ZHYI

- General-Purpose Frequency Converter
- Permanent Magnet Synchronous Frequency Converter
- Industry Special Frequency Converter
- High, Medium and Low Voltage Soft Starter

Easy to start

ZYV800 Series

General-Purpose AC Drive
User Manual （Brief）

Zhejiang Zhongyi Automation Technology Co., Ltd.

Contents

Safety Information

§ Safety Precautions

1. Please read and follow the safety precautions when installing, operating and maintaining the product.
2. To ensure your safety and prevent damage to equipment, please follow the marks on the product and safety precautions in this manual when installing, operating and maintaining the product.
3. "CAUTION", "WARNING", and "DANGER" items in the manual do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
4. Use this product in environment meeting the design and specification requirements; otherwise, a fault may occur. Noncompliance-caused malfunction or damage to parts are not covered in product quality warranty.
5. Inovance is not legally responsible for any personal safety accident or property losses caused by improper operation of this product.

§ Safety Grade and Definition

The 

"DANGER" indicates the improper operation, which, if not avoided, causes death or serious injury.

The 

"WARNING" indicates the improper operation, which, if not avoided, may cause death or serious injury.

The 

"CAUTION" indicates the improper operation, which, if not avoided, may cause minor injury or equipment damage.

§ Safety Information

Unpacking and Checking
 ◆ Before unpacking, check whether the outer package is intact, damaged, wet, damped, or deformed. ◆ Open the package in sequence. Violent beating is prohibited! ◆ During unpacking, check whether the product and its accessories have any damage, corrosion or bump on the surface. ◆ Check the quantity of the product and its accessories and data completeness according to the packing list.
 ◆ Do not install the product and its accessories when you find that the product and its accessories have any damage or corrosion or they have been used. ◆ Do not install the product when there is water inside the product or any of its parts is missing or damaged. ◆ Do not install the product when the product name is inconsistent with that in the packing list.

During Storage and Transportation

Warning

- Store and transport the product according to its storage and transportation conditions. The storage temperature and humidity shall meet relevant requirements.
- Do not store or transport the product in places with direct sunlight, strong electric field, strong magnetic field or strong vibration or places that are wet by rain or splashing water.
- Do not store the product for over three months. Take stricter prevention measures and perform necessary inspection when the storage time is too long.
- Well pack the product before transportation. The product must be placed in a sealed box for long-distance transportation.
- Do not transport the product together with any equipment or articles that may affect or impair the product.

Caution

- Be sure to use professional loading and unloading equipment to move large or heavy equipment and products!
- When moving the product by hand, grab the product case tightly to avoid dropping the product parts, causing injury!
- Be sure to move the product lightly, pay attention to your step to prevent trip or fall; otherwise, there is the risk of injury or damage to the product!
- When the equipment is lifted by a lifting gear, do not stand or stay in the area below the lifting area.

During Installation

Caution

- Before installation, carefully read the product manual and safety precautions!
- Do not modify the product!
- Do not unscrew the fixing bolts and bolts with red mark of the product parts and components!
- Do not install this product in a place with strong electric field or strong electromagnetic interference!
- When the product is installed in a cabinet or terminal equipment, the cabinet or terminal equipment shall be provided with the corresponding protective devices such as fireproof enclosure, electrical enclosure and mechanical enclosure. The protection grade shall comply with relevant IEC standards and local laws and regulations.

Danger

- Non-professionals are strictly prohibited from product installation, wiring, maintenance, inspection or parts replacement!
- These operations can only be done by professionals trained on electrical equipment and having knowledge of electrical equipment.
- Installers must be familiar with product installation requirements and related technical data.
- When you need to install equipment, such as transformers, having strong electromagnetic interference, install the shield protection device to prevent the product from malfunction!

During Wiring

Danger

- Non-professionals are strictly prohibited from equipment installation, wiring, maintenance, inspection or parts replacement!
- Do not perform wiring when the power is turned on. Failure to comply may result in electric shock.
- Before wiring, cut off the power of all equipment. There is residual voltage in internal capacitor of the equipment after the power is cut off. Wait for at least 10 minutes before wiring and other operations.
- Be sure the equipment and product are properly grounded. Failure to comply may result in electric shock.
- Follow the ESD precautions and wear EDS wrist strap to avoid damage to the equipment or circuit inside the product.

Warning

- It is prohibited to connect the input power to the output terminal of the equipment or product; otherwise, the equipment may be damaged or fire may occur.
- When connecting a driving equipment to the motor, be sure that the phase sequence of the driver and the motor terminal are consistent, so as to avoid reverse rotation of the motor.
- The cables used for wiring must meet relevant diameter and shielding requirements, and the shielding layer of the shielding cables must be reliably grounded at single terminal!
- After wiring is finished, be sure there is no screw or bar cables inside the equipment and product.

During Power-on

Warning

- Before power-on, be sure the equipment and product are installed properly, the wiring is firm and the motor unit is allowed to restart.
- Before power-on, be sure the power supply meets the equipment requirements to avoid damage to the equipment or causing fire!
- During power-on, mechanical devices of the equipment or product may suddenly move. Stay away from the mechanical devices.
- After power-on, do not open the equipment cabinet door or product protection cover; otherwise, there is the danger of electric shock!
- It is prohibited to touch any terminal of the equipment when power is on; otherwise, there is the danger of electric shock!
- It is prohibited to dismantle any device or parts of the equipment and product when the power is on; otherwise, there is the danger of electric shock!

During Running

Danger

- It is prohibited to touch any terminal of the equipment when it is running; otherwise, there is the danger of electric shock!
- It is prohibited to dismantle any device or parts of the equipment and product when the equipment is running; otherwise, there is the danger of electric shock!
- It is prohibited to touch the equipment closure, fan or resistor to check the temperature; otherwise, there is the danger of burn!
- Non-professional technicians are prohibited to detect the signal when the equipment is running; otherwise, there is the danger of personal injury or damage to the equipment!

Warning

- When the equipment is running, do not drop other articles or metals into the equipment; otherwise, the equipment may be damaged!
- Do not start or stop the equipment by turning on or off the connector; otherwise, the equipment may be damaged!

During Maintenance

Danger

- Non-professionals are strictly prohibited from equipment installation, wiring, maintenance, inspection or parts replacement!
- It is prohibited to maintain the equipment when power is on; otherwise, there is the danger of electric shock!
- After the equipment power is cut off, wait for at least 10 minutes before maintaining the equipment or performing other operations.

Warning

- Follow the equipment maintenance and repair requirements for routine and regular inspection and maintenance of the product and equipment, and prepare the maintenance records.

During Repair

Danger

- Non-professionals are strictly prohibited from equipment installation, wiring, maintenance, inspection or parts replacement!
- It is prohibited to repair the equipment when power is on; otherwise, there is the danger of electric shock!
- After the equipment power is cut off, wait for at least 10 minutes before inspecting or repairing the equipment or performing other operations.

Warning

- Repair the equipment according to the product warranty agreement.
- When the equipment has fault or is damaged, troubleshoot and repair the equipment and product follow guidance by professionals, and prepare the repair records.
- Replace the product wearing parts under guidance.
- Do not continue to use damaged machines; otherwise, greater damager may be caused.
- After replacing the equipment, re-check the equipment wiring and parameter settings again.

During Scrapping

Warning

- Scrap the equipment and product according to national regulations and standards to avoid property loss or personal injury!
- Recycle scrapped equipment and product according to industrial waster processing standards to avoid pollution to the environment.

§ Safety Marks

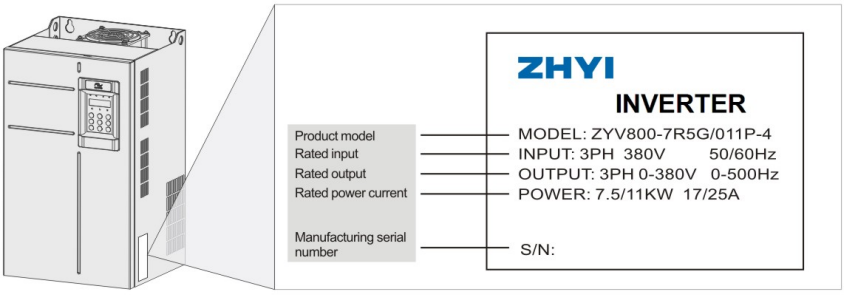
For safe operation and maintenance of the equipment, be sure to observe the safety marks affixed to the equipment and product. Do not damage, destroy or peel off the safety marks. Safety marks are described as follows:

Safety Marks	Description
	◆ Read the user manual before installing and running the equipment; otherwise, there is the danger of electric shock! ◆ Do not dismantle the cover within 10 minutes after the power is turned on or cut off! ◆ After cutting off the power at the input and output terminals, wait for 10 minutes until the power indicator turns off before maintaining, inspecting or wiring the equipment.

1 Product Information

Safety Information
Caution ◆ Do not lift/carry the drive by carrying the front cover. Failure to comply may result in personal injury. ◆ Follow proper electrostatic discharge (ESD) procedures when operating the drive. Failure to comply will risk damaging the internal circuit of the drive.

1.1 Nameplate and Model



AC drive model

ZYV 800 - 7R5G/011P - 4

Series

4 Voltage level

G General Type

Marking	7R5G	011P	---G630
Adapting motor	G7.5KW	P11KW	---G630KW

Figure 1-1 Product naming and nameplate

2 Installation and Wiring

2.1 Installation

2.1.1 Installation environment

1. Ambient temperature: The AC drive service life is greatly influenced by the ambient temperature. Do not run the AC drive under a temperature exceeding the allowed temperature range (-10°C to 50°C).

2. Install the AC drive on the surface of a flame retardant object, and ensure there is sufficient space around the enclosure to allow for efficient heat dissipation. The AC drive generates great heat during working. Use screws to install the AC drive on the mounting support vertically.

3. Install the AC drive without strong vibration. Ensure the mounting location is not affected by levels of vibration that exceeds 0.6 G. Keep the drive away from punch machines.

4. Ensure the mounting location is away from direct sunlight, damp or water drops.

5. Ensure the mounting location is protected against corrosive, combustible or explosive gases and vapors.

6. Ensure the mounting location is free from oil and dust.

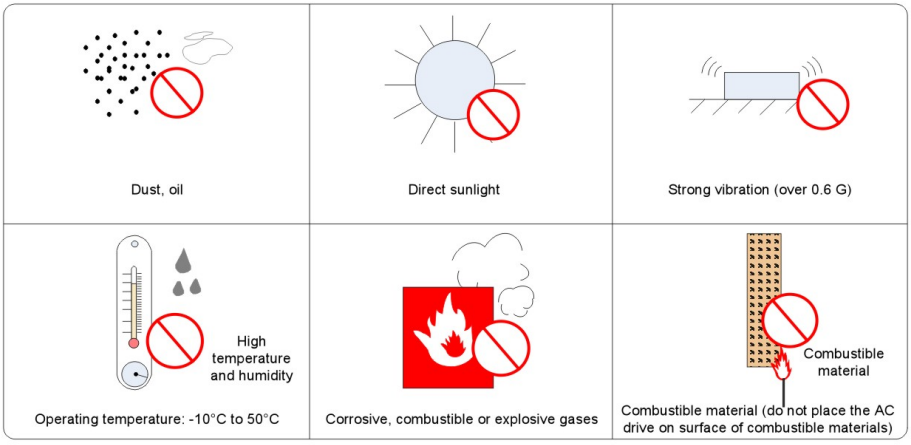


Figure 2-1 Installation environment requirements

7. The drive units must be installed in a fireproof cabinet with doors that provide effective electrical and mechanical protection. The installation must conform to local and regional laws and regulations, and to relevant IEC requirements.

2.1.2 Mounting Clearance and Orientation

1. Mounting Clearance

The mounting clearance varies with the power rating of the AC drive.

■ Mounting of a single drive

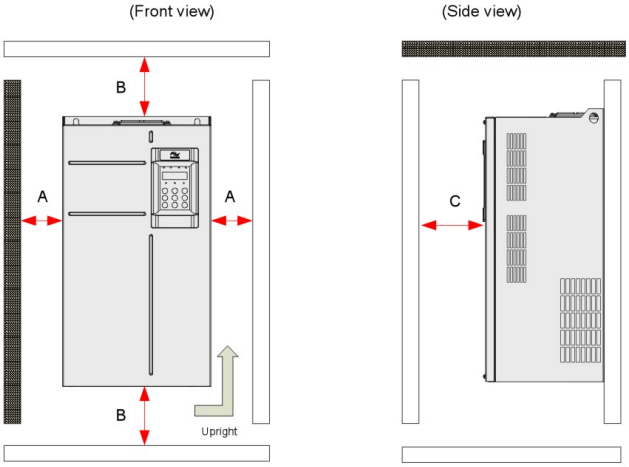


Figure 2-2 Mounting clearance of a single drive

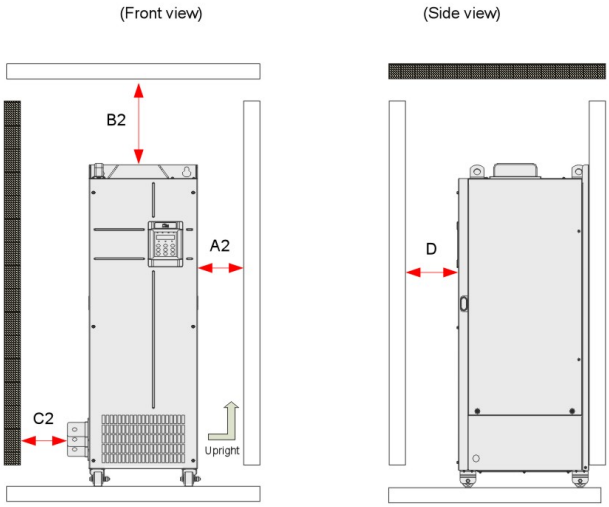


Figure 2-3 Mounting clearance of a single drive

■ Installation of an air guide plate

Where an AC drive is required to be mounted directly above another AC drive, it is recommended to install an Air Guide Plate to divert exhaust cooling air of the bottom unit away from the top unit.

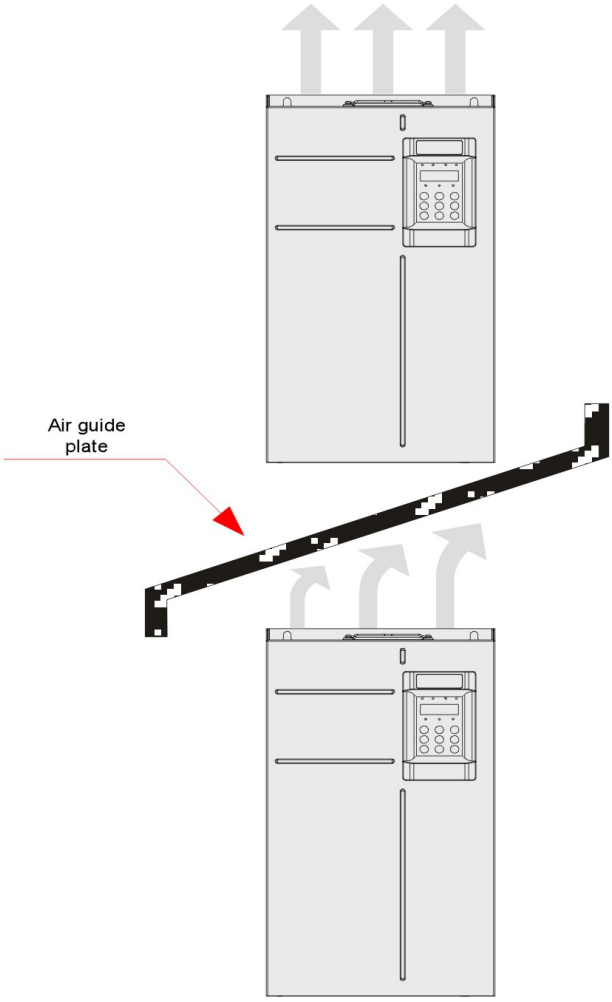


Figure 2-4 Installation of an air guide plate

2.2 Wiring

2.2.1 Standard Wiring Diagram

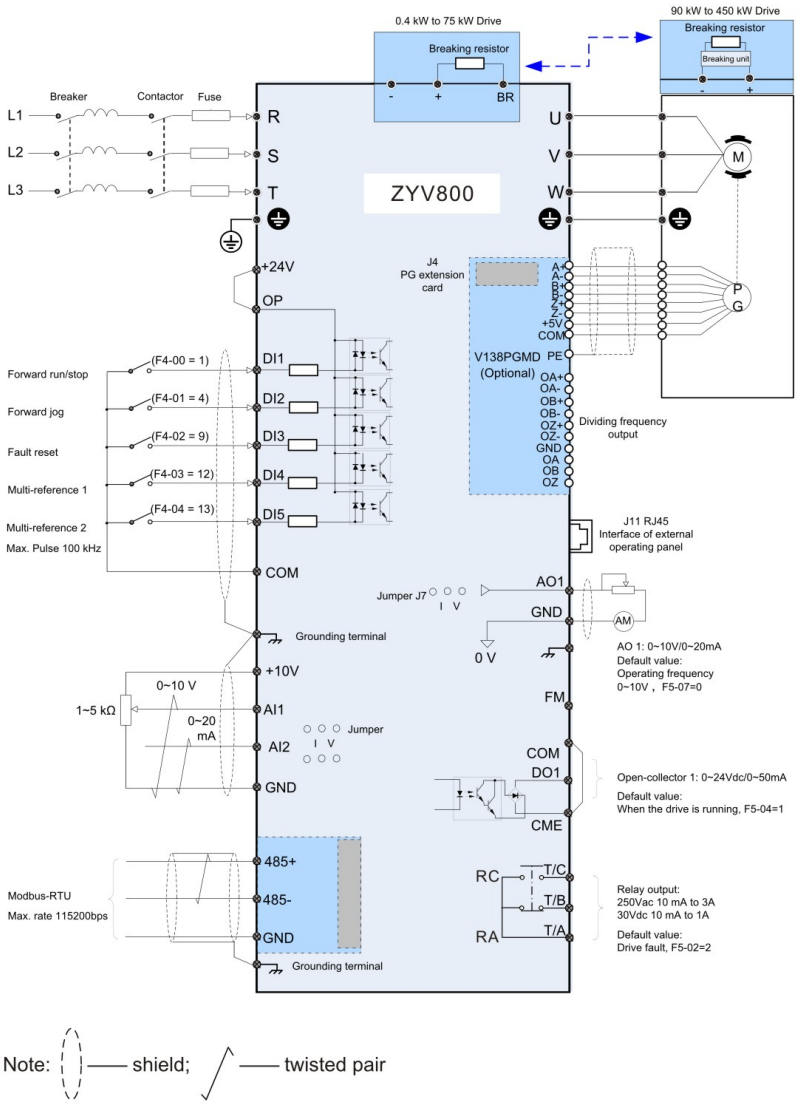


Figure 2-5 Wiring diagram of a typical three-phase 380 to 480 V drive

2.2.2 Functions of Main Circuit Terminals and Precautions

1. Main Circuit Terminals

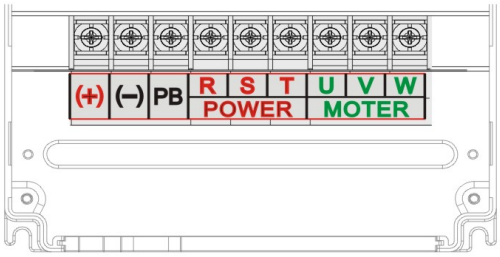


Figure 2-6 Terminal arrangement in ZYV800 T0.4GB to ZYV800 T15GB

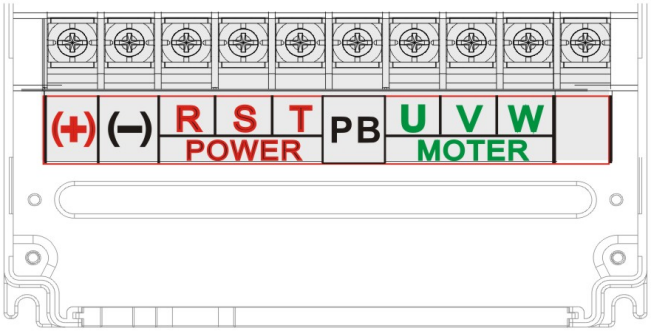


Figure 2-7 Terminal arrangement in ZYV800 T18.5G(B) to ZYV800 T160G

Table 2-1 Description of the drive terminals

Terminal	Terminal Name	Function Description
R, S, T	Three-phase supply input	Connected to three-phase power supply.
(+), (-)	DC bus terminals	Connected to external braking unit (MDBUN) with AC drive units of 90 kW and above.
(+), BR	Braking resistor connection	Connected to external braking resistor for AC drive units of 75 kW and below.
U, V, W	AC drive outputs	Connected to a three-phase motor.
⏚	Ground (PE)	Grounding connection.

2. Main Circuit Cable Selection

Inovance recommends symmetrical shielded cables as the main circuit cable, which can reduce electromagnetic radiation of the entire conductive system compared with four-conductor cables.

■ Recommended power cable: symmetrical shielded cable

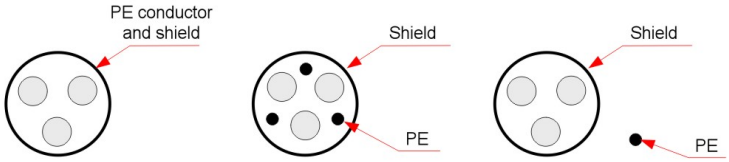


Figure 2-8 Recommended power cable

■ Non-recommended power cable

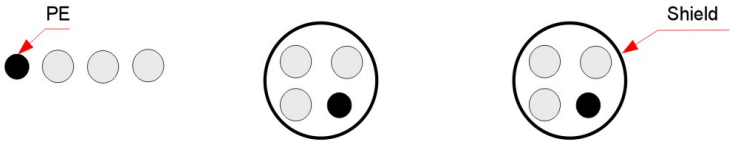


Figure 2-9 Non-recommended power cable

3. Power input R, S, T

- There are no phase sequence requirements for three-phase cable connections.
- Specification and installation of all external power cables must comply with local safety regulations and relevant IEC standards.
- Install filter close to power input side of the AC drive with a cable shorter than 30 cm. Connect the ground terminal of the filter and the ground terminal of the drive together to the cabinet main grounding terminal.

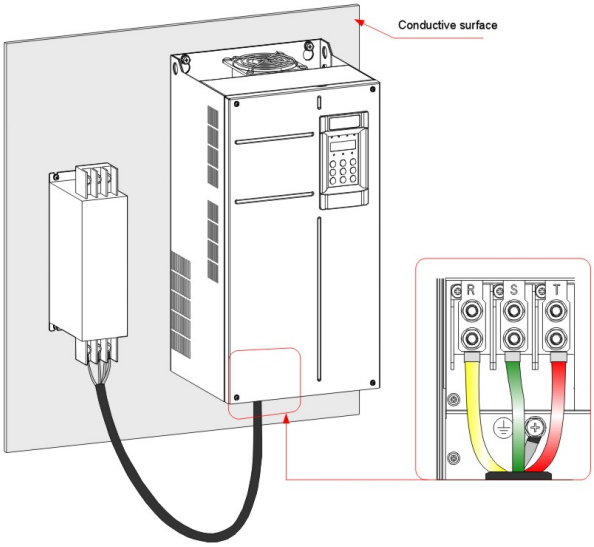


Figure 2-10Mount the filter

4. DC bus terminals (+) and (-)

- DC bus terminals, labeled (+) and (-), are terminals that carry a residual voltage for a period after the drive has been switched off.
- To avoid risk of equipment damage or fire, when you select an external braking unit for use with an AC drive of 90 kW and above, DO NOT reverse the poles (+) and (–).
- Use a cable not exceeding 10 m to connect DC bus terminals to the external MDBUN braking unit. Use twisted pair wires or close pair wires for this connection.
- Fire risk! Do not connect the braking resistor directly to the DC bus.

5. Braking Resistors (+) and BR

- Braking resistor terminals (+) and PB are only for the drive units up to 75 kW that are fitted with an internal braking unit.
- To avoid risk of equipment damage, use a cable not exceeding 5 m to connect an external braking resistor. Failure to comply may cause damage to the drive.
- To avoid risk of ignition due to overheating of the braking resistor, do not place anything combustible around the braking resistor.
- Set F6-15 (Braking use ratio) and F9-08 (Braking unit action initial voltage) correctly according to load after connecting the braking resistor to the drive of up to 75 kW that is fitted with an internal braking unit.

6. AC Drive Outputs UVW

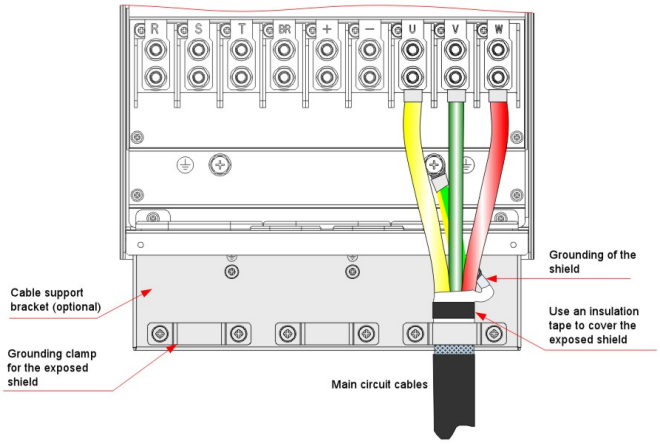


Figure 2-11 Drain wire

- Cable specification and installation of all cables connected to the drive output U, V, W must comply with local safety regulations and relevant IEC standards.
- To avoid risk of equipment damage or operating faults, do not connect a capacitor or surge absorber to the output side of the AC drive.
- Long motor cables can contribute to electrical resonance caused by distributed capacitance and inductance. In some cases, this might cause equipment damage in the drive, in motor or in cables. To avoid these problems, install an AC output reactor close to the drive if cable is longer than 100 m.
- The shielding cables are recommended for the motor. The shielding layer must be wound onto the cable support bracket. The drain wire must be grounded to the grounding (PE) terminal.
- Ensure the drain wire of the motor cable shield is as short as possible and its width must be no less than 1/5 of its length.

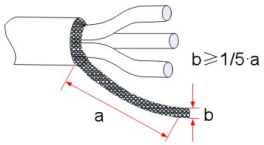


Figure 2-12 Drain wire of motor cable shield

7. Grounding (PE) Connection

- For personal safety and reliability of the equipment, it is important to connect ground (PE) terminal to an effective electrical ground. Resistance value of the ground cable must be less than 10 Ω.
- Do not connect the grounding (PE) terminal of the drive to neutral conductor of the power system.
- Use proper grounding cable with yellow/green insulation for the protective grounding conductor.
- Ground the shield.
- It is recommended that the drive be installed on a metal mounting surface.
- Install the filter and the drive on the same mounting surface and ensure filtering effect.

8. Main Circuit Cable Protection

- Add heat shrink tube to the cable lug cooper tube and cable core part of the main circuit cable and ensure the heat shrink tube completely covers the cable conductor part, as shown in the following figure.

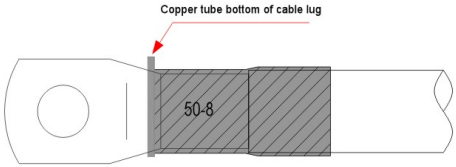


Figure 2-13 Heat shrink tube of the cable conductor part

9. Power Input Protection

- Install protection devices (a fuse and a MCCB) at power input to the drive. The protection devices must provide protection on overcurrent and short-circuit, and be able to completely isolate the drive from the electrical power input.
- Cables and protection device on power input must be suitably rated for the power and voltage class of the drive under normal conditions, and under possible fault conditions such as system overload and short-circuit on the power input.

10. Power Grid System

- The drive is applicable to system with neutral point grounded. Do not install a filter.

  Failure to comply may result in personal injury or damage to the drive.

2.2.3 Control Board

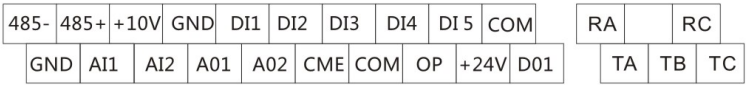


Figure 2-14 ZYV800 Control Board

Table 2-2 Control circuit terminal function

Type	Terminal	Terminal Name	Function Description
Power supply	+10V-GND	+10 V power supply	Provides +10 V power supply to an external unit. Max. output current: 10 mA. Generally used to supply an external potentiometer of 1 kΩ to 5 kΩ
	+24V-COM	+24 V power supply	Provide +24 V power supply to an external unit. Generally used for power supply for DI/DO terminals and external sensors. Max. output current: 200 mA <1>
	OP	Input terminal for external power supply	Connected to +24 V by default. When DI1 to DI5 need to be driven by external signals, OP must be disconnected from + 24 V and connected to an external power supply.
Analog outputs	AI1-GND	Analog input 1	Voltage range of inputs: 0 to 10 VDC Input impedance: 22 kΩ
	AI2-GND	Analog input 2	Either a voltage or a current input, determined by jumper J9 Input voltage range: 0 to 10 VDC Input current range: 0 to 20 mA Input impedance: 22 kΩ (voltage input), 500 Ω or 250 Ω (current input) decided byJ10 <2>
Digital outputs	DI1- OP	Digital input 1	Optically-coupled isolation compatible with dual-polarity inputs Input impedance: 1.39 kΩ Voltage range for inputs: 9 to 30 V
	DI2- OP	Digital input 2	
	DI3- OP	Digital input 3	
	DI4- OP	Digital input 4	
	DI5- OP	High-speed pulse input	In addition to having the same features as DI1 to DI4, DI5 can also be used for high speed pulse inputs. Max. input frequency: 100 kHz Input impedance: 1.03 kΩ
Analog outputs	AO1-GND AO2–GNO	Analog output 1	Either a voltage or a current output, determined by jumper J7. Output voltage range: 0 to 10 V Output current range: 0 to 20 mA
Digital outputs	DO1-CME	Digital output 1	Optically-coupled isolation, dual-polarity open-collector output Output voltage range: 0 to 24 V Output current range: 0 to 50mA Note that CME and COM are internally insulated, but are shorted externally by a jumper. In this case, DO1 is driven by +24 V by default. Remove the jumper link if you need to apply external power to DO1.

Type	Terminal	Terminal Name	Function Description
Relay outputs	T/A-T/B	Normally-closed (NC) terminal	Contact driving capacity: 250 VAC, 3 A, Cos Φ = 0.4 30 VDC, 1 A
	T/A-T/C RA–RC	Normally-open (NO) terminal	
Jumpers[3]	J7	AO1 output selection	Either a voltage or a current output, voltage output by default
	J9	AI2 input selection	Either a voltage or a current input, voltage input by default
	J10	AI2 input impedance selection	Either 500 Ω or 250 Ω input, 500 Ω input by default

3 Panel Operation

3.1 Introduction

The AC drive has an inbuilt programming/operating panel with LED indicators and display. It allows you to operate function parameters and monitor/control system status.

3.2 LED Operating Panel

The LED operating panel allows you to set and modify function parameters, monitor system status, start or stop the AC drive. Details of the operating panel are shown in the following figure.

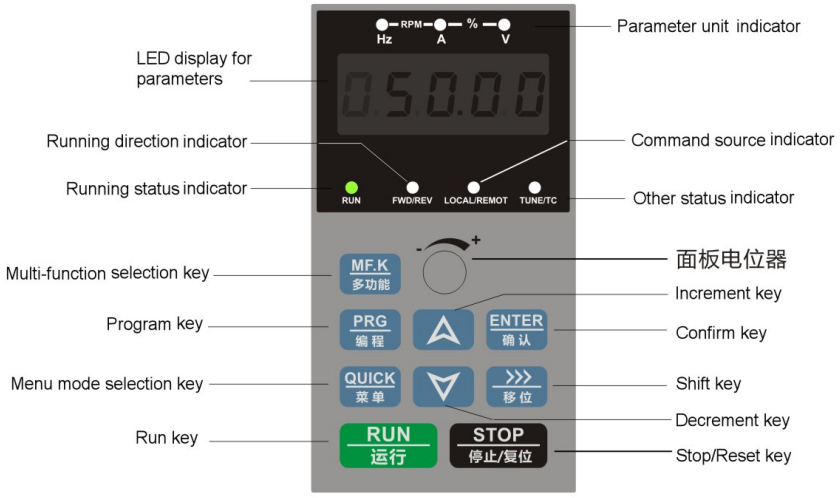
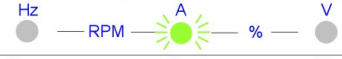
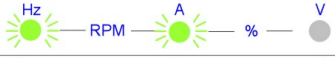


Figure 3-1 Details of the operating panel

3.2.1 Indicators on LED Operating Panel

 indicates the light turns on,  indicates the light turns off.  indicates the light flashes.

Table 3-1 Indicators on the operating panel

State		Indication
RUN Running status indicators	 RUN	OFF indicates the STOP status.
	 RUN	ON indicates the RUNNING status.
LOCAL/REMOT Running command indicators	 LOCAL/ REMOT	OFF indicates under operating panel control.
	 LOCAL/ REMOT	ON indicates under terminal control.
	 LOCAL/ REMOT	FLASHING indicates under serial communication control.
FWD/REV Forward and reverse rotation indicators	 FWD/REV	OFF indicates reverse motor rotation.
	 FWD/REV	ON indicates reverse motor rotation.
TUNE/TC Tuning, torque control and fault indicators	 TUNE/TC	OFF indicates the drive is normal.
	 TUNE/TC	ON indicates torque control mode.
	 TUNE/TC	FLASHING SLOWLY (once a second) indicates auto-tuning status.
	 TUNE/TC	FLASHING QUICKLY (four times a second) indicates a fault condition.
		Hz for frequency
		A for current
		V for voltage
		RPM for motor speed
		Percentage

3.2.2 LED Display

The five-digit LED data display can show the frequency reference, output frequency, monitoring information, and fault code.

Table 3-2 Indication of LED display

LED display	Indication	LED display	Indication	LED display	Indication	LED display	Indication
0	0	6	6	C	C	N	N
1	1	7	7	c	c	P	P
2	2	8	8	d	D	r	R
3	3	9	9	E	E	t	T
4	4	A	A	F	F	U	U
5	5, S	b	B	L	L	u	u

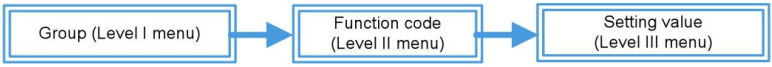
3.2.3 Keys on LED Operating Panel

Table 3-3 Function of keys on the LED operating panel

Key	Key Name	Function
PRG	Programming	Enter or exit Level I menu.
ENTER	Confirm	Enter each level of menu interface and confirm displayed parameter setting.
△	Increment	When editing a parameter value, it increases the displayed value.
▽	Decrement	When editing a parameter value, it decreases the displayed value.
▷	Shift	Select the displayed parameter in the STOP or RUNNING status. Select the digit to be modified when modifying a parameter value.
RUN	RUN	Start the AC drive when using the operating panel control mode.
STOP RES	Stop/Reset	Stop the AC drive when the drive is in the RUNNING status. The functions of this key can be restricted by using function F7-02. Perform a reset operation when the drive is in the FAULT status.
MF.K	Multifunction	**Perform a function switchover as defined by the setting of F7-01.** For details, see "3.2.6 MF.K KEY Function"
QUICK	Menu mode selection	Press it to switch over between menu modes as defined by the setting of FP-03.

3.2.4 View and Modify Function Parameters

The drive operating panel has three levels of menu:



After entering each level of menu, you can press , , or to modify the flashing value. Operation procedure is shown in Figure 3-1.

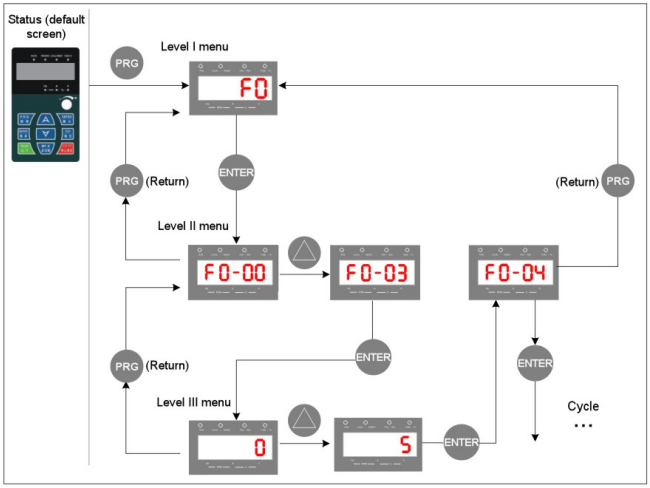


Figure 3-1 Operation procedure of the three levels of menu

The following example shows how to modify F3-02 from 10.00 Hz to 15.00 Hz.

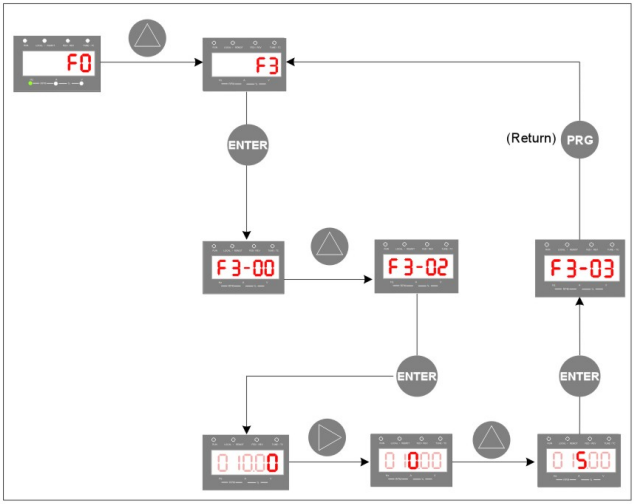


Figure 3-2 How to modify the parameter value

■ Press PRG or ENTER from a Level III menu to return to a Level II menu. The difference between the two keys is: ENTER is used to save the parameter value you have set, return to Level II menu and then select the next function parameter. PRG is used to return to Level II menu without saving the parameter value and remain at the current parameter.

■ (When operating in Level III menus, if the parameter does not include a flashing digit, then it is not possible to modify that parameter. There are two possible reasons for this:

- The function parameter you have selected is read-only. This is because the display is showing the AC drive model; the display is showing an actual parameter detected by the system; or the display is showing a running record parameter.
- The displayed function parameter cannot be modified while the AC drive is in the RUNNING status. You can modify these types of parameter only when the AC drive is in the STOP status.

3.2.5 Overall Arrangement of Function Parameters

Table 3-4 Overall arrangement of function parameters

Parameter Group	Function Description	Description
F0 to FP	Basic function parameters	Displays parameters such as running commands, frequency commands, motor parameters, control modes, AI/AO characteristic correction, and optimization control
A0 to AC		
U0	Monitoring function parameter group	Displays basic monitoring parameters

Before viewing function parameters, set FP-02 (SELECTED) to see whether the function parameter group is displayed. The following figure shows how to view the function parameter group number:

Parameter No.	Parameter Name	Default	Setting Range	Description
FP-02	Parameter display property	11	Unit's digit: Group U is displayed. 0: Not displayed; 1: Displayed Ten's digit: Group A is displayed. 0: Not displayed; 1: Displayed	The value you set for function parameter GP-02 determines whether the operating panel displays groups U and A.

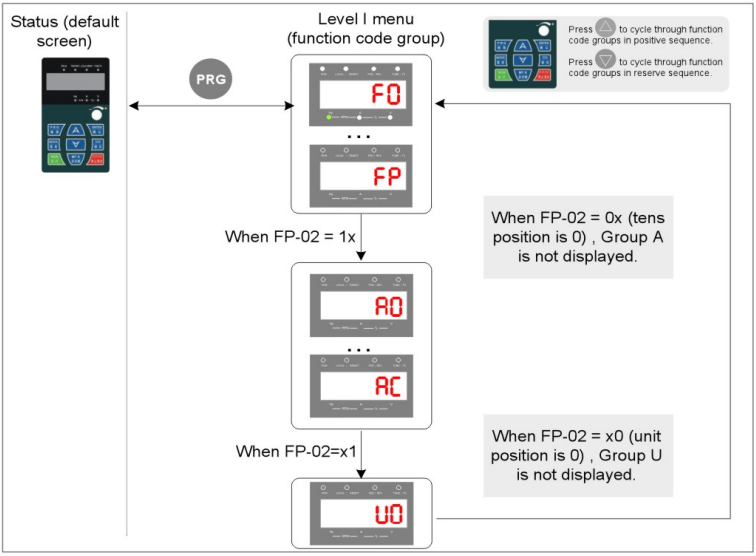


Figure 3-4 View the function parameter group number

3.2.6 View Function Parameters

When the drive in STOP or RUNNING state, press to switch each byte of F7-03, F7-04, an F7-05 to display multiple status parameters.

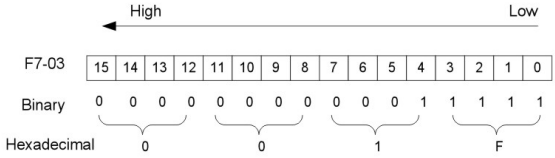
A maximum of 32 parameters in the running status can be viewed in F7-03 (running parameter 1) and F7-04 (running parameter 2) based on each bit selection in binary. At stop, a total of 13 parameters can be viewed in F7-05 (STOP parameter) based on each bit selection in binary.

You can use the operating panel to view running frequency, bus voltage, output voltage, output current, output power and PID reference.

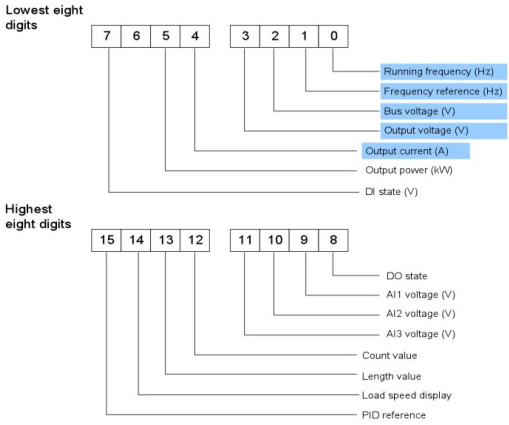
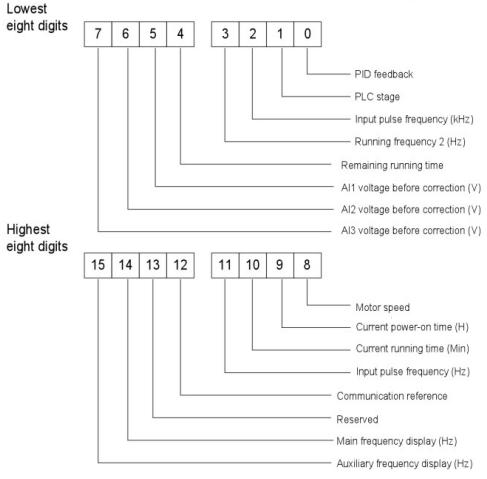
(1) Set each bit of F7-03 to 1 according to the mapping between each bit and the corresponding parameter.

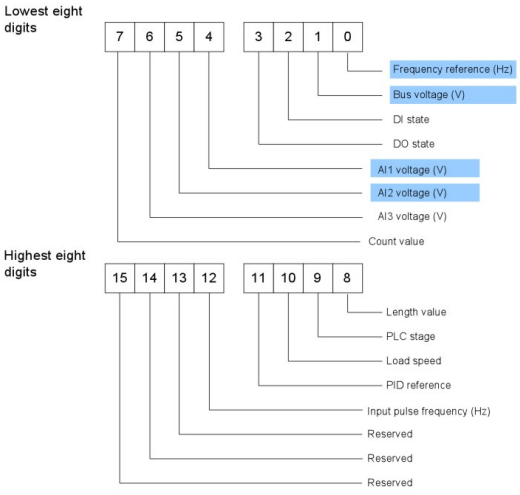
(2) Convert binary number to equivalent hexadecimal number. H.001F is displayed.

(3) Press to convert each bit of F7-03. The reference is as follows:



You can view the other parameters in the same way. The mapping of each bit of F7-03, F7-04, and F7-05 is shown in the following figure:

Parameter No.	Parameter Name	Default	Setting Range	Description
F7-03	LED display running parameters 1	1F	0000 to FFFF	If a parameter needs to be displayed during running, set corresponding bit to 1, and set F7-03 to hexadecimal equivalent.  Note: Values with shading are default values.
F7-04	LED display running parameters 2	0	0000 to FFFF	If a parameter needs to be displayed during running, set corresponding bit to 1, and set F7-04 to hexadecimal equivalent. 

Parameter No.	Parameter Name	Default	Setting Range	Description
F7-05	LED display stop parameters	33	0000 to FFFF	If a parameter needs to be displayed during stop, set corresponding bit to 1, and set F7-05 to hexadecimal equivalent.  Note: Values with shading are default values.

Note

- Once the AC drive is re-powered on after power down, the display includes the selected parameters before power down by default.

3.2.7 MF.K Key Function

Function of the MF.K key on the LED operating panel can be set using parameter F7-01. You can switch over running command or frequency reference direction of the drive and implement forward/reverse jog through this key in either STOP or RUNNING status.

Parameter No.	Parameter Name	Default	Setting Range	Description
F7-01	MF.K key function selection	0	0: MF.K disabled	The key has no function.
			1. Switchover between operating panel and terminal/ communication.	F0-02 = 0, there is no effect after you press the MF.K key. F0-02 = 1, running command can be switched over between terminal and operating panel through the MF.K key. F0-02 = 2, communication source can be switched over between communication and operating panel through the MF.K key.
			2. Forward/Reverse RUN switchover	Frequency reference direction can be switched over through the MF.K key. This function is valid only when running command is operating panel.
			3: Forward jog	Forward jog of the drive can be implementedthrough the MF.K key. This function is valid only when running command is operating panel.
			4: Reverse jog	Reverse jog of the drive can be implemented through the MF.K key. This function is valid only when running command source is operating panel.

4 Basic Operations and Trial Run

This chapter describes basic operations and trial run of the AC drive, mainly including setting the frequency reference, and stopping and starting the drive.

4.1 Quick Commissioning Guide

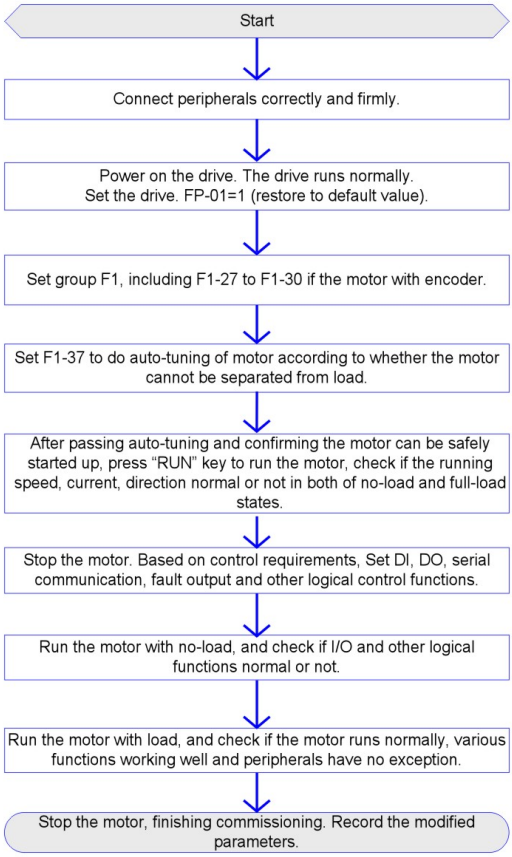


Figure 4-1 Quick commissioning steps

4.2 Commissioning Flowchart

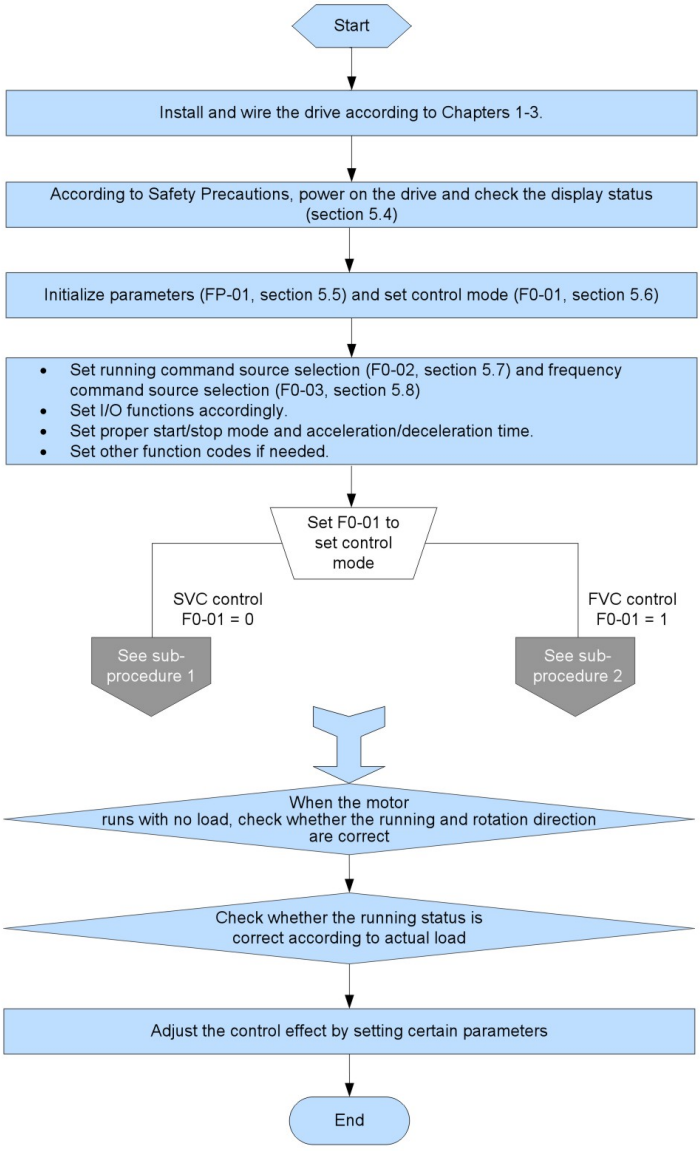


Figure 4-2 Commissioning flowchart

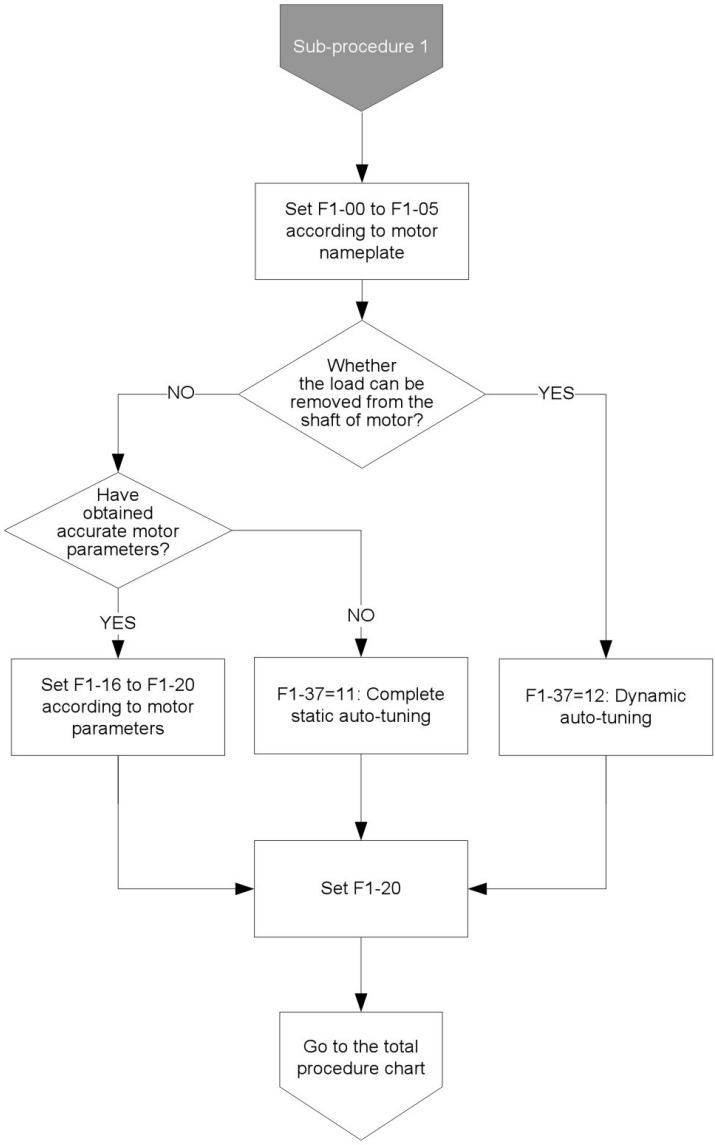


Figure 4-3 Commissioning subprocess flowchart 1 (SVC control)

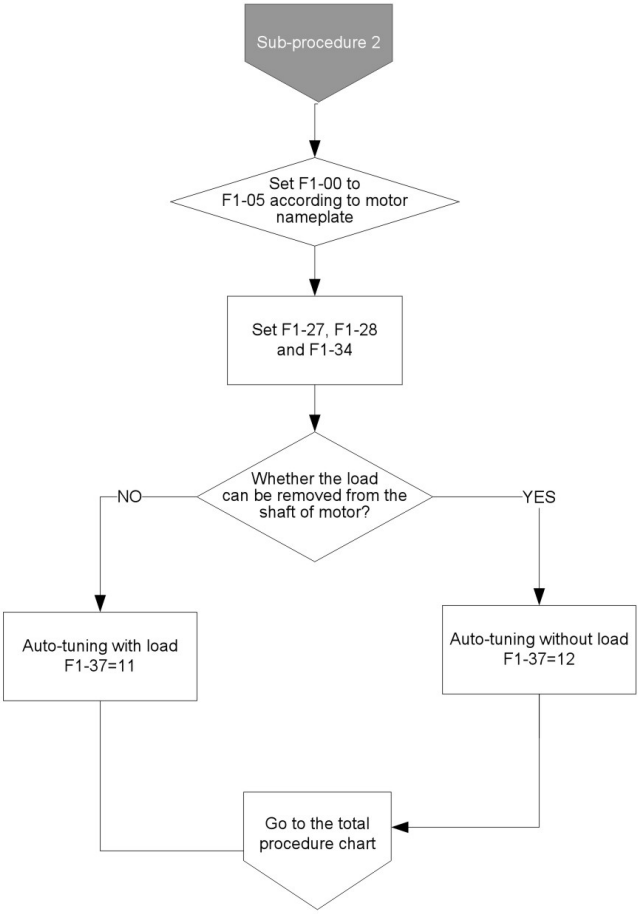


Figure 4-4 Commissioning subprocess flowchart 2 (Vector control (FVC))

4.3 Checklist Before Power-on

Be sure to check the following items before powering on the drive.

Item	Content
Voltage	The voltage is AC 380 to 480 V and 50/60 Hz.
	The input connects R, S, and T are properly connected.
	The drive is connected to the motor properly.
Connection of drive output terminals and motor terminals	The drive output terminals U, V and W are firmly connected to the motor terminals.
Connection of terminals in control circuit	Terminals of the control circuit are firmly connected to other control devices.
Status of control terminals	All terminals of the control circuit are OFF (the drive is not running).
Load	The motor is idle and not connected to the mechanical system.

4.4 Display After Power-on

After the drive is powered on, the display on operating panel is described in the following table.

State	Display	Description
Normal	50.00	Default value 50.00 Hz is displayed.
After the fault occurs	Err02	The drive stops and displays error code.

4.5 Parameter Initialization

You can restore the drive to factory parameters. After initialization, FP-01 is automatically zeroed.

FP-01	Parameter initialization		Default	0
	Setting Range	0	No operation	
		1	Restore factory parameters except motor parameters	
		2	Clear records	
		4	Back up current user parameters	
		501	Restore user backup parameters	

1: Restore factory parameters except motor parameters

When FP-01 is set to 1, most of the parameters are restored to the factory default settings. However, motor parameters, frequency reference resolution (F0-22), error records, accumulative running time (F7-09), accumulative power-on time (F7-13), accumulative power consumption (F7-14), and heatsink temperature of AC drive IGBT (F7-07) cannot be restored.

2: Clear records

Error records, F7-09, F7-13, and F7-14 are cleared.

4: Back up current user parameters

Parameters set by the current user are backed up. Values of all the current function parameters are backed up for restoration after error caused by parameter adjustment.

501: Restore user backup parameters

Restore parameters backed up by setting FP-01 to 4.

4.6 Motor Control

Parameter	Description	Scenario
F0-01: Motor control mode	F0-01 = 0: SVC	It indicates the SVC control mode. It is applicable for common high-performance control scenarios in which one AC drive can drive only one motor, for example, machine tool, centrifuge, drawing machine, and injection molding machine.
	F0-01 = 1: FVC	It indicates the FVC control mode. The motor must have an encoder and the drive must have a PG card in the same type of the encoder. It is applicable to scenarios requiring high precision speed or torque control. One AC drive can drive only one motor, for example, high-speed paper making machine, crane and elevator.

4.7 Start/Stop running command

F0-02	Running command selection		Default	0
	Setting Range	0	Operating panel (LED off)	
		1	Terminal (LED on)	
		2	Serial communication (LED flashing)	

You can use F0-02 to select input channel of the drive running command. The drive running commands include start, stop, forward, reverse, and jog.

F0-02 = 0: Operating panel (The LOCAL/REMOT indicator is off.)

The commands are given by pressing the RUN and STOP/RES on the operating panel.

F0-02 = 1: Terminal (The LOCAL/REMOT indicator is on.)

Commands are given by using multi-functional input terminals with functions such as FWD, REV, JOGF and JOGR.

F0-02 = 2: Serial communication (The LOCAL/REMOT indicator is flashing.)

4.7.1 Start/Stop Operating Panel

The commands are given by pressing the RUN and STOP/RES on the operating panel, and the LOCAL/REMOT indicator is off. For information about the keys, see Chapter 4 Panel Operations.

4.7.2 Start/Stop DI

F4-11	Terminal I/O control mode		Default	0
	Setting Range	0	Two-wire control mode 1	
		1	Two-wire control mode 2	
		2	Three-wire control mode 1	
		3	Three-wire control mode 2	

F4-11 defines the four terminal I/O control modes, in which the drive running is controlled by DI terminals.

The following example takes DI1, DI2 and DI3 to describe how to control the AC drive through DI terminals. Set F4-00 to F4-02 to select DI1, DI2 and DI3. For details, see setting ranges of F4-00 to F4-09.

F4-11 = 0: Two-wire Control Mode 1. It is the most commonly used two-wire control mode. Allocate DI1 with forward run function and DI2 with reverse run function.

The parameters are set as below:

Parameter No.	Name	Value	Function Description
F4-11	Terminal I/O control mode	0	Two-wire control mode 1
F4-00	DI1 function selection	1	Forward RUN (FWD)
F4-01	DI2 function selection	2	Reverse RUN (REV)

K1	K2	Running Command
1	0	Forward
0	1	Reserve
1	1	Stop
0	0	Stop

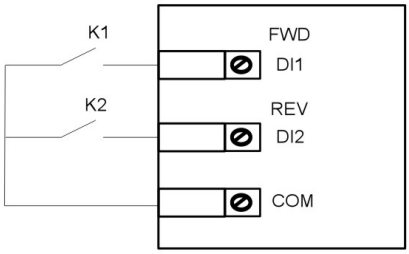


Figure 4-5 Two-wire control mode 1

In this mode, when K1 is closed, drive rotates in forward direction. When K2 is closed, drive rotates in reverse direction. When K1 and K2 are both open or closed simultaneously, drive stops.

F4-11 = 1: Two-wire Control Mode 2. In this mode, DI1 is RUN enabled terminal, and DI2 determines running direction.

The parameters are set as below:

Parameter No.	Name	Value	Function Description
F4-11	Terminal I/O control mode	1	Two-wire control mode 2
F4-00	DI1 function selection	1	RUN enabled
F4-01	DI2 function selection	2	Reverse RUN

K1	K2	Running Command
1	0	Forward
1	1	Reserve
0	0	Stop
0	1	Stop

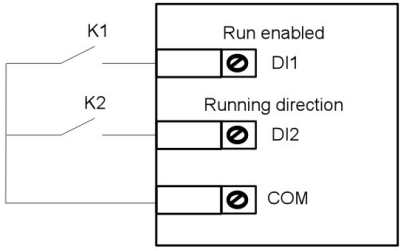


Figure 4-6 Two-wire control mode 2

In this mode, when K1 is closed, motor rotates in forward direction with K2 open. When K1 is closed, motor rotates in reverse direction with K2 closed. When K1 is open, motor stops no matter whether K2 is open or closed.

F4-11 = 2: Three-wire Control Mode 1. In this mode, DI3 is three-wire control terminal. DI1 is set for forward run function and DI2 is set for reverse run function.

The parameters are set as below:

Parameter No.	Name	Value	Function Description
F4-11	Terminal I/O control mode	2	Three-wire control mode 1
F4-00	DI1 function selection	1	Forward RUN (FWD)
F4-01	DI2 function selection	2	Reverse RUN (REV)
F4-02	DI3 function selection	3	Three wire control

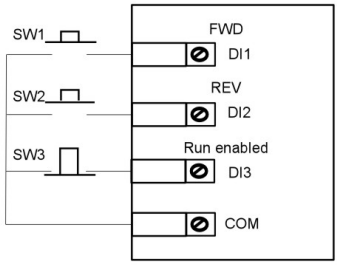


Figure 4-7 Three-wire control mode 1

In this mode, on normal condition (SW3 closed), after you press down SW1, motor rotates in forward direction. After you press down SW2, motor rotates in reverse direction. Motor stops immediately when SW3 opens. SW3 must remain closed during START sequence and during normal RUN operation. Signals from SW1 and SW2 are valid only with SW3 closed. The motor status is determined by the key that you last press down.

F4-11 = 3: Three-wire Control Mode 2. In this mode, DI3 is three-wire control terminal. DI1 determines whether the RUN command is enabled and DI2 determines running direction.

The parameters are set as below:

Parameter No.	Name	Value	Function Description
F4-11	Terminal I/O control mode	3	Three-wire control mode 2
F4-00	DI1 function selection	1	RUN enabled
F4-01	DI2 function selection	2	Reverse RUN
F4-02	DI3 function selection	3	Three wire control

K	Running direction
0	Forward
1	Reserve

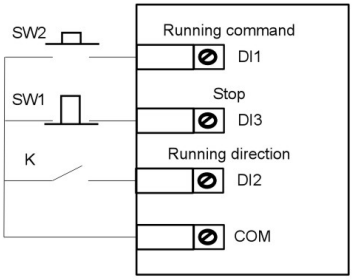


Figure 4-8 Three-wire control mode 2

In this mode, when SW1 is closed, after you press down SW2, motor rotates in forward direction with K open and in reverse direction with K closed. Motor stops immediately when SW1 opens. SW1 must remain closed during START sequence and during normal RUN operation. Signals from SW2 are valid only with SW1 closed.

4.7.3 Start/Stop Through Communication

The controller can start/stop the AC drive through various communications. When using communication functions, the relative parameters F0-02 and F0-28 are needed to be set according to different communication types, see the following table. In addition, an optional communication extension card is needed. For information about optional communication cards, see Appendix A Expansion Optional Cards.

Setting Procedure	Parameter No.	Description	
Use frequency command to set the serial communication mode	F0-02	F0-02 = 2	
Select serial communication mode	F0-28	Modbus protocol	F0-28 = 0
		PROFIBUS-DP protocol	F0-28 = 1
		CANopen protocol	F0-28 = 1
CANlink is always valid and does not need to be set.			

4.8 Start the AC Drive

4.8.1 Start Mode

F6-00	Start mode		Default	0
	Setting Range	0	Direct Start	

0: Direct start

If the DC injection braking time is set to 0, the drive will start from the setting start-up frequency (F6-03). If the DC injection braking time is not set to 0, the drive will start DC braking firstly and then start from the setting start-up frequency (F6-03). This DC injection braking function is applicable to small-inertia loads which is easy to slip during startup stage.

It is applicable to most small-inertia loads, the frequency curve is shown in the following figure. The DC injection braking function is applicable to drive load such as elevator and crane. Start frequency is applicable to drive equipment which requires startup torque, such as cement mixer.

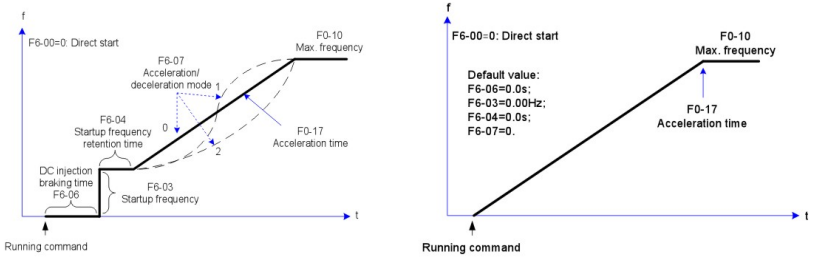


Figure 4-9 Direct start

4.8.2 Start Frequency

F6-03	Start frequency	Default	0.00 Hz
	Setting Range	0.00 Hz to 10.00 Hz	
F6-04	Start frequency holding time	Default	0.0s
	Setting Range	0.0s to 100.0s	

Set an appropriate start frequency to ensure the motor torque when the motor starts. The start frequency needs to be retained for a period of time for full magnetic flux when the motor starts.

F6-03 has no lower frequency limit. If target frequency is smaller than start frequency, the motor does not start and is idle.

Retention time of start frequency is not counted into acceleration time but into running time of simple PLC function.

4.9 View Running Status

4.9.1 Digital Output

Parameters F5-01 to F5-04 define how DO terminals indicate the running status and alarm information for the AC drive. There are about 40 functions available to use for these parameters.

Terminal	Corresponding Parameter	Output Feature Description
RA–RC	F5-01	Relay Drive capacity: 250 VAC, 3 A
TA–TB–TC	F5-02	Extension card, relay Drive capacity: 250 VDC, 3 A
DO1-CME	F5-04	Transistor Drive capacity: 24 VDC, 50 mA

4.9.2 Analog Output (AO)

The drive supports a maximum of two analog output terminals. AO1 is on the control board and AO2 is on the optional extension card. F5-07 and F5-08 define how AO terminals indicate the drive internal running parameters in analog mode.

Terminal	Input Signal Characteristics
AO1-GND	If J7 jumps to the "V" position, AO outputs voltage signal of 0 to 10 VDC.
	If J7 jumps to the "I" position, AO outputs current signal of 0 to 20 mA.
AO2-GND	It is on the optional extension card. It outputs voltage signal of 0 to 10 VDC.

F5-10	AO1 zero offset coefficient	Default	0.0%
	Setting Range	-100.0% to +100.0%	
F5-11	AO1 gain	Default	1.00
	Setting Range	-10.00 to +10.00	
F5-12	AO2 zero offset coefficient	Default	0.00%
	Setting Range	-100.0% to +100.0%%	
F5-13	AO2 gain	Default	1.00
	Setting Range	-10.00 to +10.00	

These four function parameters can define required AO curve.

If "b" represents zero offset, "k" represents gain, "Y" represents actual output of the AO, and "X" represents output frequency, then the actual output is

Y=kX + b.

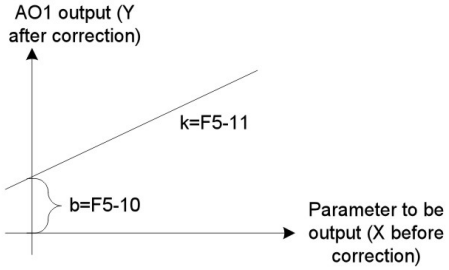


Figure 4-10 AO signal correction characteristic curve

Zero offset coefficient 100% of AO1 and AO2 corresponds to 10 V or 20 mA. A standard output is the value corresponding to 0 to 10 V or 0 to 20 mA without offset or gain.

For example, AO is used for output of frequency reference. To implement output of 8 V at 0 Hz and output of 4 V at 40 Hz, set F5-11 to -0.5 and set F5-10 to 80%.

4.10 Auto-tuning

You can obtain parameters of controlled motor through motor auto-tuning. Motor auto-tuning methods are dynamic auto-tuning, and static auto-tuning with load. You can enter the motor parameters manually.

Auto-tuning Method	Application	Result
Dynamic auto-tuning with no-load F1-37 = 12	It is applied to applications where motor can be disconnected from load.	Best
Auto-tuning with load F1-37 = 11	It is applied to applications where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed.	OK
Manual parameter input	It is applied to applications where the motor cannot be disconnected from the load. Copy parameters of motors of same model which have been auto-tuned to F1-16 to F1-20.0	Better

Auto-tuning methods are described below.

Motor 1 is used to describe motor auto-tuning methods. If you need to perform motor 2 auto-tuning, set F0-24=1.

Step 1: If the motor can be disconnected from load, cut off the power, disconnect the motor from load to let the load runs in idle.

Step 2: Power on the AC drive. Set F0-02 = 0 to select the operating panel as running command.

Step 3: Input motor nameplate parameters (F1-00 to F1-05) correctly. Set the following parameters according to the motor:

Motor	Parameter
Motor 1	F1-00: Motor type selection F1-01: Rated motor power F1-02: Rated motor voltage F1-03: Rated motor current F1-04: Rated motor frequency F1-05: Rated motor speed
Motor 2	A2-00 to A2-05 have the same definition.

If there is an encoder, set F1-27 and F1-28.

Step 4: Set F1-37 (A2-37 in case of Motor 2) to 12 (complete dynamic auto-tuning) and press ENTER. TUNE is displayed, as shown in the following figure:

Press RUN on the operating panel. The AC drive drives the motor to accelerate/decelerate and run in forward/reverse direction. The RUN indicators becomes ON and auto-tuning lasts for about 2 minutes. After the preceding display disappears and the operating panel returns to normal parameter display state, it indicates that auto-tuning is completed.

After auto-tuning, the following motor parameters are calculated:

Motor	Parameter
Motor 1	F1-16: Stator resistance of synchronous motor F1-17: D-axis inductance of synchronous motor F1-18: Q-axis inductance of synchronous motor F1-20: Counter electromotive force of synchronous motor
Motor 2	A2-16 to A2-20 have the same definition.

If motor cannot be disconnected from load, set F1-37 (A2-37 in case of Motor 2) to 11 (auto-tuning of synchronous motor with load) and press RUN on the operating panel. Auto-tuning starts.

5 Troubleshooting and Solutions

5.1 Safety Information

Safety Information	
Danger	◆ Do not disconnect the AC drive while power is on, and keep all breakers in OFF state. Failure to comply may result in electric shock.
Warning	◆ Make sure to ground the AC drive according to local laws and regulations. Failure to comply may result in electric shock or a fire. ◆ Do not remove the front cover or touch internal circuit while the power is on. Failure to comply may result in electric shock. ◆ Do not allow unqualified personnel to perform any maintenance, inspection or part replacement work. Failure to comply may result in electric shock or a fire. ◆ When installing the drive inside an enclosed cabinet, use cooling fan or air conditioner to keep temperature below 50°C. Failure to comply may result in overheating or even a fire. ◆ Tighten all screws based on the specified tightening torque. Failure to comply may result in a fire or electric shock. ◆ Always confirm input voltage is within nameplate rating. Failure to comply may result in electric shock or a fire. ◆ Keep flammable and combustible materials away from the drive.
Caution	◆ Cover the top of the drive with a temporary cloth or paper during installation so as to prevent foreign matter such as metal shavings, oil and water from falling into the drive. If any foreign matter falls into the drive, the drive may have a fault. ◆ After the installation is completed, remove the temporary cloth or paper. If leaving the cloth or paper on the drive, the drive may have abnormal heating due to poor ventilation. ◆ Follow proper electrostatic discharge (ESD) procedures when operating the AC drive. Failure to comply will damage internal circuit of the drive.

5.2 Troubleshooting During Trial Run

1. Drive in Open-loop Vector Control (F0-01 = 0: Default value)

The AC drive implements control of the motor speed and torque without an encoder for speed feedback. In this control mode, auto-tuning is required for motor related parameters.

Problem	Solutions
Overload or overcurrent detected during motor start	• Set motor parameters F1-01 to F1-05 according to motor nameplate. • Select a proper motor auto-tuning mode by setting F1-37 and perform motor auto-tuning. If possible, select dynamic auto-tuning.
Poor torque or speed response and motor oscillation at speeds below 5 Hz	• If motor torque and speed response are too slow, increase the setting of F2-00 (speed loop proportional gain) by 10 gradually or decrease the setting of F2-01 (speed loop integral time) by 0.05 gradually. • If motor oscillation occurs, decrease F2-00 and increase F2-01.
Poor torque or speed response and motor oscillation at speeds above 5 Hz	• If motor torque and speed response are too slow, increase the setting of F2-03 (speed loop proportional gain) by 10 gradually or decrease the setting of F2-04 (speed loop integral time) by 0.05 gradually. • If motor oscillation occurs, decrease F2-03 and increase F2-04.
Obvious speed fluctuation	• If motor speed fluctuation is abnormal, decrease F2-00 or F2-03.
Too loud motor noise	• Increase the setting of F0-15 (carrier frequency) by 1.0 kHz gradually. Note that increase in carrier frequency will result in an increase in the leakage current of the motor.
Insufficient motor torque	• Check whether torque upper limit is small. If yes, please: Increase the setting of F2-10 (digital setting of torque upper limit in speed control mode) in the speed control mode; increase the torque reference (A0-03) in the torque control mode.

5.3 Faults and Diagnostics

Troubleshoot the faults occurring during operating the drive as follows:

Fault Name	Operating Panel Display	Cause	Possible Solution
Overcurrent during acceleration	Err02	Ground fault or short circuit exists in the output circuit.	• Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC or FVC but motor auto-tuning is not performed.	• Set motor parameters according to motor nameplate and perform motor auto-tuning.
		Acceleration time is too short.	• Increase acceleration time.
		The overcurrent stall prevention parameters are set improperly.	• Ensure that current limit is enabled (F3-19 = 1). • The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. • The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		Customized torque boost or V/F curve is not appropriate.	• Adjust the customized torque boost or V/F curve.
		The spinning motor is started.	• Enable the flying start function or start the motor after it stops.
		The AC drive suffers external interference.	• View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the driver board or hall device problem.
Overcurrent during deceleration	Err03	Gund fault or short circuit exists in the output circuit.	• Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC or FVC but motor auto-tuning is not performed.	• Set motor parameters according to motor nameplate and perform motor auto-tuning.
		Deceleration time is too short.	• Increase deceleration time.
		The overcurrent stall prevention parameters are set improperly.	• Ensure that current limit is enabled (F3-19 = 1). • The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. • The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		Braking unit and braking resistor are not installed.	• Install braking unit and braking resistor.
		The AC drive suffers external interference.	• View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the driver board or hall device problem.

Fault Name	Operating Panel Display	Cause	Possible Solution
Overcurrent at constant speed	Err04	Ground fault or short circuit exists in the output circuit.	• Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC or FVC but motor auto-tuning is not performed.	• Set motor parameters according to motor nameplate and perform motor auto-tuning.
		The overcurrent stall prevention parameters are set improperly.	• Ensure that current limit is enabled (F3-19 = 1). • The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. • The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		The AC drive power class is small.	• If output current exceeds rated motor current or rated output current of the AC drive during stable running, replace a drive of larger power class.
		The AC drive suffers external interference.	• View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the driver board or hall device problem.
Overvoltage during acceleration	Err05	Input voltage is too high.	• Adjust input voltage to normal range.
		An external force drives motor during acceleration.	• Cancel the external force or install a braking resistor.
		The overvoltage stall prevention parameters are set improperly.	• Ensure that the voltage limit function is enabled (F3-23 = 1). • The setting of voltage limit (F3-22) is too large. Adjust it between 770 V and 700 V. • The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50.
		Braking unit and braking resistor are not installed.	• Install braking unit and braking resistor.
		Acceleration time is too short.	• Increase acceleration time.
Overvoltage during deceleration	Err06	The overvoltage stall prevention parameters are set improperly.	• Ensure that the voltage limit function is enabled (F3-23 = 1). • The setting of voltage limit (F3-22) is too large. Adjust it between 770 V and 700 V. • The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50.
		An external force drives motor during deceleration.	• Cancel the external force or install a braking resistor.
		Deceleration time is too short.	• Increase deceleration time.
		Braking unit and braking resistor are not installed.	• Install braking unit and braking resistor.

Fault Name	Operating Panel Display	Cause	Possible Solution
Overvoltage at constant speed	Err07	The overvoltage stall prevention parameters are set improperly.	• Ensure that the voltage limit function is enabled (F3-23 = 1). • The setting of voltage limit (F3-22) is too large. Adjust it between 770 V and 700 V. • The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50. • The setting of frequency rise threshold during voltage limit (F3-26) is too small. Adjust it between 5 Hz and 20 Hz.
		An external force drives motor during running.	• Cancel the external force or install a braking resistor.
Control power fault	Err08	The input voltage exceeds the setting range.	• Adjust the input voltage to be within the setting range.
Undervoltage	Err09	Instantaneous power failure occurs	• Enable the power dip ride through function (F9-59 ≠ 0).
		The AC drive's input voltage is not within the permissible range.	• Adjust the voltage to normal range.
		The bus voltage is abnormal.	• Contact the agent or Inovance.
		The rectifier bridge, the buffer resistor, the driver board or the control board are abnormal.	• Contact the agent or Inovance.
AC drive overload	Err 10	Load is too heavy or locked-rotor occurs on motor.	• Reduce load or check motor and mechanical conditions.
		The AC drive power class is small.	• Replace a drive of larger power class.
Motor overload	Err 11	F9-01 (Motor overload protection gain) is set improperly.	• Set F9-01 correctly.
		Load is too heavy or locked-rotor occurs on motor.	• Reduce load or check motor and mechanical conditions.
Input phase loss	Err 12	Input phase loss occurs.	• Eliminate faults in external circuitry.
		Driver board, lightning protection board, control board, or rectifier bridge is abnormal.	• Contact the agent or Inovance.
Output phase loss	Err 13	Motor winding is damaged.	• Check resistance between motor wires.
		The cable connecting the AC drive and the motor is abnormal.	• Check for wiring errors and ensure the output cable is connected properly.
		The AC drive's three-phase outputs are unbalanced when the motor is running.	• Check whether the motor three-phase winding is normal.
		The driver board or the IGBT is abnormal.	• Contact the agent or Inovance.

Fault Name	Operating Panel Display	Cause	Possible Solution
IGBT overheat	Err 14	The ambient temperature is too high.	• Lower the ambient temperature.
		The ventilation is clogged.	• Clean the ventilation.
		The fan is damaged.	• Replace the cooling fan.
		Thermally sensitive resistor of IGBT is damaged.	• Replace the damaged thermally sensitive resistor.
		The AC Drive IGBT is damaged.	• Replace the AC Drive IGBT.
External fault	Err 15	External fault signal is input through DI.	• Confirm that the mechanical condition allows restart (F8-18) and reset the operation.
		External fault signal is input through virtual I/O.	• Confirm that the virtual I/O parameters in group A1 are set correctly and reset the operation.
Communication fault	Err 16	Host controller is in abnormal state.	• Check the cable of host controller.
		Communication cable is abnormal.	• Check the communication cables.
		The serial port communication protocol (F0-28) of extension communication card is set improperly.	• Set F0-28 of extension communication card correctly.
		Communication parameters in group Fd are set improperly.	• Set communication parameters in group Fd properly.
		After all the preceding checkings are done but the fault still exists, restore the default settings.	
Contactor fault	Err 17	Driver board and power supply are abnormal.	• Replace driver board or power supply board.
		Contactor is abnormal.	• Replace contactor.
		The lightning protection board is abnormal.	• Replace the lightning protection board.
Current detection fault	Err 18	The hall is abnormal.	• Replace the hall element.
		The driver board is abnormal.	• Replace the driver board.
Motor auto-tuning fault	Err 19	Motor parameters are not set according to nameplate.	• Set motor parameters correctly according to nameplate.
		Motor auto-tuning times out.	• Check the cable connecting AC drive and motor.
		The encoder is abnormal.	• Check whether F1-27 (encoder pulses per revolution) is set correctly. Check whether signal lines of encoder are connected correctly and securely.
Encoder fault	Err20	Encoder is not matched.	• Set the type of encoder correctly.
		Encoder wiring is incorrect.	• Check the PG card power supply and phase sequence.
		Encoder is damaged.	• Replace encoder.
		PG card is abnormal.	• Replace PG card.
EEPROM read-write fault	Err21	The EEPROM chip is damaged.	• Replace the main control board.
Short circuit to ground	Err23	Motor is short circuited to the ground.	• Replace cable or motor.

Fault Name	Operating Panel Display	Cause	Possible Solution
Accumulative running time reached	Err26	Accumulative running time reaches the setting value.	• Clear the record through parameter initialization.
User-defined Fault 1	Err27	User-defined fault 1 is input through DI.	• Reset the operation.
		User-defined fault 1 is input through virtual I/O.	• Reset the operation.
User-defined Fault 2	Err28	User-defined fault 2 is input through DI.	• Reset the operation.
		User-defined fault 2 is input through virtual I/O.	• Reset the operation.
Accumulative power-on time reached	Err29	Accumulative power-on time reaches the setting value.	• Clear the record through parameter initialization.
Load loss	Err30	The output current of AC drive is smaller than F9-64 (load loss detection level).	• Check whether load is disconnected or the setting of F9-64 and F9-65 (load lost detection time) satisfies actual running condition.
PID feedback lost during running Feedback loss	Err31	PID feedback is smaller than the setting value of FA-26 (detection level of PID feedback loss).	• Check PID feedback or set FA-26 properly.
Pulse-by-pulse current limit fault	Err40	Load is too heavy or locked-rotor occurs on motor.	• Reduce load or check motor and mechanical conditions.
		The AC drive power class is small.	• Replace a drive of larger power class.
Motor switchover fault during running Motor winding is damaged.	Err41	Motor switchover through terminal during drive running of the AC drive.	• Perform motor switchover after the AC drive stops.
Speed error	Err42	Encoder parameters are set improperly.	• Set encoder parameters properly.
		Motor auto-tuning is not performed.	• Perform motor auto-tuning.
		F9-69 (detection level of speed error) and F9-70 (detection time of speed error) are set incorrectly.	• Set F9-69 and F9-70 correctly based on actual condition.
Motor overspeed Problem	Err43	Encoder parameters are set improperly.	• Set encoder parameters properly.
		Motor auto-tuning is not performed.	• Perform motor auto-tuning.
		F9-67 (Overspeed detection level) and F9-68 (Overspeed detection time) are set incorrectly.	• F9-67 and F9-68 correctly based on actual condition.
Motor overtemperature	Err45	Cable connection of temperature sensor becomes loose	• Check cable connection of temperature sensor.
		The motor temperature is too high.	• Decrease carrier frequency or take other measures to cool the motor.

5.4 Symptoms and Diagnostics

SN	Fault Description	Cause	Possible Solution
1	There is no display while power-on. 	The mains voltage is not input or too low.	• Check the power supply.
		The switching power supply on driver board of the AC drive is faulty.	• Check bus voltage.
		Wires between control board and driver board and between control board and operating panel break.	• Re-connect the 8-pin wire and 40-pin wire.
		Pre-charge resistor of the AC drive is damaged.	• Contact the agent or Inovance.
		Control board or operating panel is faulty.	
		Rectifier bridge is damaged.	
2	"88888" is displayed while power-on. 	Wire between driver board and control board is in poor contact.	• Re-connect the 8-pin wire and 28-pin wire.
		Related components on control board are damaged	• Contact the agent or Inovance.
		The motor or motor cable is short circuited to ground.	
		The hall is damaged.	
		The mains voltage is too low.	
3	"Err23" is displayed at power-on. 	Motor or motor output cable is short circuited to ground.	• Use a megger to measure insulation resistance of motor and motor cable.
		The AC drive is damaged.	• Contact the agent or Inovance.
4	The display is normal while power-on. But after running, "88888" is displayed and the drive stops immediately. 	The cooling fan is damaged or locked-rotor occurs.	• Replace the cooling fan.
		Short circuit exists in wiring of control terminals.	• Eliminate short circuit fault in control circuit wiring.
5	Err14 (IGBT overheat) is detected frequently. 	The setting of carrier frequency is too high.	• Reduce carrier frequency (F0-15).
		The cooling fan is damaged, or ventilation is clogged.	• Replace the fan or clean the ventilation.
		Components inside the AC drive are damaged (thermistor or others).	• Contact the agent or Inovance.

SN	Fault Description	Cause	Possible Solution
6	The motor does not rotate after the AC drive runs.	It is motor or motor cable problem.	• Check that wiring between AC drive and motor is normal.
		Related AC drive and motor parameters are set improperly.	• Restore the factory parameters and re-set the following parameters properly: • Encoder parameters, Motor ratings, such as rate motor frequency and rated motor speed • Motor 1 control mode (F0-01) and command source selection (F0-02) • F3-01 (torque boost) in V/F control under heavy-load start.
		Cable connection between driver board and control board is in poor contact.	• Re-connect wirings and ensure secure connection.
		The driver board is faulty.	• Contact the agent or Inovance.
7	DI terminals are disabled.	Related parameters are set incorrectly.	• Check and set parameters in group F4 again.
		External signals are incorrect.	• Re-connect external signal cables.
		Jumper across OP and +24 V becomes loose.	• Re-confirm the jumper bar across OP and +24 V.
		The control board is faulty.	• Contact the agent or Inovance.
8	Motor speed does not rise in closed-loop vector control.	Encoder fault	• Replace encoder and re-confirm cable connection.
		Encoder connection is incorrect or in poor contact.	• Replace PG card.
		PG card is faulty.	• Contact the agent or Inovance.
		The driver board is faulty.	
9	The AC drive detects overcurrent and overvoltage frequently.	Motor parameters are set improperly.	• Set motor parameters or perform motor auto-tuning again.
		Acceleration/deceleration time is improper.	• Set proper acceleration/deceleration time.
		Load fluctuates.	• Contact the agent or Inovance.
10	Err17 is detected upon power-on or running. 	The pre-charge relay or contactor is not closed.	• Check whether the relay or contactor cable is loose. • Check whether the relay or contactor is faulty. • Check whether 24 V power supply of the contactor is faulty. • Contact the agent or Inovance.
11	The motor stops freely or cannot be braked during deceleration or deceleration to stop.	The encoder disconnection or overvoltage stall protection takes effect.	• When F0-01 = 1, check whether the encoder is connected. • If braking resistor is set, set Overvoltage Stall Enabled to Disabled (F3-23 = 0).

6 Routine Inspection and Maintenance

6.1 Routine Inspection

Safety Information	
Danger	◆ Do not connect or disconnect wiring while the power is on. ◆ Before the inspection, disconnect all power supply. After disconnect the power of the drive, as there is residual voltage in the DC capacitor in the drive, wait for several minutes until the the power indicator is off. Before powering on the drive again for operation, wait for an interval specified by the drive. ◆ Do not modify or disconnect wiring, remove optional extension card or replace the cooling fan while the power is on. ◆ Make sure to connect the motor-side grounding terminal. Failure to comply may result in electric shock due to touching motor housing. ◆ Do not allow unqualified personnel to do the repair & maintenance work. ◆ Installation, wiring, commissioning, repair & maintenance, and component replacement must be performed only by qualified technicians.
Warning	◆ Do not run the AC drive with front cover removed. ◆ Drawings in the user guide are sometimes shown without covers or protective guards to display the details. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with instructions. ◆ Tighten all terminal screws based on specified tightening torque. ◆ Ensure that input voltage is within permissible range. Incorrect input voltage of main circuit may result in abnormal running. ◆ Keep combustible materials far away from the AC drive or mount the AC drive on incombustible surfaces such as a metal wall.
Caution	◆ Replace the cooling fan in correct ways as specified in this chapter. Ensure correct air outlet direction of the fan. Incorrect air direction will diminish the cooling effects. ◆ Do not connect or disconnect motor while the drive is running. Failure to comply may result in electric shock and damage to the AC drive. ◆ Use shielded cables for control circuit wiring. ◆ Meanwhile, ground the shield to the grounding terminal reliably. ◆ Do not modify the drive circuitry. Failure to comply will damage the AC drive. ◆ Make sure to connect the output terminals of the AC drive and the motor terminals correctly. ◆ If it is necessary to change the motor rotation direction, exchange any two of UVW cables of the AC drive. ◆ Do not operate the AC drive that has been damaged. This is to prevent further damage to external equipments.

6.1.1 Routine Inspection Items

Influence of ambient temperature, humidity, dust and vibration will cause aging of components in the AC drive, which may cause potential faults or reduce the product life. Therefore, it is necessary to carry out routine and periodic maintenance. More frequent inspection will be required if it is used in harsh environments, such as:

High ambient temperature;

Frequent starting and stopping;

Fluctuations in the AC power supply or load;

Excessive vibrations or shock loading;

Dust, metal dust, salt, sulfuric acid, chlorine atmospheres;

Poor storage conditions.

Check the following items routine to avoid deterioration in performance or product. Copy this checklist and sign the "Checked" column after each inspection.

Inspection Item	Inspection Points	Solutions	Checked
Motor	Inspect whether abnormal oscillation or noise exists.	• Check mechanical connections. • Check power phases of the motor. • Tighten all loose screws.	
Fan	Inspect whether the cooling fan of the AC drive and the motor works abnormally.	• Check running of the drive-side cooling fan. • Check running of the motor-side cooling fan. • Check whether the cooling fan is clogged or dirty. • Check whether ambient temperature is within the permissible range.	
Installation environment	Inspect whether the cabinet and cable duct are abnormal.	• Check for input and output cables with insulation damaged. • Check for vibration of hanging bracket. • Check whether copper ground bars and terminals become loose or get corroded.	
Load	Inspect whether the drive output current exceeds the drive or motor rating for an extended period of time.	• Check for setting of motor parameters. • Check for excessive load. • Check for mechanical vibration (< 0.6 g on normal condition).	
Input voltage	Check main power supply and control voltage.	• Adjust the input voltage to the permissible range. • Check whether start of heavy load exists.	

6.2 Periodic Inspection

6.2.1 Periodical Inspection Items

Always keep the AC drive clean. Clear away dusts especially metal powder on the surface of the AC drive, to prevent dust from entering the drive. Clear oil dirt from the cooling fan of the AC drive.

⚠ Danger	◆ Do not perform inspection work while the power is on. ◆ Before the inspection, disconnect all power supply and wait for 10 minutes to avoid risk caused by the residual voltage in the capacitor of the drive.

Inspection Item	Inspection Points	Inspection Points	Checked
General	Inspect for wastes, dirt and dust on the surface of the AC drive.	• Check whether the AC drive is powered off. • Use a vacuum cleaner to suck up wastes and dust to prevent direct touching. • Wipe surface dirt gently with a soft cloth immersed in neutral detergent.	
Cables	Inspect power cables and connections for discoloration. Inspect wiring insulation for aging or wear.	• Replace cracked cable. • Replace damaged terminals.	
Peripheral devices such as relay and contactor	Inspect contactors and relays for excessive noise during operation. Inspect coils for signs of overheating such as melted or cracked insulation. Check whether the coil voltage is normal.	• Replace abnormal peripheral device.	
Ventilation	Inspect whether ventilation and heatsink are clogged. Check whether the fan is damaged.	• Clean ventilation. • Replace the fan.	
Control circuit	Inspect for control components in poor contact. Inspect for loose terminal screws. Inspect for control cables with cracked insulation.	• Clear away foreign matters on the surface of control cables and terminals. • Replace damaged or corroded control cables.	

6.2.2 Insulation Test on Main Circuit

Before measuring insulation resistance with a megameter (a 500 VDC megameter is recommended), disconnect the main circuit from the AC drive. Do not conduct the dielectric strength test using an insulation megameter.. High voltage (> 500 V) test need not be performed again because it has been completed before delivery.

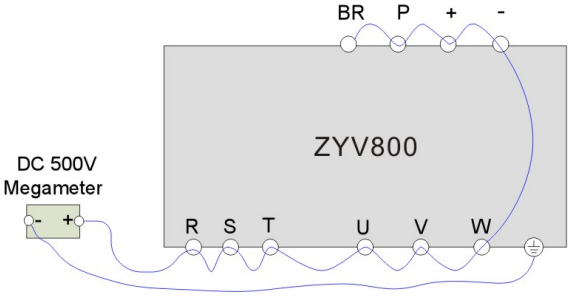


Figure 6-1 Test insulation on the main circuit

The measured insulation resistance must be greater than 5 MΩ.

Before test, remove the VDR screw. For positions of VDR and EMC screws, see Figure 3-37 in 3 Installation and Wiring.

7 Specifications and Model Selection

7.1 Technical Specifications of ZYV800 Series AC Drive(table7-1)

Table 7-1 Technical Specifications of ZYV800 Series AC Drive

Item		Description	
Standard functions	Input frequency resolution	Digital setting: 0.01 Hz Analog setting: Max. frequency x 0.025%	
	Control mode	Sensorless vector control (SVC) Feedback vector control (FVC) Voltage/Frequency (V/F) control	
	Startup torque	0.25 Hz/150% (SVC) 0 Hz/180% (FVC)	
	Speed range	1:200 (SVC)	1:1000 (FVC)
	Speed stability accuracy	±0.5% (SVC)	±0.02% (FVC)
	Torque control accuracy	±2% (FVC); ±5% for 5 Hz above (SVC)	
	Torque boost	Customized boost 0.1 % to 30.0 %	
	V/F curve	Straight-line V/F curve Multi-point V/F curve Square V/F curve Complete V/F separation Half V/F separation	
	Ramp mode	Straight-line ramp S-curve ramp Four separate acceleration/deceleration time settings in the range of 0.0s to 6500.0s.	
	DC injection braking	DC injection braking frequency: 0 Hz to max. frequency DC injection braking active time: 0.0s to 36.0s. Current level of DC injection braking: 0.0% to 100.0%.	
	Jog running	Frequency range of jog running: 0.00 to 50.00 Hz Acceleration/Deceleration time of jog running:0.0s to 6500.0s	
	Onboard multiple preset speeds	The system implements up to 16 speeds by using simple PLC function or by using digital input signals.	
	Onboard PID	The system implements the proportional integral-derivative (PID) function in the closed-loop control.	
	Automatic voltage regulation (AVR)	The system maintains a constant output voltage automatically when the grid voltage changes through the permissible range.	
	Overvoltage and overcurrent stall control	The system limits the output current and voltage automatically during operation to prevent frequent or excessive trips.	
	Overcurrent fast prevention	The function helps to avoid frequent overcurrent faults.	
	Torque limit and control	The system limits the torque automatically to prevent frequent overcurrent tripping during operation. Torque control is applied in vector control.	

Item		Description
Individualized Functions	Power dip ride-through	Load feedback energy compensates for any voltage reduction, allowing the drive to continue to operate for a short time during power dips.
	Overcurrent fast prevention	The function helps to avoid frequent overcurrent faults.
	Virtual I/O	Five groups of virtual digital input/outputs (DI/DO) support simple logic control.
	Timing control	Time range: 0.0 to 6500.0 minutes
	Dual-motor switchover	The drive have two groups of motor parameters and can control up to two motors.
	Multiple field buses	The drive supports four field buses: Modbus, PROFIBUS-DP, CANlink, and CANopen.
	Motor overheat protection	Option: The optional input/output (I/O) extension card allows AI3 to receive a signal from the motor temperature sensor input (PT100, PT1000) to implement motor overheat protection.
	Multiple encoder types	The drive supports a range of different encoder types: Differential encoder, open-collector encoder, and resolver.
	User programmable function	Option: The optional programming card supports secondary development in a programming environment compatible with the Inovance programmable logic controller (PLC).
	Advanced software tool	Software in the drive allows users to configure some operating parameters, and provides a virtual oscilloscope display that shows system status.
RUN	Running command	Allows different methods of switching between running commands: Operating panel (keypad & display); terminal I/O control; and serial communication
	Main frequency reference setting channel	Supports up to 10 frequency reference setting channels and allows different methods of switching between frequency reference setting channels: Digital setting Analog voltage reference Analog current reference Pulse reference Communication reference
	Auxiliary frequency reference setting channel	Supports up to 10 auxiliary frequency sources, and allows fine tuning of the auxiliary frequency and main & auxiliary calculation.
	Input terminals	Standard: Five digital input (DI) terminals, one of which supports up to 100 kHz high-speed pulse inputs. Two analog input (AI) terminals, one of which supports only 0 to10 V input, and the other supports 0 to 10 V and 0 to 20 mA current input. Expanded capacity: Five digital input (DI) terminals. One AI terminal that supports –10 to 10 V voltage input and PT100/PT1000 motor temperature sensor inputs.
	Output terminals	Standard: Single high-speed pulse output terminal (open-collector) for a square-wave signal output In the frequency range 0 to 100 kHz Single digital output (DO) terminal Single relay output terminal Single analog output (AO) terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V. Expanded capacity: Single digital output (DO) terminal Single relay output terminal Single analog output (AO) terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V.

Item		Description
Display and operating panel	LED display	It shows parameter values.
	LCD display	It is optional and shows parameters in Chinese or English.
	Copy	The LCD operating panel can be used to copy parameters quickly.
	Key locking and function selection	Keys on the control panel can be locked or partially locked electronically to prevent accidental operation.
Protections	Phase loss protection	Input phase loss protection Output phase loss protection
	Instantaneous overcurrent protection	Stop when 250% of rated output current is exceeded.
	Overvoltage protection	Stop when the DC bus voltage is above 820 V.
	Overvoltage protection	Stop when the DC bus voltage is below 350 V.
	Overheat protection	Protection triggered when the AC Drive bridge gets overheated.
	Overload protection	Stop after running at 150% of rated current for 60 seconds.
	Overcurrent protection	Stop when 2.5 times of rated current of the AC drive is exceeded.
	Braking protection	Braking unit overload protection Braking resistor short-circuit protection
	Short-circuit protection	Output phase-to-phase short-circuit protection Output phase-to-ground short-circuit protection
Environment	Installation location	Install the AC Drive where it is indoors and protected from direct sunlight, dust, corrosive or combustible gases, oil smoke, vapor, ingress from water or any other liquid, and salt.
	Altitude	Below 1000 m If the altitude exceeds 1000 m, de-rating by 1% for per 100 m increase Max. 3000 m (Note: The maximum altitude for 0.4 to 3 kW drives is 2000 m. For use at altitude over 2000 m, contact Inovance.)
	Ambient temperature:	-10°C to +40°C. If the ambient temperature is not in this range, de-rating by 1.5% per 1°C increase. Max. temperature: 50°C
	Humidity	Less than 95% RH non-condensing
	Vibration	Less than 5.9 m/s² (0.6 g)
	Storage temperature	-20°C to +60°C

7.2 Appearance and Dimensions of ZYV800 Series AC Drive

7.2.1 Overall Dimensions

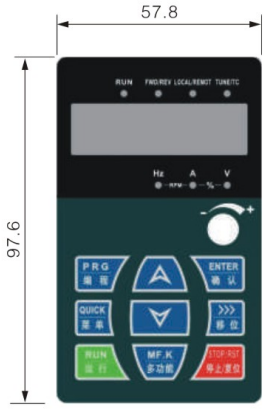


Figure 7-1 Keyboard size

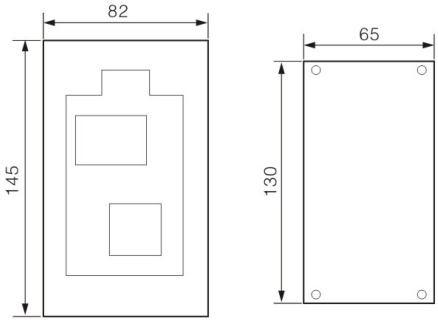


Figure 7-2 Keyboard outer frame size &Opening size

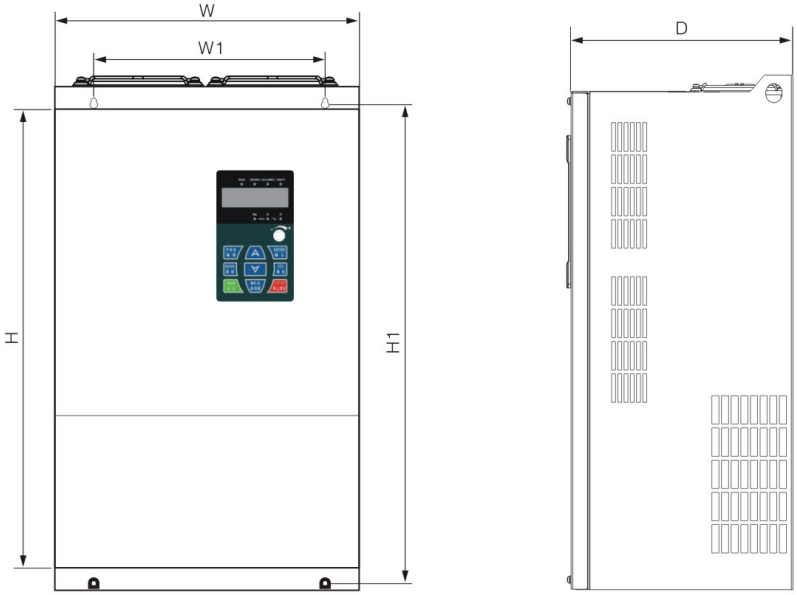


Figure 7-3 Mouting Dimensions

Table 7-3 Mounting Hole Dimensions

Drive Model	Adapting motor (KW)	Overall Dimensions H (mm)	W (mm)	D (mm)	Hole Dimensions W1 (mm)	H1 (mm)	Hole Diameter (mm)
ZYV800-1R5G/2R2P-4	1.5/2.2	190	125	165	115	177	Ø4
ZYV800-2R2G/4R0P-4	2.2/4.0	190	125	165	115	177	Ø4
ZYV800-4R0G/5R5P-4	4.0/5.5	190	125	165	115	177	Ø4
ZYV800-5R5G/7R5P-4	5.5/7.5	257	145	180	130	244	Ø5
ZYV800-7R5G/011P-4	7.5/11	257	145	180	130	244	Ø5
ZYV800-011G/015P-4	11/15	320	170	210	150	305	Ø5
ZYV800-015G/018P-4	15/18.5	320	170	210	150	305	Ø5
ZYV800-018G/022P-4	18.5/22	320	170	210	150	305	Ø5
ZYV800-022G/030P-4	22/30	400	215	220	140	385	Ø6
ZYV800-030G/037P-4	30/37	400	215	220	140	385	Ø6
ZYV800-037G/045P-4	37/45	505	295	230	160	490	Ø6
ZYV800-045G/055P-4	45/55	505	295	230	160	490	Ø6
ZYV800-055G/075P-4	55/75	570	340	255	200	550	Ø8
ZYV800-075G/090P-4	75/90	570	340	255	200	550	Ø8
ZYV800-090G/110P-4	90/110	610	400	290	240	590	Ø10
ZYV800-110G/132P-4	110/132	610	400	290	240	590	Ø10
ZYV800-132G/160P-4	132/160	760	500	350	400	735	Ø12
ZYV800-160G/185P-4	160/185	760	500	350	400	735	Ø12
ZYV800-185G/200P-4	185/200	760	500	350	400	735	Ø12
ZYV800-200G/220P-4	200/220	760	500	350	400	735	Ø12
ZYV800-220G/250P-4	220/250	760	500	350	400	735	Ø12
ZYV800-250G/280P-4	250/280	1300	750	450	500	830	
ZYV800-280G/315P-4	280/315	1300	750	450	500	830	
ZYV800-315G/355P-4	315/355	1300	750	450	500	830	
ZYV800-355G/400P-4	355/400	1300	750	450	500	830	
ZYV800-400G/450P-4	400/450	1300	750	450	500	830	
ZYV800-450G/500P-4	450/500	1530	950	510	800	970	
ZYV800-500G/560P-4	500/560	1530	950	510	800	970	
ZYV800-560G/630P-4	560/630	1530	950	510	800	970	
ZYV800-630G/710P-4	630/710	1650	1050	510	900	1010	
ZYV800-710G/750P-4	710/750	1650	1050	510	900	1010	

Appendix A

A.1 Definition of Communication Data Address

The drive supports four communication protocols (Modbus-RTU, CANopen, CANlink, and PROFIBUS-DP2). The host controller can implement control such as monitoring and parameter viewing and modification on the AC drive through their protocols.

The drive's communication data is classified into parameter data and non-parameter data. The non-parameter data includes running commands, running status, running parameters and alarm information.

A.1.1 Parameter Data

The parameter data provides important parameters of the AC drive. In addition to function parameter group F of MD320, MD500E provides the function parameter group A.

The parameter data is described as below:

ZYV800 Parameter Data	Group F (read-write)	F0, F1, F2, F3, F4, F5, F6, F7, F8, F9, FA, FB, FC, FD, FE, and FF
	Group A (read-write)	A0, A1, A2, A3, A4, A5, A6, A7, A8, A9, AA, AB, AC, AD, AE, and AF

Communication addresses of parameter data are defined as follows:

1. Read parameters by communication

For groups F0 to FF and A0 to AF, the high 16 bits of the communication address indicate the group number and the low 16 bits indicate the parameter number in the group.

Example: Communication address of F0-16 is F010H, where F0H represents group F0 and 10H is the hexadecimal data format of serial number 16 in the group.

Communication address of AC-08 is AC08H, where ACH represents group AC and 08H is the hexadecimal data format of serial number 8 in the group.

2. Write parameters by communication

For groups F0 to FF, whether the high 16 bits in communication address are 00 to 0F or F0 to FF is decided by whether the high 16 bits are written to EEPROM. The low 16 bits indicate parameter number in the group. Example:

F0-16:

If it needs not be written to EEPROM, communication address is 0010H.

If it needs to be written to EEPROM, communication address is F010H.

For groups A0 to AF, whether the high 16 bits in communication address are 40 to 0F or A0 to AF is decided by whether the high 16 bits are written to EEPROM. The low 16 bits indicate parameter number in the group. Example:

AC-08:

If it needs not be written to EEPROM, communication address is 4C08H.

If it needs to be written to EEPROM, communication address is AC08H.

A.2 Modbus Communication Protocol

The drive provides RS485 communication interface and supports Modbus-RTU slave communication protocol so that the user can implement centralized control, such as setting running commands and parameters, and reading running status and fault information of the AC drive, by using a PC or PLC.

This protocol defines content and format of transmitted messages during serial communication, including master polling (or broadcasting) format and master coding method (parameter for the action, transmission data, and error check). The slave uses the same structure in response, including action confirmation, data returning and error check. If an error occurs when the slave receives a message, or the slave cannot complete the action required by the master, the slave returns a fault message as a response to the master.

A.2.1 Application

The AC drive is connected to a "single-master multi-slave" PC/PLC control network with RS485 bus.

A.2.2 Bus Structure

1. Interface mode

The RS485 extension card MD38TX1 must be inserted into the AC drive.

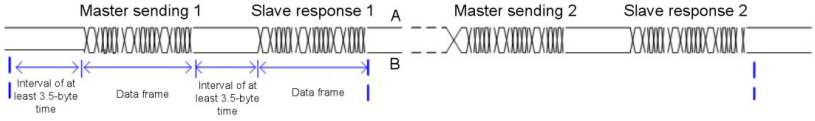
2. Topological structure

The system consists of a single master and multiple slaves. In the network, each communication device has a unique slave address. A device is the master (can be a PC, a PLC or an HMI) and initiates communication to perform parameter read or write operations on slaves. The other devices (slaves) provide data to respond to query or operations from the master. At the same moment, either the master or the slave transmits data and the other can only receives data.

The address range of the slaves is 1 to 247, and 0 is broadcast address. A slave address must be unique in the network.

3. Transmission mode

The asynchronous serial and half-duplex transmission mode is used. During asynchronous serial communication, data is sent frame by frame in the form of message. In Modbus-RTU protocol, an interval of at least 3.5-byte time marks the end of the previous message. A new message starts to be sent after this interval.

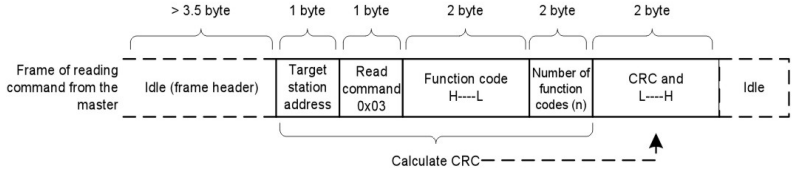


The communication protocol used by the drive is the Modbus-RTU slave communication protocol, which allows the drive to provide data to respond to "query/command" from the master or execute the action according to "query/command" from the master.

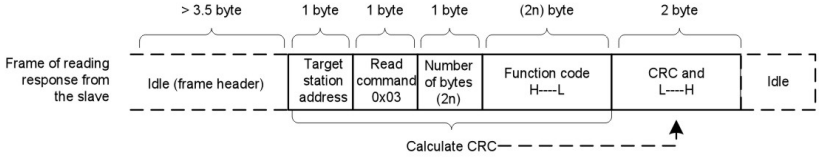
The master can be a PC, an industrial device, or a PLC. The master can communicate with a single slave or send broadcast messages to all slaves. When the master communicates with a single slave, the slave needs to return a message (response) to "query/command" from the master. For a broadcast message sent by the master, the slaves need not return a response.

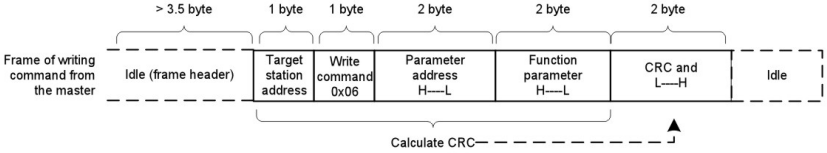
A.3 Data Format

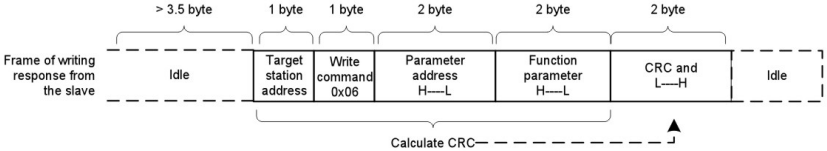
The Modbus-RTU protocol communication data format of the drive is as follows. The drive supports reading and writing of word-type parameters only. Reading command is 0x03 and writing command is 0x06. It does not support reading and writing of bytes or bits.



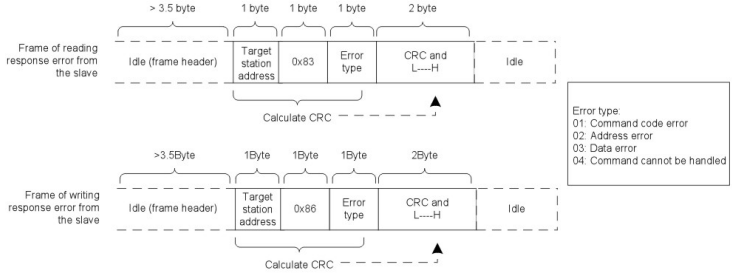
In theory, the host controller can read several consecutive parameters (n can reach up to 12) but the last parameter it reads must not jump to the next parameter group. Otherwise, an error occurs on response.







If the slave detects reading/writing failure caused by a communication frame error or by other reasons, an error frame will be returned.



The frame format is described in the following table.

Frame header (START)	Greater than the 3.5-byte transmission idle time
Slave address (ADR)	Communication address: 1 to 247 0: Broadcast address
Command code (CMD)	03: Read slave parameters; 06: Write slave parameters
Parameter address (H)	It is the internal parameter address of the AC drive, expressed in hexadecimal format. The parameters include functional parameters and non-functional parameters (running status and running command). During transmission, low-order bytes follow the high-order bytes.
Parameter address (L)	
Number of parameters (H)	It is the number of parameters read by this frame. If it is 1, it indicates that one parameter is read. During transmission, low-order bytes follow the high-order bytes. In the present protocol, only one parameter is read once, and this field is unavailable.
Number of parameters (L)	
Data (H)	It is the response data or data to be written. During transmission, low-order bytes follow the high-order bytes.
Data (L)	
CRC CHK low bytes	Detection value: CRC16 verification value During transmission, low-order bytes follow the high-order bytes. For calculation method, see CRC Check.
CRC CHK high bytes	
END	It is 3.5-byte transmission time.

CRC Check

In Modbus-RTU mode, a message includes a CRC-based error-check field. The CRC field checks content of the entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC field is calculated by the transmitting device, and then added to message. The receiving device recalculates a CRC value after receiving the message, and compares the calculated value with the CRC value in the received CRC field. The CRC is first stored to 0xFFFF. Then a procedure is invoked to process the successive 8-bit byte in the message and the value in the register. Only the eight bits in each character are used for the CRC. The start bit, stop bit and the parity bit do not apply to the CRC.During generation of the CRC, each eight-bit character is in exclusive-OR (XOR) with the content in the register. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was a 1, the register then performs XOR with a preset value. If the LSB was a 0, no XOR is performed. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is in XOR with the register's current value, and the process repeats for eight more shifts as described above. The final value of the register, after all the bytes of the message have been applied, is the CRC value. The CRC is added to the message from the low-order byte followed by the high-order byte. The CRC simple function is as follows:

```
unsigned int crc_chk_value(unsigned char *data_value,unsigned char length)
{
                    unsigned int crc_value=0xFFFF;
                    int i;
                    while（length--)
    {
                        crc_value^=*data_value++;
                        for（i=0;i<8;i++)
      {
                            If(crc_value&0x0001)

          {
                                crc_value=(crc_value>>1)^0xa001;
                            }
                            else
                            {
                                crc_value=crc_value>>1;
                            }
                        }
                    }
                    return(crc_value);
}
```

Definition of Communication Parameter Addresses

Function parameters can be read and written (except those which cannot be changed because they are only for the factory use or for monitoring).

A.4 Rules for Parameter Address Marking

Parameter group No. and parameter identifying No. are used to express parameter address.

High-order bytes: F0 to FF (groups F), A0 to AF (groups A), 70 to 7F (group U)

Low-order bytes: 00 to FF

For example, to read parameter F3-12, communication address of F3-12 is expressed as 0xF30C.

Note	• Group FF: They are factory parameters. The parameters cannot be read or changed. • Group U: These parameters can only be read.

Some parameters cannot be modified when the AC drive is running. Some parameter cannot be modified regardless of status of the AC drive. In addition, pay attention to setting range, unit and description of parameters when modifying them.

Parameter Group	Visited Address	Parameter Address in RAM
F0 to FE	0xF000 to 0xFEFF	0x0000 to 0x0EFF
A0 to AC	0xA000 to 0xACFF	0x4000 to 0x4CFF
U0	0x7000 to 0x70FF	

Note	• Frequent storage to the EEPROM reduces its service life. Therefore, in communication mode, users can change values of certain parameters in RAM rather than storing the setting.

For groups F parameters, users only need to change high order F of the parameter address to 0.

For groups A parameters, users only need to change high order A of the parameter address to 4.

The parameter addresses are expressed as follows:

High-order bytes: 00 to 0F (groups F), 40 to 4F (groups A)

Low-order bytes: 00 to FF

For example,

if F3-12 is not stored into EEPROM, the address is expressed as 030C;

if A0-05 is not stored into EEPROM, the address is expressed as 4005;

This address can only be marked as RAM. It is an invalid address when being read.

Stop/RUN Parameters

Parameter Address	Description	Parameter Address	Description
1000H	Communication setting value (Decimal): -10000 to 10000	1010H	PID reference
1001H	Running frequency	1011H	PID feedback
1002H	Bus voltage	1012H	PLC process
1003H	Output voltage	1013H	Pulse input frequency, unit: 0.01 kHz
1004H	Output current	1014H	Feedback speed, unit 0.1Hz
1005H	Output power	1015H	Remaining running time
1006H	Output torque	1016H	AI1 voltage before correction
1007H	Running speed	1017H	AI2 voltage before correction
1008H	DI input indication	1018H	AI3 voltage before correction
1009H	DO output indication	1019H	Linear speed
100AH	AI1 voltage	101AH	Current power-on time
100BH	AI2 voltage	101BH	Current running time
100CH	AI3 voltage	101CH	Pulse input frequency, unit: 1Hz
100DH	Counting value input	101DH	Communication reference
100EH	Length value input	101EH	Actual feedback speed
100FH	Load speed	101FH	Main frequency X display
–	–	1020H	Auxiliary frequency Y display

Note

- Communication setting value indicates percentage: 10000 corresponds to 100.00%, and -10000 corresponds to -100.00%.
- With regard to frequency, communication reference is a percentage of F0-10 (maximum frequency). With regard to torque, communication reference is a percentage of F2-10 and A2-48 (corresponding to motor 1 and motor 2, respectively).

Control command input to AC drive (write-only):

Command Word Address	Status Definition
2000H	0001: Forward run
	0002: Reverse run
	0003: Forward jog
	0004: Reverse jog
	0005: Coast to stop
	0006: Decelerate to stop
	0007: Fault reset

Read AC drive state (read-only):

Command Word Address	Command Word Function
3000H	0001: Forward run
	0002: Reverse run
	0003: Stop

Parameter lock password check: If the actual password is returned, it indicates that password check is passed. ("0000H" is returned when password is set to 0 (no password)).

Password Address	Password Content
1F00H	*****

DO terminal control (write-only)

Command Address	Command Content
2001H	BIT0: DO1 output control BIT1: DO2 output control BIT2: Relay1 output control BIT3: Relay2 output control BIT4: FMR output control BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5

AO1 control (write-only)

Command Address	Command Content
2002H	0 to 7FFF indicates 0% to 100%.

AO2 control (write-only)

Command Address	Command Content
2003H	0 to 7FFF indicates 0% to 100%.

Pulse output control (write-only)

Command Address	Command Content
2004H	0 to 7FFF indicates 0% to 100%.

AC drive fault description:

AC Drive Fault Address	AC Drive Fault Information	
8000H	0000: No fault 0001: Reserved 0002: Overcurrent during acceleration 0003: Overcurrent during deceleration 0004: Overcurrent at constant speed 0005: Overvoltage during acceleration 0006: Overvoltage during deceleration 0007: Overvoltage at constant speed 0008: Buffer resistor overload 0009: Undervoltage 000A: AC drive overload 000B: Motor overload 000C: Power input phase loss 000D: Power output phase loss 000E: IGBT overheat 000F: External fault 0010: Communication fault 0011: Contactor fault 0012: Current detection fault 0013: Motor auto-tuning fault 0014: Encoder/PG card fault	0015: Parameter read and write fault 0016: AC drive hardware fault 0017: Motor short circuited to ground 0018: Reserved 0019: Reserved 001A: Accumulative running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Accumulative power-on time reached 001E: Load lost 001F: PID feedback lost during running 0028: Fast current limit timeout 0029: Motor switchover error during running 002A: Too large speed deviation 002B: Motor over-speed 002D: Motor overheat 005A: Incorrect setting of PPR of the encoder 005B: Not connecting the encoder 005C: Initial position error 005E: Speed feedback error

A.5 Group FD Communication Parameter Description

Fd-00	Baud rate	Default	5005
	Setting Range	Units position (Modubs)	
		0: 300 bps	5: 9600 bps
		1: 600 bps	6: 19200 bps
		2: 1200bps	7: 38400 bps
		3: 2400 bps	8: 57600 bps
		4: 4800 bps	9: 115200 bps

This parameter is used to set transmission speed between host controller and AC drive. Note that baud rate of host controller must be the same as that of AC drive. Otherwise, communication shall fail. The higher baud rate is, the faster communication will be.

Fd-01	Data format	Default	0
	Setting Range	0: No check <8,N,2>	
		1: Even parity check <8,E,1>	
		2: Odd parity check <8,O,1>	
		3: No check, data format <8,N,1>	

Note that data format of host controller must be the same as that of AC drive. Otherwise, communication shall fail.

Fd-02	Local address	Default	1
	Setting Range	1 to 247 0: Broadcast address	

When local address is set to 0 (that is, broadcast address), host controller broadcast is enabled.

This address is unique (except broadcast address), which is basis for point-to-point communication between host controller and AC drive.

Fd-03	Response delay	Default	2 ms
	Setting Range	0 to 20 ms	

This parameter sets interval between AC drive completing receiving data and AC drive sending data to host controller. If response delay is shorter than system processing time, system processing time shall prevail. If response delay is longer than system processing time, system sends data to host controller only after response delay is up.

Fd-04	Communication timeout	Default	0.0s
	Setting Range	0.0s (invalid) 0.1s to 60.0s	

When this parameter is set to 0.0s, system does not detect communication timeout.

When AC drive does not receive communication signal within time set in this parameter, it detects communication timeout fault (Err16). Generally, this parameter is set to 0.0s. In applications with continuous communication, you can use this parameter to monitor communication status.

Fd-05	Communication Protocol Selection	Default	0
	Setting Range	0: Non-standard Modbus protocol 1: Standard Modbus protocol	

When Fd-05 = 1, standard Modbus protocol is used. For details, see B.3

When Fd-05 = 0, an additional byte is returned by the slave computer during read. For other read or write operations, the number of bytes returned is the same in both standard and non-standard protocols.

Fd-06	Current resolution read by communication	Default	0
	Setting Range	0: 0.01A 1: 0.1A	

This parameter is used to set unit of output current read by communication.

Appendix B Parameter Table

When a non-zero value is set for FP-00, the user-defined password is used. In function parameter mode and function parameter editing mode, enter the password correctly. To remove password protection, set FP-00 to 0.

The user password protection is used to protect operation on the panel. If this protection has been enabled, when you finish reading or writing parameters through the keypad and exit, you need to enter the password to get access again. Reading and writing are allowed without the password during communication operation (except FP and FF groups).

Password protection is not applicable to user-defined parameters.

Groups F and A include standard function parameters. Group U includes the monitoring function parameters. The symbols in the parameter table are described as follows:

☆ : It is possible to modify the parameter with the drive in the stop and in the Run status.

★ : It is not possible to modify the parameter with the drive in the Run status.

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

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

B.1 Standard Parameter Table

Para. No.	Name	Setting Range	Default	Change
Group F0: Standard Parameters				
F0-00	G/P type display	1: G (constant torque load) 2: P (fan an bump)	Model dependent	●
F0-01	Motor 1 control mode	0: SVC 2: V/F	0	★
F0-02	Command source selection	0: Operating panel 1: Terminal 2. Serial communication	0	☆
F0-03	Main frequency reference setting channel selection	0: Digital setting (revised value is not cleared after power off) 1: Digital setting (revised value is cleared after power off) 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI5) 6: Multi-reference 7: Simple PLC 8: PID reference 9: Communication setting	0	★
F0-04	Auxiliary frequency reference setting channel selection	Same to F0-03	0	★
F0-05	Base value of range of auxiliary frequency reference for Main and auxiliary calculation	0: Relative to maximum frequency 1: Relative to main frequency reference	0	☆
F0-06	Range of auxiliary frequency reference for main and auxiliary calculation	0% to 150%	100%	☆

Para. No.	Name	Setting Range	Default	Change
F0-07	Final Frequency reference setting selection	Units position: Frequency reference selection 0: Main frequency reference 1: Main and auxiliary calculation (based on tens position) 2: Switchover between main and auxiliary 3: Switchover between main and "main & auxiliary calculation" 4: Switchover between auxiliary and "main & auxiliary calculation" Tens position main and auxiliary calculation formula 0: Main + auxiliary 1: Main - auxiliary 2: Max. (main, auxiliary) 3: Min. (main, auxiliary)	00	☆
F0-08	Preset frequency	0.00 to max. frequency (F0-10)	50.00Hz	☆
F0-09	Running direction	0: Run in the default direction (FWD/REV indicator off) 1: Run in the direction reverse to the default direction (FWD/REV indicator on)	0	☆
F0-10	Max. frequency	5.00 Hz to 500.00 Hz	50.00Hz	★
F0-11	Setting channel of frequency upper limit	0: Set by F0-12 1: AI1 2: AI2 3: AI3 4: Pulse reference 5: Communication reference	0	★
F0-12	Frequency reference upper limit	Frequency lower limit (F0-14) to max. frequency (F0-10)	50.00Hz	☆
F0-13	Frequency reference upper limit offset	0.00 Hz to max. frequency (F0-10)	0.00Hz	☆
F0-14	Frequency reference lower limit	0.00 Hz to frequency upper limit (F0-12)	0.00Hz	☆
F0-15	Carrier frequency	2.0 to 8.0 kHz	Model dependent	☆
F0-16	Carrier frequency adjusted with temperature	0: Disabled 1: Enabled	1	☆
F0-17	Acceleration time 1	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F0-18	Deceleration time 1	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Mode ldependent	☆
F0-19	Acceleration/Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
F0-21	Frequency offset of Auxiliary frequency setting channel for main and auxiliary calculation	0.00 Hz to max. frequency (F0-10)	0.00Hz	☆
F0-22	Frequency reference resolution	2: 0.01 Hz	2	★
F0-23	Retentive of digital setting frequency upon stop	0: Not retentive 1: Retentive	0	☆
F0-24	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2	0	★
F0-25	Acceleration/Deceleration time base frequency	0: Maximum frequency (F0-10) 1: Frequency reference 2: 100 Hz	0	★

Para. No.	Name	Setting Range	Default	Change
F0-26	Base frequency for UP/ DOWN modification during running	0: Running frequency 1: Frequency reference	0	★
F0-27	Command source + frequency source	Units position: operating panel (keypad & display) + frequency reference setting channel 0: No function 1: Digital setting 2: AI1 3: AI2 4: AI3 5: Pulse reference (DI5) 6: Multi-reference 7: Simple PLC 8: PID reference 9: Serial communication Tens position: terminal I/O control + frequency reference setting channel Hundreds position: serial communication + frequency reference setting channel	0000	☆
F0-28	Serial port communication protocol	0: Modbus protocol 1: PROFIBUS-DP or CANopen protocol	0	★
		Group F1: Motor 1 Parameters		
F1-00	Motor type selection	2: magnet synchronous motor	0	★
F1-01	Rated motor power	0.1 to 1000.0 kW	Model dependent	★
F1-02	Rated motor voltage	1 to 2000 V	Model dependent	★
F1-03	Rated motor current	0.01 to 655.35 A (AC drive power ≤ 55 kW) 0.1 to 6553.5 A (AC drive power > 55 kW)	Model dependent	★
F1-04	Rated motor frequency	0.01 Hz to max. frequency	Model dependent	★
F1-05	Rated motor speed	1 to 65535 RPM	Model dependent	★
F1-16	Stator resistance of synchronous motor	0.001 to 65.535 Ω (AC drive power ≤ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning parameter	★
F1-17	D-axis inductance of synchronous motor	0.01 to 655.35 mH (AC drive power ≤ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning parameter	★
F1-18	Q-axis inductance of synchronous motor	0.01 to 655.35 mH (AC drive power ≤ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning parameter	★
F1-20	Counter electromotive force of synchronous motor	0.0V to 6553.5 V	Auto-tuning parameterr	★
F1-27	Encoder pulses per revolution	1 to 65535	1024	★
F1-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 4: Wire-saving UVW encoder	0	★
F1-34	Number of pole pairs of resolver	1 to 65535	1	★
F1-36	Encoder wire-break fault detection time	0.0s: No detection 0.1s to 10.0s	0.0s	★

Para. No.	Name	Setting Range	Default	Change
F1-37	Auto-tuning selection	00: No operation 1: Synchronous auto-tuning with load 2: Synchronous auto-tuning with no-load	00	★
Group F2: Vector Control Parameters of Motor 1				
F2-00	Speed loop proportional gain 1	1 to 100	20	☆
F2-01	Speed loop integral time1	0.01s to 10.00s	0.50s	☆
F2-02	Switchover frequency 1	0.00 to F2-05	5.00Hz	☆
F2-03	Speed loop proportional gain 2	1 to 100	20	☆
F2-04	Speed loop integral time 2	0.01s to 10.00s	1.00s	☆
F2-05	Switchover frequency 2	F2-02 to maximum frequency	10.00 Hz	☆
F2-09	Torque limit source in speed control	0: F2-10 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) Full scale of 1-7 corresponds to F2-10.	0	☆
F2-10	Digital setting of torque limit in speed control	0.0% to 200.0%	150.0%	☆
F2-11	Torque limit source in speed control (regenerative)	0: F2-12 (electrical or regenerative) 1: AI 2: AI2 3: AI3 4: Pulse reference 5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: F2-12 Full scale of 1-7 corresponds to F2-12.	0	☆
F2-12	Digital setting of torque limit in speed control (regenerative) Digital setting (regenerative)	0.0% to 200.0%	150.0%	☆
F2-13	Excitation adjustment proportional gain	0 to 60000	2000	☆
F2-14	Excitation adjustment integral gain	0 to 60000	1300	☆
F2-15	Torque adjustment proportional gain	0 to 60000	2000	☆
F2-16	Torque adjustment integral gain	0 to 60000	1300	☆
Group F3: V/F Control Parameters				
F3-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★

Para. No.	Name	Setting Range	Default	Change
F3-01	Torque boost	0.0%: No torque boost 0.1 to 30.0 %	Model dependent	☆
F3-02	Cut-off frequency of torque boost	0.00 Hz to max. frequency	50.00Hz	★
F3-03	Multi-point V/F frequency 1	0.00 Hz to F3-05	0.00Hz	★
F3-04	Multi-point V/F voltage 1	0.0% to 100.0%	0.0%	★
F3-05	Multi-point V/F frequency 2	F3-03 to F3-07	0.00Hz	★
F3-06	Multi-point V/F voltage 2	0.0% to 100.0%	0.0%	★
F3-07	Multi-point V/F frequency 3	F3-05 to rated motor frequency F1-04, Hz	0.00Hz	★
F3-08	Multi-point V/F voltage 3	0.0% to 100.0%	0.0%	★
F3-10	V/F over-excitation gain	0 to 200	64	☆
F3-11	V/F oscillation suppression gain	0 to 100	40	☆
F3-13	Voltage source for V/F separation	0: Set by F3-14 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Multi-reference 6: Simple PLC 7: PID reference 8: Serial comms. Note: 100.0% corresponds to the rated motor voltage	0	☆
F3-14	Digital setting of voltage for V/F separation	0 V to rated motor voltage	0V	☆
F3-15	Voltage rise time of V/F separation	0.0s to 1000.0s Note: It is the time used for the voltage increases from 0 V to the motor rated voltage.	0.0s	☆
F3-16	Voltage decline time of V/F separation	0.0s to 1000.0s Note: It is the time used for the voltage increases from 0 V to the motor rated voltage.	0.0s	☆
F3-17	Stop mode selection for V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0	0	☆
F3-18	Current limit level	50% to 200%	150%	★
F3-19	Current limit selection	0: Disabled 1: Enabled	1 (Enabled)	★
F3-20	Current limit gain	0 to 100	20	☆
F3-21	Compensation factor of speed multiplying current limit	50% to 200%	50%	★
F3-22	Voltage limit	650.0 to 800.0 V	770.0V	★
F3-23	Voltage limit selection	0: Disabled 1: Enabled	1 (Enabled)	★
F3-24	Frequency gain for voltage limit	0 to 100	30	☆
F3-25	Voltage gain for voltage limit	0 to 100	30	☆
F3-26	Frequency rise threshold during voltage limit	0 to 50 Hz	5Hz	★

Para. No.	Name	Setting Range	Default	Change
Group F4: Input Terminals				
F4-00	DI1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) (Note: F4-11 shall be set when F4-00 is set to 1 or 2.) 3: Three-wire 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: External fault normally open (NO) input 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, keypad) 20: Running command 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 30: Pulse input (enabled only for DI5) 31: Reserved 32: Immediate DC injection braking 33: External fault normally closed (NC) input 34: Frequency modification enabled 35: PID action direction reverse 36: External STOP terminal 1 37: Running command switchover terminal 2 38: PID integral disabled 39: Switchover between main frequency source and preset frequency 40: Switchover between auxiliary frequency source and preset frequency 41: Motor terminal selection 42: Reserved 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 injection braking	1	★
F4-01	DI2 function selection		4	★
F4-02	DI3 function selection		9	★
F4-03	DI4 function selection		12	★
F4-04	DI5 function selection		13	★

Para. No.	Name	Setting Range	Default	Change
		50: Clear the current running time 51: Two-wire/Three-wire mode switchover 52: Reverse frequency forbidden 53-59: Reserved		
F4-10	DI filter time	0.000s to 1.000s	0.010s	☆
F4-11	Terminal I/O control mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	0	★
F4-12	Terminal UP/DOWN rate	0.001 to 65.535 Hz/s	1.00 Hz/s	☆
F4-13	AI curve 1 min. input	0.00 V to F4-15	0.00V	☆
F4-14	Corresponding percentage of AI curve 1 min. input	-100.0% to +100.0%	0.0%	☆
F4-15	AI curve 1 max. input	F4-13 to +10.00 V	10.00V	☆
F4-16	Corresponding percentage of AI curve 1 max. input	-100.0% to +100.0%	100.0%	☆
F4-17	AI1 filter time	0.00s to 10.00s	0.10s	☆
F4-18	AI curve 2 min. input	0.00 V to F4-20	0.00V	☆
F4-19	Corresponding percentage of AI curve 2 min. input	-100.0% to +100.0%	0.0%	☆
F4-20	AI curve 2 max. input	F4-18 to 10.00 V	10.00V	☆
F4-21	Corresponding percentage of AI curve 2 max. input	-100.0% to +100.0%	100.0%	☆
F4-22	AI2 filter time	0.00s to 10.00s	0.10s	☆
F4-23	AI3 curve min. input	-10.00 V to F4-25	-10.00V	☆
F4-24	Corresponding percentage of AI curve 3 min. input	-100.0% to +100.0%	-100.0%	☆
F4-25	AI curve 3 max. input	F4-23 to +10.00 V	10.00V	☆
F4-26	Corresponding percentage of AI curve 3 max. input	-100.0% to +100.0%	100.0%	☆
F4-27	AI3 filter time	0.00s to 10.00s	0.10s	☆
F4-28	Pulse min. input	0.00 kHz to F4-30	0.00kHz	☆
F4-29	Corresponding percentage of pulse min. input	-100.0% to 100.0%	0.0%	☆
F4-30	Pulse max. input	F4-28 to 100.00 kHz	50.00kHz	☆
F4-31	Corresponding percentage of pulse max. input	-100.0% to 100.0%	100.0%	☆
F4-32	Pulse filter time	0.00s to 10.00s	0.10s	☆
F4-33	AI curve selection	Units position: AI1 curve selection 1: Curve 1 (2 points, see F4-13 to F4-16) 2: Curve 2 (2 points, see F4-18 to F4-21) 3: Curve 3 (2 points, see F4-23 to F4-26) 4: Curve 4 (4 points, see A6-00 to A6-07) 5: Curve 5 (4 points, see A6-08 to A6-15) Tens position: AI2 curve selection Hundreds position: AI3 curve selection	321	☆

Para. No.	Name	Setting Range	Default	Change
F4-34	Setting selection when AI less than min. input	Units position: AI1 0: Corresponding percentage of min. input 1: 0.0% Tens position: AI2 Hundreds position: AI3	000	☆
F4-35	DI1 delay	0.0s to 3600.0s	0.0s	★
F4-36	DI2 delay	0.0s to 3600.0s	0.0s	★
F4-37	DI3 delay	0.0s to 3600.0s	0.0s	★
F4-38	DI active mode selection 1	0: High level active 1: Low level active Units position: DI1 active mode Tens position: DI2 active mode Hundreds position: DI3 active mode Thousand position: DI4 active mode Ten thousands position: DI5 active mode	00000	★
Group F5: Output Terminals				
F5-01	Control board relay function selection (RA-RC)	0: No output 1: AC Drive running 2: Fault output (coast to 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 completed 12: Accumulative running time reached 13: Frequency limited 14: Torque limited	1	☆
F5-02	Control board relay function selection (T/A-T/B-T/C)	15: Ready for RUN 16: AI1 > AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage status 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 28: Current 1 reached 29: Current 2 reached	2	☆
F5-04	DO1 function selection	30: Timing duration reached 31: AI1 input limit exceeded 32: Load lost 33: Reverse running 34: Zero current status 35: IGBT 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 (no output at undervoltage)	1	☆

Para. No.	Name	Setting Range	Default	Change
F5-07	AO1 function selection	0: Running frequency 1: Set frequency 2: Output current 3: Output torque (absolute value, proportion to motor torque) 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 8: AI2	0	☆
F5-08	AO2 function selection	9: AI3 (extension card) 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current (100.0% corresponds to1000.0 A) 15: Output voltage (100.0% corresponds to1000.0 V) 16: Output torque (actual value, proportion to motor torque)	1	☆
F5-10	AO1 zero offset coefficient	-100.0% to +100.0%	0.0%	☆
F5-11	AO1 gain	-10.00 to +10.00	1.00	☆
F5-12	AO2 zero offset coefficient	-100.0% to +100.0%	0.0%	☆
F5-13	AO2 gain	-10.00 to +10.00	1.00	☆
F5-17	Relay 1 output delay	0.0s to 3600.0s	0.0s	☆
F5-18	Relay 2 output delay	0.0s to 3600.0s	0.0s	☆
F5-20	DO1 output delay	0.0s to 3600.0s	0.0s	☆
F5-22	Active mode selection of DO output terminals	0: Positive logic active 1: Negative logic active Units position: FMR active mode Tens position: Relay1 active mode Hundreds position: Relay2 active mode Thousands position: DO1 active mode Ten thousands position: DO2 active mode	00000	☆
Group F6: Start/Stop Control				
F6-00	Start mode	0: Direct start	0	☆
F6-03	Start frequency	0.00Hz to 10.00Hz	0.00Hz	☆
F6-04	Start frequency holding time	0.0s to 100.0s	0.0s	★
F6-07	Acceleration/Deceleration mode	0: Linear acceleration/deceleration 1: Static S-curve acceleration/deceleration 2: Dynamic S-curve acceleration/deceleration	0	★
F6-08	Time proportion of S-curve start segment	0.0% to (100.0% - F6-09)	30.0%	★
F6-09	Time proportion of S-curve end segment	0.0% to (100.0% - F6-08)	30.0%	★
F6-10	Stop mode	0: Decelerate to stop; 1: Coast to stop	0	☆
F6-15	Braking use ratio	0% to 100%	100%	☆
Group F7: Keypad Operation and LED Display				
F7-01	MF.K key function selection	0: MF.K key disabled 1: Switchover from remote control (terminal or communication) to keypad control 2: Switchover between forward rotation and reverse rotation 3: Forward jog 4: Reverse jog	0	★

Para. No.	Name	Setting Range	Default	Change
F7-02	STOP/RESET key function	0: STOP/RESET key enabled only in keypad control 1: STOP/RESET key enabled in any operation mode	1	☆
F7-03	LED display running parameters 1	0000 to FFFF Bit00: Running frequency 1 (Hz) Bit01: Frequency reference (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI state (V) Bit08: DO state Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID reference	1F	☆
F7-04	LED display running parameters 2	0000 to FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Pulse reference (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: Motor speed Bit09: Current power-on time (H) Bit10: Current running time (Min) Bit11: Pulse reference (Hz) Bit12: Communication reference Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆
F7-05	LED display stop parameters	0000 to FFFF Bit00: Frequency reference (Hz) Bit01: Bus voltage (V) Bit02: DI state Bit03: DO state 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 reference Bit12: Pulse reference (kHz)	33	☆

Para. No.	Name	Setting Range	Default	Change
F7-06	Load speed display coefficient	0.0001 to 6.5000	1.0000	☆
F7-07	Heatsink temperature of AC Drive	-20°C to 120°C	-	●
F7-08	Product number	-	-	●
F7-09	Accumulative running time	0h to 65535 h	-	●
F7-10	Performance software version	-	-	●
F7-11	Function software version	-	-	●
F7-12	Number of decimal places for load speed display	Units position: Number of decimal places for U0-14 0: No decimal place 1: One decimal places 2: Two decimal places 3: Three decimal places Tens position: Number of decimal places of U0-19/U0-29 1: One decimal places 2: Two decimal places	21	☆
F7-13	Accumulative power-on time	0 to 65535 h	-	●
F7-14	Accumulative power consumption	0 to 65535 kWh	-	●
		Group F8: Auxiliary Functions		
F8-00	Jog frequency reference	0.00 Hz to max. frequency	2.00Hz	☆
F8-01	Jog acceleration time	0.0s to 6500.0s	20.0s	☆
F8-02	Jog deceleration time	0.0s to 6500.0s	20.0s	☆
F8-03	Acceleration time 2	0.0s to 6500.0s	Model dependent	☆
F8-04	Deceleration time 2	0.0s to 6500.0s	Model dependent	☆
F8-05	Acceleration time 3	0.0s to 6500.0s	Model dependent	☆
F8-06	Deceleration time 3	0.0s to 6500.0s	Model dependent	☆
F8-07	Acceleration time 4	0.0s to 6500.0s	0.0s	☆
F8-08	Deceleration time 4	0.0s to 6500.0s	0.0s	☆
F8-09	Frequency jump 1	0.00 Hz to max. frequency	0.00Hz	☆
F8-10	Frequency jump 2	0.00 Hz to max. frequency	0.00Hz	☆
F8-11	Frequency jump band	0.00 Hz to max. frequency	0.00 Hz	☆
F8-12	Forward/Reverse run switchover dead-zone time	0.0s to 3000.0s	0.0s	☆
F8-13	Reverse RUN selection	0: Disabled 1: Enabled	0	☆
F8-14	Running mode when frequency reference lower than frequency lower limit	0: Run at frequency reference lower limit 1: Stop 2: Run at zero speed	0	☆
F8-15	Droop rate	0.00% to 100.00%	0.00%	☆
F8-18	Startup protection selection	0: Disabled 1: Enabled	0	☆
F8-19	Frequency detection value 1	0.00 Hz to max. frequency	50.00Hz	☆

Para. No.	Name	Setting Range	Default	Change
F8-20	Frequency detection hysteresis 1	0.0% to 100.0% (FDT1 level)	5.0%	☆
F8-21	Detection width of target frequency reached	0.0% to 100.0% (maximum frequency)	0.0%	☆
F8-22	Jump frequency function	0: Disabled 1: Enabled	0	☆
F8-25	Switchover frequency of accel time 1 and accel time 2	0.00 Hz to max. frequency	0.00Hz	☆
F8-26	Switchover frequency of deceleration time 1 and deceleration time 2	0.00 Hz to max. frequency	0.00Hz	☆
F8-27	Set highest priority to terminal JOG function	0: Disabled 1: Enabled	0	☆
F8-28	Frequency detection value 2	0.00 Hz to max. frequency	50.00Hz	☆
F8-29	Frequency detection hysteresis 2	0.0% to 100.0% (FDT2 level)	5.0%	☆
F8-30	Detection of frequency 1	0.00 Hz to max. frequency	50.00Hz	☆
F8-31	Detection width of frequency 1	0.0% to 100.0% (maximum frequency)	0.0%	☆
F8-32	Detection of frequency 2	0.00 Hz to max. frequency	50.00Hz	☆
F8-33	Detection width of frequency 2	0.0% to 100.0% (maximum frequency)	0.0%	☆
F8-34	Zero current detection level	0.0% to 300.0% 100.0% corresponds to rated motor current.	5.0%	☆
F8-35	Zero current detection delay	0.01s to 600.00s	0.10s	☆
F8-36	Output overcurrent threshold	0.0% (no detection) 0.1% to 300.0% (rated motor current)	200.0%	☆
F8-37	Output overcurrent detection delay	0.00s to 600.00s	0.00s	☆
F8-38	Detection level of current 1	0.0% to 300.0% (rated motor current)	100.0%	☆
F8-39	Detection width of current 1	0.0% to 300.0% (rated motor current)	0.0%	☆
F8-40	Detection level of current 2	0.0% to 300.0% (rated motor current)	100.0%	☆
F8-41	Detection width of current 2	0.0% to 300.0% (rated motor current)	0.0%	☆
F8-42	Timing function	0: Disabled 1: Enabled	0	★
F8-43	Running time setting channel	0: Set by F8-44 1: AI1 2: AI2 3: AI3 (100% of analog input corresponds to the value of F8-44)	0	★
F8-44	Running time	0.0 Min to 6500.0 Min	0.0 Min	★
F8-45	AI1 input voltage lower limit	0.00 V to F8-46	3.10V	☆
F8-46	AI1 input voltage upper limit	F8-45 to 10.00 V	6.80V	☆
F8-47	IGBT temperature threshold	0°C to 100°C	75℃	☆
F8-48	Cooling fan working mode	0: Working during drive running 1: Working continuously	0	☆

Para. No.	Name	Setting Range	Default	Change
F8-49	Wakeup frequency	Hibernating frequency (F8-51) to max. frequency (F0-10)	0.00Hz	☆
F8-50	Wakeup delay time	0.0s to 6500.0s	0.0s	☆
F8-51	Hibernating frequency	0.00 Hz to wakeup frequency (F8-49)	0.00Hz	☆
F8-52	Hibernating delay time	0.0s to 6500.0s	0.0s	☆
F8-53	Running time threshold this time	0.0 to 6500.0 min	0.0Min	☆
F8-54	Output power correction coefficient	0.00% to 200.0%	100.0%	☆
F8-57	Current correction coefficient	95% to 100%	100%	☆
Group F9: Fault and Protection				
F9-00	Motor overload protection	0: Disabled 1: Enabled	1	☆
F9-01	Motor overload protection gain	0.20 to 10.00	1.00	☆
F9-02	Motor overload pre-warning coefficient	50% to 100%	80%	☆
F9-03	Overvoltage protection gain	0 to 100	30	☆
F9-04	Overvoltage protection voltage	650 to 800 V	760V	☆
F9-07	Detection of short-circuit to ground upon power-on	Units position:Detection of short-circuit to ground upon power on 0: Disabled 1: Enabled Tens position: Detection of short-circuit to ground before running 0: Disabled 1: Enabled	01	☆
F9-08	Braking unit applied voltage	650 to 800 V	760V	★
F9-09	Auto reset times	0 to 20	0	☆
F9-10	Selection of DO action during auto reset	0: Not act 1: Act	0	☆
F9-11	Delay of auto reset	0.1s to 100.0s	1.0s	☆
F9-12	Input phase loss/pre-charge relay protection	Units position: Input phase loss protection Tens position: Pre-charge relay protection 0: Disabled 1: Enabled	11	☆
F9-13	Output phase loss protection	Units position: Output phase loss protection 0: Disabled 1: Enabled Tens position: Output phase loss protection before running 0: Disabled 1: Enabled	01	☆

Para. No.	Name	Setting Range	Default	Change
F9-14	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 resistor overload 9: Undervoltage 10: AC drive overload 11: Motor overload 12: Power input phase loss	-	●
F9-15	2nd fault type	13: Power output phase loss 14: IGBT overheat 15: External fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Encoder/PG card fault 21: Parameter read and write fault 22: AC drive hardware fault 23: Motor short circuited to ground 24: Reserved 25: Reserved	-	●
F9-16	3rd (latest) fault type	26: Accumulative running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Accumulative power-on time reached 30: Load lost 31: PID feedback lost during running 40: Fast current limit timeout 41: Motor switchover error during running 42: Too large speed deviation 43: Motor over-speed 45: Motor overheat 51: Initial position error 55: Slave error in master-slave control	-	●
F9-17	Frequency upon 3rd fault	-	-	●
F9-18	Current upon 3rd fault	-	-	●
F9-19	Bus voltage upon 3rd fault	-	-	●
F9-20	DI state upon 3rd fault	-	-	●
F9-21	DO state upon 3rd fault	-	-	●
F9-22	AC drive state upon 3rd fault	-	-	●
F9-23	Power-on time upon 3rd fault	-	-	●

Para. No.	Name	Setting Range	Default	Change
F9-24	Running time upon 3rd fault	-	-	●
F9-25	Counter electromotive force upon 3rd (latest) fault	-	-	●
F9-27	Frequency upon 2nd fault	-	-	●
F9-28	Current upon 2nd fault	-	-	●
F9-29	Bus voltage upon 2nd fault	-	-	●
F9-30	DI state upon 2nd fault	-	-	●
F9-31	DO state upon 2nd fault	-	-	●
F9-32	AC drive state upon 2nd fault	-	-	●
F9-33	Power-on time upon 2nd fault	-	-	●
F9-34	Running time upon 2nd fault	-	-	●
F9-35	Counter electromotive force upon 2nd fault	-	-	●
F9-37	Frequency upon 1st fault	-	-	●
F9-38	Current upon 1st fault	-	-	●
F9-39	Bus voltage upon 1st fault	-	-	●
F9-40	DI state upon 1st fault	-	-	●
F9-41	DO state upon 1st fault	-	-	●
F9-42	AC drive state upon 1st fault	-	-	●
F9-43	Power-on time upon 1st fault	-	-	●
F9-44	Running time upon 1st fault	-	-	●
F9-47	Fault protection action selection 1	Units position: Motor overload (Err11) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Tens position: Input phase loss (Err12) Hundreds position: Output phase loss (Err13) Thousands position: External fault (Err15) Ten thousands position: Communication fault (Err16)	00000	☆
F9-48	Fault protection action selection 2	Units position: Encoder fault (Err20) 0: Coast to stop Tens position: EEPROM read-write fault (Err21) 0: Coast to stop 1: Stop according to the stop mode Hundreds position: AC drive overload fault selection (Err10) 0: Coast to stop 1: De-rated running 2: De-rated running (only for air compressor) Thousands position: Motor overheat (Err45) Ten thousands position: Accumulative running time reached (Err26)	00000	☆

Para. No.	Name	Setting Range	Default	Change
F9-49	Fault protection action selection 3	Units position: User-defined fault 1 (Err27) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Tens position: User-defined fault 2 (Err28) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Hundreds position: Accumulative power-on time reached (Err29) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Thousands position: Load lost (Err30) 0: Coast to stop 1: Deceleration to stop 2: Continue to run at 7% of rated motor frequency and restore to the frequency reference if the load recovers Ten thousands position: PID feedback lost during drive running (Err31) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run	00000	☆
F9-50	Fault protection action selection 4	Units position: Too large speed feedback error (Err42) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Tens position: Motor overspeed (Err43) Hundreds position: Initial position fault (Err51)	00000	☆
F9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Frequency reference 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0	☆
F9-55	Backup frequency upon fault	0.0% to 100.0% (100.0% corresponds to max. frequency (F0-10))	100.0%	☆
F9-56	Type of motor temperature sensor	0: No temperature sensor 1: PT100 2: PT1000	0	☆
F9-57	Motor overheat protection threshold	0°C to 200°C	110℃	☆
F9-58	Motor overheat pre-warning threshold	0°C to 200°C	90℃	☆
F9-59	Power dip ride-through function selection	0: Disabled 1: Bus voltage constant control 2: Decelerate to stop	0	★
F9-60	Threshold of power dip ride-through function disabled	80% to 100%	85%	★
F9-61	Judging time of bus voltage recovering from power dip	0.0s to 100.0s	0.5S	★
F9-62	Threshold of power dip ride-through function enabled	60% to 100%	80%	★

Para. No.	Name	Setting Range	Default	Change
F9-63	Load lost protection	0: Disabled 1: Enabled	0	☆
F9-64	Load lost detection level	0.0% to 100.0%	10.0%	☆
F9-65	Load lost detection time	0.0 to 60.0s	1.0s	☆
F9-67	Overspeed detection level	0.0% to 50.0% (max. frequency)	20.0%	☆
F9-68	Overspeed detection time	0.01 to 0.600s	0.010s	☆
F9-69	Detection level of speed error	0.0% to 50.0% (maximum frequency)	20.0%	☆
F9-70	Detection time of speed error	0.0s: Not detected 0.1 to 60.0s	5.0s	☆
F9-71	Power dip ride-through gain Kp	0 to 100	40	☆
F9-72	Power dip ride-through integral coefficient Ki	0 to 100	30	☆
F9-73	Deceleration time of power dip ride-through	0 to 300.0s	20.0s	★
		Group FA: PID Function		
FA-00	PID reference setting channel	0: Set by FA-01 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Serial comms. 6: Multi-reference	0	☆
FA-01	PID digital setting	0.0% to 100.0%	50.0%	☆
FA-02	PID feedback setting channel	0: AI1 1: AI2 2: AI3 3: AI1-AI2 4: Pulse reference (DI5) 5: Serial comms. 6: AI1 + AI2 7: Max. (|AI1|, |AI2|) 8: Min. (|AI1|, |AI2|)	0	☆
FA-03	PID operation direction	0: Forward 1: Reverse	0	☆
FA-04	PID reference and feedback range	0 to 65535	1000	☆
FA-05	Proportional gain Kp1	0.0 to 1000.0	20.0	☆
FA-06	Integral time Ti1	0.01s to 10.00s	2.00s	☆
FA-07	Differential time Td1	0.000s to 10.000s	0.000s	☆
FA-08	PID output limit in reverse direction	0.00 Hz to maximum frequency	0.00Hz	★
FA-09	PID error limit	0.0% to 100.0%	0.0%	☆
FA-10	PID differential limit	0.00% to 100.00%	0.10%	☆
FA-11	PID reference change time	0.00 to 650.00s	0.00s	☆

Para. No.	Name	Setting Range	Default	Change
FA-12	PID feedback filter time	0.00 to 60.00s	0.00s	☆
FA-13	PID output filter time	0.00 to 60.00s	0.00s	☆
FA-15	Proportional gain Kp2	0.0 to 1000.0	20.0	☆
FA-16	Integral time Ti2	0.01s to 10.00s	2.00s	☆
FA-17	Differential time Td2	0.000s to 10.000s	0.000s	☆
FA-18	PID parameter switchover condition	0: No switchover 1: Switchover through DI 2: Auto switchover based on PID error 3: Auto switchover based on running frequency	0	☆
FA-19	PID error 1 for auto switchover	0.0% to FA-20	20.0%	☆
FA-20	PID error 2 for auto switchover	FA-19 to 100.0%	80.0%	☆
FA-21	PID initial value	0.0% to 100.0%	0.0%	☆
FA-22	PID initial value active time	0.00 to 650.00s	0.00s	☆
FA-23	Reserved	-	-	-
FA-24	Reserved	-	-	-
FA-25	PID integral property	Units position: Integral separation 0: Disabled 1: Enabled Tens position: Whether to stop integral operation when the PID output reaches the limit 0: Continue integral operation 1: Stop integral operation	00	☆
FA-26	Detection level of PID feedback loss	0.0%: No detection 0.1% to 100.0%	0.0%	☆
FA-27	Detection time of PID feedback loss	0.0s to 20.0s	0.0s	☆
FA-28	Selection of PID operation at stop	0: Disabled 1: Enabled	0	☆
Group Fb: Wobble Function, Fixed Length and Count				
FB-00	Wobble setting mode	0: Relative to central frequency 1: Relative to the max. frequency	0	☆
FB-01	Wobble amplitude	0.0% to 100.0%	0.0%	☆
FB-02	Wobble step	0.0% to 50.0%	0.0%	☆
FB-03	Wobble cycle	0.1s to 3000.0s	10.0s	☆
FB-04	Triangular wave rising time coefficient	0.1% to 100.0%	50.0%	☆
FB-05	Set length	0 to 65535 m	1000 m	☆
FB-06	Actual length	0 to 65535 m	0m	☆
FB-07	Number of pulses per meter	0.1 to 6553.5	100.0	☆
FB-08	Set count value	1 to 65535	1000	☆
FB-09	Designated count value	1 to 65535	1000	☆
Group FC: Multi-Reference and Simple PLC Function				
FC-00	Reference 0	-100.0% to 100.0%	0.0%	☆
FC-01	Reference 1	-100.0% to 100.0%	0.0%	☆
FC-02	Reference 2	-100.0% to 100.0%	0.0%	☆
FC-03	Reference 3	-100.0% to 100.0%	0.0%	☆
FC-04	Reference 4	-100.0% to 100.0%	0.0%	☆
FC-05	Reference 5	-100.0% to 100.0%	0.0%	☆
FC-06	Reference 6	-100.0% to 100.0%	0.0%	☆

Para. No.	Name	Setting Range	Default	Change
FC-07	Reference 7	-100.0% to 100.0%	0.0%	☆
FC-08	Reference 8	-100.0% to 100.0%	0.0%	☆
FC-09	Reference 9	-100.0% to 100.0%	0.0%	☆
FC-10	Reference 10	-100.0% to 100.0%	0.0%	☆
FC-11	Reference 11	-100.0% to 100.0%	0.0%	☆
FC-12	Reference 12	-100.0% to 100.0%	0.0%	☆
FC-13	Reference 13	-100.0% to 100.0%	0.0%	☆
FC-14	Reference 14	-100.0% to 100.0%	0.0%	☆
FC-15	Reference 15	-100.0% to 100.0%	0.0%	☆
FC-16	Simple PLC running mode	0: Stop after running one cycle 1: Keep final values after running one cycle 2: Repeat after running one cycle	0	☆
FC-17	Simple PLC retentive selection	Unit position: Retentive at power down 0: Not retentive 1: Retentive Tens position: Retentive at stop 0: Not retentive at stop 1: Retentive at stop	00	☆
FC-18	Running time of simple PLC reference 0	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-19	Acceleration/deceleration time of simple PLC reference 0	0 to 3	0	☆
FC-20	Running time of simple PLC reference 1	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-21	Acceleration/deceleration time of simple PLC reference 1	0 to 3	0	☆
FC-22	Running time of simple PLC reference 2	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-23	Acceleration/deceleration time of simple PLC reference 2	0 to 3	0	☆
FC-24	Running time of simple PLC reference 3	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-25	Acceleration/deceleration time of simple PLC reference 3	0 to 3	0	☆
FC-26	Running time of simple PLC reference 4	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-27	Acceleration/deceleration time of simple PLC reference 4	0 to 3	0	☆
FC-28	Running time of simple PLC reference 5	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-29	Acceleration/deceleration time of simple PLC reference 5	0 to 3	0	☆
FC-30	Running time of simple PLC reference 6	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-31	Acceleration/deceleration time of simple PLC reference 6	0 to 3	0	☆
FC-32	Running time of simple PLC reference 7	0.0s (h) to 6553.5s (h)	0.0s (h)	☆

Para. No.	Name	Setting Range	Default	Change
FC-33	Acceleration/deceleration time of simple PLC reference 7	0 to 3	0	☆
FC-34	Running time of simple PLC reference 8	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-35	Acceleration/deceleration time of simple PLC reference 8	0 to 3	0	☆
FC-36	Running time of simple PLC reference 9	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-37	Acceleration/deceleration time of simple PLC reference 9	0 to 3	0	☆
FC-38	Running time of simple PLC reference 10	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-39	Acceleration/deceleration time of simple PLC reference 10	0 to 3	0	☆
FC-40	Running time of simple PLC reference 11	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-41	Acceleration/deceleration time of simple PLC reference 11	0 to 3	0	☆
FC-42	Running time of simple PLC reference 12	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-43	Acceleration/deceleration time of simple PLC reference 12	0 to 3	0	☆
FC-44	Running time of simple PLC reference 13	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-45	Acceleration/deceleration time of simple PLC reference 13	0 to 3	0	☆
FC-46	Running time of simple PLC reference 14	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-47	Acceleration/deceleration time of simple PLC reference 14	0 to 3	0	☆
FC-48	Running time of simple PLC reference 15	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-49	Acceleration/deceleration time of simple PLC reference 15	0 to 3	0	☆
FC-50	Time unit of simple PLC running	0: s (second) 1: h (hour)	0	☆
FC-51	Reference 0 source	0: Set by FC-00 1: AI1 2: AI2 3: AI3 4: Pulse reference 5: PID 6: Set by preset frequency (F0-08), modified through terminal UP/DOWN	0	☆

Para. No.	Name	Setting Range	Default	Change
Group FD: Communication				
FD-00	Baud rate	Units position (Modbus) 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens position (PROFIBUS-DP) 0: 115200BPs 1: 208300BPs 2: 256000BPs 3: 512000Bps Hundreds position: Reserved Thousands position: CANlink 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1M	5005	☆
FD-01	Modbus data format symbol	0: No check <8,N,2> 1: Even parity check <8,E,1> 2: Odd parity check <8,O,1> 3: No check, data format <8,N,1> (Valid for Modbus)	0	☆
FD-02	Local address	0: Broadcast address; 1 to 247 (Valid for Modbus, PROFIBUS-DP and CANlink)	1	☆
FD-03	Modbus response delay	0 to 20 ms (Valid for Modbus)	2	☆
FD-04	Serial port communication timeout	0.0: Disabled 0.1 to 60.0s (Valid for Modbus, PROFIBUS-DP and CANopen)	0.0	☆
FD-05	Modbus protocol selection and PROFIBUS-DP data frame	Units position: Modbus 0: Non-standard Modbus protocol 1: Standard Modbus protocol Tens position: PROFIBUS-DP 0: PPO1 format 1: PP02 format 2: PPO3 format 3: PPO5 format	30	☆
FD-06	Current resolution read by communication	0: 0.01 A (≤ 55 kW) 1: 0.1A	0	☆
FD-08	Profibus and CANopen communication timeout time	0.0 (Invalid) 0.1 to 60.0s	0	☆

Para. No.	Name	Setting Range	Default	Change
Group FE: User-Defined Parameters				
FE-00	User-defined parameter 0	F0-00 to FP-xx A0-00 to Ax-xx U0-00 to U0-xx U3-00 to U3-xx	U3-16	☆
FE-01	User-defined parameter 1		U3-17	☆
FE-02	User-defined parameter 2		F0.00	☆
FE-03	User-defined parameter 3		F0.00	☆
FE-04	User-defined parameter 4		F0.00	☆
FE-05	User-defined parameter 5		F0.00	☆
FE-06	User-defined parameter 6		F0.00	☆
FE-07	User-defined parameter 7		F0.00	☆
FE-08	User-defined parameter 8		F0.00	☆
FE-09	User-defined parameter 9		F0.00	☆
FE-10	User-defined parameter 10		F0.00	☆
FE-11	User-defined parameter 11		F0.00	☆
FE-12	User-defined parameter 12		F0.00	☆
FE-13	User-defined parameter 13		F0.00	☆
FE-14	User-defined parameter 14		F0.00	☆
FE-15	User-defined parameter 15		F0.00	☆
FE-16	User-defined parameter 16		F0.00	☆
FE-17	User-defined parameter 17		F0.00	☆
FE-18	User-defined parameter 18		F0.00	☆
FE-19	User-defined parameter 19		F0.00	☆
FE-20	User-defined parameter 20		U0-68	☆
FE-21	User-defined parameter 21		U0-69	☆
FE-22	User-defined parameter 22		F0.00	☆
FE-23	User-defined parameter 23		F0.00	☆
FE-24	User-defined parameter 24		F0.00	☆
FE-25	User-defined parameter 25		F0.00	☆
FE-26	User-defined parameter 26		F0.00	☆
FE-27	User-defined parameter 27	F0-00 to FP-xx A0-00 to Ax-xx U0-00 to U0-xx U3-00 to U3-xx	F0.00	☆
FE-28	User-defined parameter 28		F0.00	☆
FE-29	User-defined parameter 29		F0.00	☆
Group FP: Function Parameter Management				
FP-00	User password	0 to 65535	0	☆
FP-01	Parameter initialization	0: No operation 01: Restore factory parameters except motor parameters 02: Clear records 04: Back up current user parameters 501: Restore user backup parameters	0	★
FP-02	Parameter display property	Unit's digit: Group U is not displayed. 0: Not displayed 1: Displayed Ten's digit: Group A is displayed. 0: Not displayed 1: Displayed	11	★
FP-03	Selection of individualized parameter display	Units position: Selection of user-defined parameter display 0: Not displayed 1: Displayed Tens position: Selection of user-modified parameter display 0: Not displayed 1: Displayed	00	☆
FP-04	Selection of parameter modification	0: Disabled 1: Enabled	0	☆

Para. No.	Name	Setting Range	Default	Change
		Group A0: Torque Control and Limit		
A0-00	Speed/Torque control selection	0: Speed control 1: Torque control	0	★
A0-01	Torque reference source in torque control	0: Set by A0-03 1: AI1 2: AI2 3: AI3 4: Pulse reference 5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) Full scale of 1-7 corresponds to A0-03.	0	★
A0-03	Torque digital setting in torque control	-200.0% to 200.0%	150.0%	☆
A0-05	Forward max. frequency in torque control	0.00 Hz to max. frequency	50.00Hz	☆
A0-06	Reverse max. frequency in torque control	0.00 Hz to max. frequency	50.00Hz	☆
A0-07	Acceleration time in torque control	0.00s to 65000s	0.00s	☆
A0-08	Deceleration time in torque control	0.00s to 65000s	0.00s	☆
		Group A1: Virtual DI/DO		
A1-00	VDI1 function selection	0 to 59	0	★
A1-01	VDI2 function selection	0 to 59	0	★
A1-02	VDI3 function selection	0 to 59	0	★
A1-03	VDI4 function selection	0 to 59	0	★
A1-04	VDI5 function selection	0 to 59	0	★
A1-05	VDI active state setting mode	Units position: VDI1 Tens position: VDI2 Hundreds position: VDI3 Thousands position: VDI4 Ten thousands position: VDI5 0: Decided by state of VDOx 1: Decided by A1-06	00000	★
A1-06	Selection of VDI active state	0: Disabled 1: Enabled Units position: VDI1 Tens position: VDI2 Hundreds position: VDI3 Thousands position: VDI4 Ten thousands position: VDI5	00000	★
A1-07	Function selection for AI1 used as DI	0 to 59	0	★
A1-08	Function selection for AI2 used as DI	0 to 59	0	★
A1-09	Function selection for AI3 used as DI	0 to 59	0	★
A1-10	Active state selection for AI used as DI	0: High level active 1: Low level active Units position: AI1 Tens position: AI2 Hundreds position: AI3	000	★

Para. No.	Name	Setting Range	Default	Change
A1-11	VDO1 function selection	0: Short with physical DIx internally 1 to 41: See physical DO selection in group F5	0	☆
A1-12	VDO2 function selection	0: Short with physical DIx internally 1 to 41: See physical DO selection in group F5	0	☆
A1-13	VDO3 function selection	0: Short with physical DIx internally 1 to 41: See physical DO selection in group F5	0	☆
A1-14	VDO4 function selection	0: Short with physical DIx internally 1 to 41: See physical DO selection in group F5	0	☆
A1-15	VDO5 function selection	0: Short with physical DIx internally 1 to 41: See physical DO selection in group F5	0	☆
A1-16	VDO1 output delay	0.0s to 3600.0s	0.0s	☆
A1-17	VDO2 output delay	0.0s to 3600.0s	0.0s	☆
A1-18	VDO3 output delay	0.0s to 3600.0s	0.0s	☆
A1-19	VDO4 output delay	0.0s to 3600.0s	0.0s	☆
A1-20	VDO5 output delay	0.0s to 3600.0s	0.0s	☆
A1-21	VDO active mode selection	0: Positive logic active 1: Negative logic active Units position: VDO1 Tens position: VDO2 Hundreds position: VDO3 Thousands position: VDO4 Ten thousands position: VDO5	00000	☆
Group A5: Control Optimization				
A5-00	DPWM switchover frequency upper limit	5.00Hz to max. frequency	8.00Hz	☆
A5-01	PWM modulation pattern	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5-02	Dead zone compensation mode selection	0: Disabled 1: Enabled (compensation mode 1)	1	☆
A5-03	Random PWM depth	0: Random PWM invalid 1 to 10: Random PWM	0	☆
A5-04	Overcurrent fast prevention	0: Disabled 1: Enabled	1	☆

Para. No.	Name	Setting Range	Default	Change
A5-05	Voltage over modulation coefficient	100% to 120%	110%	★
A5-06	Undervoltage threshold	120.0 to 1500.0 V	350.0V	☆
A5-08	Dead-zone time adjustment	100% to 200%	150%	★
A5-09	Overvoltage threshold	200.0V to 820.0V	820.0V	★
		Group A6: AI Curve Setting		
A6-00	AI curve 4 min. input	-10.00 V to A6-02	0.00V	☆
A6-01	Corresponding percentage of AI curve 4 min. input	-100.0% to +100.0%	0.0%	☆
A6-02	AI curve 4 inflexion 1 input	A6-00 to A6-04	3.00V	☆
A6-03	Corresponding percentage of AI curve 4 inflexion 1 input	-100.0% to +100.0%	30.0%	☆
A6-04	AI curve 4 inflexion 2 input	A6-02 to A6-06	6.00V	☆
A6-05	Corresponding percentage of AI curve 4 inflexion 2 input	-100.0% to +100.0%	60.0%	☆
A6-06	AI curve 4 max. input	A6-04 to +10.00 V	10.00V	☆
A6-07	Corresponding percentage of AI curve 4 max. input	-100.0% to +100.0%	100.0%	☆
A6-08	AI curve 5 min. input	-10.00 V to A6-10	-10.00V	☆
A6-09	Corresponding percentage of AI curve 5 min. input	-100.0% to +100.0%	-100.0%	☆
A6-10	AI curve 5 inflexion 1 input	A6-08 to A6-12	-3.00V	☆
A6-11	Corresponding percentage of AI curve 5 inflexion 1 input	-100.0% to +100.0%	-30.0%	☆
A6-12	AI curve 5 inflexion 2 input	A6-10 to A6-14	3.00V	☆
A6-13	Corresponding percentage of AI curve 5 inflexion 2 input	-100.0% to +100.0%	30.0%	☆
A6-14	AI curve 5 max. input	A6-12 to 10.00 V	10.00V	☆
A6-15	Corresponding percentage of AI curve 5 max. input	-100.0% to +100.0%	100.0%	☆
A6-24	Jump point of AI1 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-25	Jump amplitude of AI1 input corresponding setting	0.0% to 100.0%	0.5%	☆
A6-26	Jump point of AI2 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-27	Jump amplitude of AI2 input corresponding setting	0.0% to 100.0%	0.5%	☆
A6-28	Jump point of AI3 input corresponding setting	-100.0% to 100.0%	0.0%	☆

Para. No.	Name	Setting Range	Default	Change
Group A8: Point-point Communication				
A8-00	Point-point communication	0: Disabled 1: Enabled	0	☆
A8-01	Master or slave selection	0: Master 1: Slave	0	☆
A8-02	Selection of action of the slave in point-point communication	Units position: whether to follow master's command 0: No 1: Yes Tens position: whether to send fault information to master when a fault occurs 0: No 1: yes Hundreds position: whether to alarm when it becomes off-line 0: No 1: Yes (Err16)	011	★
A8-03	The slave received data	0: Torque reference 1: Frequency reference	0	☆
A8-04	Zero offset of received data (torque)	-100.00% to 100.00%	0.00%	★
A8-05	Gain of received data (torque)	-10.00 to 100.00	1.00	★
A8-06	Point-point communication interruption detection time	0.0 to 10.0s	1.0s	☆
A8-07	Master data sending cycle in point-point communication	0.001 to 10.000s	0.001s	☆
A8-11	Window width	0.20 to 10.00 Hz	0.50Hz	☆
Group AC: AI/AO Correction				
AC-00	AI1 measured voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-01	AI1 displayed voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-02	AI1 measured voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-03	AI1 displayed voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-04	AI2 measured voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-05	AI2 displayed voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-06	AI2 measured voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-07	AI2 displayed voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-08	AI3 measured voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-09	AI3 displayed voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-10	AI3 measured voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-11	AI3 displayed voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-12	AO1 target voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-13	AO1 measured voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-14	AO1 target voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-15	AO1 measured voltage 2	-10.00V to 10.000V	Factory-corrected	☆

Para. No.	Name	Setting Range	Default	Change
AC-16	AO2 target voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-17	AO2 measured voltage 1	-10.00V to 10.000V	Factory-corrected	☆
AC-18	AO2 target voltage 2	-10.00V to 10.000V	Factory-corrected	☆
AC-19	AO2 measured voltage 2	-10.00V to 10.000V	Factory-corrected	☆

B.2 Monitoring Parameters

Para. No.	Name	Minimum Unit	Communication Address
Group U0: Monitoring Parameters			
U0-00	Running frequency	0.01Hz	7000H
U0-01	Frequency reference	0.01Hz	7001H
U0-02	Bus voltage	0.1V	7002H
U0-03	Output voltage	1V	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	0.01V	7009H
U0-10	AI2 voltage (V)/current (mA)	0.01 V/0.01 mA	700AH
U0-11	AI3 voltage	0.01V	700BH
U0-12	Count value	1	700CH
U0-13	length value	1	700DH
U0-14	Load speed display	1	700EH
U0-15	PID reference	1	700FH
U0-16	PID feedback	1	7010H
U0-17	PLC stage	1	7011H
U0-18	Pulse reference	0.01kHz	7012H
U0-19	Feedback speed	0.01Hz	7013H
U0-20	Remaining running time	0.1 Min	7014H
U0-21	AI1 voltage before correction	0.001V	7015H
U0-22	AI2 voltage (V)/ current (mA) before correction	0.001V/0.01 mA	7016H
U0-23	AI3 voltage before correction	0.001V	7017H
U0-24	Rotation speed	1 Rpm	7018H
U0-25	Current power-on time	1 Min	7019H
U0-26	Current running time	0.1 Min	701AH
U0-27	Pulse reference	1Hz	701BH
U0-28	Communication reference	0.01%	701CH
U0-29	Encoder feedback speed	0.01Hz	701DH
U0-30	Main frequency reference	0.01Hz	701EH
U0-31	Auxiliary frequency reference	0.01Hz	701FH
U0-32	Viewing any register address value	1	7020H
U0-34	Motor temperature	1℃	7022H
U0-35	Target torque	0.1%	7023H
U0-36	Resolver position	1	7024H
U0-37	Power factor angle	0.1°	7025H
U0-38	ABZ position	1	7026H
U0-39	Target voltage upon V/F separation	1V	7027H

Para. No.	Name	Minimum Unit	Communication Address
Group U0: Monitoring Parameters			
U0-40	Output voltage upon V/F separation	1V	7028H
U0-41	DI state display	1	7029H
U0-42	DO state display	1	702AH
U0-43	DI set for function state display 1 (function 01-40)	1	702BH
U0-44	DI set for function state display 2 (function 41-80)	1	702CH
U0-45	Fault information	1	702DH
U0-58	Phase Z counting	1	703AH
U0-59	Rated frequency	0.01%	703BH
U0-60	Running frequency	0.01%	703CH
U0-61	AC drive state	1	703DH
U0-62	Current fault code	1	703EH
U0-63	Sending value of point-point communication	0.01%	703FH
U0-64	Number of slaves	1	7040H
U0-65	Torque upper limit	0.1%	7041H
U0-66	Communication extension card type	100: CANOpen 200: PROFIBUs-DP 300: CANlink	7042H
U0-67	Communication extension card version	Display Range	-

Warranty Notes

Dear users, please read the following carefully so that we can provide you with better service:

I. A free warranty period of 12 months shall be implemented from the date of purchase of products (except for non-standard products exported abroad).

II. After the warranty period, the products enjoy paid lifelong service.

III. Exemption clause of our company: If the failure caused by the following reasons is not within the scope of the manufacturer's 12-month free warranty service commitment:

1. Incorrect operation (subject to the randomly equipped "Operator Manual");

2. The user repairs the product or modifies the product failure caused by the product without communicating with our company;

3. Faults caused by using products beyond the requirements of standard specifications;

4. Product damage caused by improper selection of transportation mode or other external forces during transportation of purchased products (the transportation mode is reasonably selected by the user, and the company assists in handling the consignment formalities);

5. Abnormal aging or failure of product devices due to poor use environment of users;

6. Product damage caused by force majeure such as earthquake, fire, feng shui disaster, lightning strike, abnormal voltage or other natural disasters.

IV. Our company has the right not to provide warranty service under the following circumstances:

1. When the user fails to pay off the payment according to the Purchase and Sale Contract signed by both parties;

2. The nameplate, trademark and factory date of the product are unrecognizable;

3. Users deliberately conceal faults caused by improper operation during installation and wiring of products.

Warranty Card

Customer name:	
Detailed address:	
Postal code:	Contact person:
Telephone:	Fax:
Frequency converter number:	Frequency converter model:
Device name:	Matched motor power:
Date of purchase:	Time of failure:

Whether the brake unit function is used □ Yes □No	Is there any abnormal noise during the fault □ Yes □No	Is there any smoke during the failure □ Yes □No

Failure description:

Note: Please send this card to our company together with the faulty products, thank you!

ZHYI

Certificate of Conformity

Inspector:_____

This product has been inspected by our quality control and quality inspection department, and its performance parameters meet the factory inspection standards, so it is allowed to leave the factory.

Zhejiang Zhongyi Automation Technology Co., Ltd.

ZHYI

Zhejiang Zhongyi Automation Technology Co., Ltd.

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