normal range. 3: Contact the agent or our company.
AC drive overload	Err10	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.

Fault Name	Display	Possible Causes	Solutions
Motor overload	Err11	1: FA-01 is set improperly. 2: The load is too heavy or locked-rotor occurs on the motor. 3: The AC drive model is of too small power class.	1: Set FA-01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an AC drive of higher power class.
Power input phase loss	Err12	1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightening board is faulty. 4: The main control board is faulty.	1: Eliminate external faults. 2: Contact the agent or our company.
Power output phase loss	Err13	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3: Contact the agent or our company.
Module overheat	Err14	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The inverter module is damaged.	1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
External equipment fault	Err15	1: External fault signal is input via DI. 2: External fault signal is input via virtual I/O.	Reset the operation.
Communication fault	Err16	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: F0-28 is set improperly. 4: The communication parameters in group FD are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set F0-28 correctly. 4: Set the communication parameters properly.
Contactor fault	Err17	1: The drive board and power supply are faulty. 2: The contactor is faulty.	1: Replace the faulty drive board or power supply board. 2: Replace the faulty contactor.
Current detection fault	Err18	1: The HALL device is faulty. 2: The drive board is faulty.	1: Replace the faulty HALL device. 2: Replace the faulty drive board.

Fault Name	Display	Possible Causes	Solutions
Motor auto-tuning fault	Err19	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the AC drive and the motor.
EEPROM read-write fault	Err21	The EEPROM chip is damaged.	Replace the main control board.
AC drive hardware fault	Err22	1: Overvoltage exists. 2: Overcurrent exists.	1: Handle based on overvoltage. 2: Handle based on overcurrent.
Short circuit to ground	Err23	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	Err26	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
User-defined fault 1	Err27	1: The user-defined fault 1 signal is input via DI. 2: User-defined fault 1 signal is input via virtual I/O.	Reset the operation.
User-defined fault 2	Err28	1: The user-defined fault 2 signal is input via DI. 2: The user-defined fault 2 signal is input via virtual I/O.	Reset the operation.
Accumulative power-on time reached	Err29	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Load becoming 0	Err30	The AC drive running current is lower than F9-64.	Check that the load is disconnected or the setting of F9-64 and F9-65 is correct.
PID feedback lost during running	Err31	The PID feedback is lower than the setting of FA-26.	Check the PID feedback signal or set FA-26 to a proper value.
Pulse-by-pulse current limit fault	Err40	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Too large speed deviation	Err42	2: The motor auto-tuning is not performed. 3: FA-33 and FA-34 are set incorrectly.	2: Perform the motor auto-tuning. 3: Set FA-33 and FA-34 correctly based on the actual situation.

9.4 Common Faults and Solutions

You may come across the following faults during the use of the AC drive. Refer to the following table for simple fault analysis.

Table 9-2 Troubleshooting to common faults of the AC drive

SN	Fault	Possible Causes	Solutions
1	There is no display at power-on.	1: There is no power supply to the AC drive or the power input to the AC drive is too low. 2: The power supply of the switch on the drive board of the AC drive is faulty. 3: The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5: The cable connecting the control board and the drive board and the operation panel breaks.	1: Check the power supply. 2: Check the bus voltage. 3: Re-connect the 8-core and 28-core cables. 4: Contact the agent or our company for technical support.
2	The AC drive display is normal upon power-on. But the display is abnormal after running and stops immediately.	1:The cooling fan is damaged or locked-rotor occurs. 2: The external control terminal cable is short circuited.	1: Replace the damaged fan. 2: Eliminate external fault.
3	"Err23" is displayed at power-on.	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC drive is damaged.	1: Measure the insulation of the motor and the output cable with a megger. 2: Contact the agent or our company for technical support.
4	Err14 (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged, or the air filter is blocked. 3: Components inside the AC drive are damaged (thermal coupler or others).	1: Reduce the carrier frequency (F0-20). 2: Replace the fan and clean the air filter. 3: Contact the agent or our company for technical support.
5	The motor does not rotate after the AC drive runs.	1: Check the motor and the motor cables. 2: The AC drive parameters are set improperly (motor parameters). 3: The cable between the drive board and the control board is in poor contact. 4: The drive board is faulty.	1: Ensure the cable between the AC drive and the motor is normal. 2: Replace the motor or clear mechanical faults. 3: Check and re-set motor parameters.

Warranty Agreement

1. The warranty period of the product is 18 months (refer to the barcode on the equipment). During the warranty period, if the product fails or is damaged under the condition of normal use by following the instructions, our company will be responsible for free maintenance.

2. Within the warranty period, maintenance will be charged for the damages caused by the following reasons:

   a. Improper use or repair/modification without prior permission

   b. Fire, flood, abnormal voltage, other disasters and secondary disaster

   c. Hardware damage caused by dropping or transportation after procurement

   d. Improper operation

   e. Trouble out of the equipment (for example, external device)

3. If there is any failure or damage to the product, please correctly fill out the Product Warranty Card in detail.

4. The maintenance fee is charged according to the latest Maintenance Price List of our company.

5. The Product Warranty Card is not re-issued. Please keep the card and present it to the maintenance personnel when asking for maintenance.

6. If there is any problem during the service, contact our company's agent or our company directly.

Product Warranty Card

Customer information	Add. of unit:	
	Name of unit: P.C.:	Contact person:
		Tel.:
Product information	Product model:	
	Body barcode (Attach here):	
	Name of agent:	
Failure information	(Maintenance time and content): Maintenance personnel:	