PC30 Smart Pro Pump Drive

User Manual

Version code：30303656 PC30-EN-V04-2601

Preface

Thank you for using PC30 series products. This manual provides you with relevant operation instructions and detailed description of parameters. Please read this manual carefully before installation, running, maintenance or inspection.

Make sure the wiring and the pump's rotation direction is correct before using.

Content

Notes for Safe Operation

⚠ Warning: Indicate a potentially dangerous situation in which could result in death or serious physical injuries.

⚠ Caution: Indicate a potentially dangerous situation in which could result in minor or moderate physical injuries and damage to equipments. Meanwhile, this sign can be also used for indicating errors or unsafe operation.

SPD: Abbreviation of smart pump drive.

■ **Inspection**

⚠ **CAUTION**
◎Do not install or operate the SPD if it is damaged or has missing parts. Otherwise it may result in equipment damage or physical injuries.

■ **Installation**

⚠ **CAUTION**
◎Please hold the bottom of SPD when installing or moving it. In case that the SPD is broken or damaged; only holding the shell is not allowed. ◎Keep the SPD away from heat, inflammable and explosive goods; Install SPD on the metal or other nonflammable objects. ◎If the SPD is mounted in an electric cabinet or other enclosed objects, fans or other cooling device should be installed inside the cabinet; Setting ventilation opening to ensure ambient temperature is below 40℃. Otherwise it may be damaged because of high temperature.

■ **Wiring**

⚠ **WARNING**
◎Wiring must be completed by qualified electrical engineers. Otherwise it can cause an

electrical shock or SPD damage.

◎Before wiring, make sure the power supply is de-energized. Otherwise it will cause an electrical shock or a fire.

◎Make sure the ground terminal ⏚ is grounded safely and correctly. Otherwise there will be a risk of electrical shock on the shell of SPD.

◎Do not touch the main circuit terminal, and the main circuit terminals of the SPD are not allowed to contact the shell. Otherwise it may cause an electrical shock.

CAUTION

◎Before connecting, make sure the voltage rating and phase number of SPD is conformed to the input power voltage, phase number; Otherwise it may cause a fire or physical injuries.

◎Never connect the AC input power supply to the output terminals V, U, W of SPD; Otherwise it will cause damage to the SPD and you are not guaranteed to enjoy the warranty services.

◎Never conduct a pressure test on SPD； Otherwise it will cause damage to the SPD.

◎The main circuit wiring of the SPD and the control loop wiring should be separated or vertical crossed, otherwise the control signal will be interfered.

◎The cable connected to the main circuit terminals should be use lugs with isolated casing

◎If the length of cable between the SPD and the motor is over 50 meters, an output reactor is recommended so as to protect the SPD and motor.

■ Running

WARNING

◎Turn on the input AC power after the wiring of SPD is completed and the front cover is installed. Do not dismantle the front cover when operating; otherwise it will lead to an electric shock.

◎When SPD is set with the function of fault automatic reset or auto-restart after power failure, protection measures for equipment system should be taken in advance. Otherwise it will cause physical injuries.

◎The key “RUN/STOP” may be lose efficacy because some function had been set, a separate emergency power switch can be installed in the SPD control system; Otherwise it may cause damage or physical injuries.

◎Though the SPD terminal is in stop state, the terminal is electrified after power on. Do not touch; otherwise there will be a risk of electric shock.

■ Maintenance and Inspection

WARNING

◎When power on, do not touch the connection terminals. Otherwise it may cause an electrical shock.

◎Only qualified electrical engineering personnel can maintain, replace and inspect the SPD.

◎Wait at least 10 minutes after the power failure, or make sure that is no residual voltage before carry out maintenance and inspection, otherwise it may cause damage.

CAUTION

◎PCB board has CMOS integrated circuit, do not touch, otherwise the static electricity may damage PCB board.

■ Others

WARNING

◎It is strictly forbidden to transform the SPD, otherwise it may cause casualties. After arbitrarily changing SPD, will no longer enjoy the warranty service.

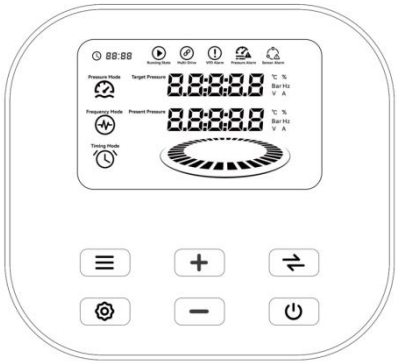
◎Due to the characteristics of the capacitor components, the capacitance performance of equipment that has not been powered on for a long time will be significantly affected.Therefore, for machines that have not been powered on for a long time (including new machines that have been stored without being used), please power them on and turn on the lights once every 2-3 months to ensure the functionality of the capacitors.

◎If it has not been used for more than one year, the capacitor needs to be replaced.

Please contact the technical support.

Chapter 1 Operation Panel Instruction

1.1 Operation Panel Diagram



1.1.1 **Menu:** Used when switching from fixed mode to parameter mode.

1.1.2 **Setting:** Set the water pressure shortcut key and determine the key when setting parameters, confirm and save the pressure setting.

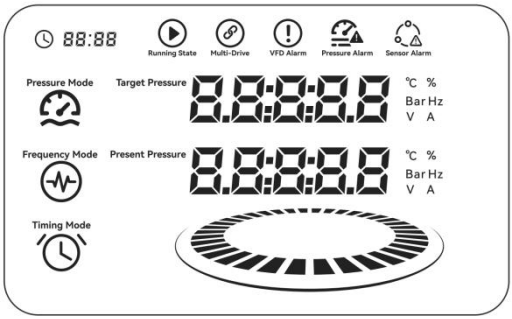
1.1.3 **Shift:** To switch the display content and modify the parameters to move the cursor, in the shutdown state, long press shift can run at a speed of 5Hz, you can judge the direction is right or wrong.

In the running state, press Shift to switch back and forth between the running frequency, output current, set pressure, and feedback pressure. When modifying parameters, press Shift to switch the blinking bit to the current modifiable bit.

1.1.4 **"+/-" :** For setting parameter values and setting pressure values to modify, hold down for 2 seconds to enter the pressure setting interface.

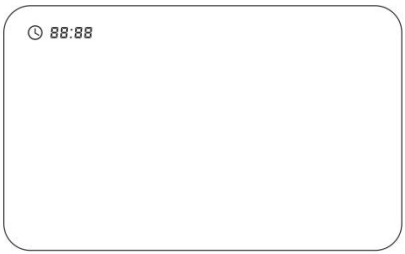
1.1.5 **Start/Stop:** Start button on the keyboard, Stop button on the keyboard, and reset button on the fault.

1.2 Display area description

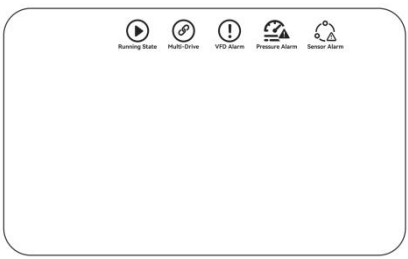


1.2.1 Clock area:

Real-time time can be displayed, and the local time can be set through software;



1.2.2 Status Area:



Running state: the machine is always bright when running, shining when hibernating, and extinguished when shutting down;

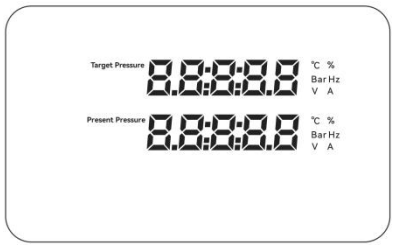
Multi-Drive: When the machine is in online mode, this light is steady on;

VFD Alarm: shining alarm when the machine itself fails, such as overvoltage, overcurrent, high temperature, etc.

Pressure Alarm: shining alarm when water pressure is abnormal, such as water pressure is too low, water pressure is too high, water shortage, etc.

Sensor Alarm: shining alarm when the water pressure sensor fails, such as when the sensor is disconnected;

1.2.3 Parameter Area:



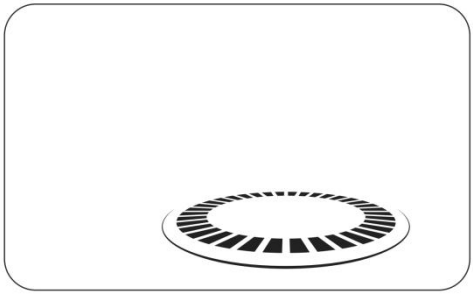
Target pressure: When the "target pressure" is lit, the value displayed on the right is the corresponding target pressure value. You can adjust the target pressure by long pressing the "+" and "-" buttons;

Current pressure: When "Current pressure" is lit, the value displayed on the right side is the corresponding current pressure value;

Parameter display: through the "shift" button, the displayed parameters can be converted, and the corresponding value is displayed together with the rear unit, which is direct and clear;

Parameter setting: Long press the "Menu" key for 3 seconds, you can set the parameter setting mode, you can set the target parameter;

1.2.4 Parameter Area:

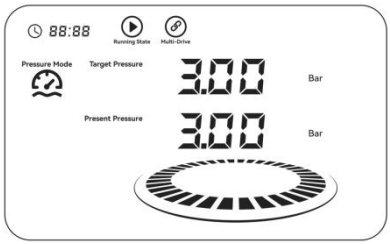
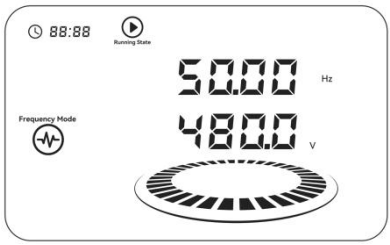
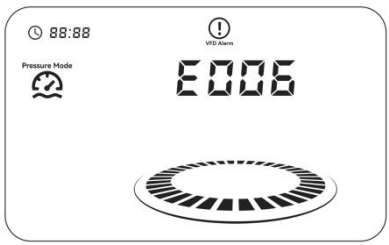
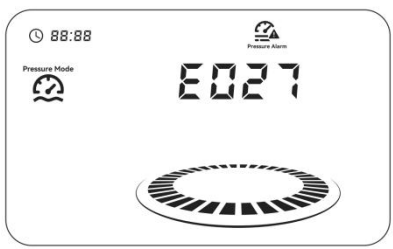


Dynamic display: When setting normal operation, the display disk is rotating state, blinking state when hibernating, it is steady on during shutdown;

Pressure Mode: When the mode is lit, it means that the equipment is working in constant pressure water supply mode;

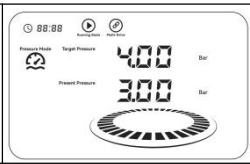
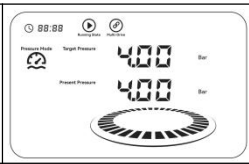
Frequency Mode: When the mode is on, it means that the device is working in manual frequency mode:

Timing Mode: When the mode is on, it means that the equipment is working in the regular water supply mode.

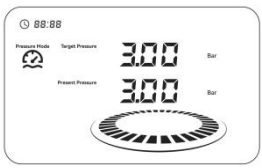
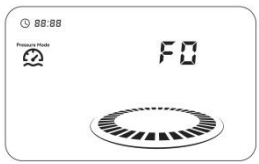
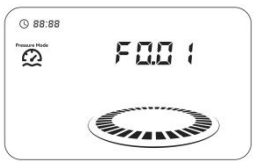
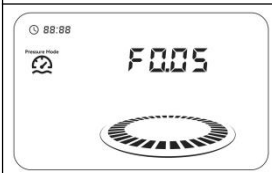
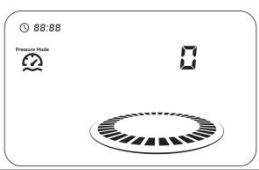
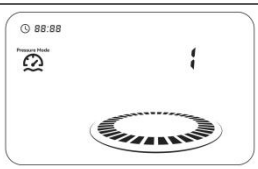
Pressure Mode Display style	
Frequency Mode Display style	
VFD Alarm Display style	
Pressure Alarm Display style	

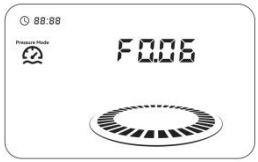
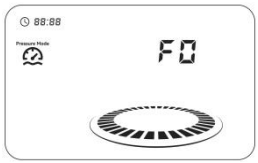
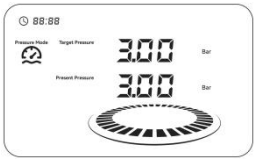
1.3 Operation and display mode

1.3.1 Target pressure setting

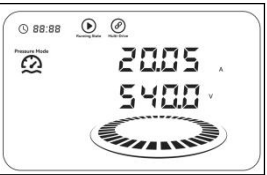
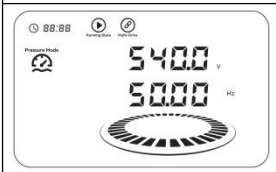
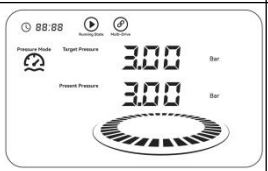
		
1.Enter target pressure Settings	2.Adjusted target pressure	3.Complete target pressure setting
In the constant pressure mode, when the machine is running or stopped, long press the "+ or -" button to set the target pressure mode	The target pressure can be adjusted with the shift button, the adjustment is completed, the target pressure flashes for about 3 seconds, and the pressure will be automatically saved;	After the target pressure adjustment is saved, the current pressure will be pressurized to be consistent with the target pressure after operation;

1.3.2 Parameter adjustment Settings

		
1.Enter the parameter setting mode	2.Select the target parameter group	3.Enter the target parameter group
In the shutdown state, long press the "Menu" key for 3 seconds, the machine will enter the parameter setting mode;	When F0 is displayed on the screen, press the + key to select the corresponding parameter group and press the Setting key to confirm.	After the F0 parameter group is performed, the target parameter, such as F0.05, is also selected by "+" and "-" with the "shift" key
		
4.Select target parameter	5.Entry target parameter	6.Select parameter options
When adjusting to F0.05, press the "Set" key to enter the parameter;	After entering the parameters, the factory default values are displayed, and you can press + and - to adjust them	If the target value is 1, adjust it to 1, press the "Set" key to save;

		
7.Save setting parameter	8.Return parameter group	9.Return to run screen
After confirming that the parameter is saved, it will be automatically converted to the next parameter.	If you do not need to set other parameters, press the menu twice, you can directly return to the original interface:	Return to the initial interface can continue to start running;

1.3.3 View running parameters

		
1.Pressure mode parameter display	2.Frequency and current display	3.Current and voltage display
Under constant pressure operation, the interface mainly displays the values of "target pressure" and "current pressure";	If you need to view other running parameters, press the "shift" key to convert the display parameters;	The unit after the number indicates the corresponding definition; Hz indicates the current operating frequency. A is the running current;
		
4.Voltage and frequency display	5.AReturn to the constant pressure interface	
V is the DC voltage of the machine;	Cycle back to the pressure display interface	

Chapter 2 Model description and installation

2.1 Model Instruction

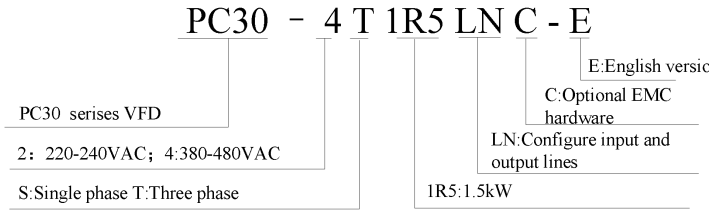


Figure2-1-1 model instruction of PC30 diagram

Note1: The machine can be optional with EMC certification version, the machine is 61800-3 certification standard, in line with the standard application scenarios; If the application market has mandatory requirements, please ask for matching when placing an order;To meet the corresponding EMC standards, shielded wires with standard diameters should be used.

Inverter Mode	Rated power	EMC standard
	kW	
PC30-2S2R2C-E	2.2	C2
PC30-4TR75C-E	0.75	C2
PC30-4T1R5C-E	1.5	C2
PC30-4T2R2C-E	2.2	C2
PC30-4T004C-E	4	C2
PC30-4T5R5C-E	5.5	C2
PC30-4T7R5C-E	7.5	C2
PC30-4T011C-E	11	C2
PC30-4T015C-E	15	C2
PC30-4T018R5C-E	18.5	C3
PC30-4T022C-E	22	C3

Table 2-1-2 PC30 EMC standards for each power

2.2 Quick selection

Inverter Model	Rated power（kW）	Power capacity	Input current	Output current	G/P	
		kVA	A	A	kW	HP
PC30-2S2R2-E	2.2	4	23	9.6	2.2	3
PC30-4TR75-E	0.75	1.5	3.4	2.1	0.75	1
PC30-4T1R5--E	1.5	3	5.0	3.8	1.5	2
PC30-4T2R2-E	2.2	4	5.8	5.1	2.2	3
PC30-4T004-E	4	5.9	10.5	9	4	5.5
PC30-4T5R5-E	5.5	8.9	14.6	13	5.5	7.5
PC30-4T7R5-E	7.5	11	20.5	17	7.5	10
PC30-4T011-E	11	17	26	25	11	15
PC30-4T015-E	15	21	35	32	15	20
PC30-4T018R5-E	18.5	24	38.5	37	18.5	25
PC30-4T022-E	22	30	46.5	45	22	30

Table 2-2-1 selection table of PC30

2.3 Product appearance size drawing (unit: mm)

Inverter Mode	Rated power	Product dimensions（mm）			Mounting plate size（mm）	
	kW	(L)	(W)	(H)	(L)	(W)
PC30-2S2R2-E	2.2	250	177	114	195	161
PC30-4TR75-E	0.75					
PC30-4T1R5-E	1.5					
PC30-4T2R2-E	2.2					
PC30-4T004-E	4					
PC30-4T5R5-E	5.5	277	197	128	215	180
PC30-4T7R5-E	7.5					
PC30-4T011-E	11	330	235	148	262	216
PC30-4T015-E	15					
PC30-4T018R5-E	18.5					
PC30-4T022-E	22					

Table 2-3-1 PC30 Product size table

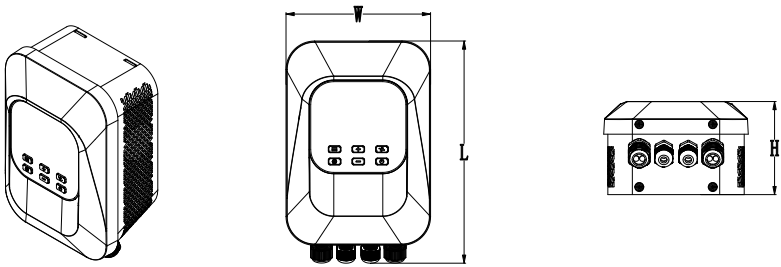


Table 2-3-2 PC30 product appearance dimension diagram

2.4 Installation Procedure Illustrations

2.4.1 First open the terminal box of the pump motor, and fix the power cord and the connecting terminal of the pump;

2.4.2 Then the bottom plate is fixed on the motor junction box, considering the frequency converter is centered, the bottom plate should be reasonably adjusted;

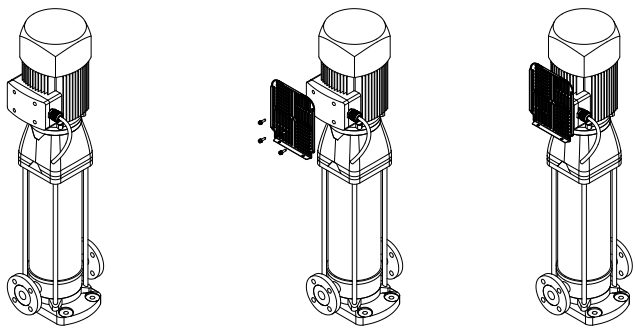


Table 2-4-1 PC30 installation operations

2.4.3 Fix the machine on the bottom plate, and then use the bottom plate screw to fix the connection between the machine and the bottom plate from below;

2.4.4 Connect the input end of the machine to the AC input air switch, corresponding to L1/L2/L3, and connect the yellow green line to the grounding end of the distribution box;

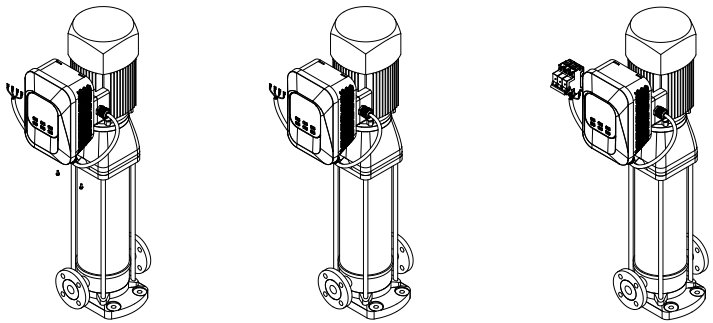


Table 2-4-2 PC30 installation operations

2.4.5 If the machine wants to connect the sensor and install multiple units online, it is necessary to open the upper shell for connection and installation. The wire can be connected through the two waterproof joints in the middle of the machine, and the waterproof joints are locked after installation to avoid water in the machine.

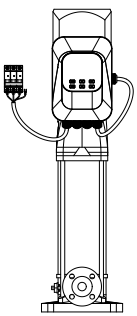


Table 2-4-3 PC30 installation operations

2.5 Wiring Diagram of Main Circuit and Control Terminals

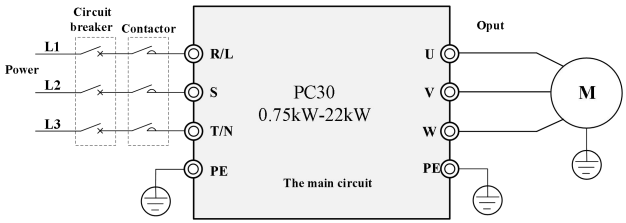


Figure 2-5-1

Terminal mark	Name	Instructions
R、S、T/L、N	Three-phase（Single-phase）power input terminal	Three - phase（Single-phase） AC power input connection terminal
U、V、W	Inverter output terminal	Connection of three-phase motor
PE	Earthing terminal	Connect the earth terminal

Figure 2-4-2

2.6 Control loop terminals and functions

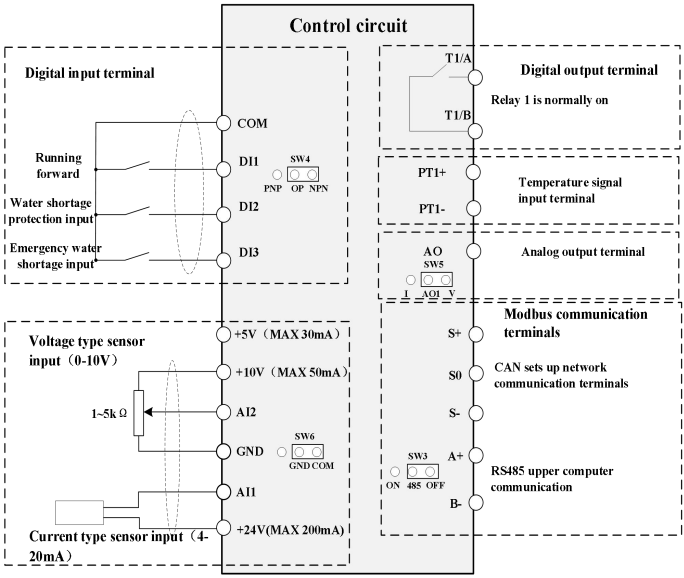


Figure 2-6-1

■ Control terminal instruction

Terminal symbol	Terminal name	Technical specification
DI1~DI3	Multi-function digital input terminal	1. Optical couplers isolation one-way input 2. Enabled when connected to GND. Disabled when open 3. Input voltage range: 9~36 VDC 4. Input impedance:4 KΩ
AI1	Analog input terminal 1	1. Input voltage range: DC 0~10VDC or 0/4~20mA, determined by parameters. 2.Input impedance: 22KΩ when voltage input; 500Ω when current input
AI2	Analog input terminal 2	
5V	Analog reference voltage	5V, ±5% maximum output current 30mA
10V	Analog reference voltage	10V, ±5% maximum output current 50mA
GND	Analog ground terminal	5V and 10V reference zero potential
TA/TB	Relay RO1 output	TA~TB: normally open terminals Contact capacity: AC 250V / 3A
AO	AO Analog Output Terminal	The default output is 0-10V. The toggle switch SW5 allows for selection of 4-20mA output.
24V	24V power for external devices	Provide +24V power to external devices. Maximum output current 100 mA. Commonly used as digital input working power and external sensor power
COM	24V power public terminal	Provide 24V power public terminal to external devices
A+	Standard RS485 communication terminal	Standard isolated485 communication interface. Please use twisted pair or shielded wire. Can be used for PC communication control.
B-		
S+	CAN communication terminal	Standard CAN communication interface. Please use twisted pair or shielded wire. Can be used for inverter on-line.
S-		
S0		
PT1+/PT1-	Thermocouple signal	The standard motor temperature signal can be

Terminal symbol	Terminal name	Technical specification
	port	connected for alarm protection

Figure 2-6-2

2.7 Wiring diagram

The inverter can be connected to two types of feedback devices, remote pressure gauge and pressure transmitter, please connect according to the feedback device with the following figures, the wire is required to use not less than 0.5m² of twisted pair shielded wire, and the shielding layer should be grounded.

2.7.1 Remote pressure gauge: working voltage 5VDC, output 0 ~ 5VDC, signal input connection AI2;

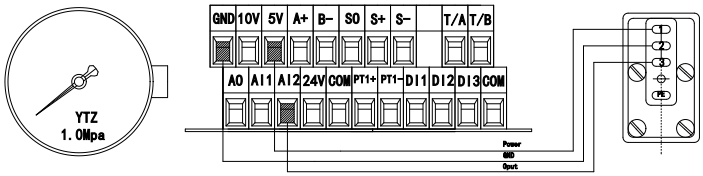


Figure 2-6-1

2.7.2 24V pressure transmitter: working voltage range 24VDC, output 4 ~ 20mA, signal input connected to AI1;

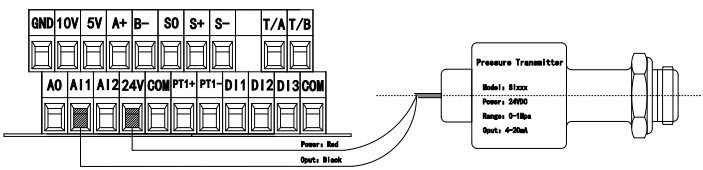


Figure 2-6-2

2.8 Product Usage Environment Description

Enable Use environment	Place of use	Inside the room, there is no direct exposure to sunlight, no dust, no corrosive gases, no flammable gases, no oil mist, no water vapor, no dripping water or salt particles.
	Altitude	Below 1000m, no power reduction; from 1000m to 3000m, for every 100m increase in altitude, the frequency needs to be reduced by 1%.
	Environmental temperature	-10℃ to 50℃. When the temperature exceeds 40℃, the equipment should be used at a reduced capacity. For every 1℃ increase in ambient temperature, the capacity should be reduced by approximately 1%. The maximum operating ambient temperature is 50℃.
	Humidity	≤ 95%RH, avoid condensation
	Vibration	Vibration acceleration is less than 0.6g.
	Storage temperature	-40℃ ～ 70℃

Chapter 3 Quick Setting

3.1 Please follow the steps below to finish setting

Step 1: Set the sensor range, the sensor type

F0.08 = 16.0 Sensor's range

F0.09 = 2 Sensor feedback channel selection (0: AI1 channel 1: AI2 channel; 2: Max (AI1, AI2))

F2.00= 0 AI1 Sensor type (0:4-20mA; 1:0-10V; 2:0.5-4.5V)

Step2: Confirm the motor's rotation direction

Run the pump shortly, monitor if the direction is correct. Change the rotation direction by 2 ways below:

① Disconnect the input power and make sure the display is OFF, then exchange two lines of any of U\V\W.

② Stop the VFD, Modify to F0.02.

Step 3: Adjust the display pressure

There is two ways to adjust the display pressure and actual pressure:

① When the pressure is stable, adjust F2.01 or F2.03 within each range of 0.010.

② If the VFD pressure is a little higher, make the sensor range lower(F0.08); If the VFD pressure is a little lower, make the sensor range higher (F0.08).

Step4: Macro Settings

Please refer to the table below, to set the system quickly.

System Type	Host drives	VFD network, Auxiliary No.1	VFD network, Auxiliary No.2	VFD network, Auxiliary No.3	VFD network, Auxiliary No.4	VFD network, Auxiliary No.5
Solo Pump setting	F0.20=1	\	\	\	\	\
Two VFDs setting	F0.20=2	F0.20=11	\	\	\	\
Three VFDs setting	F0.20=3	F0.20=11	F0.20=12	\	\	\
Four VFDs setting	F0.20=4	F0.20=11	F0.20=12	F0.20=13	\	\
Five VFDs setting	F0.20=5	F0.20=11	F0.20=12	F0.20=13	F0.20=14	\
Six VFDs setting	F0.20=6	F0.20=11	F0.20=12	F0.20=13	F0.20=14	F0.20=15
Emergent Mode	F0.20=9	\	\	\	\	\

Figure 3-1-1

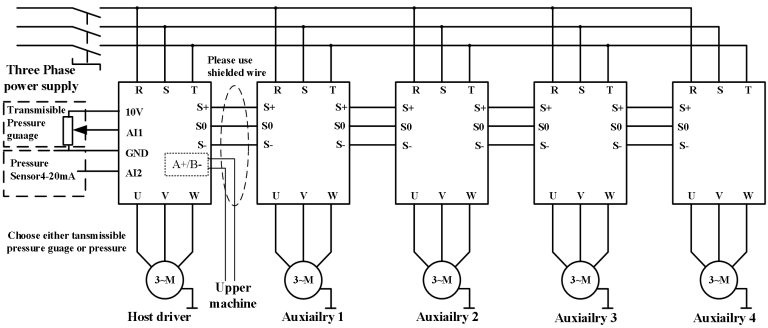


Figure 3-1-2

Multi-online connection: the system can realize up to 6 equipment online, online connection installation, need to connect all the machines in the system S+/S- in parallel, and then press the above online parameters can be set to achieve online function application;

Connect the upper computer: If you want to connect the upper computer to monitor the system equipment, you need to connect the upper computer to A+/B- and all the machines are connected in parallel;

Chapter 4 Datasheet of PC30

Note:

"○": The parameter can be modified in both standby and operating state.

"●": The parameter can't be modified in operating state.

"◎":The parameter is the actual detected and recorded value which can't be modified.

4.1 Common Parameter Sets of Single-drive

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F0.00	Pre-set pressure	F4.01~F0.10	bar	3.0	○	In multi-drive mode, users only need to set parameters of the host drive.	0x000
F0.01	Startup pressure deviation	0.0~F0.00	bar	0.3	○	Wakeup from standby mode when the pressure is lower than pre-set pressure	0x001
F0.02	Motor rotation direction	0: Forward 1: Reverse	\	0	●	Rotation direction can be changed by modifying this parameter	0x002
F0.03	Antifreeze function	0: Disabled 1: Enabled (in seconds) 2: Enabled (in minutes) 3: inlet pressure control	\	0	○	Antifreeze and rust-proof function of the pump itself. For details, please refer to F4.10~F4.14 The antifreeze function for each VFD need to be set separately in multi-pump.	0x003

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F0.04	Water leakage coefficient	0.0~100.0	\	2.5	○	The bigger the water leakage, the smaller the coefficient. 2.5s (7.5kw and below) 5.0s (7.5kw and above)	0x004
F0.05	Run command channel	0~4	\	0	○	0:Keyboard control 1:Terminal control 2:RS485 3: Inlet pressure control 4：Timed water supply start/stop control	0x005
F0.06	Auto-starting option	0~1	\	0	○	0:Disabled 1:Enabled	0x006
F0.07	Auto-starting delay time	0.1~100.0	s	5.0	○	Delay time while auto-starting at power on	0x007
F0.08	Sensor range	0.0~200.0	bar	16.0	○	The maximum range of sensor	0x008
F0.09	The selection of sensor feedback channel	0:AI1 1:AI2 2: Max (AI1,AI2) 3:Min(AI1,AI2) 4:AI1-AI2	\	2	○	AI1 and AI2 can be connected to the default sensor randomly.	0x009
F0.10	High pressure alarm value setting	F0.00~F0.08	bar	14.4	○	When feedback pressure is bigger than this set pressure, it alarms and stops after F4.09 delay. When the pressure returns to normal, after the reset delay time, the fault is solved automatically.	0x00A

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F0.11	Low pressure alarm value setting	0.0~F0.00	bar	0.0	○	When the feedback pressure is less than this set pressure, it alarms and stops after alarm delay set by F4.09. This function is invalid when this parameter is set as 0. When the pressure returns to normal, the fault is solved automatically after the reset delay	0x00B
F0.12	Inlet stop pressure	0.0Bar～F0.08	Bar	3.5Bar	○	Effective when F0.05=3, the converter starts when the inlet pressure is less than F0.13, and stops when the inlet pressure is greater than F0.12.The inlet pressure sensor can choose AI1 or AI2 as signal detection.	0x00C
F0.13	Intake starting pressure	0.0Bar～F0.12	Bar	2.5Bar	○		0x00D
F0.14	Intake feedback channel	0:AI1 1:AI2	0	0	○		0x00E
F0.15	Working mode of VFD	0~1	\	0	○	0:Pressure mode 1:General mode	0x00F
F0.17	Software version	2.000~2.999	\		◎	This instruction is only applicable to the software in this version.	0x011
F0.18	Acceleration time	0.0 ~6500.0	s	Model configuration	○	Differentiating from the power range 0.75-2.2kW:3.0s 4-7.5kW:5.0s 11-18.5kW:8.0s 22kW:20s	0x012
F0.19	Deceleration time	0.0~6500.0	s	Model configuration	○	Differentiating from the power range	0x013
F0.20	Macro functin	0~15	\	0	●	Refer to quick settings（Chapter 3）	0x014

4.2 Common Parameter Groups of Multi-drive Mode

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F1.00	On-line communication address	0-5	\	0	◎	1-5 is the address of auxiliary drives. The address of host drive is 0.	0x100
F1.01	The selection of backup actions for the sub-unit from the main unitb	0: closing down 1: constant speed 2: constant pressure	\	0	○	0: auxiliaries shut down after the host is disconnected. 1: auxiliaries can operate at a constant speed without connecting pressure sensors. 2: auxiliaries can operate at a constant pressure	0x101
F1.02	The selection of communication network mode	0~1	\	0	◎	0: CAN was set to auxiliary 1: CAN was set to host	0x102
F1.03	Number of the auxiliary drives	0~5	Set	0	◎	0: Cancel the control function of the host drives over the auxiliaries. Note: This parameter only serves as PID frequency source and is only set in CAN host drive.	0x103
F1.04	On-line operation mode	0: Multi-pump master-slave control 1: Multi-pump synchronous control 2: Multi-pump one-in-use, one-as-backup control	\	0	●	0: when the pressure is not enough, and the system is put into auxiliary operation in turn. 1: when the pressure is not enough, host and auxiliary Operating frequency is the same. 2: Only one VFD runs at any time and the rest is standby.	0x104

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F1.05	Multi-connection rotation interval/power consumption	0min/kWh～2000min/kWh	min/hWh	240	○	The alternating time of host drives and auxiliary drives 0: Cancel the alternating function of host drives and the auxiliary drives.	0x105
F1.06	Address setting of small pump	1~6	\	6	○	It is invalid when this address is bigger than the number of auxiliary drives. 0 means that the host drive is the small pump.	0x106
F1.07	Delay time of adding pumps	0.0~100.0	s	5.0	○	It means the delay time of adding pumps when the pressure is not enough.	0x107
F1.08	Multi-split system rotation time/water tower mode interval time	0: Minutes 1: Hour	1	0	●	When F1.12 is a new protocol, simply set this parameter on the host, and the slave will follow automatically. The old protocol requires Settings for each machine	0x108
F1.09	Water tower mode interval operation time	1~10000	1	60	●	The time unit takes effect according to the F1.08 setting	0x109
F1.10	Standby host enable Settings	0: Host communication loss or ERR24 1: All faults (except under-voltage)	1	0	○	This parameter is set on the host. When the host triggers the corresponding fault, the backup host is activated	0x10A
F1.11	Dual-syste	0: Close	1	0	○	When this mode is turned on, if	0x10B

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
	m mode	1: Mode 1 （RS485+RS485） 2: Mode 2 （AI1+RS485） 3: Mode 3 （AI1+DI）				the function No. 8 of the DI terminal is effective, switch to RS485 control; if not, switch back to the multi-split mode.	
F1.12	Multi-split CAN protocol	0: V1.0(Old Protocol) 1: V2.0 (New Protocol)	1	1	○	In order to be compatible with the PDH30 multi-split system and the PC30 V2.000 version software, the new protocol supports the dual-system mode. And starting from version V2.001, the new protocol is fully enabled. Subsequently, the main and auxiliary machines of the multi-split system need to uniformly use the same protocol	0x10C
F1.13	Operation duration of the water tower mode	0~10000	60			The unit of time based on F1.08 settings	
F1.16	Communication start/stop maintains memory	0: Invalid 1: Effective	0				
F1.17	Alternate host boot command control	0：Controlled by the original host's original start signal 1：Automatic start	1	1	○	When the alternate host is enabled, you can modify the parameters to choose how to start the command.	0x110
F1.18	Communicationnd control	0：Host computer start control 1：Multi-line communication	1	1	○	When the host computer is installed, you can modify this parameter to select the machine to directly start and stop the machine.	0x111

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
		control					
F1.19	Automatic and manual control of communication	0: Automatic control 1: Manual control	1	0	○	This parameter is only set during communication control for automatic and manual switching. The manual frequency source is controlled by the auxiliary frequency source	0x113
F1.20	Standby host mode	0x0000-0x1131	1	0x0001	○		0x114
F1.21	Multi-split rotation mode	0: Time control 1: Power control	1	0	○	0：After F1.05 time, force the machine with the least running time to run in rotation. 1：After F1.05 time, the machine with the least electricity consumption is forcibly rotated to operate.	0x115
F1.23	Multi-scene mode	0-2	1	0	○	0: balance 1: Hotel (constant pressure preferred) 2: Villa (sleep priority)	0x117
F1.24	Multifunction button (ENT button under level 0 menu)	0-5	1	0	○	0: No function 1: Change the running direction 2: Automatic/manual mode switch 3: Lock/unlock parameter switchover 4: Multi-scene switch (standard, hotel, villa) 5: Restore factory parameters	0x118

4.3 Debugging Parameter Groups

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F2.00	Selection of AI1 channel feedback types	0-4	1	0	○	0:4-20mA 1:0-10V 2:0.5-4.5V 3:0-5V 4:0-20mA	0x200
F2.01	AI1 signal correction coefficient	0.750-1.250	0.001	1.000	○	Correction of AI1 channel signal deviation	0x201
F2.02	Selection of AI2 channel feedback types	0-4	/	1	○	0:4-20mA 1:0-10V 2:0.5-4.5V 3:0-5V 4:0-20mA	0x202
F2.03	AI2 signal correction coefficient	0.750-1.250	0.001	1.000	○	Correction of AI2 channel signal deviation	0x203
F2.04	Motor control mode	0：SVC 1：VF	1	1	●	0：AM-SVC； 1：AM-VF；	0x204

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F2.05	Frequency source choice	0: The frequency is set by the keyboard numbers and is not remembered. 1: The frequency is set by the keyboard numbers and is remembered. 2: AI1 3: AI2 5: Emergent water supply 8: PID 9:Setting-by communication	/	8	●	Choose 8 for the host drives Choose 9 for auxiliary drives Choose 5 for emergent water supply.	0x205
F2.06	Maximum output frequency	50.00-500.00	Hz	50.00	●	When the operating frequency needs to exceed 320Hz, the F2.19 parameter needs to be set to change the decimal point of the operating frequency from two places to one place for it to take effect. If the motor is 60Hz, please modify this parameter first and then modify F2.06 and F5.04.	0x206
F2.07	Upper limit of running frequency	F2.08~F2.06	Hz	50.00	○	The upper limit of VFD's running frequency	0x207
F2.08	Lower limit of running frequency	0.00~F2.07	Hz	0.00	○		0x208

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F2.09	Options when it reaches the lower limit frequency	0-2	\	0	○	0: standby 1: Running according to the lower limit frequency 2: stop	0x209
F2.10	Setting of carrier frequency	1~16.0	kHz		○	Noise of the motor can be adjusted by modifying this value	0x20A
F2.11	Fan running mode	0-2	\	2	○	0: Running constantly when start-up 1: Running constantly when power on 2: Automatic operation according to temperature	0x20B
F2.12	Selection of the halt mode	0: Slow down and stop the machine 1: Free Shutdown	\	0	○	The selection for the halt mode of VFD.	0x20C
F2.13	Number of automatic reset failures	0~5	\	3	○	(E015/E024/E027/E028/E029/E031) These are not affected by this function.	0x20D

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F2.14	Selection of Carrier PWM Wave Characteristics	LED unit: 0: Independent of temperature 1: Dependent on temperature LED ten-thousands place: Carrier and output frequency correlation 0: Independent of output frequency 1-8: On, with adjustable depth LED hundreds place: Random PWM depth 0: Off 1-8: On, with adjustable depth LED thousands place: Over-modulation option 0: Off 1: On	0	1001	○	Electromagnetic noise can be improved LED bits: Carrier is associated with temperature 0: It doesn't depend on temperature 1: It has to do with temperature LED 10 bits: Carrier is associated with output frequency 0: Independent of the output frequency 1: Related to the output frequency LED hundred: random PWM depth 0: shut down 1-8: Open and adjust the depth LED thousand: overmodulation option 0: shut down 1: open	0x20E
F2.15	Frequency of standby host(auxiliary)	0~100.0	%	80.0%		Standby host uses the operating frequency of constant speed mode.	0x20F

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F2.16	Frequency setting for auxiliary channel selection	0: The frequency is set by the keyboard digits and is not remembered. 1: The frequency is set by the keyboard digits and is remembered. 2: AI1 3: AI2 4 - 6: Keep 7: Terminal UP/DW control 8: PID 9: Communication set 10: Multi-split set	1	1	●		0x210
F2.19	Frequency decimal point	1：One hundred and one decimal points 2：Two points	1	2	○		0x213

4.4 PID and Standby Parameter Sets

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F3.00	Proportional gain	0.00~1000.0	%	20.0	○	The bigger this parameter is, the quicker the response speed of water pressure system will be. However, if the value is too big, the system will oscillate. The value should be adjusted according to different water supply system.	0x300
F3.01	Integral time	0.01~10.00	s	1.00	○		0x301
F3.02	Differential time	0.000~10.000	s	0.00	○		0x302
F3.03	Start-up time of PID	0.00~100.0	s	0.10	○		0x303
F3.04	Deviation limit of PID control	0.0~100.0	%	0.0	○		0x304
F3.05	PID source setting choice	0~3	\	0	○	0: The digital PID is set 1: indicates that the AI1 channel is set 2: The AI2 channel is set 3: keyboard setting (timed water supply mode)	0x305

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F3.06	PID Control Selection	0: Positive 1: Negative	\	0	○		0x306
F3.07	Broken-line fault detection time of PID feedback	0.0~100.0	s	30.0	○	When the inverter runs through the detection time, If the PID feedback value is still 0, the PID feedback disconnection fault is reported. This function is invalid when the setting is 0.	0x307
F3.08	PID standby function option	0: Disabled 1: Sleep mode 1 2: Sleep mode 2 3: Sleep mode 3 4：Water tower mode(Control by pressure) 5：Water tower mode(Control by time)	\	2	○	Sleep mode 1: The system performs sleep processing based on pressure, frequency and time. At this time, the water leakage coefficient, the pressure holding detection time and the sleep rate are effective. Sleep mode 2:Sleep based on pressure and sleep frequency Sleep mode 3: rely on sleep frequency and sleep pressure to sleep; 4：Water tower mode: Operate the water tower at regular intervals when the pressure is insufficient	0x308
F3.09	PID wakeup detection delay	0.0~100.0	s	3.0	○	PID wakeup detection delay	0x309

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F3.10	PID standby detection delay	0.0~100.0	s	5	○	If the standby is slow or it can't enter standby in small water demand, decrease this value. If it enters standby in advance or it is started and stopped frequently, increase this value.	0x30A
F3.11	PID standby deviation pressure	0.0~1.0	bar	0.1	○	When the feedback pressure is within standby deviation range, it starts standby.	0x30B
F3.12	PID standby hold frequency	0.00~F3.13	Hz	20.00	○	PID runs at standby hold frequency. After the standby duration, PID enters standby status.	0x30C
F3.13	Standby detection frequency	F3.12~F2.07	Hz	25.00	○	The system will judge whether the condition of standby function, meet the frequency.	0x30D
F3.14	Low frequency operation hold time	0~120.0	s	5.0	○	When the system goes to sleep, the running time of PID standby hold frequency.	0x30E
F3.15	Periodic hibernation interval time	0~600	s	30.0		After this time, the system automatically detects the pressure hold status. 30.0s (7.5kw and below) 60.0s (7.5kw or above)	0x30F

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F3.16	The frequency for half pump flow (The pumping flow ratio between small pump and large pump)	20.00~F2.07	Hz (%)	30.00	○	Used in the mode of average dividing frequency. It is the frequency value that the pump reach half pump flow (notes: the parameter is reused in the small pump, serving as the flow percentage for small pumps and large pumps.)	0x310
F3.17	VFD Sleep Ratio	0~30	\	9	○	Set bigger make sleep quicker	0x311
F3.18	The feedback of disconnected detection value	0~1.00	V	0.20	○	Sampling minimum value in the system. It is judged by the voltage.	0x312
F3.19	Proportional gain 2	0.0~100.0	%	20.0	○		0x313
F3.20	Integral time 2	0.00~10.00	s	2.00	○		0x314

4.5 Parameter Sets of Pump Protection

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F4.00	Water shortage protection	0~4	\	2	○	0: Disabled 1: Enabled. Judge by frequency, pressure and current 2: Enabled. Judge by outlet pressure	0x400

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F4.01	Threshold of water shortage detection	0.0~F0.00	bar	0.5	○	When feedback pressure is smaller than this value, water shortage judgement is made	0x401
F4.02	Detection frequency of water shortage protection	0~F2.07	Hz	48.00	○	Comparison frequency to judge whether water shortage occurs. When running frequency is bigger than this frequency, it is judged as water shortage.	0x402
F4.03	Detection time of water shortage protection	0.0~200.0	s	60.0	○	When it meets the condition of water shortage, water shortage fault will be reported after this time.	0x403
F4.04	Current percentage of water shortage protection detection	0~100.0	%	40.0	○	It is valid only when F4.00 = 1. The percentage of motor rated current. When running current is less than this current, it is judged as water shortage.	0x404
F4.05	Automatic restart delay of water shortage protection	0~9999	min	15	○	Set 0: use F4.07 and F4.08 to reset water shortage faults. If it is not the “Set 0”	0x405
F4.06	Automatic reset times of water shortage protection	0~9999	\	10	○	When water shortage fault is reported, after the period set by F4.05, the VFD resets and runs automatically. Reset times are limited by F4.05. When it reaches reset times, water shortage fault can’t be cleared automatically. Press REST manually to reset the fault. 9999 can reset the fault unlimitedly	0x406

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F4.07	Input water recover pressure	0~F0.00	bar	1.0	○	If the system reported the water shortage fault (E027); When the VFD detection pressure is greater or equal to detection pressure of setting input water, and the time is greater than the detection time of input water, the system will reset to E027. This is applicable to pressurization system .of water inlet This is pressure value of output water	0x407
F4.08	Input water recover detect time	0~100.0	s	20.0	○		0x408
F4.09	The delay time of abnormal pressure alarm	0.0~120.0	s	3.0	○	The delay time of water pressure alarm and failure alarm	0x409
F4.10	Antifreeze operation frequency	0.00Hz ~ upper frequency F2.07	Hz	10.00	○	The time unit of antifreeze and antirust can be seconds or minutes, refer to the setting of F0.03.When the interval is set to 0, always run at the antifreeze operating frequency.	0x40A
F4.11	Antifreeze running time	0s/min～65000s/min	s/min	60	○		0x40B
F4.12	Antifreeze operation interval time	0s/min～65000s/min	s/min	300	○		0x40C
F4.13	Detection time of burst pipes	0~1000	s	0	○	The running frequency of all drives in system is greater or equal than F4.02, and the pressure is less than the starting pressure. It will report E031 fault after the time of F4.15. Set“0”: The detection of burst pipes is invalid.	0x40D

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F4.14	Antifreeze starting temperature	0～100℃	1℃	5℃	○	When the antifreeze selection mode is 3, the antifreeze function is turned on below the temperature, and the antifreeze period is timed with	0x400

4.6 Parameter Sets of Motor

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F5.00	Motor type	0-2	1	0	●	0: Asynchronous motor (AM) 1: Permanent magnet synchronous motor (PM) 2: single-phase motor	0x500
F5.01	Rated power of motor	0.1～22.0kW	0.1kW	Model determination	●	Set according to motor nameplate	0x501
F5.02	Rated voltage of motor	1～440V	1V	Model determination	●	Set according to motor nameplate	0x502
F5.03	Rated current of motor	0.1～50.0A	0.01A/0.1A	Model determination	●	Set according to motor nameplate	0x503
F5.04	Rated frequency of motor	0.01 ~ Maximum frequency F2.06	0.01Hz	Model determination	●	Set according to motor nameplate	0x504
F5.05	Rated motor speed	1～65000rpm	1rpm	Model determination	●	Set according to motor nameplate	0x505
F5.06	Motor stator resistance	0.001～65.000		Model determination	●		0x506
F5.07	Motor rotor resistance	0.001～65.000		Model determination	●		0x507
F5.08	Motor fixed rotor	0.1～6500.0mH		Model determination	●		0x508

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
	inductance						
F5.09	Mutual inductance of motor fixed rotor	0.1～6500.0mH		Model determination	●		0x509
F5.10	Motor no-load current	0.1～650.0A		Model determination	●		0x50A
F5.11	Tuning selection	0-2		0	●	0: no operation is performed 1: Static self-learning 2: Move and learn 3: Static learning 2(AM computing Lm)	0x50B
F5.12	G/P models	0: G type machine; 1: P-type machine;		Model determination	●		0x50C

4.7 Parameter Sets of Terminals

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F6.00	Motor overload warning coefficient	20.0～250.0%		80.0%	○		0x600
F6.01	Motor overload protection coefficient	20.0～250.0%		100.0%	○	The motor overload protection is an inverse-time curve	0x601
F6.02	Self-recovery interval time of faults	0.1～100.0s	s	30.0	○		0x602

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F6.03	PWM parameter setting	Units digit Ten One hundred Thousand bits		0x0001	○	Units bit: PWM mode selection 0: Automatic switching 1: CPWM 2: DPWM; 3: SPWM; Ten: Enable voltage prediction compensation Hundreds: 0: SSSU, 1: DSDU Thousand bits: Random carrier mode 0: Random carrier 1: Random zero vector	0x603
F6.04	Hardware current and voltage protection	The SC filtering time is: 1.2 μ s * T(T is the 100-bit setting)		0x0001	○	Unit bit: Hardware Rate Limiting (CBC) 0: Off 1: On Ten: Hardware overvoltage protection 0: Off 1: On Hundreds: SC filtering time 0 - F (Set to 0 to disable SC protection) Thousand bits: Current interference suppression 0: Off 1: On	0x604
F6.05	CBC protection point	0～220%	1%	200	○	The CBC point is adjustable as a percentage relative to the rated current of the frequency converter	0x605
F6.06	CBC overload protection time	1～5000ms	ms	500	○		0x606
F6.07	Short-circuit detection to ground upon power-on	0: Close 1: Open	1	1	○		0x607

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F6.08	Phase loss protection	0: Close 1: Open		0x0011	○	Units bit: Output phase loss protection Ten digits: Input phase loss protection Hundred position: Motor load drop protection	0x608
F6.09	Detection level of phase loss protection software	0.0～ 999.9%	0.1%	20.0	○	The software inputs the ratio of the missing phase to the bus voltage	0x609
F6.10	Output power correction coefficient	0 - 1000%	1%	100	○	Correct the output power value of C-10	0x60A
F6.11	Busbar under-voltage protection point	40.0% ～ 150.0%	0.1%	100.0	○	Compared with 537V	0x60B
F6.32	The number of constant-speed online start-up units	1~F6.33	1	1	○		0x620
F6.33	The upper limit of the number of constant-speed online start-up units	0~100	1	1	●		0x621

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F6.34	Fire mode	0: Close Mode 1 (Ignores all faults except overcurrent) 2: Mode 2 (Ignore all faults)	1	0	○		0x622

4.7 Parameter Sets of Terminals

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F7.00	Choose DI1 input terminal function	0-18		1	●	0: No function 1: Forward operation 2: Reverse operation 6: Free stop 7: Emergency stop 8: Dual-system RS485 mode 9: Fault reset 11: External fault input 18: Frequency source switching Attention：This form is not listed the function of the data is used to set prohibited	0x700
F7.01	Choose DI2 input terminal function			11	●		0x701
F7.02	Choose DI3 input terminal function			18	●		0x702
F7.06	Input terminal filtering time	0.000～60.000s		0.01s	○		0x706

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F7.07	Relay（TA1-TB1）output function selection	0-2	1	2	●	0: No function 1: Run the output 2: Fault output	0x707

4.8 Communication Parameter Sets

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F8.00	Local communication address	1~63	/	1	○	This address is used for PC communication.	0x800
F8.01	RS485 Baud rate setting of communication	0-9	\	5	○	0：300 bps 1：600 bps 2：1200 bps 3：2400 bps 4：4800 bps 5：9600 bps 6：19200 bps 7：38400 bps 8：57600 bps 9：115200 bps	0x801
F8.02	RS485 Data bit check setting	0: No check (8, N, 2) 1: Even check (8, E, 1) 2: Odd check (8 ,0 ,1) 3: No check (8, N ,1)	\	3	○	The data bit check setting of the VFD must be the same as the data bit check setting of the PC.	0x802

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F8.03	RS485 Response delay	0~500	ms	5	○		0x803
F8.04	RS485 Time out fault time	0.0~100.0	s	1.0	○	0.0: The function is disabled.	0x804
F8.05	RS485 read current resolution	0: 0.01A 1: 0.1A	\	1	○	This is to determine the current unit read by the communication.	0x805

4.9 Monitoring Parameter Sets

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F9.00	Temperature of radiator	0~100	℃	0	◎	Temperature of VFD.	0x900
F9.01	Running time of this VFD	0~65535	min	0	○	Running time of this VFD. (this is the statistical time).	0x901
F9.02	Power consumption of this machine	0～65535	0		●		0x902
F9.03	Pump temperature	0℃～100℃	0		●		0x903
F9.04	Pump overtemperature protection point	50℃～200℃	100℃		○		0x904

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
F9.12	Running time of this host drives	0~65535	min	The time is decided by the host and auxiliary drive	◎	The host drives will count the running time of each machine and conduct the rotation.	0x90C
F9.13	Running time of No. 1 auxiliary	0~65535	min		◎		0x90D
F9.14	Running time of No. 2 auxiliary	0~65535	min		◎		0x90E
F9.15	Running time of No. 3 auxiliary	0~65535	min		◎		0x90F
F9.16	Running time of No. 4 auxiliary	0~65535	min		◎		0x910
F9.17	Running time of No. 5 auxiliary	0~65535	min		◎		0x911

4.10 PFC function parameter group

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
FC.38	PFC function selection	Frequency converter temperature	111	Model setting	◎	Units: PFC switch 0: off 1: on Tens place: target voltage follows 0: fixed 220V 1: follows the shutdown voltage Hundred bits: Enable PFM mode Thousands: reserve	0xC26
FC.39	PFC power-on zero drift correction time limit	120.0 ～ 1.0Sec	1.0S	5.0S	○	Local running time (statistical time)	0xC27

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
FC.40	PFC target bus voltage setting	200.0 ～ 50.0%	1.00 %	120.00 %	●		0xC28
FC.41	The PFC voltage indicates the acceleration time	40.00 ～ 0.10Sec	1.00S	8.00S	●		0xC29
FC.42	PFC voltage indicates deceleration time	40.00 ～ 0.10Sec	1.00S	1.00S	○		0xC2A
FC.43	PFC current instruction limit	150.0 ～ 10.0%	1.00 %	100.00 %	◎		0xC2B
FC.44	PFC duty cycle limit	100.0 ～ 10.0%	1.00 %	98.00%	◎		0xC2C
FC.45	PFC voltage loop Kp gain	1000.0 ～ 0	1.0	1.0	◎		0xC2D
FC.46	PFC voltage loop Ki gain	1000.0 ～ 0	1.0	10.0	◎		0xC2E
FC.47	PFC current loop Kp gain	1000.0 ～ 0	1.0	2.0	◎		0xC2F
FC.48	Ki gain of PFC current loop	1000.0 ～ 0	1.0	3.0	○		0xC30

4.11 User Parameter Sets

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
FD.00	Password of the user	00000~65535	\	0000	○	Password to enter group FD.	0xD00
FD.01	Restore factory defaults	0~3	\	0	●	0: No action is taken 1: Restore factory value (do not restore motor parameters) 2: Clear fault records 3: Restore factory value (restore motor parameters)	0xD01

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
FD.02	Parameter locked	0~1	\	0	○	0: unlocked 1: locked	0xD02

4.12 Agent Parameter Sets

Function code	Description	Set range	Unit	Default	Revision level	Remarks	Mailing address
FE.00	Password	0000~9999	\	0000	○	The password to enter group FE.	0xE00
FE.01	Number of times the fault record is displayed	0~5	1	0000	○		0xE01
FE.02	Power-on arrival time setting	0~65535	h	0	○	After the power-on time is reached, the VFD will stop.	0xE02
FE.03	Run time arrival setting	0~65535	h	0	○	After the Running time is reached, the VFD will stop.	0xE03

4.13 C0 group keyboard timing parameters

Note: For timing mode application, first set F3.05=3,C0 parameter group to enter the description, long press "Menu" + "Shift" key for 3 seconds;

Function code	Description	Set range	Unit	Default	Revision level	Remarks

C0.00	Daily water supply switch selection	0: Off 1: Enable 2：Start and stop in different time periods	1	0	○	To enable the time-of-use constant voltage function, the inverter F3.05 needs to be simultaneously changed to 3. 2. Enable the time-segmented start and stop function. The inverter F0.05 needs to be synchronously changed to 4.
C0.01	Daily start time 1	00:00～C0.03		00:00	○	
C0.02	Daily pressure setting/start-stop 1	0.0～C0.17		3.0	○	When C0.00=1, this parameter is used as the pressure setting for different time periods, ranging from 0.0 to C0.17. When C0.00=2, this parameter is set for start-stop at different time periods, ranging from 0 to 1 (0: stop, 1: start).
C0.03	Daily start time 2	C0.01～C0.05		04:00	○	Hour: min
C0.04	Daily pressure setting/start-stop 2	0.0～C0.17		3.0	○	When C0.00=1, this parameter is used as the pressure setting for different time periods, ranging from 0.0 to C0.17. When C0.00=2, this parameter is set for start-stop at different time periods, ranging from 0 to 1 (0: stop, 1: start).
C0.05	Daily start time 3	C0.03～C0.07		08:00	○	Hour: min
C0.06	Daily pressure setting/start-stop 3	0.0～C0.17		3.0	○	When C0.00=1, this parameter is used as the pressure setting for different time periods, ranging from 0.0 to C0.17. When C0.00=2, this parameter is set for start-stop at different time periods, ranging from 0 to 1 (0: stop, 1: start).

C0.07	Daily start time 4	C0.05～C0.09		12:00	○	Hour: min
C0.08	Daily pressure setting/start-stop 4	0.0～C0.17		3.0	○	When C0.00=1, this parameter is used as the pressure setting for different time periods, ranging from 0.0 to C0.17. When C0.00=2, this parameter is set for start-stop at different time periods, ranging from 0 to 1 (0: stop, 1: start).
C0.09	Daily set stress 5	C0.07～C0.11		12:00	○	Hour: min
C0.10	Daily pressure setting/start-stop 5	0.0～C0.17		3.0	○	When C0.00=1, this parameter is used as the pressure setting for different time periods, ranging from 0.0 to C0.17. When C0.00=2, this parameter is set for start-stop at different time periods, ranging from 0 to 1 (0: stop, 1: start).
C0.11	Daily start time6	C0.09～23:59		20:00	○	Hour: min
C0.12	Daily pressure setting/start-stop 6	0.0～C0.17		3.0	○	When C0.00=1, this parameter is used as the pressure setting for different time periods, ranging from 0.0 to C0.17. When C0.00=2, this parameter is set for start-stop at different time periods, ranging from 0 to 1 (0: stop, 1: start).
C0.13	Time setting	00:00～23:59			○	Hour: min
C0.14	Keyboard parameter management	0: no operation is performed 1: Restore the keyboard to factory defaults argument			○	
C0.15	System language	0:: Chinese 1: English 2: Pure icon		0	○	

		display				
C0.16	Software version number				◎	
C0.17	Set the upper limit of keyboard pressur	0.0～200.0		10	○	

(1) When setting parameters, the following requirements should be met:

Start period 1 ≦ Start period 2 ≦Start period 3 ≦Start period 4 ≦ Start period 5 ≦Start period 6

(2) Parameter description:

Starting period 1≦ Current time < starting period 2, the set pressure of water supply for each period is set pressure 1;

Start period 2≦ Current time < start period 3, the set water supply pressure for each period is set pressure 2

Start period 3≦ Current time < start period 4, the set water supply pressure for each period is set pressure 3

Start period 4≦ Current time < start period 5, the set water supply pressure for each period is set pressure 4

Start period 5≦ Current time < start period 6, the set water supply pressure for each period is set pressure 5

Start period 6≦ Current time < start period 1(the next day), the set pressure of water supply for each period is set pressure 6

4.14 D0 group monitoring parameters

Function code	Description	Unit
D0.00	Output frequency	0.01 Hz
D0.01	Setting frequency	0.01 Hz
D0.02	Bus voltage	0.1V
D0.03	Output voltage	1V

D0.04	Output current	0.01A
D0.05	Output Power	0.1kW
D0.06	Output torque	0.1%
D0.07	DI input status	1
D0.08	DO output status	1
D0.09	AI1 voltage	0.01V
D0.10	AI2 voltage	0.01V
D0.11	Cumulative power-on time	1H
D0.12	Cumulative running time	1H
D0.13	Cumulative power consumption	0-65535kWh
D0.14	Load speed	1RPM
D0.15	PID setting	0.1Bar
D0.16	PID feedback	0.1Bar
D0.17	Show pressure	0.1
D0.18	Inlet pressure	0.0

4.15 Fault record parameter groups

Function code	Description	Default	Revision level
E0.00	Last fault type	\	◎
E0.01	Frequency at the last fault		
E0.02	Current at the last fault		
E0.03	Bus voltage at the last fault		
E0.04	input terminal status at the last fault		
E0.05	Output terminal status at the last fault		
E0.06	Fault module temperature		

E0.07	Faulty frequency converter status		
E0.08	Failure time at the last fault (Starting from this power-on)		
E0.09	Failure time at the last fault (Starting from the run)		
E0.10	Reserved		

Chapter 5 Fault Information and Troubleshooting

5.1 Fault Codes Description

Fault code	Fault type	Possible fault reasons	Solution
E002	Over current in accelerated running	1.Too fast acceleration 2.Too low grid voltage 3.The power of the VFD is too low	1.Increase acceleration time 2.Check input power 3.Use bigger power VFD
E003	Over current in decelerated running	1.Too fast deceleration 2.The power of the VFD is too low	1.Increase deceleration time 2.Increase power of the VFD
E004	Over current in constant speed running	1.Saltation or abnormality happens to load 2.The grid voltage is too low 3. The power of the VFD is too low	1.Check the load or decrease the saltation of the load 2.Check input power supply 3.Use bigger power VFD
E005	Over voltage in accelerated running	1. The input voltage is abnormal 2. Restart rotating motor after momentary outages	1.Check input power supply 2.Avoid restarting after it is stopped
E006	Over voltage in decelerated running	1.Too fast deceleration 2.The inertia of load is too big 3. The input voltage is abnormal	1.Increase acceleration time 2.Increase dynamic braking modules 3.Check input power
E007	Over voltage in constant speed running	1. Abnormal changes happen to input voltage 2.The inertia of load is too big	1.Install input reactor 2. Add proper dynamic braking modules
E008	Buffer resistor overload	1.Input voltage is not within the specified rang	1.Adjust the input voltage to the specified range

Fault code	Fault type	Possible fault reasons	Solution
E009	Low bus voltage	1. The grid voltage is too low.	1. Check grid input power supply
E010	VFD overload	1.Too fast acceleration 2. Restart rotating motor 3. The grid voltage is too low. 4. Overload	1.Increase acceleration time 2.Avoid restarting after it is stopped 3.Check grid voltage 4.Use bigger power VFD
E011	Motor overload	1. The grid voltage is too low. 2.Wrong setting to motor rated current 3.Motor stall or big changes to load 4. Motor is too small	1.Check grid voltage 2. Reset motor rated current 3.Check the load and adjust torque lifting capacity 4.Use proper motor
E012	Input phase loss	Phase loss of input R,S,T	1.Check input power 2.Check wiring installation
E013	Output phase loss	U,V,W phase loss output(or the three phases of load is not symmetrical)	1. Check output wiring 2. Check motor and cable
E014	Module overheating	1.Instant over current of VFD 2.Output three phases have interphase or ground is short circuit 3.Air passage block or fan broken 4.The environmental temperature is too high 5.Control panel wire or plugins loose 6. Power circuit irregularity 7.Control board exception	1.Refer to over current solutions 2.Re-wiring 3.Dredge air passage or change fan 4.Decrease environmental temperature 5.Check and re-connect 6.Seek for service
E015	External faults	External input terminals faults	1.Check input of external equipment
E016	Communication faults	1. Baud rate is set improperly 2.Communication faults of adopting serial communication 3. Communication is interrupted for a long time	1.Set proper baud rate 2.Press RUN/STOP key to reset; seek for service 3.Check wiring of communication interface
E017	Relay failure	1.The relay is not closed	1.Replacement relay and seek for service

Fault code	Fault type	Possible fault reasons	Solution
E018	Fault of current detection circuits	1.Poor contact of control board connector 2.Power circuit irregularity 3.Damage to hall devices 4.Exception of amplifying circuit	1.Check connector and re-plug 2.Seek for service
E022	EEPROM read write faults	1.Read write of control parameter goes wrong 2.EEPROM broken	1.Press RUN/STOP key to reset 2.Seek for service
E023	Short circuit protection with earth	1. The motor and the ground are short-circuited	1. Seek for service
E024	Feedback broken line fault	1. Sensor broken line or poor contact 2.Broken line detection time is too short 3.The sensor is broken or the system has no feedback signal.	1.Check the installation and wiring of sensor 2.Increase broken line detection time 3.Change sensor
E025	Power-on time arrival	1. The power-on time is reached	1.Seek for service
E026	Running time arrival	1.The running time is reached	1.Seek for service
E027	Water shortage alarm	1.Water pressure/level exception 2. Sensor broken line or poor contact. System has no feedback signal 3.Water shortage alarm detection time is too short (F4.03) 4.Water shortage protection frequency is too low(F4.02) 5.Water shortage protection detection current is too low（F4.04）	1. Check whether the pressure of inlet is abnormal or not 2.Check the installation and wiring of sensor 3.Check relevant parameter settings
E028	High pressure alarm	1.Feedback signal of senor exception 2.High pressure alarm value adjustment is too low (F0.10)	1.Check the wiring of sensor 2.Check relative parameter settings

Fault code	Fault type	Possible fault reasons	Solution
E029	Low pressure alarm	1. Low pressure alarm value is set too high（F0.11） 2. Sensor broken line or poor contact. System has no feedback signal 3.Sensor type is inconsistent with actual situation	1.Modify parameters 2.Check the sensor
E031	Burst pipes alarm	The detection time of burst pipe is too short (F4.10)	Pipe detection (Notes: This fault is only for manual reset)
E032	The PFC module is faulty		Seek for services
E040	The per-wave current limiting fault	1. Whether the load is too large or the motor is blocked 2. Frequency converter selection is small	1. Reduce the load and check the motor and mechanical condition 2. Choose a inverter with large power
E050	On-line communication error	1.Abnormal multi-drive communication	1.Be power on again 2.Check the parameter of communication 3.Seek for services
E098/E099	Keyboard communication failure	1.The line of keyboard communication is abnormal 2.Control board is abnormal 3. Keyboard is abnormal	1.Replace the keyboard communication line 2. Replace the keyboard or control board 3. Seek for services

Table 5-1-1 Fault codes description

5.2 Common Faults and Handling

The following faults may happen in use. For brief fault analysis, please refer to the following methods.

5.2.1 No display at power on

(1) Check whether the input power is consistent with the nominal voltage of the drive with multimeter.

(2) Check whether the three-phase rectifier bridge is intact. If the rectifier bridge is broken down, please request service.

5.2.2 The power air switch trips off at power on.

(1) Check whether there is short circuit or ground connection between input power. If yes, please eliminate it.

(2) Check whether the rectifier bridge has been broken down. If yes, please request service.

5.2.3 The motor doesn't rotate after the VFD runs.

(1) Check whether there is balanced three-phase output among U, V, W. If yes, check whether the motor is broken or blocked. If no, please confirm whether the motor parameters are set correctly.

(2) If there is output but the three-phase power is not balanced, please request service.

(3) If there is no output voltage, please request service.

5.2.4 It doesn't stop in no water use.

(1) Check whether the feedback pressure displayed on the VFD board is no less than set pressure. If the feedback pressure is less than set pressure, please check whether the range of the pressure sensor is set correctly, whether the pump rotates reversely, whether there is air and whether the inlet is blocked by sundries.

(2) If the feedback value change back and forth around the set value, stop the VFD manually and check whether the pressure keep declining or not. If yes, it needs to change the check valve.

5.2.5 It can't sleep in small amount of water use or leakage

If it can't sleep or the sleep time is too long, please decrease the value of F0.04 properly.

If it starts and stops frequently, please increase the value of F0.04 properly.

5.2.6 It can't stop to make protection in water shortage.

(1) Water shortage protection switch (F4.00) is not enabled.

(2) The threshold value of water shortage detection (F4.01) is set too low.

(3) The current percentage of water shortage detection (F4.04) is set too low.

Chapter 6 Communication Protocol

PC30 series provides RS485 communication interfaces (A+/B-), and adopts international standard Mod-Bus communication protocol. Users can realize centralized control by PC/PLC/touch screen and other upper machine to suit for specific application demand. (Setting VFD control command, running frequency, modifying function code parameters, motoring VFD working status and fault information)

6.1 Command Codes and Communication Data Description

(1)Address of functions

Function	Address definition	Data meaning	R/W character
Communication control command	0x2000H	0x0001:Forward running	W
		0x0002:Reverse running	
		0x0003:JOG forward	
		0x0004: JOG reverse	
		0x0005: Free stop（emergency stop）	
		0x0006:Deceleration stop	
		0x0007:Fault reset	
VFD status	0x3000H	0x0001: Forward running	R
		0x0002: Reverse running	
		0x0003:Stop	
Stopping or running	0x1000	Communication setting value range（-10000~10000)	W/R

Function	Address definition	Data meaning	R/W character
parameters		Note: Communication setting value is the percentage of relative value （-100.00%~100.00%）.Communication write operation can be made. When it serves as frequency source setting, the relative value is the percentage of maximum frequency （F2.07）.	
	0x1001	Running frequency(0.01Hz)	R
	0x1002	Bus voltage（0.1V）	R
	0x1003	Output voltage(1V)	R
	0x1004	Output current(0.01A,>55kW,0.1A)	R
	0x1005	Out power(0.1kW)	R
	0x1006	Out torque (0.1%)	R
	0x1007	Running speed(1RPM)	R
	0x1008	Terminal input mark state（0 decimal）	R
	0x1009	Terminal output mark state（0 decimal）	R
	0x100A	AI1 value(0.01V)	R
	0x100B	AI2 value(0.01V)	R
	0x100C	Cumulative power-on time(1h)	R
	0x100D	Cumulative running time(1h)	R
	0x100E	Cumulative power consumption (1kWh)	R
	0x100F	Setting pressure(0.1bar)	R
	0x1010	Feedback pressure(0.1bar)	R

Table 6-1-1 Address of functions

Notes: When reading parameters, read 12 consecutively.

Data	Fault
0x00	No faults
0x01	Reserved
0x02	Over current in acceleration running
0x03	Over current in deceleration running
0x04	Over current in constant running
0x05	Over voltage in acceleration running
0x06	Over voltage in deceleration running
0x07	Over voltage in constant running
0x08	Buffer resistor overload
0x09	Low bus voltage
0x0A	VFD overload
0x0B	Motor overload
0x0C	Input phase loss
0x0D	Output phase loss
0x0E	Module overheating
0x0F	External fault
0x10	Communication fault
0x11	Reserved
0x12	Fault of current detection circuits
0x16	EEPROM read-write fault
0x17	Short circuit protection with earth
0x18	PID feedback broken line fault
0x19	Power-on time arrival
0x1A	Running time arrival
0x1B	Water shortage alarm
0x1C	High water pressure alarm
0x1D	Low water pressure alarm
0x1F	Burst pipes alarm

0x32	On-line communication error
0x63	Keyboard communication failure

Table 6-1-2 Comparison of values and actual faults

6.2 Meaning of fault codes

Mod-bus fault codes		
Code	Name	Meaning
0x01	code error	The code written in the code checking address is different from the code set by FD.00 user
0x02	Illegal functions	Function code received from upper machine is not allowed operation. Perhaps the slave unit processes such requests in wrong state
0x03	Check error	In the frame information sent by the upper machine, when RTU format CRC check bit or ASCII format LRC check bit is different with the check number of lower machine, check error will be reported.
0x04	Illegal data address	Request data address of the upper machine is not allowed address. Especially, the combination of register address and transferred byte is invalid.
0x05	Illegal data value	Data field received includes not allowed value. Note: It does not mean that the data item submitted for saving in the register has an unexpected value.
0x06	Parameter modification invalid	In the writing command sent by the upper machine, the data sent is beyond parameter range or the writing address cannot be written currently.
0x07	System is locked	When the upper machine is reading or writing, if user password is set and password lock is not removed, it will report that the system is locked.

0x08	EEPROM is operating	VFD is busy(EPPROM is under saving)

Table 6-2-1 Meaning of fault codes

6.3 The example of reading and writing parameters command

	VFD address	Command	High address of parameters	Low address of parameters	High bit of data content	Low bit of data content	Low bit of CPR check	High bit of CRC check
Reading command（F0.12）	01	03	F0	0C	00	02	37	08
Writing command（F0.12）	01	06	F0	0C	00	21	BA	D1

Notes: Reading parameters address directly. For example, the read address of F3.15 is 0xF30F; the maximum-continuous units is 12.

Write parameters and save. The address is the same as the reading address. For example, the writing address of F3.17 is 0xF311

Chapter 7 Warranty Policy

Standard Warranty Period:

The pump controller manufacturer grants a standard warranty period of 18 months (1.5 years) for the pump controllers, starting from the date of shipment from manufacturer factory or 12 months (1 year) starting from the date of purchased invoice marked (whichever is longer).

Warranty Conditions:

If your pump controller gets fault and requires troubleshooting, please contact your distributor or dealer directly. Alternatively, feedback briefly to manufacture service hotline for logging and send your warranty card to our service department by fax/email to process the warranty claim. During the warranty period, the pump controller manufacturer covers all costs for replacing any product or parts of the product proved to be defective in design or manufacture. To claim the warranty under the warranty policy of pump controller manufacturer, you need to supply us with the following information and documentation regarding the faulty pump controller:

1. Product model No.(e.g. PC30-2S2R2LN-E) and serial No. (e.g.C121661B280H000292YA).
2. Copy of the invoice and warranty certificate of the controller.
3. Copy of the installation report and installation date.
4. Error message on LED screen (if available) or any information which would be helpful to determine the defect
5. Detailed information about the entire system (modules, circuits, etc.).
6. Documentation of previous claims/exchanges (if applicable).

After receiving above information, The pump controller manufacturer will decide how to proceed the service:

☐Repaired by manufacture factory, or

☐Repaired on-site by manufacture service center, or

☐Offer a replacement device of equivalent value according to model and age.

In the case of an exchange, the remaining portion of the original warranty period will be

transferred to the replacement device. You will not receive a new certificate, as your entitlement is documented at pump controller manufacturer.

If the pump controller needs to be replaced following assessment, manufacture will send a replacement unit immediately. The defective pump controller should be sent back to the closest manufacture service center by packing in its original package if possible.

Product warranty Card

Customer info.	Company name:	
	Company address:	
	Contact:	Tel.:
	Fax:	Zip code:
Product info.	Product model:	SN code:
	Buying date:	Fault date:
	Motor power:	Application situation:
Fault info.	Fault description: Signature: Date: