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.

Notes

- 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

1

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)

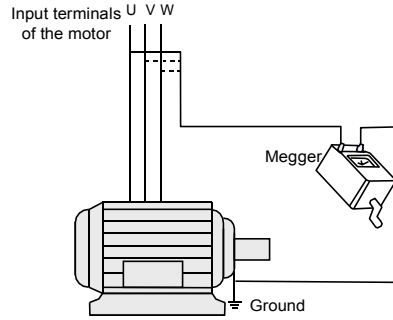
The AC drive generates high leakage current during running, which flows through the protective earthing (PE) conductor. Thus install a type-B RCD at primary side of the power supply. When selecting the RCD, you should consider the transient and steady-state leakage current to ground that may be generated 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

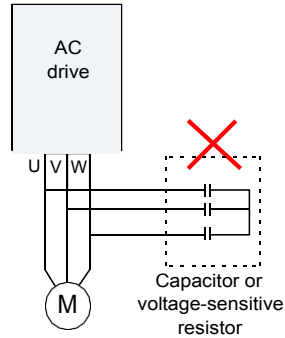
The AC drive may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency.

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

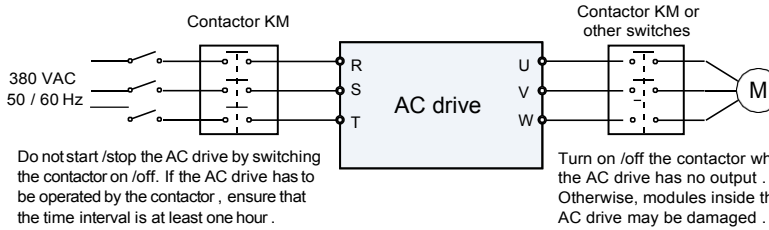
Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.



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.

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.

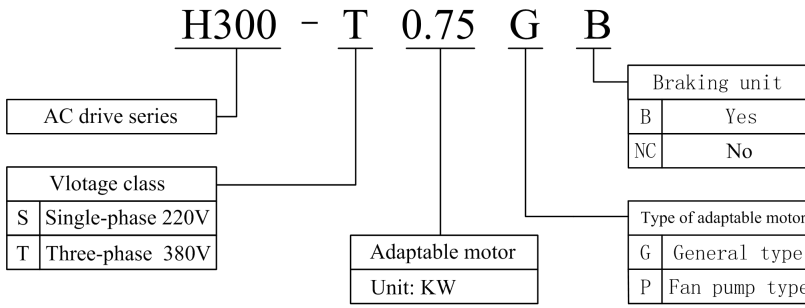
2

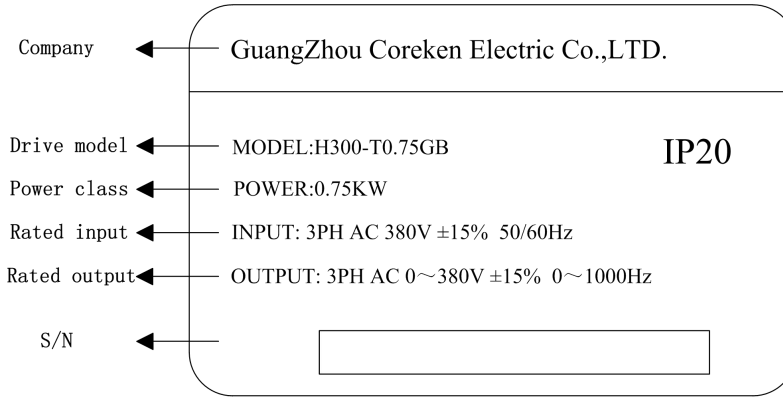
Product Information

Chapter 2 Product Information

2.1 Designation Rules and Nameplate of the H300

Figure 2-1 Designation rules and nameplate of the H300

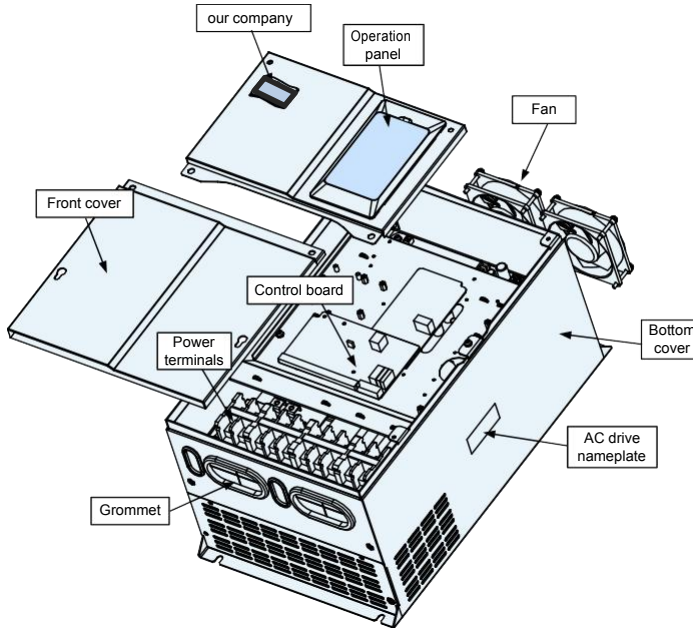




2.2 Components of the H300

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	± 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

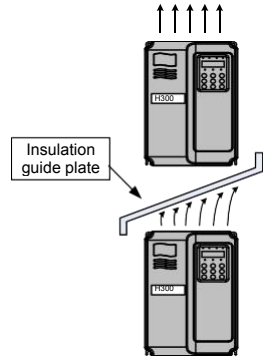
3.1.1 Installation Environment Requirements

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.

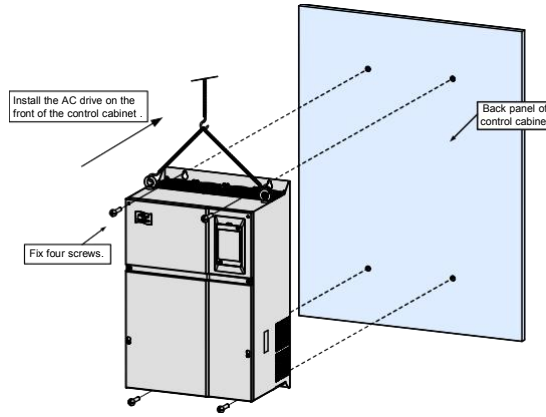
Figure 3-2 Installation of the insulation guide plate



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

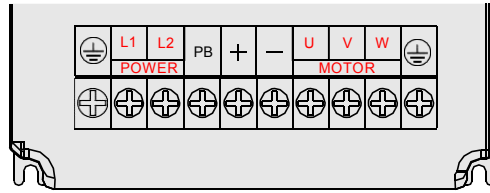


Table 3-1 Description of main circuit terminals of single-phase AC drive

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

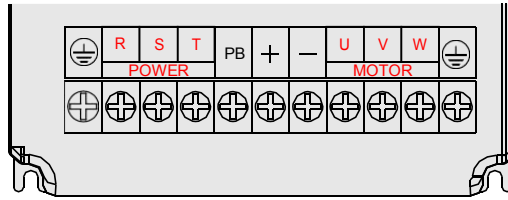


Table 3-2 Description of main circuit terminals of three-phase AC drive

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 ≤ 16 mm^2	S
16 mm^2 < S ≤ 35 mm^2	16 mm^2
35 mm^2 < S	S/2

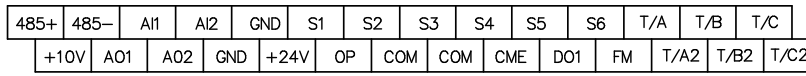
– You must use a yellow/green cable as the PE conductor.

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



■ Description of Control Circuit Terminals

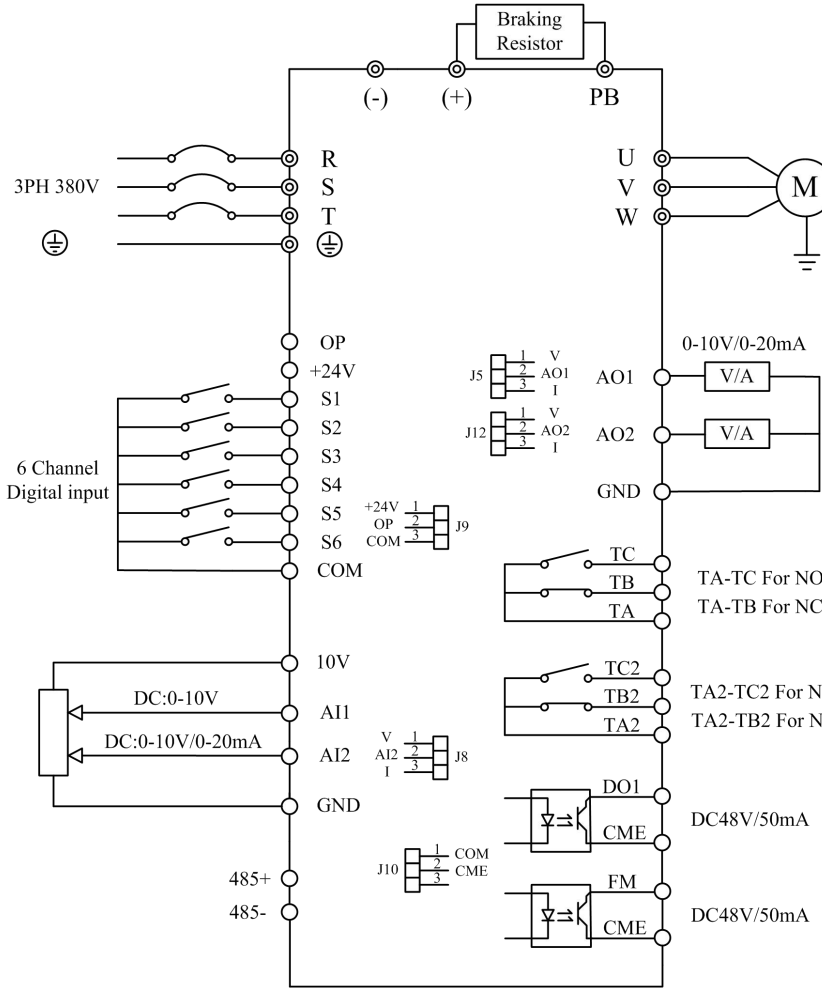
Table 3-3 Description of control circuit terminals

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
	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	DI1- OP	Digital input 1	Optical coupling isolation, compatible with dual polarity input Impedance: 2.4 kΩ Voltage range for level input: 9–30 V
	DI2- OP	Digital input 2	
	DI3- OP	Digital input 3	
	DI4- OP	Digital input 4	
	DI6- OP	Digital input 6	
	DI5- 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
	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.
	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
	T/A2-T/B2	NC terminal	
	T/A-T/C	NO terminal	
	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

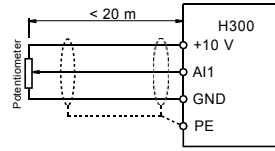
- All H300 series AC drives have the same wiring mode. The figure here shows the wiring of single-phase 220 VAC drive. ◎ indicates main circuit terminal, while ○ indicates control circuit terminal.
- When the external operation panel is connected, the display of the operation panel on the H300 goes off.

■ Description of Wiring of Signal Terminals

1) Wiring of AI terminals

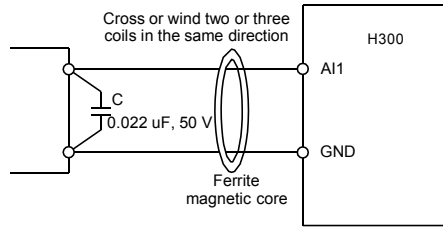
Weak analog voltage signals are easy to suffer external interference, and therefore the shielded cable must be used and the cable length must be less than 20 m, as shown in following figure.

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

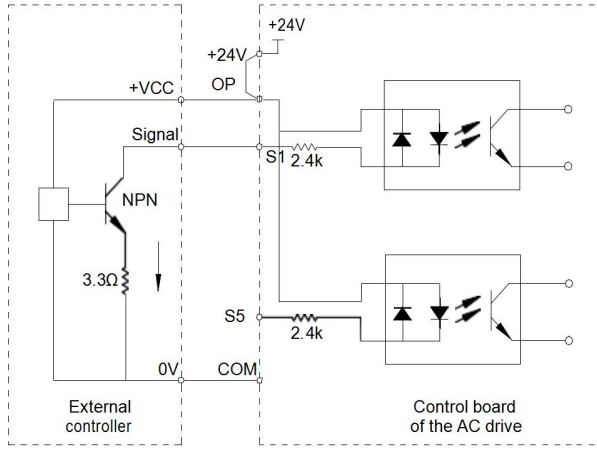


2) Wiring of DI terminals

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



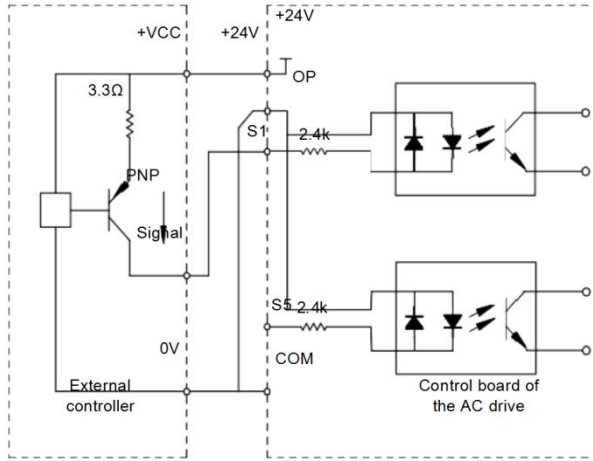
This is the most commonly used wiring mode. To apply external power supply, remove jumpers between +24 V and OP and between COM and CME, and connect the positive pole of external power supply to OP and negative pole to CME.

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



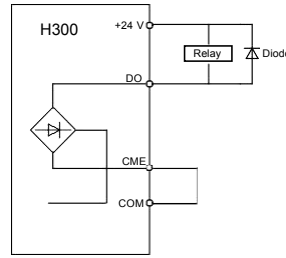
3) Wiring of DO terminal

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

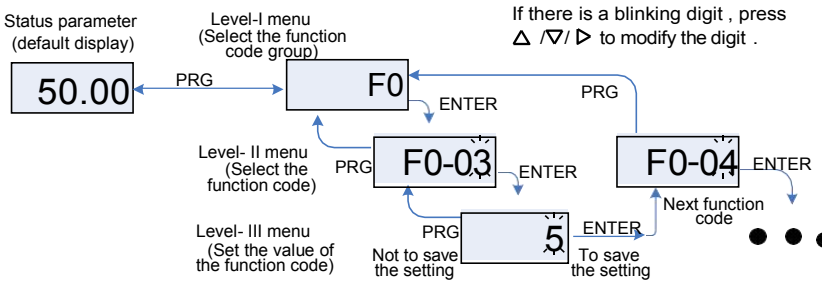
Key	Name	Function
PRGM	Programming	Enter or exit Level I menu
ENT	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting
△	Increment	Increase data or function code
▽	Decrement	Decrease data or function code
>>	Shift	Select the displayed parameters in turn in the stop or running 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

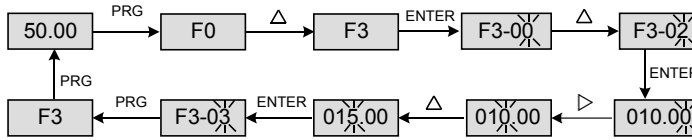


You can return to Level II menu from Level III menu by pressing PRG or ENTER.

- 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.

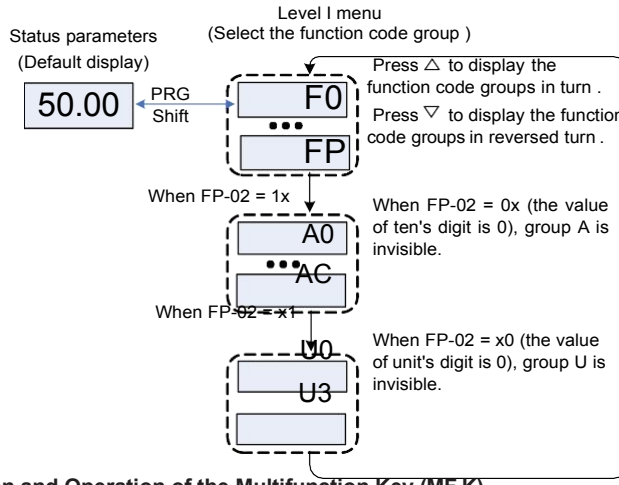
4.3 Structure of Function Codes

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



4.5 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.

4.6 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 F7-03, F7-04, and F7-05 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 F7-03 and F7-04, 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.

   F7-03: 0000 0000 0111 1101B, F7-04: 0010 0000 0000 0001B

3. Convert the binary data to hexadecimal data:

   F7-03: 007DH, F7-04: 2001H

   The values displayed on the operation panel are respectively H.1043 and H.2001 respectively for F7-03 and F7-04.

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 5: Pulse setting (S5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication setting	0	★

Function Code	Parameter Name	Setting Range	Default	Property
F0-03	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: Synchronous motor with-load 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 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 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 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 27: Length count input 28: Length reset 29: Torque control prohibited	1	★
F5-01	S2 function selection		2	★
F5-02	S3 function selection		4	★
F5-03	S4 function selection		9	★
F5-04	S5 function selection		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 36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral pause 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection terminal 1 42: Motor selection terminal 2 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC braking 50: Clear the current running time 51: Switchover between two-line mode and three-line mode 52–59: Reserved	13	★
F5-06	S7 function selection		0	★
F5-07	S8 function selection		0	★
F5-08	S9 function selection		0	★
F5-09	S10 function selection		0	★
F5-10	VDI1 function selection		0	★
F5-11	VDI1 function selection		0	★
F5-12	VDI1 function selection		0	★
F5-13	VDI1 function selection		0	★
F5-14	VDI1 function selection		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) 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)	00000	★
F5-22	DI valid mode selection 2	Unit's digit (S6 valid mode) 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)	00000	★
F5-23	VDI state setting mode	Unit's digit (VDI1) 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)	00000	★
F5-24	VDI state selection	Unit's digit (VDI1) 0: Invalid 1: Valid Ten's digit (VDI2) 0, 1 (same as VDI1) Hundred's digit (VDI3)	00000	★

		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 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) 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)	000	☆

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 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	0	☆
F6-02	Relay function (T/A-T/B-T/C)		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	☆

F6-04	DO1 function selection (open-collector output terminal)	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 36: Software current limit exceeded 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.)	1	☆
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) 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)	00000	☆
F6-22	VDO valid mode selection	Unit's digit (VDO1 valid mode) 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)	00000	☆

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 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	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
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)	03	☆
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	☆
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	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
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%	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
F8-47	Module temperature threshold	0–100°C	75°C	☆
F8-48	Current running time reached	0.0–6500.0 min	0.0 min	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F9: Process Control PID Function				
F9-00	PID setting source	0: F9-01 1: AI1 2: AI2 3: Operation panel potentiometer 4: Pulse setting (S5) 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: Reserve 3: AI1 – AI2 4: Pulse setting (S5) 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	☆
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%	☆

Function Code	Parameter Name	Setting Range	Default	Property
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 FA-47		
		Ten's digit (User-defined fault 2, Err28)		
		Same as unit's digit in FA-47		
		Hundred's digit (Accumulative power-on time reached, Err29)		
		Same as unit's digit in FA-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		

Function Code	Parameter Name	Setting Range	Default	Property
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%	☆
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	☆
Group FC: Communication Parameters				
FC-00	Local address	0: Broadcast address 1–247	1	☆
FC-01	Baud rate	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	5	☆
FC-02	Data format	0: No check, <8,N,2> 1: Even parity check, <8,E,1> 2: Odd Parity check, <8,O,1> 3: No check, <8,N,1>	0	☆
FC-03	Response delay	0–20 ms Valid for Modbus	2 ms	☆
FC-04	Communication timeout	0.0s (invalid) 0.1–60.0s	0.0s	☆
FC-05	Modbus protocol selection	0: Non-standard Modbus protocol 1: Standard Modbus protocol	0	☆
FC-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0	☆

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%	☆
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)	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
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 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 42: Too large speed deviation 99: Keyboard communication fault	-	●
FE-01	2nd fault type		-	●
FE-02	3rd (latest) fault type		-	●

Function Code	Parameter Name	Setting Range	Default	Property
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	0	★
FP-02	Parameter modification property	0: Modifiable 1: Not modifiable	0	☆

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

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Description of Function Codes

Chapter 6 Description of Function Codes

For more details, please visit our company's website.

7

EMC

Chapter 7 EMC

7.1 Definition of Terms

1) EMC

Electromagnetic compatibility (EMC) describes the ability of electronic and electrical devices or systems to work properly in the electromagnetic environment and not to generate electromagnetic interference that influences other local devices or systems.

In other words, EMC includes two aspects: The electromagnetic interference generated by a device or system must be restricted within a certain limit; the device or system must have sufficient immunity to the electromagnetic interference in the environment.

2) First environment

Environment that includes domestic premises, it also includes establishments directly connected without intermediate transformers to a low-voltage power supply network which supplies buildings used for domestic purposes

3) Second environment

Environment that includes all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes

4) Category C1 AC drive

Power Drive System (PDS) of rated voltage less than 1 000 V, intended for use in the first environment

5) Category C2 AC drive

PDS of rated voltage less than 1 000 V, which is neither a plug in device nor a movable device and, when used in the first environment, is intended to be installed and commissioned only by a professional

6) Category C3 AC drive

PDS of rated voltage less than 1 000 V, intended for use in the second environment and not intended for use in the first environment

7) Category C4 AC drive

PDS of rated voltage equal to or above 1 000 V, or rated current equal to or above 400 A, or intended for use in complex systems in the second environment

7.2 Introduction to EMC Standard

7.2.1 EMC Standard

The H300 series AC drive satisfies the requirements of standard EN 61800-3: 2004 Category C2. The AC drives are applied to both the first environment and the second environment.

7.2.2 Installation Environment

The system manufacturer using the AC drive is responsible for compliance of the system with the European EMC directive. Based on the application of the system, the integrator must ensure that the system complies with standard EN 61800-3: 2004 Category C2, C3 or C4.

The system (machinery or appliance) installed with the AC drive must also have the CE mark. The system integrator is responsible for compliance of the system with the EMC directive and standard EN 61800-3: 2004 Category C2.

Warning
If applied in the first environment, the AC drive may generate radio interference. Besides the CE compliance described in this chapter, users must take measures to avoid such interference, if necessary.

7.3 Selection of Peripheral EMC Devices

7.3.1 Installation of EMC Input Filter on Power Input Side

An EMC filter installed between the AC drive and the power supply can not only restrict the interference of electromagnetic noise in the surrounding environment on the AC drive, but also prevents the interference from the AC drive on the surrounding equipment.

The H300 series AC drive satisfies the requirements of category C2 only with an EMC filter installed on the power input side. The installation precautions are as follows:

- Strictly comply with the ratings when using the EMC filter. The EMC filter is category I electric apparatus, and therefore, the metal housing ground of the filter should be in good contact with the metal ground of the installation cabinet on a large area, and requires good conductive continuity. Otherwise, it will result in electric shock or poor EMC effect.
- The ground of the EMC filter and the PE conductor of the AC drive must be tied to the same common ground. Otherwise, the EMC effect will be affected seriously.
- The EMC filter should be installed as closely as possible to the power input side of the AC drive.

7.3.2 Installation of AC Input Reactor on Power Input Side

An AC input reactor is installed to eliminate the harmonics of the input current. As an optional device, the reactor can be installed externally to meet strict requirements of an application environment for harmonics. The following table lists the recommended manufacturers and models of input reactors.

7.3.3 Installation of AC Output Reactor on Power Output Side

Whether to install an AC output reactor on the power output side is dependent on the actual situation. The cable connecting the AC drive and the motor should not be too long; capacitance enlarges when an over-long cable is used and thus high-harmonics current may be easily generated.

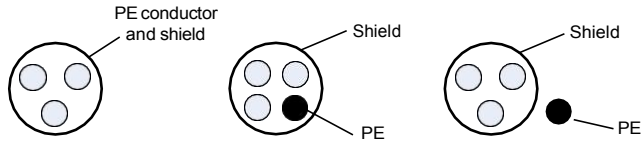
If the length of the output cable is equal to or greater than the value in the following table, install an AC output reactor on the power output side of the AC drive.

7.4 Shielded Cable

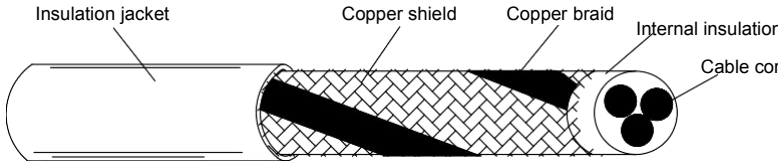
7.4.1 Requirements for Shielded Cable

The shielded cable must be used to satisfy the EMC requirements of CE marking. Shielded cables are classified into three-conductor cable and four-conductor cable. If conductivity of the cable shield is not sufficient, add an independent PE cable, or use a four-conductor cable, of which one phase conductor is PE cable.

The three-conductor cable and four-conductor cable are shown in the following figure.

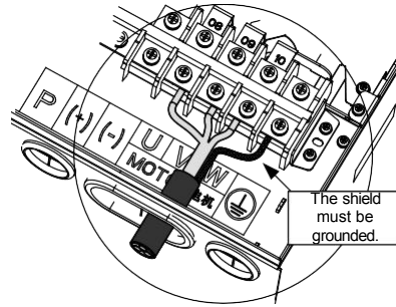


To suppress emission and conduction of the radio frequency interference effectively, the shield of the shielded cable is cooper braid. The braided density of the cooper braid should be greater than 90% to enhance the shielding efficiency and conductivity, as shown in the following figure.



The following figure shows the grounding method of the shielded cable.

Figure 7-1 Grounding of the shielded cable



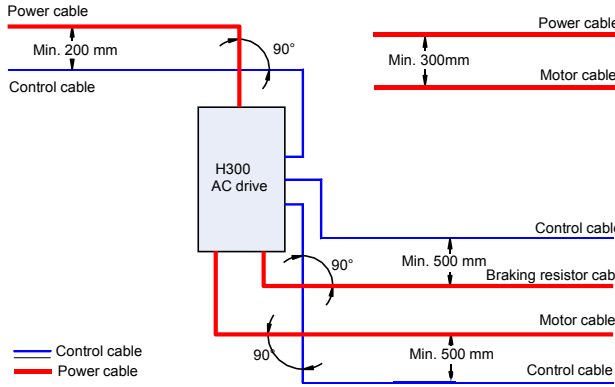
The installation precautions are as follows:

- Symmetrical shielded cable is recommended. The four-conductor shielded cable can also be used as an input cable.
- The motor cable and PE shielded conducting wire (twisted shielded) should be as short as possible to reduce electromagnetic radiation and external stray current and capacitive current of the cable. If the motor cable is over 100 meters long, an output filter or reactor is required.
- It is recommended that all control cables be shielded.
- It is recommended that a shielded cable be used as the output power cable of the AC drive; the cable shield must be well grounded. For devices suffering from interference, shielded twisted pair (STP) cable is recommended as the lead wire and the cable shield must be well grounded.

7.4.2 Cabling Requirements

1) The motor cables must be laid far away from other cables. The motor cables of several AC drives can be laid side by side.
2) It is recommended that the motor cables, power input cables and control cables be laid in different ducts. To avoid electromagnetic interference caused by rapid change of the output voltage of the AC drive, the motor cables and other cables must not be laid side by side for a long distance.
3) If the control cable must run across the power cable, make sure they are arranged at an angle of close to 90° . Other cables must not run across the AC drive.
4) The power input and output cables of the AC drive and weak-current signal cables (such as control cable) should be laid vertically (if possible) rather than in parallel.
5) The cable ducts must be in good connection and well grounded. Aluminium ducts can be used to improve electric potential.
6) The filter, AC drive and motor should be connected to the system (machinery or appliance) properly, with spraying protection at the installation part and conductive metal in full contact.

Figure 7-2 Cabling diagram



7.5 Solutions to Common EMC Interference Problems

The AC drive generates very strong interference. Although EMC measures are taken, the interference may still exist due to improper cabling or grounding during use. When the AC drive interferes with other devices, adopt the following solutions.

Interference Type	Solution
Leakage protection switch tripping	• Connect the motor housing to the PE of the AC drive. • Connect the PE of the AC drive to the PE of the mains power supply. • Add a safety capacitor to the power input cable. • Add magnetic rings to the input drive cable.
AC drive interference during running	• Connect the motor housing to the PE of the AC drive. • Connect the PE of the AC drive to the PE of the mains voltage. • Add a safety capacitor to the power input cable and wind the cable with magnetic rings. • Add a safety capacitor to the interfered signal port or wind the signal cable with magnetic rings. • Connect the equipment to the common ground.
Communication interference	• Connect the motor housing to the PE of the AC drive. • Connect the PE of the AC drive to the PE of the mains voltage. • Add a safety capacitor to the power input cable and wind the cable with magnetic rings. • Add a matching resistor between the communication cable source and the load side. • Add a common grounding cable besides the communication cable. • Use a shielded cable as the communication cable and connect the cable shield to the common grounding point.
I/O interference	• Enlarge the capacitance at the low-speed DI. A maximum of 0.11 uF capacitance is suggested. • Enlarge the capacitance at the AI. A maximum of 0.22 uF is suggested.

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						
H300S0.4GB	1	5.4	2.3	0.4	0.5	0.016
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)

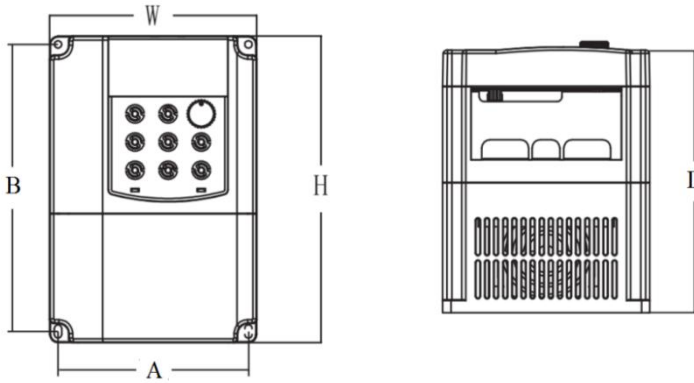


Figure 8-2 Physical appearance and overall dimensions of the H300 (sheet metal housing)

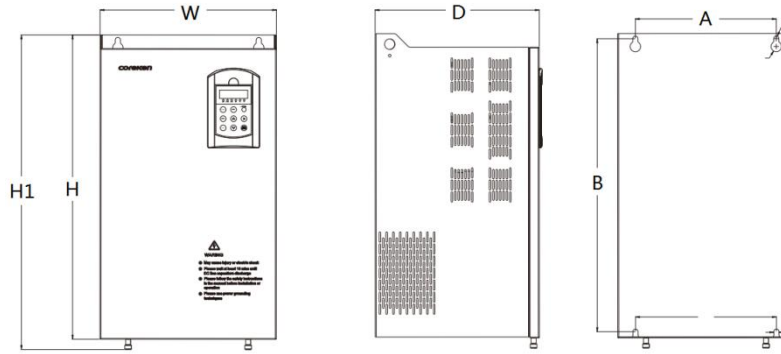


Table 8-2 Overall dimensions and mounting hole dimensions of the H300

Model	Mounting Hole (mm)		Overall Dimensions (mm)				Mounting Hole Diameter (mm)	Weigh t (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 with pedestal	580	384	Ø10.0	/
H300T200G/220P								
H300T220G/250P								
H300T250G/280P	420	1162	1132	1482 with pedestal	680	400	Ø12.0	/
H300T280G/315P								
H300T315G/355P	520	1300	1355	1765 with pedestal	800	392	Ø14.0	/
H300T355G/400P								
H300T400G/450P								

8.3 Recommended Cable Diameter and Installation Dimensions of Power Terminals

Note

- The recommended data and models are for reference only. The cable diameter you select cannot be larger than the size in the following figures.
- The prerequisite of cable selection is as follows: Under ambient temperature of 40° C in steady state, for the recommended diameters of the insulation copper conductor or cable, see section 12.4 of the IEC 60204-1-2005

8.4 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 (mm^2)	Cable of Output Side Main Circuit (mm^2)	Cable of Control Circuit (mm^2)
Single-phase 220 V					
H300S0.4GB	6	9	0.75	0.75	0.5
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

AC Drive Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm^2)	Cable of Output Side Main Circuit (mm^2)	Cable of Control Circuit (mm^2)
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

8.5 Selection and Installation of External DC Reactor

8.5.1 Installation Mode of External DC Reactor

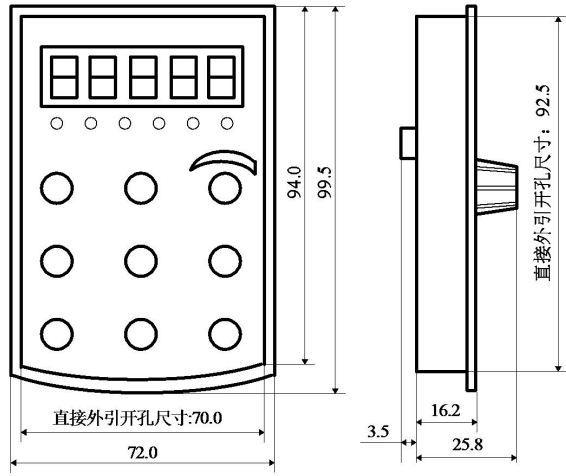
When installing the DC reactor, remove the shorting copper busbar between the main circuit connection terminals P and +. Then connect the DC reactor between terminals P and + (no polarity requirement). The copper busbar is not used any longer after the installation is complete.

Note

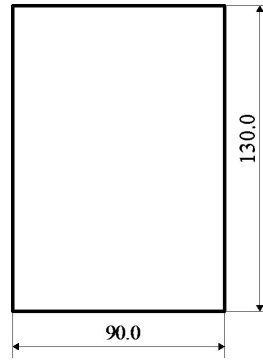
Customized models can be provided for special requirements.

8.6 Physical Dimensions of External Operation Panel

Physical dimensions of external operation panel and mounting dimensions without pedestal



Mounting dimensions of operation panel pedestal



8.7 Selection of Braking Unit and Braking Resistor

8.7.1 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.

8.7.2 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				
H300S0.4GB	80 W	≥ 200 Ω	Built-in (standard)	No special description
H300S0.7GB	80 W	≥ 150 Ω		
H300S1.5GB	100 W	≥ 100 Ω		
H300S2.2GB	100 W	≥ 70 Ω		
Three-phase 380 V				
H300T0.7GB	150 W	≥ 300 Ω	Built-in (standard)	No special description
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		
H300T18.5G	1300 W	≥ 25 Ω		
H300T22G	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

<table>
<tr><td rowspan="3">Customer information</td><td colspan="2">Add. of unit:</td></tr>
<tr><td rowspan="2">Name of unit:
P.C.:</td><td>Contact person:</td></tr>
<tr><td>Tel.:</td></tr>
<tr><td rowspan="3">Product information</td><td colspan="2">Product model:</td></tr>
<tr><td colspan="2">Body barcode (Attach here):</td></tr>
<tr><td colspan="2">Name of agent:</td></tr>
<tr><td>Failure information</td><td colspan="2">(Maintenance time and content):

Maintenance personnel:</td></tr>
</table>