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Chapter 1 Fundamental Safety Instructions

1.1 Safety Precautions

1） This chapter provides essential safety instructions for proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to observe the safety precautions may result in serious injuries or death of personnel or device damage.

2） For personal and equipment safety, follow all safety precautions indicated on the product labeling and in the manual when installing, operating, and maintaining the product.

3） "Danger", "Warning", and "Caution" items in this guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.

4） Use this product in an environment that complies with the design specifications. Malfunction or component damage caused by improper usage is not covered by warranty.

5） Our company shall take no responsibility for any personal injuries or property damage caused by improper usage.

1.2 Safety Levels and Definitions

⚠ DANGER	DANGER:Indicates that failure to comply with the notice can result in death or severe personal injuries.
⚠ WARNING	WARNING:Indicates that failure to comply with the notice may result in death or severe personal injuries.
⚠ CAUTION	CAUTION:Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

1.3 General Safety Instructions

1.3.1 Unpacking

⚠ CAUTION

● Before unpacking, please check if the product's outer packaging is intact, with no damage, moisture, warping, or deformation.

● When unpacking, please inspect the product and its accessories for any damage, rust, or scratches.

● Please unpack according to the packaging layers; do not strike the package violently!

● After unpacking, please carefully check if the product, accessories, and documentation are complete.

● Do not touch the control terminals, circuit boards, or components of the AC drive directly with your hands!

1.3.2 Storage and Transportation

⚠ CAUTION

● Please store and transport the product according to its specified storage and transportation conditions, ensuring that temperature and humidity requirements are met.

● Avoid storing or transporting the product in areas with water splashes, direct sunlight, strong

electric fields, strong magnetic fields, or severe vibrations.

- Avoid storing the product for more than three months; additional protection and necessary inspections are required.
- Do not transport this product together with equipment or products that may damage it.
- Please strictly package the product before transporting it by vehicle; long-distance transportation must use a closed container.

 WARNING

- When manually moving the product, please hold the product housing firmly to avoid parts falling off, which could cause injury!
- When moving the product, please lift and place it gently, always be aware of objects on the ground to prevent tripping or dropping, which could cause injury or damage to the product!

1.3.3 Installation

 WARNING

- Please read the product manual and safety precautions carefully before installation! Modification of this product is prohibited!
- Do not install this product in areas with strong electric fields or strong electromagnetic wave interference!
- This product should be installed in a cabinet or terminal device, which must provide corresponding fire-resistant, electrical, and mechanical protective enclosures, with protection levels compliant with relevant IEC standards and local regulations.
- Do not loosen the fixing screws of the product components or the red-marked screws!

 DANGER

- Non-professional personnel are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing components of the product!
- Installation, wiring, maintenance, inspection, or component replacement of this product must only be carried out by professional personnel who have received relevant electrical equipment training and possess electrical knowledge.
- When it is necessary to install equipment that generates strong electromagnetic interference, such as transformers, a shielding protection device must be installed to prevent the product from malfunctioning!
- Installation personnel must be familiar with the product installation requirements and relevant technical documentation.

1.3.4 Electrical Wiring

 DANGER

- Non-professional personnel are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing components of the product!
- Do not perform wiring operations while the power is connected; there is an electric shock hazard.
- Before performing wiring, disconnect the equipment power supply. After disconnecting the power, the capacitors inside the equipment may retain residual voltage. Please wait at least 10 minutes before proceeding with wiring or other operations.
- Ensure proper grounding of the equipment and product; failure to do so may result in an electric shock hazard.
- Follow the static prevention measures regulations and wear a static wrist strap during wiring and other operations to prevent damage to the equipment or internal circuitry.

⚠ **WARNING**

- Do not connect the input power to the equipment output terminals; this may cause equipment damage or even fire.
- When connecting the equipment to a motor, ensure the equipment and motor terminal phase sequence is accurate and consistent to avoid motor reverse rotation.
- After completing the wiring, ensure there are no loose screws or exposed wiring inside the equipment.
- The cables used during wiring must meet the required wire gauge and shielding standards. The shielding layer of shielded cables must be single-ended grounded.

1.3.5 Power on

⚠ **DANGER**

- Before powering on, please ensure the equipment and product are properly installed, wiring is secure, and the motor unit is ready to start.
- Before powering on, please ensure the power source meets the equipment requirements to avoid causing equipment damage or fire hazards!
- When the equipment or product is powered on, the mechanical devices may move suddenly. Please keep away from the mechanical devices.
- After powering on, please do not open the equipment cabinet door or product protective cover, otherwise there is an electric shock hazard!
- Do not allow disassembling of the equipment and product's any device or components while powered on, otherwise there is an electric shock hazard!
- Prohibited from touching any wiring terminals of the equipment while powered on, otherwise there is an electric shock hazard!

1.3.6 Operation

⚠ **DANGER**

- Do not touch any wiring terminals or surrounding circuitry while the equipment is running; there is a risk of electric shock!
- Do not touch the equipment housing, fans, or resistors; it may cause burns!
- Prohibited from signal testing by non-professional technicians while running; it may result in personal injury or equipment damage!
- Do not dismantle any part of the equipment or product while it is running; there is a risk of electric shock!

⚠ **WARNING**

- Do not use contactors to control the start and stop of the equipment; otherwise, it may cause equipment damage!
- While in operation, avoid having other items or metal objects fall into the equipment; otherwise, it may cause equipment damage!

1.3.7 Maintenance

⚠ **DANGER**

- Prohibited to perform equipment maintenance while powered on, as it poses an electric shock hazard!

- Prohibited for non-professional personnel to install, wire, maintain, inspect, or replace components of the equipment!
- After disconnecting power, wait at least 10 minutes to ensure the bus voltage safely discharges below 36V before performing maintenance, inspection, or part replacement!
- All plug-in and removal operations of components must be performed with the power off!

 WARNING

- Please follow the equipment maintenance and care requirements to carry out daily and regular inspections and maintenance on the equipment and products, and keep good maintenance records.

1.3.8 Repair

 DANGER

- Prohibit installation, wiring, maintenance, inspection or part replacement of the equipment by non-professionals!
- Equipment maintenance is prohibited while powered on, as it poses an electric shock hazard!
- Please wait at least 10 minutes after disconnecting the power supply before carrying out equipment inspection, maintenance and other operations.

 WARNING

- Please follow the product warranty agreement to equipment reporting and wearing parts replacement guide for replacement.
- Do not continue to use the damaged machine, or it will cause more damage.
- When the equipment malfunctions or is damaged, the equipment and product must be troubleshooted and repaired by a professional in accordance with the maintenance instructions, and maintenance records must be kept.
- After replacing the equipment, be sure to re-perform the equipment wiring check and parameter setting.

1.3.9 Disposal

 WARNING

- Dispose of retired equipment in accordance with local regulations and standards.Failure to comply may result in property damage, personal injury, or even death.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

Chapter 2   Product Information

2.1   Naming Rules
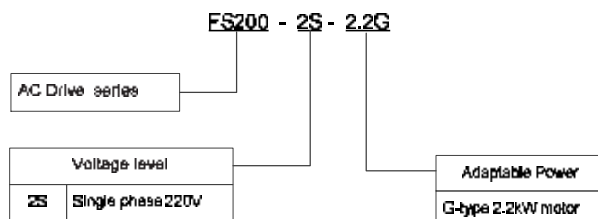
Fig.2.1-1 Naming Rules

2.2   Nameplate

Fig.2.2-1 Nameplate instructions

2.3 Information of Product Model

Table 2.3-1 Product model and technical data(Single phase 220V）

Model	Power rating (kW)	Output current (A)	Input current (A)	Adapted motor	
				kW	HP
FS200-2S-0.75G	0.75	4.0	8.2	0.75	1
FS200-2S-1.5G	1.5	7.0	14	1.5	2
FS200-2S-2.2G	2.2	9.6	23	2.2	3

2.4 Technical Specification

Table 2.4-1 Technical Features of FS200

Power input	Rated input voltage	200V Voltage Class:Single phase 200V～240V
	Frequency	50Hz/60Hz
	Voltage range	-15%～+15%
		Voltage out-of-balance rate<3%
	Frequency range	±5%
	Rated input current	See Section 2.3
Power output	Applicable motor (kW)	See Section 2.3
	Rated current (A)	See Section 2.3
	Output voltage (V)	Three-phase:0%~rated input voltage, error < ±3%
	Output frequency (Hz)	0～599.00Hz,unit:0.01Hz
	Overload capacity	150% rated current 60s, 180% rated current 1s
Control characteristics	Control mode	Sensorless vector control (SVC）、V/F control
	Range of speed regulation	1:200(SVC）
	Speed accuracy	0.5%(SVC）
	Torque control accuracy	5%(SVC）
	Torque increase	Automatic torque lifting; Manual torque increased by 0.1-30.0%
	Starting torque	0.25Hz/150%(SVC）
User terminals	Input terminals	2 digital input terminals 1 analog input terminals, both are voltage and current input optional terminal, can support 0 ~ 10V voltage or 0/4 ~ 20mA current input
	Output terminals	1 analog output terminal, voltage and current outputs are optional, can support 0-10V voltage or 0/4-20mA current outputs.
	Communication terminals	One 485 communication terminal
Control characteristics	ACC/DEC time	0.0～650.00s
	Carrier frequency	1.0kHz～16kHz
	Run command channel	Operator panel setting, control terminal setting, communication setting
	Frequency setting	Digital setting + control panel Communication Analog setting

		PID Feedback Multi-Segmented feedback
	Motor start-up methods	Started from starting frequency DC brake start-up Speed tracking start
	Manual auto switching	Panel, Terminal, Communication switching auto/Remote and manual/Local operation modes
	Motor stop methods	Ramp to stop Free stop
Featured functions	Antifreeze function	Activate the anti-freeze function to intermittently run the water pump at the lowest frequency during dormancy, preventing the pump and equipment from freezing and cracking.
	Fire Override	Continuous full-power output in emergency situations.
	Water shortage protection	After detecting water shortage in the pipeline network, the AC drive stops the water pump to provide protection.
	Pool level detection	Supports the connection of liquid level sensors for real-time detection of the water level in the tank.
	Burst Pipe Detection Function	When the output frequency of the AC drive is greater than the set value and the water discharge pressure is lower than the detected value, the system will initiate a fault protection
	Intelligent full variable frequency mode	One-key parameter switching built-in pump software intelligent multi-pump full variable frequency mode
	Cabinet control full variable frequency mode	One key parameter switching built-in pump software intelligent multi-pump full frequency conversion mode
	High voltage alarm	The system will shut down for protection when the pipeline network pressure exceeds the set alarm value.
	Low voltage alarm	The system will shut down for protection when the pipeline network pressure falls below the set alarm value.
	Alarm self-reset	Alarm self-reset function can be set.
	Sensor disconnection protection	The AC drive will alarm and shut down for protection if the sensor connection is broken.
	Plus or minus pump control	Multiple AC drive can work collaboratively at the same time, performing internal communication, where the slave units accept operational commands from the master unit.
	Pump Cleaning Functions	Activate the pump cleaning function upon receiving the command.
	Sleep and Wake-up	Supports sleep and wake-up functions.
	Automatic startup after power-on reset	Enable the restart function after power-on or reset. After power is restored or a fault is reset, there is no need to reissue the operation command.
	Permission settings	Access permissions can be set.
	Soft filling function	The pipeline gentle and soft filling water function can reduce the water hammer phenomenon in empty pipes.

	DC Brake	DC braking start frequency:0.00 to maximum frequency. DC braking current:0.0～100.0% DC braking time:0.0～100.00s
	Point control	Jogging frequency range :0.00Hz~50.00Hz Jogging acceleration and deceleration time0. 1s~6500.0s
	Multi-speed operation	Achieve up to 16-speed operation through control terminals.
	Overpressure and overcurrent speed control	Automatically limit the current and voltage during operation to prevent frequent tripping due to overcurrent and overvoltage.
Protection functions	Refer to Chapter 7-Trouble Shooting	
Environment	Place of operation	Water supply systems or automated control systems for residential communities, commercial buildings, agriculture, or factories, installed in factories, basements, or integrated pump houses outdoors.
	Altitude	0~2000m. De-rate 1% for every 100m when the altitude is above 1000 meters
	Ambient temperature	-10℃~50℃, The rated output current should be derated 1% for every 1℃ when the ambient is 40℃~50℃
	Relative humidity	5~95%, no condensation
	Vibration	Less than 5.9m/s² (0.6g)
	Storage temperature	-20℃～+60℃
Others	Efficiency at rated Amps	Rated power:≥95%；
	Installation	Backpack, wall-mounted
	IP grade	IP54
	Cooling method	Forced air cooling

2.5 Appearance, Mounting Dimensions
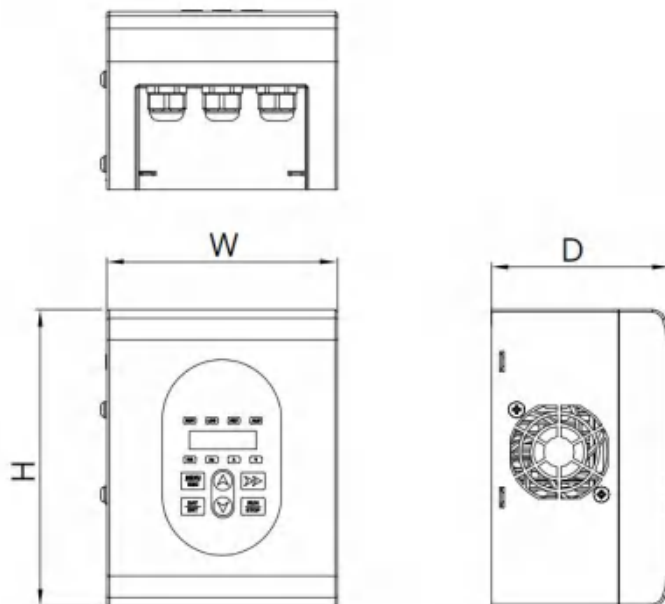
Fig 2.5-1   Overall dimensions of FS200

Table 2.5-1 Appearance and Installation Dimensions (Single-phase 220V)

Model	External dimension(mm)			NW (Kg)
	W	H	D	
FS200-2S-0.75GB				
FS200-2S-1.5GB	136	175	105	1.5
FS200-2S-2.2GB				

Chapter 3   Installation and Wiring

3.1   AC drive installation steps

Follow the steps shown in the figure below to install AC drive

Preparation tools before installation:screwdriver, wire stripper, crimping pliers, Y-type terminal block, M4/M5/M6 motor junction box screws.

(1) Remove the pump motor junction cover, connect the motor wires to the pump motor

Step 1:Remove the iron plate at the bottom of the AC drive
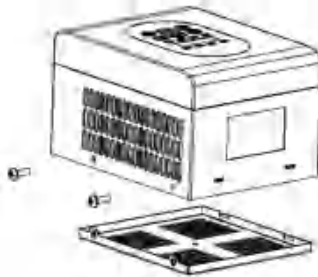
Step 2:Install the removed base plate on the motor
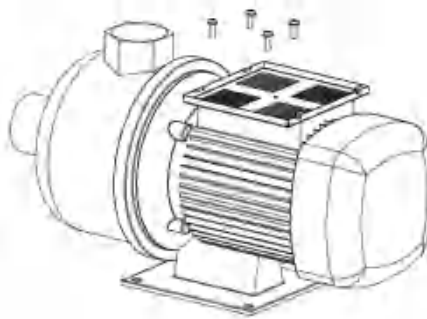
Step 3:Fix the AC drive on the iron plate
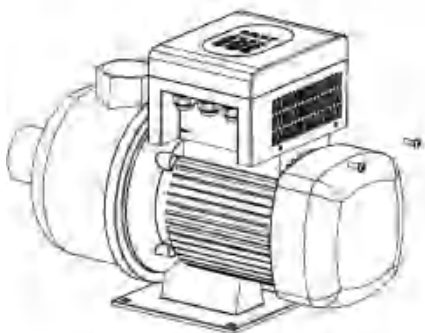
Step 4:Installation completed
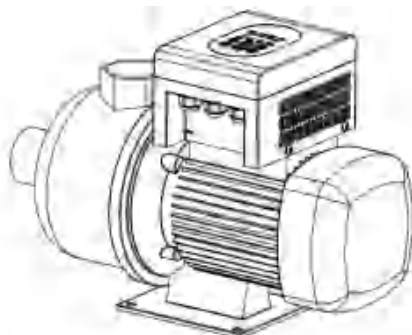
3.2 Wiring Diagram
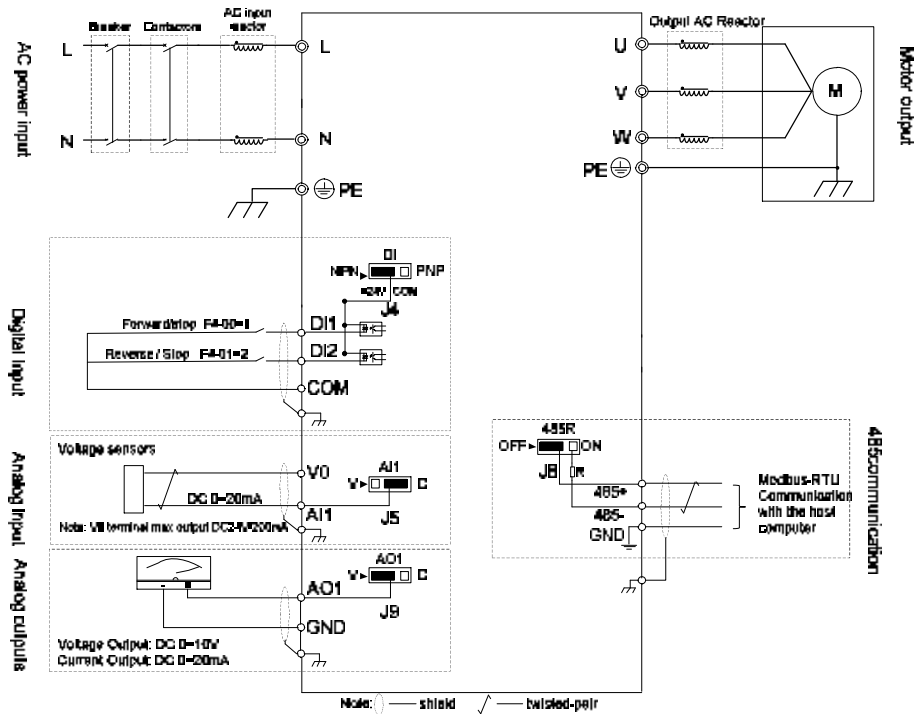
Fig. 3.2-1　AC drive standard wiring diagram

Notice:

①Terminal ◎ indicates the main circuit terminal and ○ indicates the control circuit terminal;

②Signal lines and power lines must be routed separately, and if they cross, they should be made to cross at a 90-degree angle as far as possible. Analog signal lines refer to the description in the diagram to select the wire type, and power lines should preferably be shielded cables;

3.3　Functional description of control circuit terminals

3.3.1 Schematic diagram of control circuit terminals
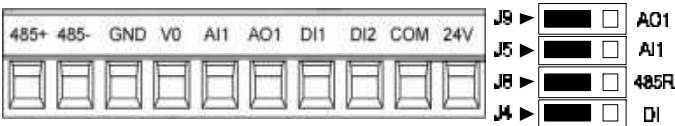
Fig. 3.3-1 Schematic diagram of control circuit terminals

3.3.2 Functional description of control circuit terminals

Table 3.3-1 Functional description of control circuit terminals

Category	Terminal	Terminal Name	Function Description
Power supply	V0	V0 power supply	1、Provide +24V power supply to the outside, used as analog input terminal working power supply and external sensor power supply. 2、Maximum output current:200mA.
	GND	V0 ground	Internal isolation from COM
	+24V	+24V power supply	1、Provide +24V power supply to the outside and use it as the working power supply for the digital input and output terminals. 2、Maximum output current:200mA.
	COM	+24V ground	Internally isolated from GND
Analog input	AI1	Analog input terminals 1	1、Input range:DC 0V to 10V or 0/4mA ～ 20mA, selected by adjusting the J2 jumper cap (AI1) on the board: 1）for DC 0V ～10V signal (default); 2）for 0/4mA～20mA signal 2、Input impedance:100kΩ for voltage input, 500Ω for current input.
	GND	Analogically	Internal isolation from COM
Digital input	DI1	Digital input terminal 1	1、Optocoupler isolated, bipolar input compatible, internal impedance 3.6kΩ. 2、Multi-function digital inputs, functions are set by F4-00 ～ F4-02. 3、The connection to +24V or to COM is selected by adjusting the J6 jumper cap (DI) on the board:
	DI2	Digital input terminal 2	1） Connected to +24V (default), external NPN connection input can be supported; 2） Connected to COM, PNP connection input can be supported externally.
	COM	+24V ground	Internally isolated from GND
Analog output	AO1	Analog output terminals	Supports 0V ～ 10V voltage or 0/4mA ～ 20mA current output, selected by J9 jumper cap (AO1): 1）for 0V ～ 10V voltage output (default); 2）for 0/4mA～20mA current output
	GND	analogously	Internal isolation from COM
485 communication	485+	485 differential signaling+	1、Standard RS-485 communication terminal, please use twisted shielded cable
	485-	485 differential signaling-	2、Supports no termination resistor or termination resistor 120R, selected by J1 jumper cap (485R):
	GND	Shield grounding for 485 communication	1） no terminating resistor (default); 2） terminating resistor 120R.

Category	Terminal	Terminal Name	Function Description
Shield grounding	GND	Shielded cable grounding	1、for the shielding of the control cable grounding, when the scene of environmental interference or control lines longer must be well grounded to reduce electromagnetic interference to comply with EMC electromagnetic specifications. 2、It is prohibited to connect this terminal to the power supply FE wire.

3.4   Pressure sensor wiring

3.4.1 Single pump:one sensor for one AC drive

For single pump systems, only one pressure sensor needs to be installed to a single AC drive, refer to the single pump sensor wiring diagram:

(1) Pressure sensor:current-type sensor, operating voltage 9 ~ 30VDC, output 4 ~ 20mA, power line into the V0 terminal, the signal line can be connected to the AI1 terminal; at this time corresponding to the AI1 pin J5 jumper cap state is ;)
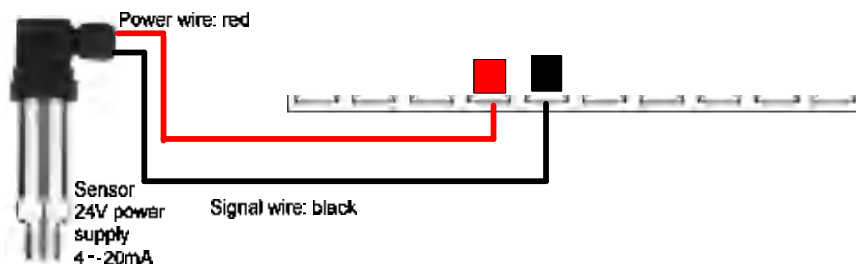
(2) Remote pressure gauge:voltage-type sensor, operating voltage 4 ~ 13Vdc, output 0 ~ 10Vdc, power line into the AO1 terminal, the signal line into the AI1 terminal, the ground line into the GND terminal; (actual wiring color reference pressure gauge specifications), at this time corresponding to the AI1 pin J5 jumper cap status;
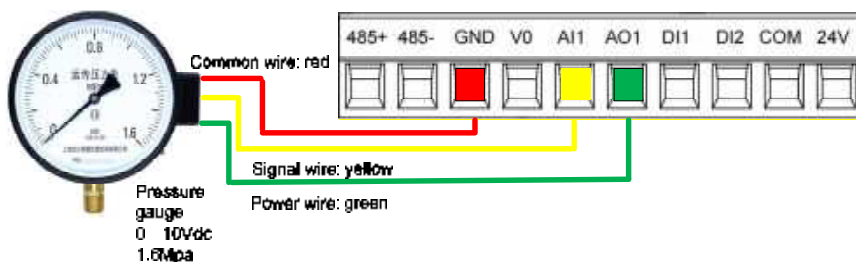
Chapter 4   Operation and Run Instructions

4.1   Operation of Control Panel

With the operation panel, you can modify the functional parameters, monitor the working status of the AC drive, and control the operation of the AC drive (start and stop). Its shape and functional areas are shown in the figure below:

Fig. 4.1-1 Control panel

4.1.1 Key Functions on Control Panel

Symbol	Key name	Meaning
	Menu/ESC key	One level menu to enter or exit, return to higher level menu.
	Incremental key	Data or function code increment.
	Decrement key	Decrement of data or function codes.
	Shift key	Under the shutdown display interface and operation display interface, the display parameters can be selected cyclically; when modifying the parameters, the modification bit of the parameters can be selected.
	Data/Enter key	Enter the data setting status and confirm the data setting.

Symbol	Key name	Meaning
———	Run/Stop key	Can be used for run and stop operations.

4.1.2 Status Indicators

Status Indicators	Indication
RUN	A constant light indicates that the AC drive is in normal operation; an off light indicates that the AC drive is in shutdown.
LOC	Lamp off indicates the coupled pump master, lamp blinking indicates the coupled pump slave.
NET	The light is on when it is in the coupled pump state, otherwise the light is off.
ALM	The light comes on when there is a fault, otherwise the light goes off.
F/R	Forward and Reverse Indicator Lights: The light is off to indicate that the AC drive is in forward rotation; the light is on to indicate that the AC drive is in reverse rotation.
Hz	Frequency indicator, lighted when the displayed value is frequency.
A	Current indicator, lighted when the displayed value is current.
V	Voltage indicator, lighted when the displayed value is voltage.

4.2 LED keypad function code view, modify method description

The LED operation panel of FS200 AC drive is a single line display, power on default into the monitoring interface, monitoring parameters can be set through the F7 group, long press the menu return key for 2s to enter the function code selection interface, you can increment and decrement keys to select the function code group and the function code, and long press the menu return key for 2s again to enter the function code setup interface, you can increment and decrement keys to set the value of the function code, and after finishing, you can save it by pressing the When finished, press the Data/Confirm key to save. Example:To change the function code A0-01 from 3.0Bar to 8.0Bar, the operation flow is shown in Fig. 4.2-1.

Example:To change the function code A0-01 from 3.0 Bar to 8.0 Bar, the operation flow is shown in Fig. 4.2-1.
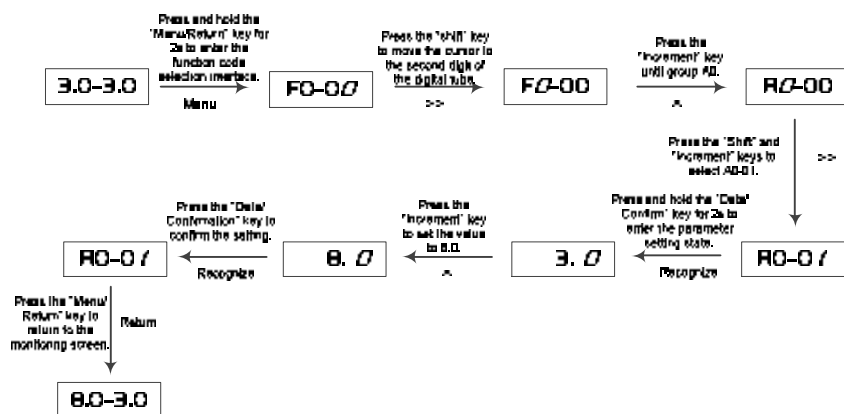
Fig. 4.2- 1 LED Keypad Operation Flow Chart

4.3 Quick Set Target Pressure Procedure

4.3.1 LED keypad for quick setting of target pressure

Example:To quickly change the set pressure from 3.0 bar to 8.0 bar and then from 8.0 bar to 2.0 bar, the procedure is shown in Figure 4.3-1.
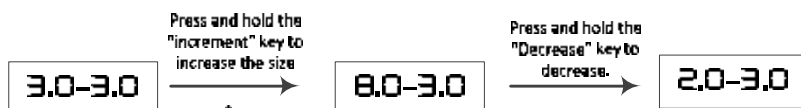
Fig.   4.3- 1 LED Keypad Quick Set Pressure Operation Flowchart

4.4　Quick debugging

4.4.1　Quick Commissioning Procedure

Step 1:Set the sensor range:

A0-03 = 16.0 Modified to 16.0 for 1.6Mpa sensor range or 10.0 for 1Mpa sensor;

Step 2:Set the set pressure:

A0-01 = 3.0 Set according to the actual application requirements, or simply press and hold the "incremental", "decremental" key for 2s to set the target pressure;

Step 3:Determine the pump steering:

Press and hold down the "shift" button on the panel to observe whether the pump steering is correct. If it is not correct, you can change the pump steering by the following methods.

1) After power failure, arbitrarily switch the two-phase connection lines in the AC drive U, V and W;

2) After stopping, modify the parameter F0-09 bits to 0 or 1;

Step 4:Calibrate pressure display:

Check the pressure gauge pointer value and the frequency converter display value, if the frequency converter pressure is large then adjust the FA-26, and vice versa.

Step 5:Apply the parameter settings:

operating mode	Setting parameters	Instructions
General AC drive mode	A0-00 = 0	Standard variable frequency mode
Multi-pump water supply mainframe or single-pump water supply mode	A0-00 = 1	Multi-pump control mainframe , mainframe set to 1 to enable multi-pump control function
Multi-pump 1 slave	A0-00 = 2	Multi-pump control of Slave 1, Slave 1 set to 2 to turn on the slave pump function
Multi-pump 2 slave	A0-00 = 3	Multi-pump control of Slave 2, Slave 2 is set to 3 to turn on the slave pump function
Multi-pump 3 slave	A0-00 = 4	Multi-pump control of Slave 3, Slave 3 is set to 4 to turn on the slave pump function
Multi-pump 4 slave	A0-00 = 5	Multi-pump control of slave number four, slave number four is set to 5 to turn on the slave pump function
Multi-pump 5 slave	A0-00 = 6	Multi-pump control of slave 5, slave 5 set to 6 to turn on the slave pump function
Fire rescue model	A0-00 = 7	Use in fire rescue
Pump clean mode	A0-00 = 8	Use when pumps are clean
Deep well pump model	A0-00 = 9	When using a deep well pump
General Pump Mode	A0-00 = 11	Other types of pump use

Chapter 5   List of Parameters

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

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

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

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

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

5.1   Fundamental group of parameters

Function Code	Parameter Name	Setting Range	Default	Property
A0group:Specialized parameters for water pumps				
A0-00	Pump operating mode	0:Standard variable frequency mode 1:Intelligent Interpump Master Mode 2:Intelligent Interpump Slave 1 3:Intelligent Interpump Slave 2 4:Intelligent Interpump Slave 3 5:Intelligent Interpump Slave 4 6:Intelligent Interpump Slave 5 7:Fire rescue mode 8:Cleaning mode 9:Deep well pump mode 10:Reserved 11:General pump mode	1	☆
A0-01	Set pressure	0.0~200.0 bar	3.0bar	☆
A0-02	Pressure sensor channel selection	Unit's digit:Outlet Ten's digit:Inlet 0:AI1(Pressure Transmitter) 1:AI2(Remote Pressure Gauge)	0x10	★
A0-03	Outlet sensor range	0.0~200.0 bar	16.0bar	☆
A0-04	Water inlet sensor range	0.0~200.0 bar	16.0bar	☆

Function Code	Parameter Name	Setting Range	Default	Property
A0-05	Interpump mode function selection	Unit's digit:Startup Timing 0:Sequential start by pump address 1:Start by runtime Ten's digit:Standby host selection 0:Turn off the standby host function 1:Enable standby host function Hundred's digit:Wheel Pump timing selection 0:Shut down wheel pumps 1:Turn on the wheel pump Thousand's digit:Frequency assignment mode 0:Overflow distribution model 1:Equal distribution model	0x0100	★
A0-06	Address for local coupled pumps	0~5(Slave use）	1	★
A0-07	Number of coupled pump slaves	0~5(Mainframe use）	0	●
A0-08	Interpump mode rotation time	0~7200min	1440min	☆
A0-09	Frequency of pump boosting in coupled pump mode	0.0~Forward upper frequency limit (F0-12)	50.00Hz	☆
A0-10	Interpump mode pumping frequency delay time	0.0~3600.0s	5.0s	☆
A0-11	Interpump slave start/stop method	Unit's digit:Start-stop mode 0:Consistent with mainframe start/stop status 1:Start-stop according to F0-02 parameters Ten's digit:Reserved Hundred's digit:Reserved Thousand's digit:Reserved	0	★
A0-12	Reserved			
A0-13	PID sleep function selection	Unit's digit:Enable bit 0:No Sleep Mode 1:Sleep Mode	1	★
A0-14	PID sleep deviation pressure	0.0~Set pressure(A0-01）	0.1bar	☆
A0-15	PID sleep detection frequency	Dormant detection low hold frequency (A0-17) ~ Forward upper frequency limit (F0-12)	35.00Hz	☆
A0-16	PID sleep detection delay time	0.0~120.0s	5.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
A0-17	PID sleep detection low hold frequency	0.00~Forward upper frequency limit (F0-12)	20.00Hz	☆
A0-18	PID Sleep Low Hold Frequency Hold Time	0.0~120.0s	5.0s	☆
A0-19	Sleep-wake stress bias	0.0~Set pressure(A0-01)	2.0bar	☆
A0-20	Wake-up delay from sleep mode	0.0~120.0s	0.5s	☆
A0-21	Inlet pressure start/Stop selection	Unit's digit:Self-starting options 0:Shutdown pressure self-activation 1:Open pressure self-start Ten's digit:self-discontinuing options 0:Closed pressure self-stopping 1:Open pressure self-stop	0	☆
A0-22	Inlet start pressure	0.0~A0-23	3.0bar	☆
A0-23	Inlet stop pressure	0.0~Inlet range(A0-04)	3.2bar	☆
A0-24	Inlet detection time	0.0~120.0s	60.0s	☆
A0-25	Freeze protection function selection	Unit's digit:Enable bit 0:Off 1:On Ten's digit:Time unit selection 0:s 1:min	0x10	☆
A0-26	Freeze protection operation frequency	0.0~Max output frequency((F0-12)	10.00Hz	☆
A0-27	Freeze protection operation time	0~3000	1	☆
A0-28	Freeze protection interval time	0~6000	5	☆
A0-29	Soft fill function for pipelines selection	Unit's digit:enable bit 0:Off 1:On	0	★
A0-30	Soft fill frequency for pipelines	0.0~Forward upper frequency limit (F0-12)	30.00Hz	☆
A0-31	Soft fill time for pipelines	0.0~3600.0s	30.0s	☆
A0-32	Soft fill cut-off pressure for pipelines	0.0~Set pressure(A0-01)	1.0bar	☆
A0-33	Firefighting mode activation trigger selection	0:Self-start 1:startup according to F0-02 run command source	0	★
A0-34	Firefighting mode frequency	0.0~Forward upper frequency limit (F0-12)	50.00Hz	☆

Function Code	Parameter Name	Setting Range	Default	Property
A0-35	Pump cleaning function selection	0:Off 1:On	0	☆
A0-36	Pump cleaning forward rotation frequency	0.0~Forward upper frequency limit (F0-12)	50.00Hz	☆
A0-37	Pump cleaning forward rotation time	0.0~3600.0s	5.0s	☆
A0-38	Pump cleaning dead zone Frequency	0.0~Forward upper frequency limit (F0-12)	0.00Hz	☆
A0-39	Pump cleaning dead zone time	0.0~3600.0s	1.0s	☆
A0-40	Pump cleaning reverse frequency	0.0~Forward upper frequency limit (F0-12)	50.00Hz	☆
A0-41	Pump cleaning reverse time	0.0~3600.0s	5.0s	☆
A0-42	Pump cleaning cycle count	0~1000	1	☆
A0-43	Pressure alarm detection selection	Unit's digit:low voltage alarm 0:Off 1:On Ten's digit:High pressure alarm 0:Off 1:On	0	☆
A0-44	High-pressure alarm set value	0.0~Outlet range(A0-03）	15.0bar	☆
A0-45	High-pressure alarm detection delay time	0.0~3600.0s	5.0s	☆
A0-46	Low-pressure alarm set value	0.0~Set pressure(A0-01）	1.0bar	☆
A0-47	Low-pressure alarm detection delay time	0.0~3600.0s	5.0s	☆
A0-48	Pump blockage detection function selection	0:Off 1:On	0	☆
A0-49	Pump blockage detection current value	0.0~200.0%	130.0%	☆
A0-50	Pump blockage detection frequency value	0.00~Forward upper frequency limit (F0-12)	15.00Hz	☆
A0-51	Pump blockage detection delay	0.0~3600.0s	5.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
A0-52	Water shortage protection selection	0:Prohibit 1:Judged by outlet pressure, frequency, current 2:Reserved 3:Judged by inlet pressure 4:Judging by single terminal 5:Judging by double terminals 6:Judging by frequency and current	0	☆
A0-53	Water shortage protection detection pressure threshold	0.0~Set pressure(A0-01）	0.5bar	☆
A0-54	Water shortage protection detection frequency	0.00~Forward upper frequency limit (F0-12)	48.00Hz	☆
A0-55	Water shortage protection detection current	0.0%~100.0%	40.0%	☆
A0-56	Water shortage protection detection time	0.0~3600.0s	60.0s	☆
A0-57	Water leak detection selection	0:No detection 1:Detection	0	☆
A0-58	Pressure deviation value for water Leak detection	0.0~Set pressure(A0-01）	1.0bar	☆
A0-59	Water leak detection time	0.0~3600.0s	120.0s	☆
A0-60	Deep well pump mode startup current limit point	0.0%～300.0%	150.0%	☆
A0-61	Reserved			
A0-62	Self-Recovery count from faults	0-100(Failure self-reset off at 0)	0	☆
A0-63	Fault Self-reset delay time	0~60000s	5s	☆
A0-64	Outlet pressure display value	0~2000.0	1.0bar	●
A0-65	Inlet pressure display value	0~2000.0	1.0bar	●
A0-66	Machine operating time(min)	0~65535	1min	●
A0-67	Power failure restart option	0:Invalid 1:Valid	0	★
A0-68	Power outage restart delay time	0.00～60.00s	0.50s	★
A0-69	Pressure correction factor	0.00~10.00	1.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F0:Basic Function Parameters				
F0-00	Reserved			
F0-01	Control mode selection	Asynchronous motor control method: 2:VF control-AM Synchronous motor control method: 4:Sensorless vector control (SVC)-PM	2	★
F0-02	Running command source selection	0:Operation Keyboard control 1:Terminal control 2:Communication control	2	★
F0-03	Main frequency source X selection	0:Digital Setting 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Multi-segment setting	0	☆
F0-04	Auxiliary frequency source Y selection	6:PLC setting 7:PID 8:Communication setting 9:Reserved10:Terminal UP/ DOWN setting	0	☆
F0-05	Auxiliary frequency source Y range selectionY	0:Relative to maximum frequency 1:Relative to main frequency X	0	☆
F0-06	Coefficient of auxiliary frequency Y	0~10.000	1.000	☆
F0-07	Frequency source selection	0:Main frequency source X 1:Auxiliary frequency source Y 2:Main frequency source X+Auxiliary frequency source Y 3:Main frequency source X-Auxiliary frequency source Y 4:Max(X,Y) 5:Min(X,Y)	0	☆
F0-08	Digital frequency	0.00~Frequency upper limit(F0-12)	50.00Hz	☆
F0-09	Rotation direction	Unit's digit :Motor direction selection 0:Same direction 1:Reverse direction Ten's digit:Running direction prohibited 0:Invalid 1:Reverse prohibited 2:Forward prohibited Hundred's digit:Frequency control direction command 0:Invalid 1:Valid Thousand's:Torque control direction command 0:Invalid 1:Valid	1100	★

Function Code	Parameter Name	Setting Range	Default	Property
F0-10	Maximum frequency	0.00~599.00Hz	50.00Hz	★
F0-11	Forward Frequency source upper limit	0:Digital Setting 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Communication setting 6:Pulse setting by DI5	0	☆
F0-12	Forward Frequency upper limit	Frequency lower limit (F0-14)~Frequency max limit (F0-10)	50.00Hz	☆
F0-13	Reverse Frequency upper limit	Frequency lower limit (F0-14)~Frequency max limit (F0-10)	50.00Hz	☆
F0-14	Frequency lower limit	0.00Hz~Frequency upper limit F0-10	0.00Hz	☆
F0-15	Carrier frequency setting	1.0~16.0kHz	Model dependent	☆
F0-16	PWM control mode 1	Unit's digit:Carrier-Temperature Correlation 0:Unrelated 1:Related Ten's digit:Carrier to output frequency correlation 0:Unrelated 1:Related Hundred's digit:Random PWM enable 0:Unrelated 1:Related Thousand's digit:PWM modulation 0:Three phase modulation 1:Automatic switching	1011	☆
F0-17	PWM control mode 2	Unit's digit:overmodulation enable 1:enable 0:disable Ten's digit:double modulation enable 1:enable 0:disable Hundred's digit:deadband compensation enable 1:enable 0:disable Thousand's digit:Reserved	1101	☆
F0-18	Reserved			
F0-19	Acceleration time 1	0.01~650.00s	Model dependent	☆
F0-20	Deceleration time 1	0.01~650.00s	Model dependent	☆
F0-21	Acceleration time 2	0.01~650.00s	Model dependent	☆
F0-22	Deceleration time 2	0.01~650.00s	Model dependent	☆

Function Code	Parameter Name	Setting Range	Default	Property
F0-23	Acceleration time 3	0.01~650.00s	Model dependent	☆
F0-24	Deceleration time 3	0.01~650.00s	Model dependent	☆
F0-25	Acceleration time 4	0.01~650.00s	Model dependent	☆
F0-26	Deceleration time 4	0.01~650.00s	Model dependent	☆
F0-27	UP/DOWN button function selection	Unit's digit:UP/DOWN key modifying function selection 0:Invalid 1:Modify frequency setting in F0-08 2:Modify PID setting in FA-01 Ten's digit:Storage selection after modification by UP/DOWN key 0:No storage when power off 1:Stored after power-off Hundred's:UP/DOWN key resolution selection 0:0.01Hz 1:0.10Hz 2:0.50Hz 3:1.00Hz 4:2.00Hz 5:5.00Hz 6:8.00Hz 7:10.00Hz Thousand's digit:Reserved	0011	★
F0-28	Reserved			
F0-29	Acceleration/Deceleration time base frequency	0:Maximum frequency (F0-10) 1:Fixed frequency 50.00Hz 2:Set frequency	0	★
F0-30	Reserved			
F0-31	Command source binding select	Unit's digit:Binding operation Keyboard command to frequency source Ten's digit:Binding operation terminal command to frequency source Hundred's digit:Binding operation communication command to frequency source 0:No Binding 1:Digital setting 2:Keyboard potentiometer setting 3:AI1 4:AI2 5:AI3 6:Multi -peed setting 7:PLC setting 8:PID setting 9:Communication setting A:Reserved B:Terminal UP/DW setting	0000	☆

Function Code	Parameter Name	Setting Range	Default	Property
F0-32	Initialization parameters	0:No operation 1:Restore factory parameters(except motor parameters） 2:Restore factory parameters (Includes motor parameters） 3:Clear the record information 067:Parameter upload 087:Parameters download	0	★
Group F1:Motor 1 parameter group				
F1-00	Motor 1 rated power	0.1~1000.0kW	Model dependent	★
F1-01	Motor 1 rated voltatge	0~1500V	Model dependent	★
F1-02	Motor 1 rated current	0.1~2000.0A	Model dependent	★
F1-03	Motor 1 rated frequency	0.01~Max frequency(F0-10)	Model dependent	★
F1-04	Motor 1 rated rpm	1~65000rpm	Model dependent	★
F1-05	Motor 1 poles	2~98	Model dependent	●
F1-06	Asynchronous motor stator resistance	0.01~50.00%	Model dependent	★
F1-07	Asynchronous motor rotor resistance	0.01~50.00%	Model dependent	★
F1-08	Asynchronous motor mutual inductance	0.01~50.00%	Model dependent	★
F1-09	Asynchronous motor leakage inductance	0.1~2000.0%	Model dependent	★
F1-10	Asynchronous motor no-load current	0.1~650.0A	Model dependent	★
F1-11	Synchronous motor stator resistance	0.01~50.00%	Model dependent	★
F1-12	Synchronous motor D-axis inductance	0.01~200.00%	Model dependent	★
F1-13	Synchronous motor Q-axis inductance	0.01~200.00%	Model dependent	★
F1-14	Synchronous motor back electromotive force	1~1500V	Model dependent	★
F1-15 F1-35	Reserved			

Function Code	Parameter Name	Setting Range	Default	Property
F1-36	Motor tuning method	0:No operation 1:Static self-learning 2:Rotating self-learning 3:Static integrity self-learning	0	★
Group F2:Motor 1 Vector Control Parameters				
F2-00	Speed loop switchover frequency 1	0.00~[F2-04]	0.00Hz	☆
F2-01	Speed loop proportional gain at low frequency	0.01~100.00	10.00	☆
F2-02	Speed loop integral time at low frequency	0.000~6.000s	0.200s	☆
F2-03	Low frequency feedback filtering time	0.0~100.0ms	0.0ms	☆
F2-04	Speed loop switchover frequency 2	[F2-00]~Frequency upper limit	0.00Hz	☆
F2-05	Speed loop proportional gain at high frequency	0.01~100.00	10.00	☆
F2-06	Speed loop integral time at high frequency	0.000~6.000s	0.200s	☆
F2-07	High frequency feedback filtering time	0.0~100.0ms	0.0ms	☆
F2-08	D-axis current proportional gain	0.001~4.000	1.000	☆
F2-09	D-axis current integration time	0.001~4.000	1.000	☆
F2-10	Q-axis current proportional gain	0.001~4.000	1.000	☆
F2-11	Q-axis current integration time	0.001~4.000	1.000	☆
F2-12	Electric torque limit source	0:Digital Setting by F2-13 1:Keyboard potentiometer 2:AI1 3:AI2 4:AI3 5:Reserved 6:Communication given	0	☆
F2-13	Electric torque limit	0.0~400.0%	150.0%	☆
F2-14	Power generating torque limit source	0:Digital Setting by F2-15 1:Keyboard potentiometer 2:AI1 3:AI2 4:AI3 5:Reserved 6:Communication given	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
F2-15	Power generating torque limit	0.0~400.0%	150.0%	☆
F2-16	Overexcitation braking gain	0.0~500.0%	100.0%	☆
F2-17	Overexcitation braking limit	0.0~250.0%	100.0%	☆
F2-18	Output power limitation	0.0~400.0%	150.0%	☆
F2-19	Motor field weakening current upper limit	0.0~250.0%	60.0%	☆
F2-20	Motor field weakening feedforward gain	0.0~200.0%	10.0%	☆
F2-21	Motor field weakening gain	0.0~500.0%	10.0%	☆
F2-22	Field weakening voltage coefficient	0.0~120.0%	97.0%	☆
F2-23	Vector electric driving slip compensation	0.0~250.0%	100.0%	☆
F2-24~ F2-26	Reserved			
F2-27	Synchronous machine pull-in current at low frequency	0.0~50.0%	10.0%	☆
F2-28	Synchronous machine pull-in current at high frequency	0.0~50.0%	10.0%	☆
F2-29	Synchronous machine pull-in current frequency	0.0~100.0%	10.0%	☆
F2-30	Vector control energy saving function	0:Disable 1:Enable	0	☆
F2-31	Energy saving control gain	0.0~80.0%	50.0%	☆
F2-32	Energy saving control low pass filter	0.000~6.000s	0.010s	☆
F2-33	Reserved			
F2-34	MTFA gain	0.0~400.0%	100.0%	☆
F2-35	MTFA filter time	0.0~100.0ms	1.0ms	☆
GroupF3:Motor 1 V/F Control Parameters				

Function Code	Parameter Name	Setting Range	Default	Property
F3-00	V/F curve setting	0:Linear V/F； 1~9:1.1-power ~1.9-power V/F； 10:Square V/F； 11:Multi-point V/F(F3-17~F3-26)；	0	★
F3-01	Torque boost	0.0~30.0%	Model dependent	☆
F3-02	Cut-off frequency of torque boost	0.0~100.0%	50.0%	☆
F3-03	VF slip compensation gain	0.0~200.0%	100.0%	☆
F3-04	VF slip compensation limit	0.0~300.0%	100.0%	☆
F3-05	VF slip compensation filter	0.000~6.000s	0.200s	☆
F3-06	Reserved			
F3-07	VF flux braking gain	1~128	64	★
F3-08	Reserved			
F3-09	VF oscillation suppression gain	0.0~900.0%	100.0%	☆
F3-10	VF oscillation suppression filter time	0.0~100.0s	1.0s	☆
F3-11	VF output voltage percentage	25.0~120.0%	100.0%	★
F3-12	Output voltage source for voltage and frequency separation	0:Digital Setting by F3-13 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:PID output setting 6:Communication setting 7:Reserved	0	☆
F3-13	Voltage digital setting for V/F separation	0.0% - 100.0%	0.0%	☆
F3-14	Voltage rise time of V/F separation	0.00-100.00sec	10.00s	☆
F3-15	Voltage decline time of V/F separation	0.00-100.00sec	10.00s	☆
F3-16	Stop mode selection upon V/F separation	0:Frequency and voltage rising and declining independently 1:Frequency declining after voltage declines to 0	0	☆
F3-17	VF voltage point V1	0.0~100.0%	3.0%	★
F3-18	VF frequency point F1	0.00~maximum frequency	1.00Hz	★

Function Code	Parameter Name	Setting Range	Default	Property
F3-19	VF voltage point V2	0.0~100.0%	28.0%	★
F3-20	VF frequency point F2	0.00~maximum frequency	10.00Hz	★
F3-21	VF voltage point V3	0.0~100.0%	55.0%	★
F3-22	VF frequency point F3	0.00~maximum frequency	25.00Hz	★
F3-23	VF voltage point V4	0.0~100.0%	78.0%	★
F3-24	VF frequency point F4	0.00~maximum frequency	37.50Hz	★
F3-25	VF voltage point V5	0.0~100.0%	100.0%	★
F3-26	VF frequency point F5	0.00~maximum frequency	50.00Hz	★
F3-27	VF automatic energy saving control	0:Off 1:On	0	★
F3-28	Frequency lower limit of energy saving and voltage reduciotn	0.0~50.00Hz	15.00Hz	★
F3-29	Voltage lower limit of energy saving and voltage reduciotn	20.0~100.0%	50.0%	★
F3-30	Voltage reducing rate of energy saving and voltage reduction rate	0.000~0.200V/ms	0.010V/ms	☆
F3-31	Voltage recovering rate of energy saving and voltage reduction rate	0.000~2.000V/ms	0.200V/ms	☆
Group F4:Input terminal parameter group				
F4-00	DI1 terminal function selection	See 5.2 DI terminal function selection	1	★
F4-01	DI2 terminal function selection		2	★
F4-02 ~ F4-09	Reserved			
F4-10	DI terminal filter time	0.000s~1.000s	0.010s	☆
F4-11	Terminal control operation 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	☆

Function Code	Parameter Name	Setting Range	Default	Property
F4-12	UP/DOWN terminal adjusting speed	0.01~50.00Hz/s	0.50Hz/s	☆
F4-13	AI1 voltage lower limit value	0.00~10.00V	0.00V	☆
F4-14	AI1 voltage lower limit corresponding setting	-100.0~100.0%	0.0%	☆
F4-15	AI1 voltage upper limit value	0.00~10.00V	10.00V	☆
F4-16	AI1 voltage upper limit corresponding setting	-100.0~100.0%	100.0%	☆
F4-17	AI1 voltage filter time	0.000~6.000s	0.010s	☆
F4-18 ~ F4-33	Reserved			
F4-34	AI curve selection	0:Line　　1:Curve 1　　2:Curve 2 Unit's digit:AI1 Ten's digit:AI2 Hundred's digit:AI3 Thousand's digit:Reserved	0000	☆
F4-35	Reserved			
F4-36	DI1 On delay time	0.000~6.000s	0.010s	☆
F4-37	DI1 Off delay time	0.000~6.000s	0.010s	☆
F4-38 ~ F4-55	Reserved			
F4-56	DI1~DI3 terminal effective mode selection	0:Close Enable 1:Disconnect Enable Unit's:DI1　　　　Ten's:DI2 Hundred's:DI3	0000	☆
F4-57~ F4-58	Reserved			
F4-59	AI signal input type selection	0:Input voltage　　1:current(0~20mA） 2:current(4~20mA） Unit's digit::AI1　　Ten's digit:AI2 Hundred's digit:Reserved Thousand's:Reserved	0002	☆
Group F5:Input terminal parameter group				

Function Code	Parameter Name	Setting Range	Default	Property
F5-00	Output signal selection	Unit's digit:AO1 0:0~10V 1:4~20mA 2:0~20mA Ten's digit:AO2 0:0~10V 1:4~20mA 2:0~20mA Hundred's digit:DO1 0:Switching signals 1:Pulse signal Thousand's:Reserved	0000	☆
F5-01~ F5-05	Reserved			
F5-06	AO1 output function selection	See 5.3 AO terminal function selection	0	☆
F5-07~ F5-10	Reserved		1	☆
F5-11	AO1 output gain	25.0~200.0%	100.0%	☆
F5-12	AO1 output signal bias	-10.0~10.0%	0.0%	☆
F5-13	AO1 output filter	0.010~6.000s	0.010s	☆
Group F6:Start/ Stop control parameter group				
F6-00	Start mode	0:Direct start 1:Rotational speed tracking restart 2:Start after DC current injection	0	★
F6-01~ F6-02	Reserved			
F6-03	Startup frequency	0.00~60.00Hz	0.50Hz	★
F6-04	Startup frequency holding time	0.0~50.0s	0.0s	★
F6-05	Startup DC braking current/ Pre-excited current	0.0~150.0%	60.0%	★
F6-06	Startup DC braking time/ Pre-excited time	0.0~60.0s	0.0s	★
F6-07	Acceleration/Deceleration mode	0:Linear Acceleration/Deceleration mode 1:S-curve Acceleration/Deceleration mode	0	★
F6-08	Acceleration time proportion of S-curve start segment	0.01~650.00s	Model dependent	☆
F6-09	Acceleration time proportion of S-curve end segment	0.01~650.00s	Model dependent	☆
F6-10	Deceleration time proportion of S-curve start segment	0.01~650.00s	Model dependent	☆

Function Code	Parameter Name	Setting Range	Default	Property
F6-11	Deceleration time proportion of S-curve end segment	0.01~650.00s	Model dependent	☆
F6-12	Stop mode	0:Decelerate to stop 1:Free stop	0	☆
F6-13	Initial frequency of stop DC braking	0.00~50.00Hz	1.00Hz	★
F6-14	DC braking waiting time when stop	0.0~60.0s	0.0s	★
F6-15	DC braking current when stop	0.0~150.0%	60.0%	★
F6-16	DC braking time when stop	0.0~60.0s	0.0s	★
F6-17	Stop frequency	0.00 Hz to maximum frequency(F0-10)	0.50Hz	☆
F6-18	Rotational speed tracking mode	Unit's digit:Software frequency tracking selection 0:Search from maximum frequency 1:Search from stop frequency Ten's digit:Software frequency tracking selection 0:Bidirectional search 1:Unidirectional search	0010	★
F6-19	Reserved			
F6-20	RPM tracking speed	0.00~60.00s	0.50s	★
F6-21	RPM tracking stop delay	0.00~60.00s	1.00s	★
Group F7:Keyboard display parameter group				
F7-00	JOG/REV button function selection	0:No function 1:Reverse running 2:JOG(JOG direction is determined by the F0-09 bits) 3:Reserved 4:Forward and Reverse switching 5:Local and remote control command switching	0	★
F7-01	STOP/RES function	Unit's:STOP/RES key functions 0:Invalid for non-keypad control mode 1:Non-keypad control mode stops as per shutdown mode 2:Non-keypad control mode stops as per free mode Ten's digit:RUN key function 0:Invalid for non-keypad control method 1:Valid for keypad and communication control method	0x11	★
F7-02	LED first line display parameter 1 when running	Unit's,ten's digit:the first group shows	0001	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-03	LED first line display parameter 2 when running	00~63 Hundred's,thousand's digit:the second group shows 00~63	0402	☆
F7-04	LED first line display parameter 1 when stop		0100	☆
F7-05	LED first line display parameter 2 when stop		0402	☆
F7-06	LED second line display parameter 1 when running		0402	☆
F7-07	LED second line display parameter 2 when running		1210	☆
F7-08	LED second line display parameter 1 when stop		0402	☆
F7-09	LED second line display parameter 2 when stop		1210	☆
F7-10 ~ F7-14	Reserved			
F7-15	Performance software version	*****	Model dependent	●
F7-16	Function software version	*****	Model dependent	●
F7-17	Keyboard Version Display	*****	Model dependent	●
Group F8:Auxiliary Functions				
F8-00	User Password	0~65535	0	☆
F8-01	JOG running frequency	0.00 Hz ~ maximum frequency(F0-10)	5.00Hz	☆
F8-02	JOG acceleration time	0.01~650.00s	10.00s	☆
F8-03	JOG deceleration time	0.01~650.00s	10.00s	☆
F8-04	JOG preferred Mode	0:Linear Acceleration/Deceleration mode 1:S-curve Acceleration/Deceleration mode	0	★
F8-05	Jump frequency during acceleration and deceleration	0:Disable 1:Enable	0	★
F8-06	Jump frequency 1	0.00 Hz ~ maximum frequency (F0-10)	0.00Hz	☆
F8-07	Jump frequency 1 amplitude.	0.00 Hz ~ maximum frequency (F0-10)	0.00Hz	☆
F8-08	Jump frequency 2	0.00 Hz ~ maximum frequency (F0-10)	0.00Hz	☆

Function Code	Parameter Name	Setting Range	Default	Property
F8-09	Jump frequency 2 amplitude.	0.00 Hz to maximum frequency (F0-10)	0.00Hz	☆
F8-10	Forward and reverse running dead time	0.0~120.0s	0.0s	★
F8-11	Reserved			
F8-12	Lower limit frequency operation mode selection	0:Stop output 1:Operate at lower limit frequency	0	★
F8-13 ~ F8-14	Reserved			
F8-15	Output frequency detection value 1 (FDT1)	0.00~maximum frequency	30.00Hz	☆
F8-16	FDT1 hysteresis	0.00~maximum frequency	1.00Hz	☆
F8-17	Setting frequency to reach detection amplitude	0.00~maximum frequency	2.00Hz	☆
F8-18	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 Hz ~ maximum frequency(F0-10)	0.00Hz	☆
F8-19	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 Hz ~ maximum frequency(F0-10)	0.00Hz	☆
F8-20	Output frequency detection value 2 (FDT2)	0.00~maximum frequency	50.00Hz	☆
F8-21	FDT2 hysteresis	0.00~maximum frequency	1.00Hz	☆
F8-22	Frequency reaches detection value1	0.00Hz~F0-10	50.00Hz	☆
F8-23	Frequency reach detection 1 amplitude	0.0%~100.0%	0.0%	☆
F8-24	Frequency reaches detection value 2	0.00Hz~maximum frequency(F0-10）	50.00Hz	☆
F8-25	Frequency reach detection 2 amplitude	0.0%~100.0%	0.0%	☆
F8-26	Light load detection current value	0.0%~300.0%	10.0%	☆
F8-27	Light load detection delay time	0.00s～600.00s	1.00s	☆
F8-28	Current reaches detection value 1	0.0%~300.0%	100.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
F8-29	Current detection value 1 arrival amplitude	0.0%~F8-28	0.0%	☆
F8-30	Current reaches detection value 2	20.0%~300.0%	100.0%	☆
F8-31	Current detection value 2 arrival amplitude	0.0%~F8-30	0.0%	☆
F8-32	Timer time unit	0:Sec 1:Min 2:Hour	0	☆
F8-33	Timer Setting Value	0~65000	0	☆
F8-34	Module Temperature Reaches	0.0℃~100.0℃	75.0℃	☆
F8-35	Fan running control	0:The fan runs after the AC drive is powered on. 1:The fan is stopped related to temperature, it runs when AC drive starts. 2:The fan is stopped when the AC drive is stopped, it is running ralated to the temperature	1	☆
Group F9:Protection Parameter				
F9-00	Motor overload protection coefficient	0.0~250.0%	100.0%	☆
F9-01	Bus overvoltage suppression gain	0.0 ~ 500.0%	200.0%	☆
F9-02	Bus overvoltage suppression value	2S、2T:340.0V～380.0V 4T:650.0V～860.0V	Model dependent	★
F9-03	Overcurrent suppression gain	0.0 ~ 500.0%	100.0%	☆
F9-04	Overcurrent suppression value	0.0~300.0%	160.0%	☆
F9-05	Short circuit to ground detection selection after power-on	0:Disable 1:Enable Unit's digit:short circuit to ground fault Ten's digit:Reserved	0001	★
F9-06 ~ F9-08	Reserved			
F9-09	Phase loss protection selection	Unit's digit:Output phase loss protection 0:Disable 1:Enable Ten's digit:Input phase loss protection 0:Disable 1:Turn on the Alarm 2:Turn on the Fault Hundred's, thousand's:Reserved	0011	☆
F9-10	Type of last fault	See 5.4 Fault Code Table	——	●

Function Code	Parameter Name	Setting Range	Default	Property
F9-11	Frequency at last fault	0.00~Max Frequency	0.00Hz	●
F9-12	Output voltage at last fault	0~1500V	0.0V	●
F9-13	Current at last fault	0.1~2000.0A	0.0A	●
F9-14	DC voltage at last fault	0~3000V	0.0V	●
F9-15	Temp at last fault	0~100℃	0.0℃	●
F9-16	status at last fault	Uint:running direction 0:FWD 1:REV Ten:Running status 0:Stop 1:Constant speed 2:Acceleration 3:Deceleration Hundred's, thousand's:Reserved	0000	●
F9-17~ F9-18	Reserved			
F9-19	Type of previous fault	Reference F9-10 Contents	0	●
F9-20	Frequency at previous fault	0.00~Max Frequency	0.00Hz	●
F9-21	Output voltage at previous fault	0~1500V	0.0V	●
F9-22	Current at previous fault	0.1~2000.0A	0.0A	●
F9-23	DCvoltage at previous fault	0~3000V	0.0V	●
F9-24	Temp at previous fault	0~100℃	0.0℃	●
F9-25	status at previous fault	Uint:running direction 0:FWD 1:REV Ten:running status 0:Stop 1:Constant speed 2:Acceleration 3:Deceleration Hundred's, thousand's:Reserved	0000	●
F9-26 ~ F9-27	Reserved			
F9-28	First two failure types	Reference F9-10 Contents	0	
F9-29	First three failure types	Reference F9-10 Contents	0	
F9-30	Fault diagnosis information		0	

Function Code	Parameter Name	Setting Range	Default	Property
F9-31	Motor temperature sensor type selection	Unit's digit:Motor Temperature sensor type 0:Disable 1:PT100 2:PT1000 3:KTY84 Ten's digit:Motor overheating protection options 0:Disable 1:Turn on the overheat alarm only 2:Turn on the overheat fault only 3:Enable overheat alarm and overheat fault	0000	★
F9-32	Motor overheat protection temperature value	0℃~180℃	120.0℃	☆
F9-33	Motor overheating warning temperature value	0℃~F9-32	110.0℃	☆
F9-34	Overspeed protection action	Unit's digit:Detection selection 0:Do not detect 1:Only detected at constant speed 2:Always detect Ten's digit:Alarm selection 0:Free stop and report fault 1:Report Alarm and continue running Hundred's, thousand's digit:Reserved	0000	★
F9-35	Overspeed detection threshold	0.0~150.0%	110.0%	★
F9-36	Over speed detection time	0.000~2.000s	0.010s	★
F9-37	Excessive speed deviation detection threshold	0.0~60.0%	10.0%	★
F9-38	Excessive speed deviation detection time	0.0~60.0s	2.0s	★
Group FA:PID Function parameter group				
FA-00	PID reference setting channel	0:Digital setting by FA-01 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Reserved 6:Communication setting 7:Terminal selection	0	☆
FA-01	PID value digital setting	0.00~100.0%	50.0%	☆
FA-02	PID feedback source	0:Digital setting by FA-25 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Reserved 6:Communication setting 7:Terminal selection	2	☆

Function Code	Parameter Name	Setting Range	Default	Property
FA-03	PID control selection	Unit's digit:feedback characteristics selection 0:Positive 1:Negative Ten's digit:Closed-loop bypass holding output 0:Output cleared during closed loop bypass 1:Output maintained during closed loop bypass Hundred's place:Alignment selection 0:Non-center aligned 1:Center aligned Thousand's:Differential adjustment characteristics 0:Differentiate the deviation 1:Differentiate the feedback	0100	☆
FA-04	Proportional gain F1	0.000~8.000	0.100	☆
FA-05	Integration time I1	0.0~600.0s	1.0s	☆
FA-06	Differential gain D1	0.000~6.000s	0.000s	☆
FA-07	Proportional gain F2	0.000~8.000	0.100	☆
FA-08	Integration time I2	0.0~600.0s	1.0s	☆
FA-09	Differential gain D2	0.000~6.000s	0.000s	☆
FA-10	PID deviation limit	0.0%~100.0%	0.0%	☆
FA-11	PID differential limit	0.0~100.0%	5.0%	☆
FA-12	PID setting acceleration and deceleration time	0.00~60.00s	1.00s	☆
FA-13	PID feedback filter time	0.000~6.000s	0.010s	☆
FA-14	PID output filter time	0.000~6.000s	0.000s	☆
FA-15	PID parameter switching condition	0:No switching 1:Switched by DI terminal 2:Switch by the deviation	0	☆
FA-16	PID parameter switching low value	0.0~100.0%	20.0%	☆
FA-17	PID parameter switching high value	0.0~100.0%	80.0%	☆
FA-18	PID setting initial value	0.0%~100.0%	0.0%	☆
FA-19	PID setting initial value holding time	0.0s~650.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
FA-20	PID Integral Properties	Unit's digit:Integral Separation 0:Invalid　　　1:Valid Ten's digit:output to the limit value, whether to stop integration 0:Continue to integrate 1:Stop integrating	0000	☆
FA-21	PID disconnection action selection	0:Continue running without reporting a fault 1:Stop and report a fault 2:Continue running and output alarm 3:Run at the current frequency and alarm	0000	☆
FA-22	PID disconnection detection time	0.0~120.0s	1.0s	☆
FA-23	PID disconnection alarm upper limit value	0.0~100.0%	100.0%	☆
FA-24	PID disconnection alarm lower limit value	0.0~100.0%	0.0%	☆
FA-25	Reserved			
FA-26	PID feedback gain	0.00~10.00	1.00	☆
Group FC:Multi-segment and simple PLC function parameter				
FC-00	Multi-segment frequency 0	0.00~maximum frequency	0.00Hz	☆
FC-01	Multi-segment frequency 1	0.00~maximum frequency	0.00Hz	☆
FC-02	Multi-segment frequency 2	0.00~maximum frequency	0.00Hz	☆
FC-03	Multi-segment frequency 3	0.00~maximum frequency	0.00Hz	☆
FC-04	Multi-segment frequency 4	0.00~maximum frequency	0.00Hz	☆
FC-05	Multi-segment frequency 5	0.00~maximum frequency	0.00Hz	☆
FC-06	Multi-segment frequency 6	0.00~maximum frequency	0.00Hz	☆
FC-07	Multi-segment frequency 7	0.00~maximum frequency	0.00Hz	☆
FC-08	Multi-segment frequency 8	0.00~maximum frequency	0.00Hz	☆
FC-09	Multi-segment frequency 9	0.00~maximum frequency	0.00Hz	☆
FC-10	Multi-segment frequency 10	0.00~maximum frequency	0.00Hz	☆
FC-11	Multi-segment frequency 11	0.00~maximum frequency	0.00Hz	☆
FC-12	Multi-segment frequency 12	0.00~maximum frequency	0.00Hz	☆

Function Code	Parameter Name	Setting Range	Default	Property
FC-13	Multi-segment frequency 13	0.00~maximum frequency	0.00Hz	☆
FC-14	Multi-segment frequency 14	0.00~maximum frequency	0.00Hz	☆
FC-15	Multi-segment frequency 15	0.00~maximum frequency	0.00Hz	☆
FC-16	Multi-segment operation mode selection	Unit's digit:circular mode 0:Single cycle 1:Continuous cycle 2:Keep the final value after a single cycle Ten's digit:timing unit 0:Seconds 1:Minutes 2:Hours Hundred's digit:power-off storage method 0:Do not store 1:Store Thousand's digit:startup mode 0:Rerun from the first stage 1:Restart from the stage of downtime 2:Continue operation with the remaining time of the shutdown stage	0x0020	☆
FC-17	Running time of PLC reference 0	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-18	Acceleration/deceleration time of PLC reference 0	Unit's digit:running direction of this stage 0:Forward 1:Reverse Ten's digit:acceleration and deceleration time of this stage 0:Acceleration and deceleration time 0 1:Acceleration and deceleration time 1 2:Acceleration and deceleration time 2 3:Acceleration and deceleration time 3 Hundred's, thousand's:Reserved	0000	☆
FC-19	Running time of PLC reference 1	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-20	Acceleration/deceleration time of PLC reference 1	the same as FC-18	0000	☆
FC-21	Running time of PLC reference 2	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-22	Acceleration/deceleration time of PLC reference 2	the same as FC-18	0000	☆
FC-23	Running time of PLC reference 3	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-24	Acceleration/deceleration time of PLC reference 3	the same as FC-18	0000	☆
FC-25	Running time of PLC reference 4	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆

Function Code	Parameter Name	Setting Range	Default	Property
FC-26	Acceleration/deceleration time of PLC reference 4	the same as FC-18	0000	☆
FC-27	Running time of PLC reference 5	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-28	Acceleration/deceleration time of PLC reference 5	the same as FC-18	0000	☆
FC-29	Running time of PLC reference 6	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-30	Acceleration/deceleration time of PLC reference 6	the same as FC-18	0000	☆
FC-31	Running time of PLC reference 7	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-32	Acceleration/deceleration time of PLC reference 7	the same as FC-18	0000	☆
FC-33	Running time of PLC reference 8	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-34	Acceleration/deceleration time of PLC reference 8	the same as FC-18	0000	☆
FC-35	Running time of PLC reference 9	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-36	Acceleration/deceleration time of PLC reference 9	the same as FC-18	0000	☆
FC-37	Running time of PLC reference 10	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-38	Acceleration/deceleration time of PLC reference 10	the same as FC-18	0000	☆
FC-39	Running time of PLC reference 11	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-40	Acceleration/deceleration time of PLC reference 11	the same as FC-18	0000	☆
FC-41	Running time of PLC reference 12	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-42	Acceleration/deceleration time of PLC reference 12	the same as FC-18	0000	☆
FC-43	Running time of PLC reference 13	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-44	Acceleration/deceleration time of PLC reference 13	the same as FC-18	0000	☆
FC-45	Running time of PLC reference 14	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆

Function Code	Parameter Name	Setting Range	Default	Property
FC-46	Acceleration/deceleration time of PLC reference 14	the same as FC-18	0000	☆
FC-47	Running time of PLC reference 15	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-48	Acceleration/deceleration time of PLC reference 15	the same as FC-18	0000	☆
FC-49	Multi-Segment Speed / PLC 0th segment selection of the given method	0:Function code FC-00 given 1:Keypad potentiometer 2:AI1 3:AI2 4:AI3 5:Reserved 6:Digital given frequency F0-08,UP/DOWN can be modified	0	★
Group Fd:Communication parameter group				
Fd-00	Baud rate	Unit's digit:Modbus baud rate 0:1200bps 1:2400bps 2:4800bps 3:9600bps 4:19200bps 5:38400bps Ten's digit::CAN baud rate 0:125kbps 1:250kbps 2:500kbps 3:800kbps 4:1Mbps	0023	★
Fd-01	Modbus data format	0:(N，8，1) 1:(E，8，1) 2:(O，8，1) 3:(N，8，2) 4:(E，8，2) 5:(O，8，2)	0	★
Fd-02	Local address	1~247	1	★
Fd-03	Response delay	0~500ms	0ms	☆
Fd-04	Communication response timeout	0~500ms	1.0ms	☆
Fd-05	Communication failure action selection	0:Do not detect 1:Free stop and report fault 2:Report alarm and continue running 3:Forced shutdown	0	☆

Function Code	Parameter Name	Unit	Property
Group U0:Monitoring parameters			
U0-00	Running frequency(Hz）	0.01Hz	●
U0-01	Setting frequency(Hz）	0.01Hz	●
U0-02	Bus voltage(V）	0.1V	●
U0-03	Output voltage(V）	0.1V	●
U0-04	Output current(A）	0.1A	●
U0-05	Output power(kW）	0.1kW	●
U0-06	Reserved		
U0-07	DI input status, hexadecimal	nnnnn	●
U0-08	DO output status, hexadecimal	nnnnn	●
U0-09~ U0-13	Reserved		
U0-14	AI1 voltage after correction	0.00V(mA)	●
U0-15	AI2 voltage after correction	0.00V(mA)	●
U0-16	AI3 voltage after correction	0.01V	●
U0-17	PID setting	0.0%	●
U0-18	PID feedback	0.0%	●
U0-19	Count value	0	●
U0-20	Motor speed	rpm	●
U0-21	Feedback speed	0.01Hz	●
U0-22	PLC stage	0	●
U0-23	Communication setting value	0.01Hz	●
U0-24	Main frequency X	0.1Hz	●
U0-25	Auxiliary frequency Y	0.1Hz	●
U0-26	Input pulse frequency	0.01KHz	●
U0-27	AI1 voltage before correction	0.001V(mA)	●
U0-28	AI2 voltage before correction	0.001V(mA)	●
U0-29	AI3 voltage before correction	0.001V	●
U0-30	AO1 target voltage	0.01V	●
U0-31	AO2 target voltage	0.01V	●
U0-32	HDO target frequency	0.01KHz	●

U0-33	Reserved		
U0-34	AC drive operation status (Bit0 0::Stop 1:Run Bit1 0:non-accelerated state 1:accelerated state Bit2 0:non-deceleration state 1:deceleration state Bit3 0:Forward operation 1:Reverse operation)	——	●
U0-35	AC drive current fault	——	●
U0-36	Running time of this power-up	0.1hour	●
U0-37	PLC current stage remaining time1	1	●
U0-38	PLC current stage remaining time2	1	●
U0-39	Accumulative running time 1(Hour)	1hour	●
U0-40	Accumulative running time 2 (Min)	1min	●
U0-41	Reserved	0.1℃	●
U0-42	Temperature of Inverter module	0.1℃	●
U0-43	Reserved		
U0-44	Target torque	0.0%	●
U0-45	Output torque	0.0%	●
U0-46	Set pressure	0.1bar	●
U0-47	Outlet pressure	0.1bar	●
U0-48	Inlet pressure	0.1bar	●

5.2 DI terminal function selection

DI Setting Value	Function	DI Setting Value	Function	DI Setting Value	Function
0	No function	22	Frequency UP/DW/reset	44	Pulse Input
1	Forward RUN (FWD)	23	Command channel switches to keyboard	45	Timer trigger terminal
2	Reverse RUN (REV)	24	Changeover of the command channel to terminal	46	Timer Zero Terminal
3	3-wire control (DI)	25	Changeover of the command channel to communication	47	Counter clock input terminal
4	Forward JOG (FJOG)	26	Changeover of the command channel to Control Word	48	Counter Zero Terminal
5	Reverse JOG (RJOG)	27	Program run (PLC) pause	49	DC brake command
6	Free stop	28	Program run (PLC) restart	50	Pre-excitation command terminal
7	Emergency stop	29	PID control cancel	51	Run prohibited
8	Fault reset	30	PID control pause	52	Forward run prohibited
9	External fault input	31	PID characteristic switching	53	Reverse run prohibited
10	Multi-reference terminal 1	32	PID gain switching	54	RUN pause
11	Multi-reference terminal 2	33	PID Integral Pause	55	Switching between motor 1 and motor 2
12	Multi-reference terminal 3	34	PID given switching 1	56	External fault 2
13	Multi-reference terminal 4	35	PID given switching 2	57	External fault 3
14	Terminal 1 for acceleration/deceleration time selection	36	PID given switching 3	67	External high voltage input
15	Terminal 2 for acceleration/deceleration time selection	37	PID feedback switching 1	68	External water shortage input 1
16	acceleration/deceleration pause	38	PID feedback switching 2	69	Fire trigger signals
17	Frequency source X switches to frequency source Y	39	PID feedback switching 3	70	Pump cleaning trigger signal
18	Frequency channel switches to X	40	Swing input	71	External water deficit input 2
19	Frequency channel switches to Y	41	Swing pause	72	Pump manual operation
20	Frequency UP	42	Swing reset		
21	Frequency DW	43	Speed control/Torque control switchover		

5.3 AO terminal function selection

Terminal Setting Value	Function	Terminal Setting Value	Function
0	Output frequency	10	Mechanical speed
1	Given frequency	11	PID given value
2	Output current	12	PID feedback value
3	Output power	13	Pulses input value DI5
4	Output voltage	14	Bus voltage
5	AI1 input value	15	Input voltage (0~10V corresponds to 0~1.5 times the nominal voltage)
6	AI2 input value	16	AC drive temperature (0~10V corresponds to 0~100.0°C)
7	485 communication given	17	Motor temperature (0~10V corresponds to 0~200.0°C)
8	Output torque	18	Fixed 5V supply output
9	Given torque	19	Fixed 10V power output

5.4 Fault Code Table

Keyboard display	Communication code	Fault type	Keyboard display	Communication code	Fault type
00	0	No fault	Err01	1	VCE Overcurrent protection
Err02	2	Acceleration overcurrent	Err03	3	Deceleration overcurrent
Err04	4	Constant speed overcurrent	Err07	7	Stopping over voltage
Err08	8	Acceleration over voltage	Err09	9	Deceleration Over voltage
Err10	10	Constant speed over voltage	Err11	11	Undervoltage fault
Err12	12	Input phase loss	Err13	13	Output phase loss
Err14	14	AC drive overload	Err15	15	Motor overload
Err16	16	Current detection fault	Err17	17	AC drive over temperature
Err19	19	Speed deviation over limit	Err20	20	Short circuit to ground
Err21	21	External fault 1	Err22	22	Fast current limit
Err23	23	Communication fault	Err25	25	EEprom parameters communication fault
Err26	26	PID feedback loss fault	Err27	27	Agent setting time reached
Err28	28	Input power failure	Err32	32	Auto-tunning over time
Err33	33	Motor over speed	Err34	34	Load detection protection 1
Err35	35	Load detection protection 2	Err36	36	Encoder fault
Err37	37	Synchronous motor position detection fault	Err38	38	Motor over temperature
Err39	39	Synchronous motor out of step	Err46	46	External fault 2
Err47	47	External fault 3	Err48	48	AI1 input disconnection
Err49	49	AI2 input disconnection	Err50	50	AI3 input disconnection
Err51	51	Water shortage fault	Err52	52	Water seepage problem
Err53	53	Low voltage alarm	Err54	54	High pressure alarms
Err55	55	Pump address duplication	Err56	56	Pump blocking protection
ALA64	64	Main contactor disconnect alarm	ALA65	65	Input phase loss alarm
ALA66	66	PID feedback loss alarm	ALA67	67	Load detection protection 1 alarm
ALA68	68	Load detection protection 2 alarm	ALA69	69	Parameters save alarm

ALA70	70	Speed deviation over limit alarm	ALA71	71	Motor speed over limit alarm
ALA72	72	Controller error warnings	ALA74	74	Communication disconnection alarm
ALA80	80	AI1 input disconnection alarm	ALA81	81	AI2 input disconnection alarm
ALA82	82	AI3 input disconnection alarm			

Chapter 6   Detailed description of parameters

6.1   Detailed description of parameters

6.1.1 A0 Group pump-specific parameters

A0-01	Set pressure	0.0~200.0 bar	3.0bar	Setting system target work pressure
A0-19	Sleep-wake stress bias	0.0~Set pressure(A0-01）	2.0bar	Pressure less than set pressure - Wake-up in case of pressure deviation
A0-20	Wake-up delay from sleep mode	0.0~120.0s	0.5s	Wake-up delay time

● A0-01 System pressure setpoint, e.g. in a pumping system, the pressure value required in this system is 4 bar, then A0-01 = 4.0.

● A0-19 Hibernation Wake-up Pressure Deviation, e.g. In a pump system, the target pressure is 4.0 bar, and when the pump is hibernated, the wake-up value of the pressure value in this system is required to be 3.6 bar, then A0-19 = 0.4.

● A0-20 Hibernation wake-up delay, e.g., in a water pump system, the target pressure is 4.0 bar, the wake-up pressure is 0.4 bar, and the wake-up delay is 2.0s, then the system wakes up after 2s when the pressure is 3.6 bar, and wakes up immediately if the pressure is less than 3.6 bar.

A0-02	Pressure sensor channel selection	Unit's digit:Outlet Ten's digit:Inlet 0:AI1(Pressure Transmitter) 1:AI2(Remote Pressure Gauge)	0x10	Inlet and outlet pressure sensor channels
A0-03	Outlet sensor range	0.0~200.0 bar	16.0bar	Maximum range of outlet sensor
A0-04	Inlet sensor range	0.0~200.0 bar	16.0bar	Maximum range of inlet sensor

● A0-02 Pressure sensor channel selection, the default is 0x10 that is, the water inlet default use AI2 (outlet can only use AI1), before using the sensor type needs to be set according to F4-59 and F4-13~F4-17.

● A0-03 Outlet pressure sensor range, set according to the maximum value of the range, e.g., in the pump system, the range of the installed outlet sensor is 0~1.6Mpa, then A0-03=16.0.

● A0-04 Inlet pressure sensor range, set to the maximum value of the range, e.g. A0-04 = 16.0 for an inlet sensor installed in a pump system with a range of 0 to 1.6 MPa.

Note:When using the pressure sensor, you need to pay attention to whether the sensor type is current type or voltage type, in addition to setting the AI type and the upper and lower limit values, you also need to pay attention to the selection of the type by the hardware jumper cap.

A0-43	Pressure alarm detection selection	Unit's digit:low voltage alarm 0:Off 1:On Ten's digit:High pressure alarm 0:Off 1:On	0	High and low voltage alarm enable selection

A0-44	High-pressure alarm set value	0.0~Outlet range(A0-03）	15.0bar	High Pressure Alarm Value
A0-45	High-pressure alarm detection delay time	0.0~3600.0s	5.0s	High voltage alarm delay
A0-46	Low-pressure alarm set value	0.0~Set pressure(A0-01）	1.0bar	Low voltage alarm value
A0-47	Low-pressure alarm detection delay time	0.0~3600.0s	5.0s	Low voltage alarm delay

● A0-43 Pressure Alarm Selection, you can choose whether to turn on the high pressure and low pressure alarm, the default is 0, turn off the high and low pressure alarm, in the water pump system, if only turn on the high pressure alarm then A0-43 = 0x10, if turn on the high pressure and low pressure alarm at the same time then A0-43 = 0x11.

● A0-44 high pressure alarm set value, when current pressure is greater than or equal to high pressure alarm set value, alarm after delay, e.g.:in water pump system, set A0-43 = 0x10 to turn on high pressure alarm, set A0-44 = 15.0, set A0-45 = 5.0, then alarm when pressure is greater than or equal to 15.0bar for more than 5s. Err54.

● A0-45 High Pressure Alarm Delay Time, the delay time of high pressure alarm, i.e., the high pressure fault will be reported only when the current pressure is greater than or equal to the high pressure alarm pressure is detected continuously within this time.

● A0-46 low-pressure alarm set value, the current pressure is less than or equal to the low-pressure alarm set value, after the delay alarm, for example:in the water pump system, set A0-43 = 0x01 to open the low-pressure alarm, set A0-46 = 1.0, set A0-47 = 10.0, then the alarm will be triggered when the pressure is less than or equal to 1.0 bar for more than 10s. Err53.

● A0-47 Low pressure alarm delay time, the delay time of low pressure alarm, that is, the low pressure fault is reported only when the current pressure is less than or equal to the low pressure alarm pressure is detected continuously within this time.

A0-13	PID sleep function selection	Unit's digit:Enable bit 0:No Sleep Mode 1:Sleep Mode	1	Choice of hibernation method
A0-14	PID sleep deviation pressure	0.0~Set pressure(A0-01) (valid for main pump only)	0.1bar	Dormant Pressure = Set Pressure - Dormant Pressure Deviation
A0-15	PID sleep detection frequency	Dormant detection low hold frequency (A0-17) ~ Forward upper frequency limit (F0-12)	35.00Hz	
A0-16	PID sleep detection delay time	0.0~120.0s	5.0s	
A0-17	PID sleep detection low hold frequency	0.00~Forward upper frequency limit (F0-12)	20.00Hz	
A0-18	PID sleep low hold frequency hold time	0.0~120.0s	5.0s	

● A0-13 No sleep when set to 0. Output frequency is fully regulated by PID, which can be applied to applications that do not require shutdown for sleep.

● If A0-13 is set to 1, the hibernation is determined by both the current pressure and the output frequency. The hibernation pressure is equal to the set pressure A0-01 minus the A0-14 hibernation deviation pressure. When the feedback pressure is greater than or equal

to the hibernation pressure and the operating frequency is less than or equal to the hibernation detection frequency A0-15 after the hibernation detection delay time A0-16 to enter the low-speed holding state, low-speed holding state during the low-speed holding frequency A0-17 output, after the A0-18 low-speed holding time, if the feedback pressure is still greater than or equal to the hibernation pressure the output frequency of the system will be lowered to 0 Hz to enter the dormant state. If the feedback pressure is still greater than or equal to the hibernation pressure, the system output frequency will be reduced to 0Hz and enter the hibernation state.

A0-05	Interpump mode function selection	Unit's digit:Startup Timing 0:Sequential start by pump address 1:Start by runtime Ten's digit:Standby host selection 0:Turn off the standby host function 1:Enable standby host function Hundred's digit:Wheel Pump timing selection 0:Shut down wheel pumps 1:Turn on the wheel pump Thousand's digit:Frequency assignment mode 0:Overflow distribution model 1:Equal distribution model	0x0100	
A0-06	Address for local coupled pumps	0 to 5 (Slave use)	1	slave address
A0-07	Number of coupled pump slaves	0~5 (Mainframe use)	0	Read-only, automatically detected by the host
A0-08	Interpump mode rotation time	0~7200min	1440min	

● A0-05 Joint Pump Mode Function Selection bits are used to select the pump startup sequence, the master pump setting is valid, the slave pump setting is invalid. When set to 0, the pumps will be started according to the pump address size from small to large; when set to 1, the pumps with shorter running time will always be started first after being sorted according to the running time size.

● A0-05 The 10 digits of joint pump mode function selection are used to select whether or not to turn on the standby host function, the slave pump setting is valid, and the master pump setting is invalid. For multi-pump system application, if you want this slave to be the standby master, set this station number parameter A0-05 ten bits to 1 to turn on the standby master function. When this slave detects that the master is offline, it will automatically switch to a new master to take over the system work.

Note:When a slave is set as a standby host, it is necessary to connect the pressure sensor for the slave, and at the same time, after the system is re-powered, if the original host is functioning normally, the standby host will still be used as a slave.

● A0-05 The function selector of joint pump mode is used to select whether or not to turn on the operation of wheel pumps, the setting of master pump is valid, the setting of slave pump is invalid. When applying multi-pump system, if you don't want a certain pump to run for a long time but switch the pump to run after a period of time, you can set the A0-05 bit to 1 to enable the wheel pump function.

● A0-06 The communication address of the local coupled pump can only be set in the shutdown state, in the multi-pump system this parameter sets the slave address and the master setting is invalid.

Note:In the application, this parameter is set automatically according to the working mode of A0-00 pump, and no user modification is required except for special cases.

● A0-07 The number of slaves of the coupled pump, the value is automatically detected by the system, the size of the value is the number of normal slaves in the coupled pump system, the number of slaves that fall off the line and report errors are not counted in the value.

● A0-08 Rotation time of coupled pump, this parameter is used together with A0-05 hundred bit, for example:A0-08=60, when A0-05 hundred bit is set to 1, the rotation pump is turned on. When the system is started after the A pump first run and at a certain frequency pressure has reached the set value, at this time the B pump is not running, then in the 60 minutes after the start of the system will be calculated once the A, B two pumps cumulative running time, if the A pump running time is still less than the B pump, then still run the A pump, if after 60 minutes after the A pump running time is greater than the B pump, then stop the A pump to start running the B pump.

A0-11	Interpump slave start/stop method	Unit's digit:Start-stop mode 0:Consistent with mainframe start/stop status 1:Start-stop according to F0-02 parameters Ten's digit:Reserved Hundred's digit:Reserved Thousand's digit:Reserved	0	The default is for the slave to follow the master

● This parameter is valid only for slave pumps.

● When the multi-pump system is established, the AC drives are connected to each other by master-slave communication. When A0-11 bits are 0, the slave pumps follow the master pump to start or stop together. When A0-11 bits are 1, the slave pump start state is decided according to F0-02 run command source control.

A0-09	Frequency of pump boosting in coupled pump mode	0.0~Forward upper frequency limit (F0-12)	50.00Hz	Frequency of pumping for system operation
A0-10	Interpump mode pumping frequency delay time	0.0~3600.0s	5.0s	Delay time for pumping after reaching the pumping frequency during system operation

● This parameter is only valid for main pump setting.

● Multiple pumps of the pumping mechanism, when the main pump running frequency >= parameter A0-09 and time exceeds the parameter A0-10, start the next pump, if the amount of water is still insufficient, in accordance with the same conditions to start the third and fourth pumps.

● Pump reduction mechanism for multiple pumps:AC drive uses the PID outputs in combination with the current and set pressure conditions to determine when to reduce the pumps.

A0-52	Water shortage protection selection	0:Prohibit 1:Judged by outlet pressure, frequency,	0	Water shortage dry pumping selection bit, alarm Err51

		current		when triggered
		2:Reserved		
		3:Judged by inlet pressure		
		4:Judging by single terminal		
		5:Judging by double terminals		
		6:Judging by frequency and current		
A0-53	Water shortage protection detection pressure threshold	0.0~Set pressure(A0-01）	0.5bar	
A0-54	Water shortage protection detection frequency	0.00~Forward upper frequency limit (F0-12)	48.00Hz	
A0-55	Water shortage protection detection current	0.0%~100.0%	40.0%	
A0-56	Water shortage protection detection time	0.0~3600.0s	60.0s	

● When A0-52 is set 0, the water shortage dry pumping protection function is invalid and no water shortage dry pumping is detected.

● When A0-52 is set to 1, the water shortage dry pumping is judged by outlet pressure, running frequency and current current, during A0-56 time, the outlet pressure is continuously detected to be less than A0-53 water shortage protection detection pressure threshold, the current running frequency is greater than A0-54 water shortage protection detection frequency and the percentage of the current current and the rated current of motor is less than A0-55 water shortage protection detection current percentage when Err51 water shortage fault is reported. Detecting current percentage reports Err51 water shortage fault.

● When A0-52 is set to 3, water shortage is judged by inlet pressure, and Err51 water shortage fault is reported when the inlet pressure is continuously detected to be less than A0-53 water shortage protection detection pressure threshold and the current operating frequency is greater than A0-54 water shortage protection detection frequency during A0-56 time.

● When A0-52 is set 4, water shortage is judged by single terminal, and after any one of DI terminals is set as water shortage terminal (function 68 or 71), if the terminal is triggered continuously within A0-56 time, Err51 water shortage fault is reported.

● When A0-52 is set 5 to judge water shortage by double terminals, two DI terminals need to be set to function 68 and 71 respectively, and trigger both terminals continuously within A0-56 time, then report Err51 water shortage fault.

● When A0-52 is set to 6, water shortage dry pumping is judged by running frequency and current current, within A0-56 time, when the current running frequency is detected continuously to be greater than A0-54 water shortage protection detecting frequency and the percentage of the current current and the rated current of the motor is less than the percentage of the current detected by A0-55 water shortage protection, then Err51

water shortage fault is reported.

A0-57	Water leak detection selection	0:No detection 1:Detection	0	When set to 1, the Err52 water leakage alarm is triggered when the water leakage condition is met.
A0-58	Pressure deviation value for water Leak detection	0.0 to set pressure (A0-01)	1.0bar	
A0-59	Water leak detection time	0.0~3600.0s	120.0s	

● When A0-57 is set to 1, water leakage fault is detected. During A0-59 time, the outlet pressure is continuously detected to be less than A0-58 water leakage detection pressure, the current operating frequency is greater than A0-54 and the current current current and motor rated current percentage is greater than A0-55 when Err52 water shortage fault is reported.

A0-25	Freeze protection function selection	Unit's digit:Enable bit 0:Off 1:On Ten's digit:Time unit selection 0:s 1:min	0x10	When set to 1, freeze protection is enabled
A0-26	Freeze protection operation frequency	0.0~Max. output frequency(F0-10）	10.00Hz	
A0-27	Freeze protection operation time	0~3000	1	
A0-28	Freeze protection interval time	0~6000	5	

● A0-25 is set to 1, the antifreeze protection function is turned on. When the AC drive is in the dormant state, it runs to the operation frequency set by A0-26 after the time set by A0-28, and stops after running for the time set by A0-27, and so on.

A0-48	Pump blockage detection function selection	0:Off 1:On	0	When set to 1, the blocking protection function is enabled.
A0-49	Pump blockage detection current value	0.0~200.0%	130.0%	
A0-50	Pump blockage detection frequency value	0.00~Forward upper frequency limit (F0-12)	15.00Hz	
A0-51	Pump blockage detection delay	0.0~3600.0s	5.0s	

● When   A0-48 is set to 1, the pump blocking protection function is enabled, and the Err56 blocking alarm will be triggered when the output current is greater than parameter A0-49, the operation frequency is less than or equal to A0-50, and the time of maintaining parameter A0-51.

A0-35	Pump cleaning function selection	0:Off 1:On	0	
A0-36	Pump cleaning forward rotation frequency	0.0~Forward upper frequency limit F0-12	50.00Hz	
A0-37	Pump cleaning forward rotation time	0.0~3600.0s	5.0s	
A0-38	Pump cleaning dead	0.0~Forward upper	0.00Hz	

	zone Frequency	frequency limit (F0-12)		
A0-39	Pump cleaning dead zone time	0.0~3600.0s	1.0s	
A0-40	Pump cleaning reverse frequency	0.0~Forward upper frequency limit F0-12	50.00Hz	
A0-41	Pump cleaning reverse time	0.0~3600.0s	5.0s	
A0-42	Pump cleaning cycle count	0~1000	1	

● Please note that the cleaning action will cause the pump to perform forward and reverse rotation, as some pumps can only run in one direction, this function does not support pumps that can only run in one direction, to avoid damage to the pump.

● To use the cleaning function, you need to set A0-00=8 to enter the cleaning mode. When A0-35 cleaning function is turned on, the cleaning function program will run according to the parameter A0-36~A0-42.

A0-33	Firefighting mode activation trigger selection	0:Self-start 1:startup according to F0-02 run command source	0	
A0-34	Firefighting mode frequency	0.0~Forward upper frequency limit F0-12	50.00Hz	

● Fire rescue mode need to set A0-00=7 first.

● A0-33 set the fire rescue mode triggering method, when selecting 0, AC drive startup can be triggered automatically by setting A0-00=7 to enter the fire rescue mode, when selecting 1, AC drive startup is required according to F0-02 command source.

● A0-34 sets the operation frequency in fire rescue mode, when the fire rescue mode is triggered, the AC drive will run at this set frequency.

A0-21	Inlet pressure start/Stop selection	Unit's digit:Self-starting options 0:Shutdown pressure self-activation 1:Open pressure self-start Ten's digit:self-discontinuing options 0:Closed pressure self-stopping 1:Open pressure self-stop	0	
A0-22	Inlet start pressure	0.0~A0-23	3.0bar	
A0-23	Inlet stop pressure	0.0~Inlet range(A0-04）	3.2bar	
A0-24	Inlet detection time	0.0~120.0s	60.0s	

● A0-21 is used to select whether or not to turn on the inlet pressure auto start/stop function, when A0-21=0x01 turn on the auto start AC drive with inlet pressure, when A0-21=0x10 turn on the inlet pressure auto stop AC drive.

● When is used, first set A0-21=0x11 to turn on the inlet pressure start/stop allowable bit. When the inlet pressure is less than or equal to A0-22 inlet start pressure, after A0-24 inlet detection time if the inlet pressure is still less than or equal to A0-22, then automatically start AC drive; when the inlet pressure is greater than or equal to A0-23 inlet stop pressure, after A0-24 inlet detection time if the inlet pressure is still greater than or equal to A0-23, then automatically Stop AC drive;

Note:An inlet pressure sensor is required to use the inlet pressure start/stop function.

A0-62	Self-Recovery count from faults	0-100(Failure self-reset off at 0)	0	
A0-63	Fault Self-reset delay time	0~60000s	5s	

● A0-62 Set the number of times the fault is automatically reset, when set to 0, the fault self-reset function is invalid.

● When a fault occurs, the current fault is automatically reset after A0-63 fault self-reset delay time, if the AC drive is in running state before the fault then the fault is reset and immediately re-run, if the AC drive is in shutdown state before the fault then the fault is only reset and the AC drive will not be run again. a total of reset A0-62 set number of times, if the A total of reset A0-62 set number of times, if the reset number exceeds A0-62, then the fault will not be reset again.
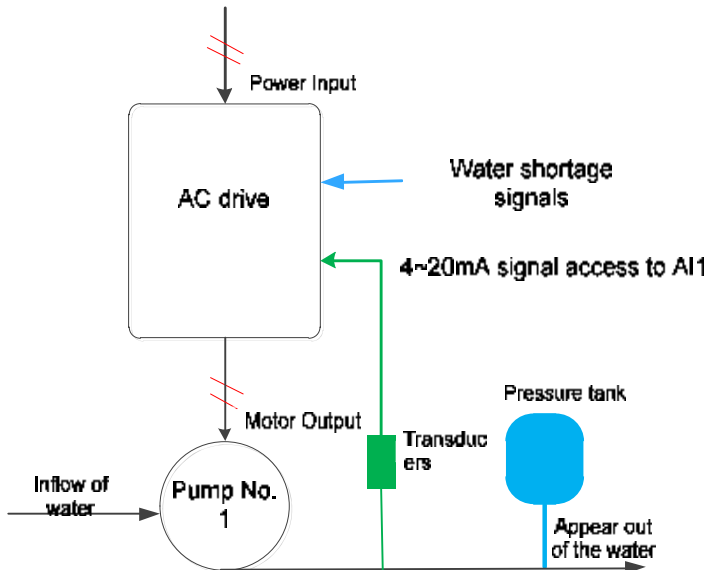
6.2　Debugging Application Cases

6.2.1　Single-pump water supply system applications

The system uses a 1.0Mpa 24V 4~20mA pressure sensor and requires a system target pressure of 4.0bar to be set. start/stop is activated by the AC drive panel keys.

Parameters are set as follows:

Parametric code	Parameter name	Parameterization
A0-00	Pump operating mode	1
A0-01	Set pressure	4.0bar
A0-03	Sensor range (outlet)	10.0bar

The wiring schematic is shown below:

● Single pump features

Under the default parameters, after installing the pressure sensor line, you can directly operate the keyboard [Start], [Stop] key to control the pump start and stop. If you need to use the external water shortage signal can be set to DI terminal 68 function or 71 function to access the external signal can be.

6.2.2　Multi-pump water supply system applications

The system uses three pumps to form a multi-pump water supply system, using 1.6Mpa 24V 4~20mA pressure sensor, required to set the system target pressure of 4.0bar, and the multi-pump system requires the configuration of standby master; if you do not need to configure a standby master, then the slave station only needs to be set to A0-00 to select the operating mode. If you need to use external water shortage signal, set the DI terminal function to function 68 or 71 and then access the water shortage signal.

When the multi-pump pump function is turned on, the pump rotation function (the pump with the smallest running time will be started first, and it will be rotated once every 24 hours) and the pump increase function will be turned on by default. Start and stop using the AC drive keypad, the slave pump follows the master pump.

The parameters are set as follows.:

Main Pumping Station No. 　(AC drive 1)

Parametric code	Parameter name	Parameterization
A0-00	Working mode	1
A0-01	Set pressure	4.0bar
A0-03	Sensor range (outlet)	16.0bar

● Secondary master No. 　(AC drive 2)

Parametric code	Parameter name	Parameterization
A0-00	Working mode	2
A0-05	Interpump mode function selection	0x0111

● Slave Station No. 　(AC drive 3)

Parametric code	Parameter name	Parameterization
A0-00	Working mode	3

The wiring schematic is shown below:
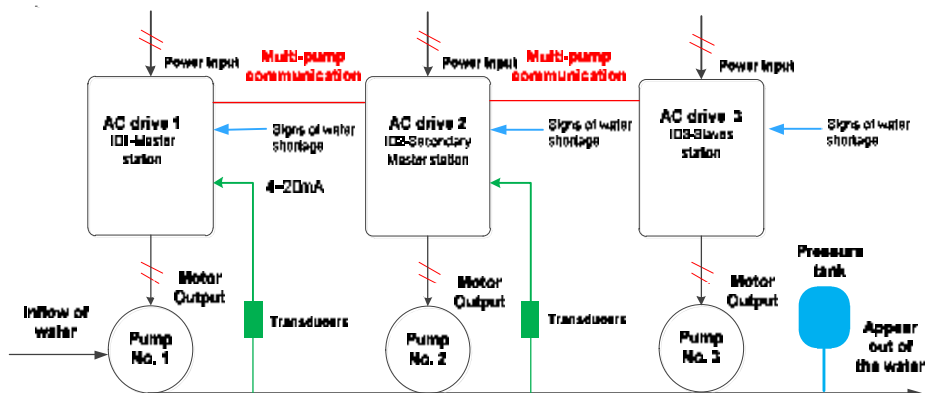
Chapter 7   Trouble Shooting

If a fault occurs during the system operation, the AC drive will immediately protect the motor to stop the output, and the corresponding AC drive fault relay contact will act. The AC drive panel displays the fault code. The fault type and common solution corresponding to the fault code are shown in the following table. The list in the table is for reference only, please do not repair or modify it without authorization. If the fault cannot be eliminated, please seek technical support from our company or the product agent.

7.1   Faults and Solutions

Communication code	Display	Fault Name	Possible Causes	Solutions
1	Err01	VCE Overcurrent protection	1:Whether the motor connection terminals U, V, W have short-circuit or straight-through between phases or to ground 2:Whether the module is overheating 3:Whether the internal wiring of the AC drive is loose 4:Whether the main control board, driver board or module is normal	1:Check motor wiring and output impedance to ground 2:Check whether the fan and air duct are normal 3:Connect all loose wires 4:Seek technical support
2	Err02	Acceleration overcurrent	1:The output circuit is grounded or short circuited 2:Motor parameter is not right 3:The acceleration time is too short 4:Manual torque boost or V/F curve is not appropriate 5:The voltage is too low 6:The startup operation is performed on the rotating motor 7:A sudden load is added during acceleration 8:The AC drive model is of too small	1:Eliminate external faults 2:Perform the motor auto-tuning 3:Increase the acceleration time 4:Correctly set the V/f curve 5:Check grid input power 6:Select rotational speed tracking restart or start the motor after it stops 7:Remove the added load 8:Select an AC drive of higher power class
3	Err03	Deceleration overcurrent	1:The output circuit is grounded or short circuited 2:Motor parameter is not right 3:The deceleration time is too short 4:The voltage is too low 5:A sudden load is added during deceleration 6:The inertia of the load is too large 7:The magnetic flux braking gain is too large	1:Eliminate external faults 2:Perform the motor auto-tuning 3:Increase the deceleration time 4:Adjust the voltage to normal range 5:Remove the added load 6:Install the braking unit and braking resistor 7:decrease the over-excitation gain

Commu nication code	Display	Fault Name	Possible Causes	Solutions
4	Err04	Constant speed overcurrent	1:The output circuit is grounded or short circuited 2:Motor parameter is not right. 3:The voltage is too low 4:A sudden load is added during operation 5:The AC drive model is of too small	1:Eliminate external faults 2:Perform the motor auto-tuning 3:Adjust the voltage to normal range 4:Remove the added load 5:Select an AC drive of higher power class
8	Err08	Acceleration over voltage	1:The input voltage is too high 2:An external force drives the motor during acceleration 3:The acceleration time is too short 4:The inertia of the load is too large 5:Motor parameter is not right	1:Adjust the voltage to normal range 2:Cancel the external force or install a braking resistor 3:Extend the acceleration time 4:Use energy consumption braking 5:Auto-tune the parameters of the motor
9	Err09	Deceleration Over voltage	1:The input voltage is too high 2:An external force drives the motor during deceleration 3:The deceleration time is too short. 4:The inertia of the load is too large	1:Adjust the voltage to normal range 2:Cancel the external force or install a braking resistor 3:Increase the deceleration time 4:Install the braking unit and braking resistor
10	Err10	Constant speed over voltage	1:The input voltage is too high 2:An external force drives the motor during acceleration 3:When the vector control is running, the parameters of the regulator are not set properly 4:The load fluctuates too much	1:Adjust the voltage to normal range 2:Cancel the external force or install a braking resistor 3:Correctly set the regulator parameters 4:Check the load
11	Err11	Undervoltage fault	1:Instantaneous power failure occurs 2:The input voltage exceeds the allowed range 3:The DC bus voltage is too low 4:The rectifier bridge and buffer resistor are faulty 5:The drive board is faulty 6:The control board is faulty	1:Reset the fault 2:Adjust the input voltage to within the allowed range 3:Seek for maintenance

Communication code	Display	Fault Name	Possible Causes	Solutions
12	Err12	Input phase loss	1:The three-phase power input is abnormal 2:The drive board is faulty 3:The lightening board is faulty 4:The main control board is faulty	1:Eliminate external faults 2:Seek for maintenance
13	Err13	Output phase loss	1:The cable connecting the AC drive and the motor is faulty 2:The AC drive's three-phase outputs are unbalanced when the motor is running 3:The drive board is faulty 4:The module is faulty	1:Eliminate external faults 2:Check the motor or replace the motor 3:Seek for maintenance
14	Err14	AC drive overload	1:The torque boost value is too large during V/f control 2:The starting frequency is too high 3:The acceleration and deceleration time is too short 4:Improper setting of motor parameters 5:Overload 6:The V/f curve is not suitable for V/f control 7:Restart the rotating motor 8:Output phase-to-phase short-circuit or short-circuit to ground	1:Reduce the torque boost value 2:Reduce the starting frequency value 3:Extend the acceleration and deceleration time 4:Correctly set according to the motor nameplate 5:Lighten the load 6:Correctly set the V/f curve 7:Reduce the current limit value or start by speed search 8:Check the motor wiring and output impedance to ground
15	Err15	Motor overload	1:Whether the setting of motor protection parameter F9-00 is appropriate 2:Whether the load is too large or the motor is blocked 3:AC drive selection is too small 4:The torque boost value is too large during V/f control 5:The V/f curve is not suitable for V/f control 6:Improper setting of motor parameters 7:Improper setting of motor overload protection time 8:Motor stall or load sudden change is too large	1:Set this parameter correctly 2:Reduce the load and check the motor and mechanical condition 3:Choose AC driver with larger power level 4:reduce the torque to increase the value 5:Set V/ F curve correctly 6:Set correctly according to the motor nameplate 7:Set the motor overload protection time correctly 8:Check the cause of motor blocking or check the load

Communication code	Display	Fault Name	Possible Causes	Solutions
16	Err16	Current detection fault	1:The internal connections become loose 2:Confirm whether the current detection device is normal 3:The control or drive board is faulty	1:Connect all cables properly. 2:Seek for maintenance
17	Err17	AC drive over temperature	1:The ambient temperature is too high 2:The air filter is blocked 3:The cooling fan is damaged 4:The thermally sensitive resistor of the module is damaged 5:The inverter module is damaged. 6:The temperature sensor is improperly connected	1:Lower the ambient temperature 2:Clean the air filter 3:Replace the damaged fan 4:Replace the damaged thermally sensitive resistor 5:Replace the inverter module 6:Seek service
19	Err19	Speed deviation over limit	1:The load is too heavy and the acceleration time is too short 2:F9-28 and F9-29 are set incorrectly 3:The set value of the deviation between the motor speed and the set speed is too small 4:The load fluctuates too much 5:The control parameter setting of vector control is unreasonable	1:Increase the acceleration and deceleration time 2:Set F9-28 and F9-29 correctly based on the actual situation 3:Correctly set the speed deviation point 4:Stable load 5:Correct settings
20	Err20	Short circuit to ground	1:The motor is short circuited to the ground 2:The output wiring is short-circuited to ground 3:Abnormal motor insulation 4:The inverter module is abnormal 5:The output leakage current to the ground is too large	1:Replace the cable or motor 2:Check the motor wiring and output impedance to ground 3:Check the motor 4:Seek service
21	Err21	External fault	External fault normally closed or normally open signal is input via DI	Reset the fault
22	Err22	Fast current limit fault	1:The load is too heavy or the rotor is locked 2:The acceleration time is too short	1:Reduce load or replace with higher power drive 2:Increase the acceleration time

Communication code	Display	Fault Name	Possible Causes	Solutions
23	Err23	Communication fault	1:The host computer is in abnormal state 2:The communication cable is faulty 3:The communication parameters in group Fd are set improperly	1:Check cabling of the host computer 2:Check the communication cabling 3:Check Fd group parameters
25	Err24	EEPROM parameters communication fault	The EEPROM chip is damaged	Replace the main control board
26	Err26	PID feedback lost during running	1:The PID feedback is lower than the setting of FA-08 2:The PID feedback channel is abnormal 3:PID parameter setting is unreasonable	1:Check the PID feedback signal or set FA-08 to a proper value 2:Check the feedback channel 3:Correct settings
28	Err28	Control power supply fault	1:The input voltage is not within the allowable range 2:The power on and off is too frequently	1:Adjust the input voltage to the allowable range 2:Extension of power on cycle
51	Err51	Low water level alarm	Low inlet pressure or poorly set parameters	Reasonable setup of parameters and shutdown of alarms
52	Err52	Water Leak Alarm	Leakage or poorly set parameters	Check for errors in the outlet pipe and parameter settings
53	Err53	Low pressure alarm	Low inlet pressure or improperly parameterized (outlet)	Reasonable setup of parameters and shutdown of alarms
54	Err54	High pressure alarm	High water pressure or improper parameterization (outlet)	Reasonable setup of parameters and shutdown of alarms
55	Err55	Pump address conflict	Duplicate Address Detected During Pump Interconnection	Detecting A0-06 for duplicates
56	Err56	Pump motor blockage protection	Pumps are blocked or improperly parameterized	Reasonable setup of parameters and shutdown of alarms

7.2 Common Symptoms and Diagnostics

The following fault conditions may be encountered during the use of the AC drive, please refer to the following methods for simple fault analysis.

NO.	Fault Name	Possible Causes	Solutions
1	There is no display at power-on.	1:There is no power supply or the power supply is too low 2:The switching power supply on the AC drive board is faulty 3:The rectifier bridge is damaged 4:The buffer resistor of the AC drive is damaged 5:The control board or the keypad is faulty 6:The cable between the control board and the drive board or keypad breaks	1:Check the power supply 2:Check the bus voltage 3:Re-connect the keypad and core cables 4:Seek service
2	"Err20" is displayed at power-on	1:The motor or the motor output cable is short-circuited to the ground 2:The AC drive is damage	1:Measure the insulation of the motor and the output cable with a megger. 2:Seek service
3	AC drive over temperature	1:The setting of carrier frequency is too high 2:The cooling fan is damaged, or the air filter is blocked 3:Components inside the AC drive are damaged (thermal coupler or others)	1:Reduce the carrier frequency 2:Replace the fan and clean the air filter 3:Seek service
4	The motor does not rotate after the AC drive runs.	1:Check the motor and the motor cables 2:The AC drive parameters are set improperly (motor parameters) 3:The cable between the drive board and the control board is in poor contact 4:The drive board is faulty	1:Ensure the cable between the AC drive and the motor is normal 2:Replace the motor or clear mechanical faults 3:Check and re-set motor parameters
5	The DI terminals are disabled.	1:The parameters are set incorrectly 2:The external signal is incorrect 3:The DI DIP switch is in the wrong position 4:The control board is faulty	1:Check and reset the parameters in group F4 2:Re-connect the external signal cables 3:Re-confirm whether the position of the DI DIP switch is consistent with the wiring method 4:Seek service
6	The AC drive reports over-current and over-voltage frequently	1:The motor parameters are set improperly 2:The acceleration/deceleration time is improper 3:The load fluctuates	1:Re-set motor parameters or re-perform the motor auto-tuning 2:Set proper acceleration/deceleration time 3:Seek service

Chapter 8   Maintenance

Affected by the ambient temperature, humidity, dust, vibration and the aging of the internal components of the AC drive, some potential problems may occur during the operation of the AC drive. The frequency converter conducts daily inspections and periodic inspections. Depending on the external environment of the AC drive, regular maintenance must be carried out every 3 to 6 months, so as to discover and deal with the problems that are difficult to find in the routine inspection process in time.

8.1   Daily inspection

To avoid damage to the AC drive and shorten its service life, please check the following items daily.

Inspection items	Check the content	Measures
Motor	● Whether the motor has abnormal vibration and abnormal sound	● Confirm whether the mechanical connection is abnormal ● Confirm whether the motor is out of phase ● Confirm that the motor fixing screws are secure
Fan	● Abnormal use of AC drive and motor cooling fan	● Confirm whether the cooling fan of the AC drive is running ● Confirm whether the cooling fan on the motor side is abnormal ● Confirm whether the ventilation channel is blocked ● Check that the ambient temperature is within the allowable range
Installation Environment	● Whether the electrical cabinet and cable trough are abnormal	● Check whether the insulation of the cables entering or leaving the AC drive is damaged ● Determine whether there is vibration on the mounting bracket ● Check whether the copper bars and connecting cable terminals are loose and corroded
Load	● Whether the AC drive running current exceeds the AC drive rating and motor rating for a certain period of time	● Confirm whether the motor parameters are set correctly ● Confirm whether the motor is overloaded ● Confirm whether the mechanical vibration is too large (normal condition <0.6g)
Power supply	● Whether the input voltage meets the requirements and whether there is a lack of phase power supply	● Confirm whether the voltage between any two phases of the input voltage is within the allowable range indicated on the nameplate ● Check if there is a large load around to start

8.2 Regular Maintenance

Under normal circumstances, it is advisable to conduct regular inspections every 3 months to 6 months, but in actual cases, please determine the actual inspection cycle based on the usage and working environment of each machine.

Inspection items	Check the content	Measures
Complete machine	● Whether there is garbage, dirt, dust accumulation on the surface	● Confirm whether the AC drive cabinet is powered off ● Use a vacuum cleaner to remove rubbish or dust to avoid touching the parts ● When the surface dirt cannot be removed, can use alcohol to wipe it and wait for it to dry and evaporate completely
Air duct vent	● Whether the air duct and heat sink are blocked ● Whether the fan is damaged	● Clean the air duct ● Replace the fan
Electrical connections	● Whether there is discoloration of wires and connection parts, and whether the insulation layer is damaged, cracked, discolored and aging ● Whether the connecting terminals are worn, damaged or loose ● Ground check	● Replace damaged cables ● Tighten loose terminals and replace damaged terminals ● Measure the grounding resistance and fasten the corresponding grounding terminal
Magnetic contactor periphery	● Whether the suction is not firm or makes abnormal noise during action ● Whether there are short-circuited, water-stained, swollen, or ruptured peripheral devices	● Replace defective components
Motor	● Whether the motor has abnormal vibration and abnormal noise	● Tighten mechanical and electrical connections and lubricate motor shaft
Electrolytic capacitor	● Whether the electrolytic capacitor has leakage、discoloration、cracks, and whether the safety valve leaks, expands, or ruptures	● Replace defective components
Circuit board	● Whether there is peculiar smell, discoloration, serious rust, and whether the connector connection is correct and reliable	● Fastener connection ● Clean the circuit board ● Replace damaged circuit board
Keyboard	● Whether the keyboard is damaged and the display is incomplete	● Replace damaged circuit board

![ATTENTION icon] **ATTENTION**

Do not perform related operations when the power is turned on, otherwise there is a danger of electric shock and death.Please make sure power supply of the AC drive has been cut off, and DC bus voltage has been discharged to 0V prior to maintenance.Never leave screws, gaskets, conductors, tools and other metal articles inside the AC drive. Failure to comply may result in equipment damage. Never modify the interior components of the AC drive in any condition. Failure to comply may result in equipment damage.

8.3 Replacement of Vulnerable Parts

Vulnerable parts of AC drive include cooling fan, electrolytic capacitor.The service lives of these parts are subject to environment and working conditions. To maintain a favorable operating environment is conducive to improving the service life of parts and components; routine inspection and maintenance also contributes to effective improvement of parts' service life. To prolong the service life of entire AC drive, the cooling fan, electrolytic capacitor or other vulnerable parts should be subjected to routine inspection according to the table below. Please replace the abnormal parts (if any) in time.

![ATTENTION icon] **ATTENTION**

- Normally, the cooling fan of the AC drive should be replaced every 2 to 3 years;
- Under normal circumstances, the large-capacity electrolytic capacitor of the AC drive should be replaced every 4 to 5 years;

8.4 Storage

When the AC drive is not used temporarily or stored for a long time after purchase, the following matters should be paid attention to:

![ATTENTION icon] **ATTENTION**

- Avoid storing the AC drive in a place with high temperature, humidity or vibration and metal dust, and ensure that the storage place is well ventilated;
- If the AC drive has not been put into use for a long time, the internal filter capacitor characteristics will decline;
- If the AC drive is not used for a long time, it should be powered on once every two years to restore the characteristics of the large-capacity filter capacitor, and the function of the AC drive should be checked at the same time. When energized, the voltage should be gradually increased through an autotransformer, and the energization time should not be less than 5 hours.

Appendix:Modbus Communication Protocol

FS200 series of frequency converters can provide RS232/RS485 communication interface, and use MODBUS communication protocol. The user can realize the central control through computer or PLC. Also it can set the running commands, modify or read the function code parameter, read the working status and fault information of the frequency converter according to the protocol.

RTU frame format:

Frame Header START	3.5 characters time
Slave Address ADR	Contact address:0~247
The command code CMD	03:Read the parameter of the slave machine 06:Write the parameters of the slave machine
The content of the data DATA(N-1)	The content of the DATA: The address of function code parameters; The quantity of function code parameters; The value of function code parameters;
The content of the data DATA(N-2)	
………..	
The content of the data DATA0	
CRC CHK Low order	detection value:CRC16 verified value. low byte is sent previous than High byte.
CRC CHK High order	
End	3.5-characters time

1. **The Definition of Communication Parameter Address**

This part is the content about communication, which used for controlling the running and working status of the frequency convert, and set relevant parameter.

Parameter of read and write function code (some function code can't be changed, only for supplier and monitor usage)

Labeling rule of function code address:
Use the group number and mark number of the function code as parameter address rule:
The high bytes:F0~:FE (group P)、70~7F (group U) the low byte:00~FF
For example:F0-11,the address indicated as F00B;

Attention:
Group FE:The parameter can neither be read nor be altered.
Group U:The parameter can only be read, but not be altered.

Some parameter can't be changed when the frequency convert is on running status; some parameter can't be changed regardless of any status of the frequency convert; please pay attention to the range, unit and relevant instruction when changing the function code parameter.

Group number of function code	access address of communication	Function code address of communication revise the RAM
Group F0~FE	0xF000~0xFEFF	0x0000~0x0EFF
Group U0	0x70000~0x70FF	

Pay attention that if the EEPROM is stored continuously, the service life will be reduced. So there is no need to store some function code on the communication mode, just need to change the value in RAM.

If it's group P of the parameter to realize this function, just need to change high byte from F to 0 on the function code address.

The relevant function code address indicated as below:High byte:00~0F (group P)   the low byte:00~FF.

For example:function code F0-11 doesn't store in EEPROM, the address indicated as 000B; this address means that it only can write RAM, but can't use the read action, if it's being read, the address is ineffective.

Communication Control Parameter Group Address Description

Parameter Address (HEX)	Parameter Description	Data description	Property
0x1000	Communication frequency setting	0~1000 Correspondence 0~100.0%	R/W
0x1001	Running frequency	Unit:0.01hz	R
0x1002	Bus voltage	Unit:0.1V	R
0x1003	Output voltage	Unit:0.1V	R
0x1004	Output current	Unit:0.1A	R
0x1005	Output power	Unit:0.1kW	R
0x1006	Output torque	Unit:0.1%	R
0x1007	Motor speed	Unit:1rpm	R
0x1008	Communication command setting	0000H:No order 0001H:Forward operation 0002H:Reverse operation 0003H:Forward jog 0004H:Reverse jog 0005H:Slow-down stop 0006H:Free stop 0007H:Fault reset 0008H:Run the prohibit command 0009H:Run the permit command	R/W
0x1009	AC drive operation status	Bit0 0:Stop 1:Run Bit1 0:non-accelerated state 1:accelerated state	R

		Bit2 0:non-deceleration state 1:deceleration state Bit3 0:Forward operation 1:Reverse operation Bit4 0:True 1:False	
0x100A	AC drive Error Codes	AC drive Current Error Codes	R
0x100B	Upper limit frequency communication given	0~32000 corresponds to 0~320.00hz	R/W
0x100C	VF Separate output voltage communication given	0~32000 corresponds to 0~320.00hz	R/W
0x100D	PID setting communication setting	0~1000 Correspondence 0~100.0%	R/W
0x100E	PID feedback communication settings	0~1000 Correspondence 0~100.0%	R/W
0x100F	Target torque communication given	0~1000 Correspondence 0~100.0%	R/W
0x1010	Torque control forward maximum frequency communication given	0~1000 Correspondence 0~100.0%	R/W
0x1011	Torque Control Reverse Maximum Frequency Communication Given	0~1000 Correspondence 0~100.0%	R/W
0x1012	Output terminal status	Bit0 0:T1 False 1:T1 True Bit1 0:T2 False 1:T2 True Bit2 0:T3 False 1:T3 True Bit3 0:DO1 False 1:DO1 True Bit4 0:DO2 False 1:DO2 True	R/W
0x1013	AO1 output given	0~1000 Correspondence 0~10.00V	R/W
0x1014	AO2 output given	0~1000 Correspondence 0~10.00V	R/W
0x1015	HDO output given	0~1000 Correspondence 0~100.0%	R/W
0x1016	Motor 1 electric torque upper limit given	0~1000 Correspondence 0~100.0%	R/W
0x1017	Motor 1 generating torque upper limit given	0~1000 Correspondence 0~100.0%	R/W
0x1018	Motor 2 electric torque upper limit given	0~1000 Correspondence 0~100.0%	R/W
0x1019	Motor 2 generating torque upper limit given	0~1000 Correspondence 0~100.0%	R/W

Example 1:read the run frequency of the first machine:0x01   0x03   0x10   0x01   0x00   0x01   0x21   0x0A   0x10 0x01   (1001) run frequency address, 0x00   0x01 (0001) one data 0x21   0x0A (0A21) CRC verified value.

Example 2:read the busbar voltage, output voltage, output current of the first machine at the same time:0x01   0x03   0x10   0x02   0x00   0x03   CRC verified value, the meaning of the data is similar to example 1.