![iBESTCN logo]

User Manual
G1 Series Smart water Pump Drive

Preface

Thank you for purchasing and using the G1 series Smart water Pump Driver products. This series products is a Multi -functional and high-performance products initially well-designed for the water Pump Inverter industry, it has the compatibility with the asynchronous motor as well, can achieve single pump control and intelligent online operation of multiple pumps. The system is easy to operate, high reliability, simple to adjust parameters, just need a key setting can be modified to the dedicated functions you needed, making it more easier when you using the inverter. It is necessary to read this manual carefully before installation, please operate according to the contents of the manual. After reading, please keep it well. This manual is a good guide to the installation, repairing, maintenance and fault diagnosis of the product.

Content

Chapter 1 safety precautions

Safety definition:

In this manual, safety precautions are divided into the following two categories:

⚠ Danger: if used incorrectly, it may result in serious physical injury or even death situation;

⚠ Caution: if used incorrectly, it may cause moderate or minor injury or damage to the equipment;

When installing, commissioning, and maintaining the system, please read this chapter carefully and follow the safety precautions specified in this chapter Item to perform operations. The Company has nothing to do with any injury or loss caused by incorrect operations.

VFD: Abbreviation of smart pump drive.

1.1 Safety Precautions

1.1.1 Installation:

⚠ **Danger**
● When you open the packaging box 1please do not install or operate the VFD if it is soaked in water or damaged or has missing parts.
● If the packing list does not match the actual name, please do not install!
● Carry with Handle gently otherwise, the equipment may be damaged.
● Do not use the VFD with damage or missing parts. There's a risk of injury!
● Do not touch the components of the control system with your hands, otherwise there is a risk of electrostatic damage!
● Please install on metal and other flame-retardant objects; Keep it away from combustibles. Otherwise it may cause a fire!
● Do not screw the fixing bolts of the equipment components at will, especially the bolts with red marks!
● Do not allow wire heads or screws to fall into the machine. Otherwise it will cause damage to the frequency converter!
● Please install the inverter in a place with little vibration and avoid direct sunlight.
● When more than two VFDs are placed in the same cabinet, please pay attention to the installation position to ensure the heat dissipation effect.

1.1.2 Wiring

<table>
<tr><td align="center">⚡ Danger</td></tr>
</table>

- Must comply with the guidance of this manual by professional electrical engineering personnel construction, otherwise there will be unexpected dangers!
- There must be a circuit breaker between the VFD and the power supply, otherwise there may be a fire!
- Before wiring, please confirm that the power supply is in the zero power state, otherwise there is a risk of electric shock!
- Please ground the VPD correctly according to the standard, otherwise there is a risk of electric shock!
- Never connect the input power supply to the output terminals (U, V, W) of the VFD.
- Pay attention to the mark of the terminal, do not connect the wrong wire! Otherwise it will cause damage to the VFD!
- Ensure that the wiring complies with EMC requirements and local safety standards. The diameter of the wire used is recommended by the national standard. Otherwise it may cause an accident!
- Never connect the brake resistor directly between the DC bus (+) and (-) terminals. Or cause a fire alarm!

1.1.3 Connecting

<table>
<tr><td align="center">⚠ Caution</td></tr>
</table>

- Please confirm whether the voltage level of the input power supply is consistent with the rated voltage level of the VFD; Whether the position of the connecting between power input terminals (R, S, T/L, N) and output terminals (U, V, W) is correct; And pay attention to check the connection with the VFD, Whether there is a short circuit in the peripheral circuit, whether the connected line is tight enough, otherwise it will cause damage to the VFD!
- Any part of the VFD does not need to carry out voltage test, the product has already been tested before leaving the factory. Otherwise it will cause an accident!

<table>
<tr><td align="center">⚡ Danger</td></tr>
</table>

- The VFD must be covered before it can be powered on. Otherwise it may cause electric shock!
- The wiring of all peripheral accessories must follow the instructions in this manual and be correctly connected according to the circuit connection method provided in this manual. Otherwise cause an accident!
- Do not open the cover after connecting. Otherwise there is a risk of electric shock!
- Do not touch the VFD and peripheral circuits with wet hands. Otherwise there is a risk of electric shock!
- Do not touch any input/output terminals of the VFD. Otherwise there is **a risk of**

> electric shock!
> - At the beginning of connecting, the VFD automatically carries out safety detection on the external strong current circuit. At this time, never touch the VFD U, V, W terminal or motor terminal, otherwise there is a risk of electric shock!
> - If parameter identification is needed, please pay attention to the danger of injury during motor rotation. Otherwise it may cause accidents!
> - Do not adjust the VFD manufacturer's parameters at will. Otherwise it may cause damage to the equipment!

1.1.4 Running

> ⚡**Danger**
>
> - Please do not touch the cooling fan or the discharge resistor to test the temperature. Otherwise it may cause burns!
> - Non-professional technicians should not detect signals in operation. Otherwise may cause physical injuries or equipment damage.
>
> ⚠**Caution**
>
> - Avoid anything falling into the equipment when the VFD is running. Otherwise cause equipment damage!
> - Do not use the contactor on and off method to control the start and stop of the VFD. Otherwise may damage the equipment!

1.1.5 maintenance：

> ⚡**Danger**
>
> - Do not repair or maintain the VFD with power on. Otherwise there is a risk of electric shock!
> - Confirm that the VFD's voltage is lower than AC36V, in that situation to carry out maintenance and repair, with a guarantee of two minutes later power off. Otherwise, the residual charge on the capacitor will cause harm to people!
> - The people who hasn't professional training experience please do not repair or maintain the VFD. Otherwise, may cause physical injuries or the damage of the equipment!
> - After replacing the VFD, the parameters must reset, and all plugable plug-ins must be plugged and unplugged in the situation of power off!

Chapter 2 Product information

2.1 Naming rules

G1 - 4.0G - T4

Product Series

4.0 : Power
G : Conventional models

S : Single-phase
T : Three-phase
2 : 220V
4 : 380V

2.2 Nameplate label

Manu-facturer → Changsha Best Electrical Technology Co., Ltd

Model → MODEL : G1-4.0G-T4   IP20

Power → POWER : 4.0kW   C E

Input → INPUT : 3PH AC380V 50/60Hz

Output → OUTPUT : 3PH AC0-380V 0-500Hz 9A

S/N → G 1 0 0 4 0 T B C J A A A A 1 0 0 0 0 1
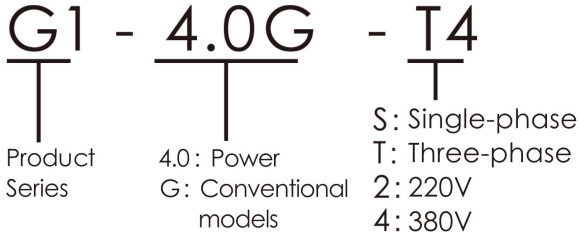
2.3 The selection of VFD

Table 2-3-1 the specification series of VFD

Inveter Model	power capacity kVA	Input current A	**Output Current** A	Adaptive Motor KW	HP
single-phase supply : 200V~240V, 50/60Hz					
G1-0.75G-S2	1.5	8.2	4.0	0.75	1
G1-1.5G-S2	3.0	14.0	7.0	1.5	2
G1-2.2G-S2	4.0	23.0	9.6	2.2	3
G1-4.0G-S2	5.9	40.0	17.0	4.0	5
G1-5.5G-S2	8.9	52.0	25.0	5.5	7.5
three-phase supply : 200V~240V, 50/60Hz					
G1-0.75G-T2	2.1	4.6	3.8	0.75	1
G1-1.1G-T2	2.9	6.3	5.1	1.5	2
G1-1.5G-T2	4.2	9	7.2	2.2	3
G1-2.2G-T2	5.3	11.4	9.0	3.0	4
G1-4.0G-T2	7.7	16.7	13.0	4.0	5
G1-5.5G-T2	14.8	32.2	25.0	5.5	7.5
G1-7.5G-T2	18.9	41.3	32.0	7.5	10
G1-11G-T2	27	59	45.0	11.0	15

Inveter Model	power capacity kVA	Input current A	**Output Current** A	Adaptive Motor KW	HP
three-phase supply：380V~440V，50/60Hz					
G1-0.75G-T4	2.8	3.4	2.5	0.75	1
G1-1.5G-T4	5	5.0	3.8	1.5	2
G1-2.2G-T4	6.7	5.8	5.1	2.2	3
G1-4.0G-T4	12.0	11.4	9.0	4.0	5
G1-5.5G-T4	17.5	16.7	13.0	5.5	7.5
G1-7.5G-T4	22.8	21.9	17.0	7.5	10
G1-11G-T4	33.4	32.2	25.0	11.0	15
G1-15G-T4	42.8	41.3	32.0	15.0	20
G1-18.5G-T4	45.0	49.5	37.0	18.5	25
G1-22G-T4	54.0	59.0	45.0	22.0	30
G1-30G-T4	40.0	62.0	60.0	30	40
G1-37G-T4	57.0	76.0	75.0	37	50
G1-45G-T4	69.0	92.0	91.0	45	60
G1-55G-T4	85.0	113.0	112.0	55	70
G1-75G-T4	114.0	157.0	150.0	75	100
G1-93G-T4	134.0	180.0	176.0	90	125
G1-110G-T4	160.0	214.0	210.0	110	150
G1-132G-T4	192.0	256.0	253.0	132	175
G1-160G-T4	231.0	307.0	304.0	160	210
G1-185G-T4	240.0	343.0	340.0	185	240
G1-200G-T4	250.0	385.0	377.0	200	260
G1-220G-T4	280.0	430.0	426.0	220	300
G1-250G-T4	355.0	468.0	465.0	250	350
G1-280G-T4	396.0	525.0	520.0	280	370
G1-315G-T4	445.0	590.0	585.0	315	500
G1-355G-T4	500.0	665.0	650.0	355	420
G1-400G-T4	565.0	785.0	725.0	400	530

2.4 Product specification

Item		specification
Basic parameter	Inveter capacity	0.75~400kW
	power input	AC：single phase 220V、three phase 220V、three phase 380V，50/60Hz
		Allowable fluctuation range of voltage：-15%-15%
		Allowable range of frequency fluctuation：±5%
	power output	output voltage：three phase 0V~ input voltage

Item		specification
		output frequency：0~500Hz，Can be changed by parameter
	carrier frequency	0.5~16kHz，The carrier frequency can be automatically adjusted according to the load characteristics
	control mode	asynchronous motor：VF control synchronous motor：SVC control
	overload capacity	150% operation 60S report overload,180% rated current 1s
man-machine interaction	input terminal	6 low speed DI digital input terminals, 2 AI analog input terminals.Both AI1 and AI2 support 0~10V voltage or 0~20mA current input
	output terminal	1 DO collector output terminal 1 AO analog output terminal, support 0~10V voltage output 2 RO relay output terminals
	communication terminal	One 485 communication terminal 1 CAN communication terminal
	DTU terminal	1 built-in DTU interface, can be built-in or external GPRS DTU, Internet of Things communication (built-in GPRS module can be installed in the inverter)
control characteristic	Run command channel	Operation panel , control terminal, communication
	Frequency set channel	Digital set, analog set, communication set, multi-stage set, PID set
	Manual automatic switching	Panel, terminal, communication switch automatic/remote and manual/local operation modes
	Antifreezing function	Turn on the antifreeze, and run the pump intermittently at the antifreeze frequency during hibernation to prevent the pump and equipment from freezing and
	Intelligent full frequency conversion	One-click parameter switching built-in pump software intelligent multi-pump full frequency conversion mode
	Cabinet control full frequency	The one-click parameter is switched to the cabinet control full frequency conversion mode that accepts the instructions issued by the PLC host
	High voltage alarm	Stop protection when the pipe network pressure exceeds the set alarm value
	Low Voltage Alarm	Stop protection when the pipe network pressure is lower than the set alarm value
	Water shortage protection	After the water shortage test of the pipe network, the inverter stops and the pump stops for protection
	Sensor break protection	When the sensor breaks the line, the inverter alarms and stops for protection
	Permission setting	Access permissions can be set

Item		specification
	Multiple control mode selection	can choose a variety of control modes: constant voltage mode, constant current mode, constant speed mode
	Burst tube detection function	When the output frequency of each inverter is greater than the set value and the outlet pressure is lower than the detected value, fault protection is carried out
	Pump cleaning	Enable the water pump cleaning function with a given command
	Fire overcontrol	Continuous full power output in case of emergency
	Add and subtract pump control	Multiple frequency converters can work together at the same time for internal communication, and the slave machine accepts the running command of the host
	Timing rotation	Rotate idle pump regularly to balance the running time of pump group
	Sleep and wake up	Supports sleep and wake up functions
	Master-slave switchover	Supports automatic master-slave switchover and standby host function
	Soft fill function	The water inlet function of pipe network can reduce the water hammer phenomenon of empty pipe
	Deep well pump function	Automatically adjust the speed according to the flow rate or automatically switch the low, medium and high speed of the water level
	Tank level detection	The liquid level sensor can be connected to detect the water level of the pool in real time
	The system automatically starts after	Enable the restart after power-on/reset function. After a call or fault is reset, you do not need to set the running command again
	Alarm self-reset	Alarm self-reset function can be set, default 5 times, up to 20 times
	Run time arrival	Shutdown protection when set runtime is reached
	Parameter copy function	The function code information of the inverter can be uploaded and downloaded to achieve rapid parameter replication
	DC braking	Dc braking starting frequency: 0.00Hz~ maximum frequency braking time：0.0s~100.0s Braking action current value：0.0%~100.0%
	inching control	Point frequency range：0.00Hz~50.00Hz Point acceleration and deceleration time 0.1s~6500.0s
	Multi-speed operation	Up to 16 segment speeds are achieved through the control terminal
	automatic voltage regulationAV	When the grid voltage changes, it can automatically keep the output voltage constant
	Over voltage over loss rate control	Automatic current and voltage limit during operation to prevent frequent overvoltage trip

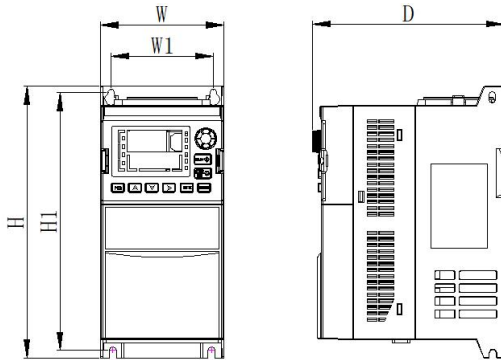| Item		specification
protection function	Inverter protection	Inverter overcurrent, inverter overload, inverter overvoltage, inverter undervoltage, input phase deficiency, output phase deficiency, communication fault, current detection fault, motor tuning fault, short
	motor protection	Motor gridlock, motor overload, speed limit, etc
Panel standard	type	LED
	LED display	Double row 5-bit digital tube display, can monitor the status of 2 frequency converter
	Visual LED indicator	4 indicators
	Visual LED unit light	8 lights
	Key	8 keys
	Encoder knob	1 knob
Panel selection	Type	LCD
	LCD display	1.9 inch screen, optional, Chinese/English prompt operation content
	Key	8 keys
	Encoder knob	1 knob
environmental conditions	Location	Water supply systems or automation control systems for residential communities, commercial buildings, agriculture or factories, installed in factories, basements or outdoor integrated pump houses
	Cooling method	Forced air cooling
	environmental temperature	-10℃~+50℃, need to be derated when 40℃~50℃.
	Storage temperature	-20℃~+60℃
	Environmental humidity	Less than 95% RH, no condensation
	vibratory	1g
	high denomination	Maximum 3000m, 1% reduction for every 100m of height above 1000m
	Pollution class	PD2
	protection class	IP20

2.5 Product dimensions

Figure 2-5-1 0.75~18.5kW/380V product external dimensions (unit: mm), the rest of the models refer to Table 2-5-4
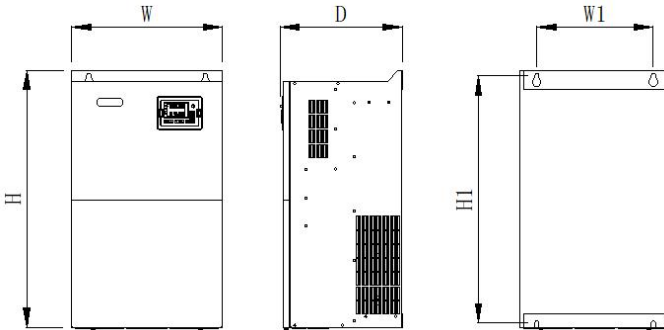

Figure 2-5-2 22~110kW/380V product external dimensions (unit: mm), the rest of the models refer to Table 2-5-4
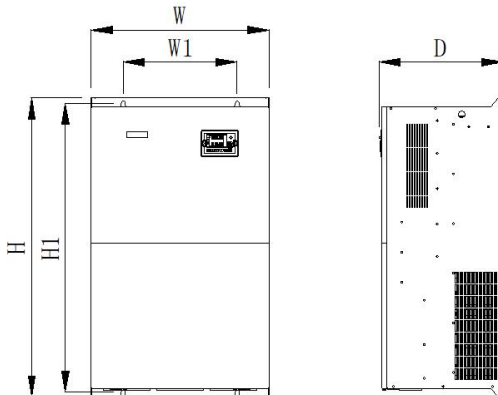

Figure 2-5-3 132~200kW/380V product external dimensions (unit: mm) , the rest of the models refer to Table 2-5-4
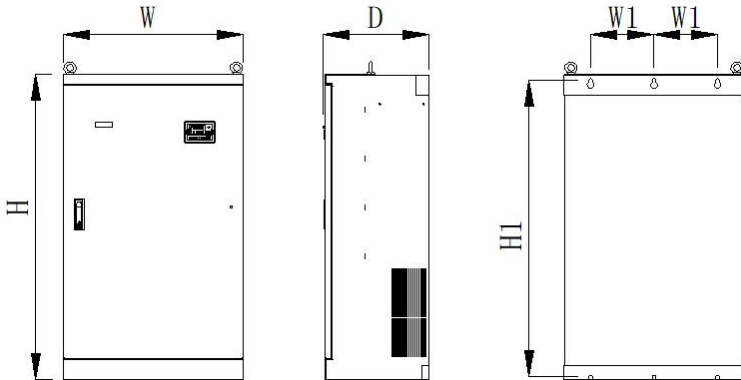
Figure 2-5-4 220~400kW/380V product external dimensions (unit: mm), the rest of the models refer to Table 2-5-4

Note: 220-400kW can be optional mounting base.

Table 2-5-4 Product dimensions of inverter

Inverter Model	Outer dimensions mm			Mounting holes mm		Mounting hole diameter mm
	H	W	D	H1	W1	
Single-phase power supply：200V~240V，50/60Hz						
G1-0.75G-S2	197	90	139	187	73	5
G1-1.5G-S2						
G1-2.2G-S2						
G1-4.0G-S2	243	125	169	227	108	6
G1-5.5G-S2	297	165	206	278	147	6
Three-phase power supply：200V~240V，50/60Hz						
G1-0.75G-T2	197	90	139	187	73	5
G1-1.1G-T2						
G1-1.5G-T2						
G1-2.2G-T2	202	102	162	189	90	6
G1-4.0G-T2						
G1-5.5G-T2	243	125	169	227	108	6
G1-7.5G-T2	297	165	206	278	147	6
G1-11G-T2	373	221	203	356	156	6
Three-phase power supply：380V~440V，50/60Hz						
G1-0.75G-S2	197	90	139	187	73	5
G1-1.5G-S2						
G1-2.2G-S2						
G1-0.75G-T4						
G1-1.5G-T4						
G1-2.2G-T4						

Inverter Model	Outer dimensions mm			Mounting holes mm		Mounting hole diameter mm
	H	W	D	H1	W1	
G1-4.0G-T4	202	102	162	189	90	6
G1-5.5G-T4						
G1-7.5G-T4	243	125	169	227	108	6
G1-11G-T4						
G1-15G-T4	297	165	206	278	147	6
G1-18.5G-T4						
G1-22G-T4	373	221	198	356	156	6
G1-30G-T4						
G1-37G-T4	435	256	215	419	170	6
G1-45G-T4						
G1-55G-T4	544	325	269	522	241	10
G1-75G-T4						
G1-93G-T4	594	350	284	572	270	10
G1-110G-T4						
G1-132G-T4	785	450	349	755	320	12
G1-160G-T4						
G1-185G-T4	845	500	349	815	320	12
G1-200G-T4						
G1-220G-T4	1060	620	368	1030	220	12
G1-250G-T4						
G1-280G-T4						
G1-315G-T4	1197	800	368	1165	300	14
G1-355G-T4						
G1-400G-T4						

2.6 Keyboard and External Tray Opening Dimensions
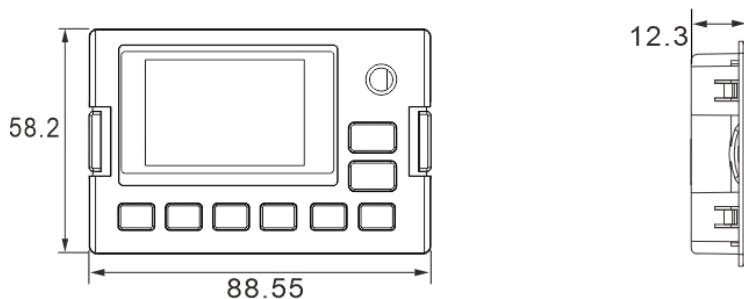
2.6.1 Keyboard dimensions

Figure 2-6-1 LED/LCD keyboard dimensions (unit: mm)

2.6.2 Opening size of external lead tray
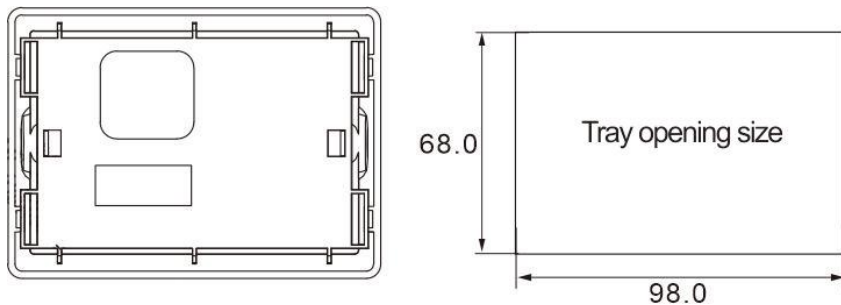
Figure 2-6-2 LED/LCD keypad tray opening size (68.0*98.0, unit: mm)

Chapter 3 Mechanical and Electrical Installations

3.1 Inverter wiring diagram
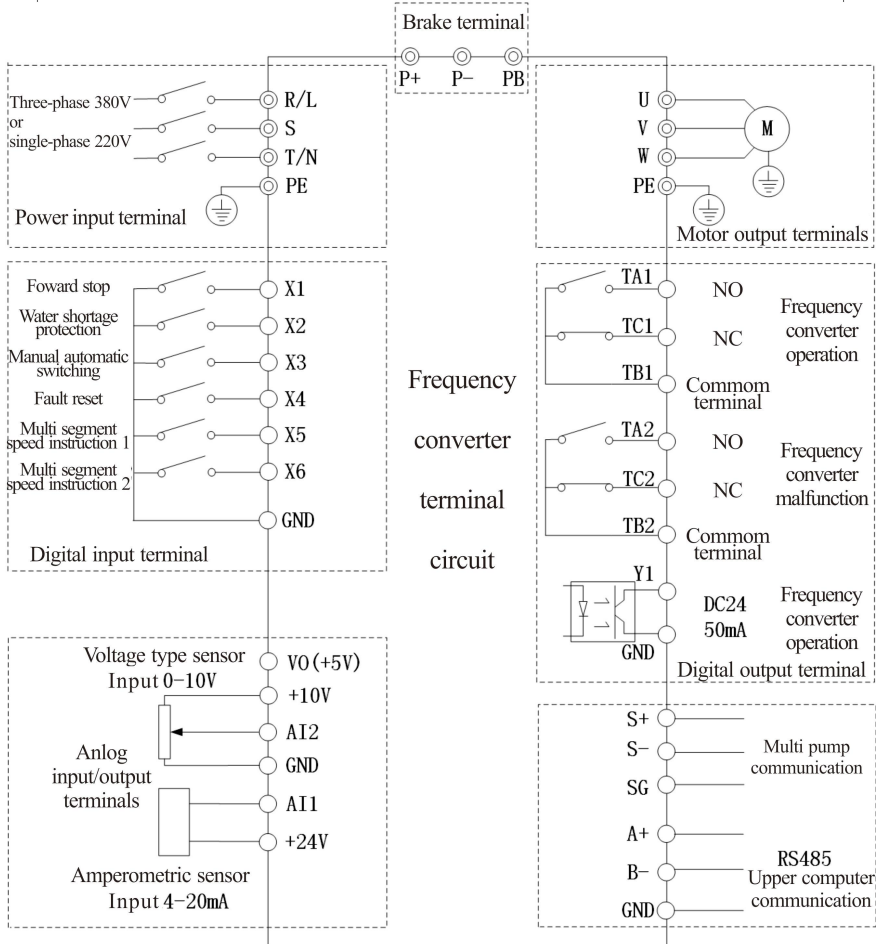
3.2 Main circuit terminal and wiring

Terminal Marking	name	specification
R、S、T	Three-phase power input terminal	Ac input three-phase power connection point
L、N	Single phase power input terminal	Ac input single-phase power connection point
U、V、W	Inverter output terminal	Connected three-phase motor
PE	ground terminal	ground terminal
P+、PB	Brake resistance terminal	Terminal invalid
P+、P-	Dc bus positive and negative terminals	Dc bus input point

3.3 Control loop terminal layout

S+	S−	SG	GND	AI1	AI2	24V	10V	VO	Y1	TA1	TB1	TC1

A+	B−	GND	X1	X2	X3	X4	X5	X6	GND	TA2	TB2	TC2
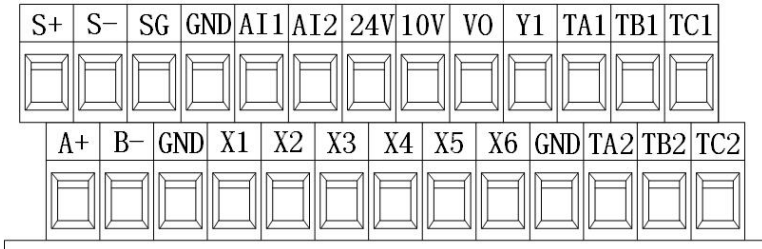
3.4 Control terminal function specification

Terminal symbol	Terminal name	functional specification
VO	Analog output terminal 0 to 10V output	The default power supply is 10V, the adjustable voltage output range is 0~10V, and the maximum output current is 30mA. The default output is 5V.
+24V	+24V power supply	To provide external +24V power supply, generally used as a digital input and output terminal working power supply and external sensor power supply; Maximum output current: 200mA.
10V	10V power supply	To provide 10V power supply, generally used as an external sensor power supply; Maximum output current: 30mA.
AI1	Analog input terminal 1	1．Input range: DC 0V to 10V / 0mA to 20mA, the parameter is adjustable.
AI2	Analog input terminal 2	2．Input impedance: 15kΩ for voltage input, 500Ω for current input.
GND	Analog digital common end	Power, digital, analog common ground terminals
X1	Digital Input 1	
X2	Digital Input 2	
X3	Digital Input 3	1．Input impedance: 4kΩ
X4	Digital Input 4	2．Voltage range at level input: 9V~30V
X5	Digital Input 5	
X6	Digital Input 6	
Y1	Digital Input 1	NPN polarity open collector output Input voltage range: 0V-24V Maximum output current: 50mA
TA1-TB1	Relay 1 Normally open terminal	
TB1-TC1	Relay 1 normally closed terminal	Contact drive capability AC250V，3A，COSø=0.4。
TA2-TB2	Relay 2 normally open terminal	DC 30V，1A
TB2-TC2	Relay 2 normally closed terminal	
A+/B-	RS485 communication terminal	RS485 and host communication terminal
S+/S-/SG	Multi-pump control communication terminals	Multi-pump control communication connection terminal, SG used to shield twisted pair shield ground
J3	EMC Ground Terminal	Shorted pins 1 and 2: EMC capacitor of GND is turned on by the control board. Shorting pins 2 and 3: Control board disconnects the EMC capacitor at GND

3.5 Pressure sensor wiring

When the multi-master station function is set in the multi-pump system, if the system needs

to use the feedback pressure sensor signal for constant pressure control, both the master station and the standby master station need to have pressure signal feedback. In this case, one more pressure sensor can be installed to feedback the signal to the standby master station. The VFD can be connected to two types of remote pressure gauge (voltage type) and pressure sensor (current type). Please refer to the following diagram for field application.

3.5.1 Single pump: one sensor corresponds to one inverter

For a single pump system, install only one pressure sensor to a single inverter, refer to the single pump sensor wiring diagram:

(1) Pressure sensor: current type sensor, working voltage 9~30VDC, output 4~20mA, power cable access 24V terminal, signal cable access AI1 terminal;
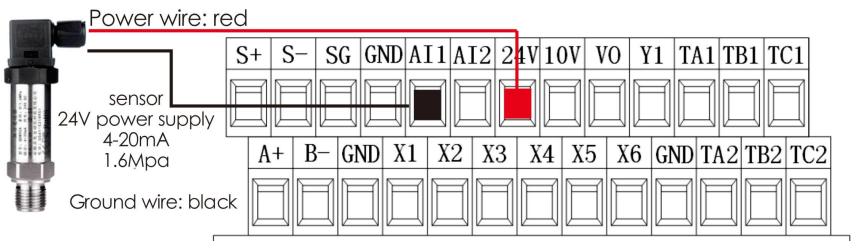
(2) Remote pressure gauge: voltage sensor, working voltage 4~13VDC, output 0~10VDC, power line access 10V terminal, signal line access AI2 terminal; (The actual wiring color refer to the pressure gauge specification)
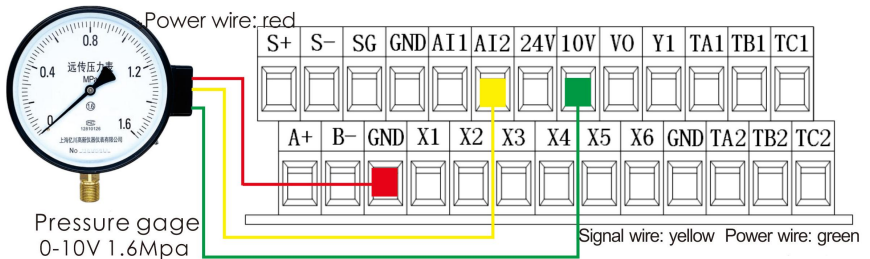
3.5.2 Multiple pumps: Add a sensor for the standby host

In the case of multi-pump system, one more pressure sensor can be installed to the VFD of the standby master station. If the standby host function is not required, the standby host of ID2 does not need to install the sensor.

(1) Pressure sensor: current type sensor, working voltage 9~30VDC, output 4~20mA, inverter internal 24V power supply;

- - - 24V power supply positive connection line   — — Ai1 current signal connection line
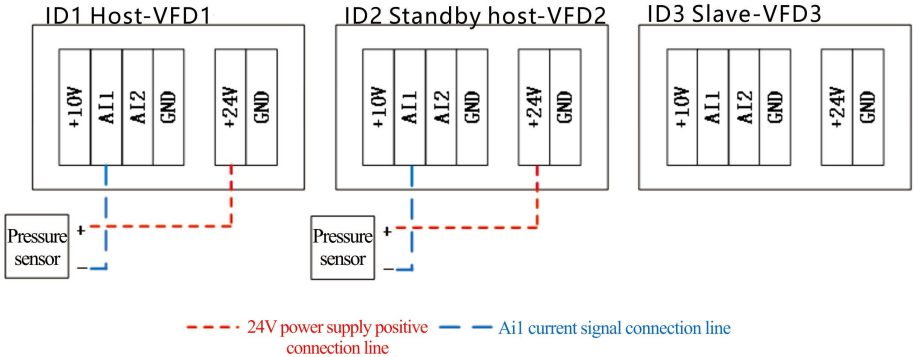
(2) Remote pressure gauge: voltage sensor, working voltage 4~13VDC, output 0~10VDC, inverter internal 10V power supply.

- - - 10V power supply positive connection line   — —AI2 current signal connection line   —— Power negative connection line
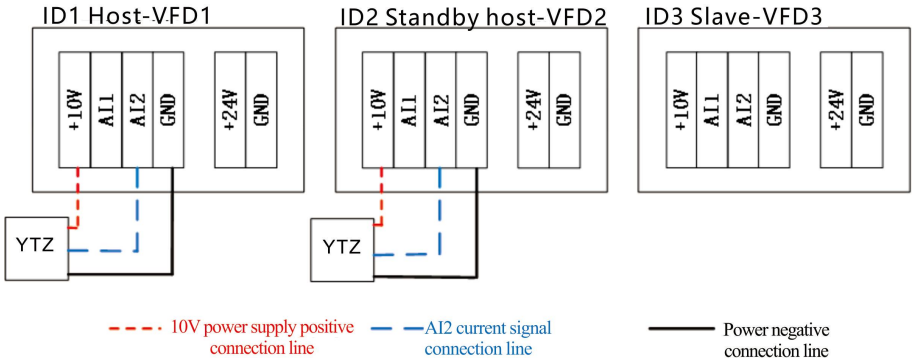
3.6 Multi-pump control communication line wiring

If you need to use multi-pump function, please connect each station S+/S-/SG in parallel; If it is necessary to connect the upper computer (HMI), connect the main station A+/B-/GND in parallel with the upper computer; if it is necessary to monitor all machines, connect each station A+/B-/GND in parallel, as shown in the following figure.

3.6.1 Multi-pump control does not use the upper computer monitoring

- - - - S+ signal parallel connection line ── ── S- signal parallel connection line ──────── SG signal ground parallel connection line
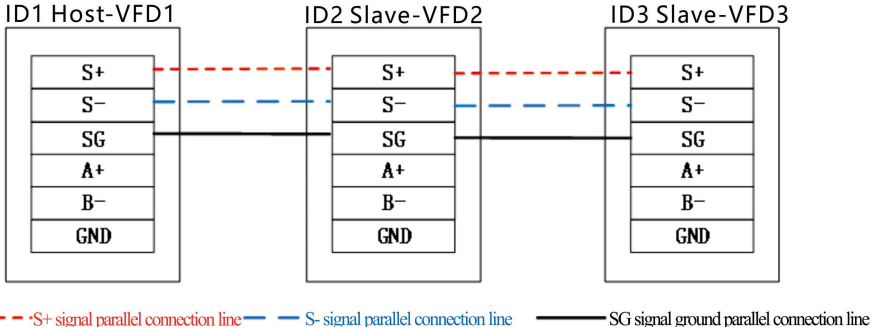
3.6.2 Multi-pump control is monitored by the upper computer

- - - - S+ signal parallel connection line ── ── S- signal parallel connection line ──────── SG signal ground parallel connection line
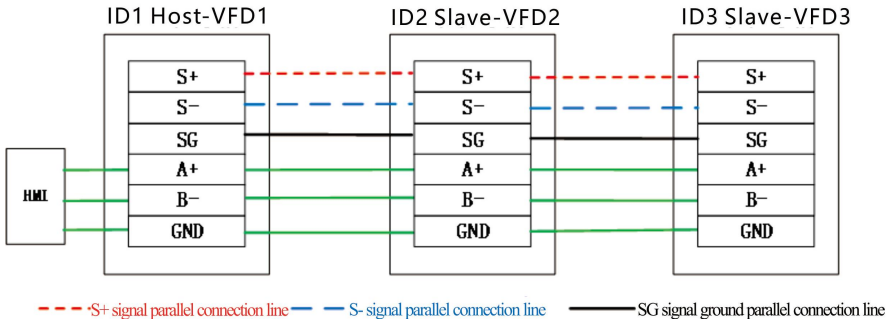
☑**NOTE**：When using CAN communication and 485 communication, in order to avoid external interference to the communication signal, it is recommended to use twisted pair shielded lines for communication connections, and try to avoid using parallel lines. If the bus length is long, connect the SG or GND cables of each node to the shielding layer of the twisted-pair shielding cable.

Chapter 4 operation and display

4.1 Operation and display interface introduction

The operation panel is the interface of man-machine communication, users can modify the functional parameters of the frequency converter, frequency converter working status monitoring and frequency converter operation control operations, G1 series standard with a two-line LED display keyboard, optional Chinese and English LCD display keyboard, the corresponding keyboard is shown in the figure below:

Figure 4-1-1 Schematic diagram of LED operation panel

(1) LED function indicator description:

Function indicator light	light on	light off
RUN ●	The water pump is running always on, dormant blinking.	Water pump stops not running.
Loc ●	Manual/local control mode is valid.。	Automatic/remote control mode is valid.
Net ●	Water pump on-line networking success.	The pumps are not networked or are unsuccessfully networked.
Alarm ●	Fault alarm or digital tube display flashes when FUNE is in tuning.	No alarm or no tuning.

(2)   LED Unit Indicator Description: Frequency (Hz), Current (A), Voltage (V), Pressure (Bar), Speed (RPM)

Unit indicator light	Light on	Light off
Hz ●	The first/second row LED display data is switched to frequency data	Non-frequency display data
A ●	The first/second line LED display data is switched to current data	Non-current display data
V ●	The first/second line LED display data is switched to the voltage data	Non-voltage display data

Bar ●	The first line shows LED data switched to pressure data	Non-pressure display data
RPM ●	The first line shows LED data switched to speed data	Non-speed display data

(3) First line LED digital tube /LCD LCD display area:

5-digit LED display can show pressure, frequency, monitoring data and alarm code, etc. The display content is set by parameters F7-02 and F7-03, and the default display is [set pressure-feedback pressure] and operation frequency; F7-05 can fix the display content of the first line of the LCD keypad.

(4) The second line LED digital tube /LCD LCD display area:

5-bit LED display, can display the inverter data, through the parameter F7-04 set the fixed display content, the default display frequency; F7-06 can fix the display content of the second line of the LCD keyboard, and the F7-07 parameter can set the display content of the third line of the LCD.

(5) LED digital tube display area letter description:

Display prefix	Name	Description	Unit
P	Current pressure	System real-time pressure	Bar
D	set pressure	System set pressure	Bar
H	Operating frequency	Current operating frequency	Hz
A	Running current	Current operating current	A
U	DC voltage	Current bus voltage	V
F	Set frequency	Current set frequency	Hz
r	running speed	Current running speed	RPM
C	Set temperature	System setting temperature	℃
L	Inlet pressure/pool level	System inlet pressure/pool level height	Bar/m

(6) Keyboard key description table:

key	name	function
PRG	menu key	Press and hold 2S to enter parameter mode from display mode
ENTER	Set key	Press and hold 2S to enter the pressure setting and the OK key when setting parameters
▲	Increasing key	Press and hold 2s to enter the pressure setting data or the increasing of the function code.
▼	Decrement key	Press and hold 2s to enter the pressure setting data or the decreasing of the function code.
MFK	Function key	Used for local/remote mode switch, F7-00 can be set function, through F1-04 parameter Settings to obtain

		the switch permission
▶	Shift key	In the shutdown state, long press 2s to determine the pump steering, switch the display content in the running state and the shutdown state, and modify the parameter shift display.
RUN	Running key	Running keys for the keyboard control
STOP RST	Stop/reset key	start button when using keyboard as starting mode. stop button and fault reset button when using keyboard as start mode.
○	Pulse knob potentiometer Press the confirm button Increase clockwise Counterclockwise decrement	Long press 2S to enter the pressure setting, setting parameters confirm,set frequency, data, or function code increment or decrement

4.2 Description of how to view and modify LED keyboard function codes

The LED control panel of G1 inverter adopts three-level menu structure for parameter setting and other operations.

The three level menus are: Function parameter group (Level 1) → Function code (Level 2) → Function code setting value (Level 3).Example of changing the function code F0-00 from 3.0Bar to 8.0Bar. Figure 4-2-1 shows the operation process.

Figure 4-2-1 LED Keyboard three-level menu operation flow chart

Note: In the three-level menu operation, you can press the "Menu" key to return to the second-level menu, press the "Setting" key to save the function parameters.

In the three-level menu state, if the parameter does not blink, the function code cannot be modified. The possible causes are as follows:

4.3

4.4

MFK	Function key	Used for local/remote mode switch, F7-00 can be set function, through F1-04 parameter Settings to obtain the switch permission
▶	Shift key	In the shutdown state, long press 2s to determine the pump steering, switch the display content in the running state and the shutdown state, and modify the parameter shift display.
RUN	Running key	Running keys for the keyboard control
STOP RST	Stop/reset key	start button when using keyboard as starting mode. stop button and fault reset button when using keyboard as start mode.
◎	Pulse knob potentiometer Press the confirm button Increase clockwise Counterclockwise decrement	Long press 2S to enter the pressure setting, setting parameters confirm,set frequency, data, or function code increment or decrement

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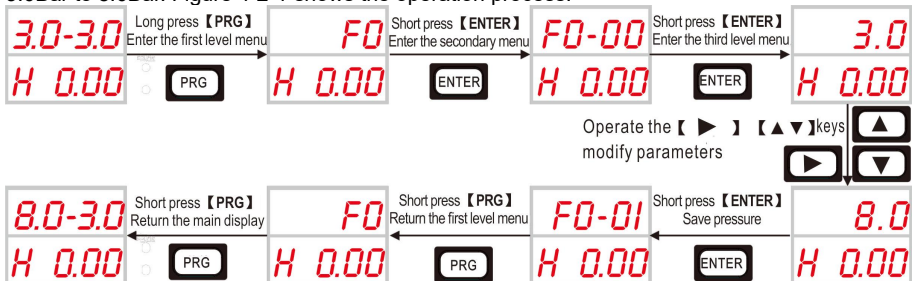
Figure 4-2-1 LED Keyboard three-level menu operation flow chart

Note: In the three-level menu operation, you can press the "Menu" key to return to the second-level menu, press the "Setting" key to save the function parameters.
In the three-level menu state, if the parameter does not blink, the function code cannot be modified. The possible causes are as follows:

4.5 Switch the pressure display mode

    The LED operating panel of G1 inverter can switch the default pressure display [set pressure - feedback pressure] to D: set pressure, P: feedback pressure display mode. F7-15=1 can be set when the sensor range exceeds 1.0Mpa and the minimum pressure needs to be displayed to 0.1Bar.

Figure 4-5-1 F7-15=0 Setting - Feedback mode   Figure 4-5-2 F7-15=1 D-P mode
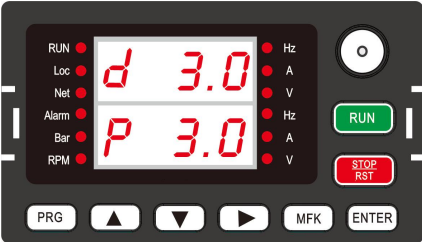
Chapter 5 Quick debugging operation

5.1 Quick debugging operation steps

Step 1: Set the sensor range:

F0-03 = 16.0 If the sensor range is 1.6Mpa, modify the value to 16.0. If the sensor range is 1Mpa, set the value to 10.0;

Step 2: Set the setting pressure:

F0-00 = 3.0 directly press the "Set" or "Increase/Decrease" button for 2s to set the target pressure according to the actual application requirements;

Step 3: Determine the pump steering:

Press and hold the "Shift" button on the panel to see if the pump is turning correctly. If not, change the pump direction by the following method.

1、after power off, arbitrarily change the inverter U, V, W in the two-phase wiring;

2、In stop mode, modify parameter F0-02=0 or 1;

Step 4：Calibration pressure display:

Check the value of the pressure gauge pointer and the display value of the VFD. If the VFD pressure is too large, reduce the F6-02 or F6-03 value, and otherwise increase the value.

Step5：Application parameter Settings:

System Type	Parameters	Descriptions
Solo Pump setting	F0-20 = 0	The default value is 0. If you want to enable automatic startup after power-on/reset, set F0-11 to 1
Multi-pump water supply host	F0-20 = 1	Multi-pump control host, host set to 1 Enable the multi-pump control function
Multi pump NO.1 slave	F0-20 = 2	Multiple pumps control slave 1 and slave 1 is set to 2 to enable slave pump function
Multiple pump NO.3 slave	F0-20 = 3	Multi-pump control No. 2 slave, No. 2 slave set to 3 turn on the slave pump function
Multiple pump NO.3 slave	F0-20 = 4	Multi-pump control No. 3 slave, No. 3 slave set to 4 Turn on the slave pump function
Multiple pump NO.4 slave	F0-20 = 5	Multi-pump control No. 4 slave, No. 4 slave set to 5 Turn on the slave pump function
Multiple pump NO.5 slave	F0-20 = 6	Multi-pump control No. 5 slave, No.5 slave set to 6 Turn on the slave pump function
One control two modes	F0-20 = 7	One control two mode for two pumps power frequency or VFD conversion automatic switching
One control and multiple modes	F0-20 = 8	Match the constant pressure water supply controller used, the controller can control the water pump switching
Constant current mode	F0-20 = 9	Deep well pump constant current application, automatically adjust the running speed according to the load
Multi-speed mode	F0-20 =10	Deep well pump multi-stage speed application, automatically switch the operating speed according to the water level
Speed regulation mode of electric control cabinet	F0-20=11	PLC terminal control start and stop, communication set frequency
Normal speed control mode	F0-20 = 12	normal speed control application, keyboard can adjust the load speed

Chapter 6 Datasheet of G1

6.1 F0~FP Basic function parameter list

Note: In the communication mode, some function codes do not need to be stored frequently, as long as the RAM address is changed. The RAM communication address is the address in the function table. If the parameter needs to be saved after power failure, please refer to the address definition of the G1 MODBUS communication protocol in the appendix。

"○": 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.

Function code	Description	Set range	Default	address s	Revision level
F0 Basic function group					
F0-00	Pre-set pressure	1.0bar～(F0-07)	3.0bar	0x0000	○
F0-01	Starting deviation	0.0bar～(F0-00)	0.3bar	0x0001	○
F0-02	Motor direction	0： Positive 1： reverse direction	0	0x0002	○
F0-03	Maximum sensor range (water outlet)	0.0bar～200.0bar	16.0bar	0x0003	○
F0-04	Sensor signal selection (water outlet)	0： AI1 1： AI2 2： MAX(AI1、AI2) 3： Min(AI1、AI2)	2	0x0004	○
F0-05	Maximum sensor range (water inlet)	0.0bar～200.0bar	16.0bar	0x0005	○
F0-06	Sensor signal selection (water outlet)	0： AI1 1： AI2	1	0x0006	○
F0-07	Hyper-pressure	0.0bar～max. range (F0-03)	15.0bar	0x0007	○
F0-08	Ultra-high pressure delay	0.0s～3600.0s	5.0s	0x0008	○
F0-09	Ultra-low pressure	0.0bar～setting pressure (F0-00)	0.0bar	0x0009	○
F0-10	Ultra-low pressure delay	0.0s～3600.0s	5.0s	0x000A	○
F0-11	Power-on/Reset Restart Select	0： invalid 1： valid Select Restart after power-on or fault reset	0	0x000B	○
F0-12	Power-on/reset Restart delay	0.0s～100.0s	5.0s	0x000 C	○
F0-13	Hibernation mode selection	0： non-dormancy 1： Use sleep frequency to sleep 2： Use hibernation deviation hibernation	2	0x000 D	●
F0-14	Resting pressure deviation	0.0bar～10.0bar	0.1bar	0x000E	○
F0-15	Sleep detection time	0.0s～100.0s	2.0s	0x000F	○
F0-16	Pressure retention detection interval	0.0s～600.0s	60.0s	0x0010	○

Function code	Description	Set range	Default	address	Revision level
F0-17	Sleep frequency	0.00～upper limiting frequency (F1-07)	25.00Hz	0x0011	○
F0-18	acceleration time 1	0.1s～6500.0s	model dependent	0x0012	○
F0-19	deceleration time 1	0.1s～6500.0s	model dependent	0x0013	○
F0-20	System operating mode	0: Single pump water supply mode 1: Intelligent connecting pump host mode 2: Intelligent connecting pump No. 1 slave 3: Intelligent connecting pump No. 2 slave 4: Intelligent connecting pump No. 3 slave 5: Intelligent connecting pump No. 4 slave 6: Intelligent connecting pump No. 5 slave 9: Constant current mode 10: Multi-speed mode 11: Speed regulation mode of electric cabinet 12: Normal speed control mode	0	0x0014	●
F1 group Start and stop function group					
F1-00	Start stop signal source instruction（Automatic/remote mode）	0: Keyboard command channel 1: Terminal command channel 2: Communication command channel	0	0x0100	○
F1-01	Primary frequency source（Automatic/remote mode）	0: Keyboard Settings, power failure does not remember 1: Keyboard Settings, power failure memory 2: AI1 3: AI2 5: Constant current 6: Multiple speed 8: PID 9: Communication setting	8	0x0101	●
F1-02	Start stop signal source instruction（Automatic/remote mode）	0: Keyboard command channel 1: Terminal command channel 2: Communication command channel	0	0x0102	○
F1-03	Auxiliary frequency	0: Keyboard Settings, power	1	0x0103	●

Function code	Description	Set range	Default	address s	Revision level
	source (Manual/Local mode)	failure does not remember 1: Keyboard Settings, power failure memory 2: AI1 3: AI2 5: Constant current 6: Multiple speed 8: PID 9: Communication setting			
F1-04	Automatic/manual action selection	0: Standard HOA automatic manual switching function (function key switching) 1: Automatic/manual switching by external signal (terminal/communication switching) 2: Function keys, terminals, and communication can be switched	1	0x0104	○
F1-05	Manual preset frequency	0.00Hz～maximum frequency (F1-06)	50.00Hz	0x0105	○
F1-06	maximum frequency	50.00Hz～500.00Hz	50.00Hz	0x0106	●
F1-07	upper limiting frequency	0.00Hz～maximum frequency (F1-06)	50.00Hz	0x0107	○
F1-08	Lower frequency	0.00Hz～upper limiting frequency (F1-07)	0.00Hz	0x0108	○
F1-09	carrier frequency	0.5kHz～16.0kHz	Model confirm	0x0109	○
F1-10	The carrier frequency is adjusted with temperature	0: Yes 1: No	0	0x010A	●
F1-11	Random carrier depth	0~10	0	0x010B	○
F1-12	stop mode	0: Slow down and stop 1: Free Stop	0	0x010C	○
F1-14	Motor control mode	0: Speed sensorless vector control (SVC) 1: V/F control	1	0x010E	●
F1-15	Start method	0: direct starting	0	0x010F	◎
F1-16	Start frequency	0.00Hz～10.00Hz	0.50Hz	0x0110	○
F1-17	Startup frequency hold time	0.0s～100.0s	0.0s	0x0111	●
F1-18	Start DC braking current	0%～100%	0%	0x0112	●
F1-19	Start DC braking time	0.0s～100.0s	0.0s	0x0113	●
F1-20	Stop DC braking start frequency	0.00Hz～maximum frequency (F1-06)	0.00Hz	0x0114	○
F1-21	Stop DC braking wait time	0.0s～100.0s	0.0s	0x0115	●

Function code	Description	Set range	Default	address	Revision level
F1-22	Stop DC braking current	0%～100%	0%	0x0116	○
F1-23	Shutdown DC braking time	0.0s～100.0s	0.0s	0x0117	●
F2 group Motor parameter group					
F2-00	Motor type selection	0：General induction motor 1：permanent magnet synchronous motor 2：single phase motor	0	0x0200	●
F2-01	Rated power of motor	0.1kW～400.0kW	model dependent	0x0201	●
F2-02	Rated voltage of motor	0V～2000V	model dependent	0x0202	●
F2-03	Rated current of motor	0.01A～655.35A(power <= 55kW) 0.1A～6553.5A(power > 55kW)	model dependent	0x0203	●
F2-04	Rated frequency of motor	0.00Hz～maximum frequency (F1-06)	model dependent	0x0204	●
F2-05	Rated speed of motor	0rpm～65535rpm	model dependent	0x0205	●
F2-06	Asynchronous motor stator resistance	0.001Ω～65.535Ω(power<=55kW) 0.0001Ω～6.5535Ω(power>55kW)	model dependent	0x0206	●
F2-07	Rotor resistance of asynchronous motor	0.001Ω～65.535Ω(power<=55kW) 0.0001Ω～6.5535Ω(power >55kW)	model dependent	0x0207	●
F2-08	Induction motor leakage reactance	0.01mH～655.35mH(<=55kW) 0.001mH～65.535mH(>55kW)	model dependent	0x0208	●
F2-09	Mutual inductance of asynchronous motor	0.1mH～6553.5mH(<=55kW) 0.01mH～655.35mH(>55kW)	model dependent	0x0209	●
F2-10	No-load current of asynchronous motor	0.01A～F2-03(power <=55kW) 0.1A～F2-03(power >55kW)	model dependent	0x020A	●
F2-11	Voltage ratio of primary and secondary windings	0.00～2.00	1.00	0x020B	○

Function code	Description	Set range	Default	address s	Revision level
	of single-phase motor				
F2-12	Stator resistance of synchronous motor	0.001Ω～65.535Ω(power <=55kW) 0.0001Ω～ 6.5535Ω(power >55kW)	model dependent	0x020 C	●
F2-13	D-axis inductance of synchronous motor	0.01mH～655.35mH(<=55kW) 0.001mH～65.535mH(>55kW)	model dependent	0x020 D	●
F2-14	Q-axis inductance of synchronous motor	0.01mH～655.35mH(<=55kW) 0.001mH～65.535mH(>55kW)	model dependent	0x020F	●
F2-16	Back electromotive force of synchronous motor	0.1V~6553.5V	model dependent	0x0210	●
F2-17	Tuning selection	0：no-operation 1：Asynchronous machine static part parameter tuning 2：Asynchronous motor dynamic full tuning 3：Asynchronous motor static full tuning 11:Synchronous motor static part tuning (no counter electromotive force) 12:Synchronous motor no-load dynamic complete tuning(tuning of reverse electromotive force)	0	0x0211	●
F3 Group Vector control parameter group					
F3-00	Velocity loop proportional gain 1	1～100	30	0x0300	○
F3-01	Velocity loop integration time 1	0.01s～10.00s	0.50s	0x0301	○
F3-02	Switching frequency 1	0.00～F3-05	5.00Hz	0x0302	○
F3-03	Velocity loop proportional gain 2	1～100	20	0x0303	○
F3-04	Velocity loop integration time 2	0.01s～10.00s	1.00s	0x0304	○
F3-05	Switching frequency 2	F3-02～maximum frequency (F1-06)	10.00Hz	0x0305	○
F3-06	Transfer difference compensation coefficient	50%～200%	100%	0x0306	○
F3-07	Velocity loop filtering time constant	0.000s～0.100s	0.050s	0x0307	○
F3-08	Vector-controlled overexcitation gain	0～200	64	0x0308	○
F3-13	M-axis current loop proportional gain	0～20000	2000	0x030 D	○
F3-14	M-axis current loop integral gain	0～20000	1300	0x030E	○
F3-15	T-axis current loop	0～20000	2000	0x030F	○

Function code	Description	Set range	Default	address s	Revision level
	proportional gain				
F3-16	T-axis current loop integral gain	0～20000	1300	0x0310	○
F3-18	Synchronous motor in a weak magnetic mode	0：Weak magnetic void 1：Direct computing mode	1	0x0312	●
F3-19	Weak magnetic coefficient of the synchronous motor	1～50	5	0x0313	○
F3-24	Initial position detection current	80%～180%	120%	0x0318	●
F3-25	Initial position angle detection of the synchronous motor	0：Per-run detection 1：Not check 2：First running test of the power-on	2	0x0319	○
F3-36	Percent of the initial excitation current of the synchronous motor	0～80	30	0x0324	○
F3-37	Low-frequency carrier frequency of the synchronous motor	0.8kHz～Carrier frequency (F1-09)	model dependent	0x0325	○
F4 Group V/F Control parameter set					
F4-00	VF curve setting	0：Straight line V/F curve 1：Multi-point V/F curve 2：Square V/F curve	0	0x0400	●
F4-01	Torque boost	0.0%：　(No torque lift) 0.1%～30.0%	model dependent	0x0401	○
F4-02	Torque boost cutoff frequency	0.00Hz～maximum frequency (F1-06)	50.00Hz	0x0402	●
F4-03	Multi-point VF frequency point 1	0.00Hz～F4-05	5.00Hz	0x0403	●
F4-04	Multi-point VF voltage point 1	0.0%～100.0%	10.0%	0x0404	●
F4-05	Multi-point VF frequency point 2	0.00Hz～F4-07	25.00Hz	0x0405	●
F4-06	Multi-point VF voltage point 2	0.0%～100.0%	50.0%	0x0406	●
F4-07	Multi-point VF frequency point 3	F4-05～F2-04	50.00Hz	0x0407	●
F4-08	Multi-point VF voltage point 3	0.0%～100.0%	100.0%	0x0408	●
F4-09	Slip compensation coefficient	0.0%～200.0%	0.0%	0x0409	○
F4-10	VF overexcitation gain	0～200	64	0x040A	○
F4-11	Oscillation suppression gain	0～100	model dependent	0x040B	○
F4-12	Oscillation suppression mode	0～4	3	0x040C	●
F4-18	VF Overflowing fast acting current	50~200%	150%	0x0412	●

Function code	Description	Set range	Default	address s	Revision level
F4-19	overcurrent enable	0: invalid 1: valid	1	0x0413	●
F4-20	Overflowing fast suppression gain	0～100	20	0x0414	○
F4-21	VF Double speed over loss speed action current compensation coefficient	50～200%	50%	0x0415	●
F4-22	VF Overvoltage stall action voltage	330.0V～800.0V	model dependent	0x0416	●
F4-23	Overvoltage enable	0: invalid 1: valid	1	0x0417	●
F4-24	VF Overvoltage stall suppression frequency gain	0～100	30	0x0418	○
F4-25	VF Overvoltage stall suppression voltage gain	0～100	30	0x0419	○
F4-26	Overvoltage stall maximum rise limit frequency	0～50Hz	5Hz	0x041A	●
F4-27	Slip compensation time constant	0.1~10.0s	0.5s	0x041B	○
F5 Group Digital input and output terminal subgroups					
F5-00	X1 Terminal function selection	0: non-function 1: Forward running 2: Reverse running	1	0x0500	●
F5-01	X2 Terminal function selection	3: Three-wire operation control 4: normal inching turning 5: reverse inching turning	11	0x0501	●
F5-02	X3 Terminal function selection	6: terminal UP 7: terminal DOWN 8: Free stop 9: fault resetting	29	0x0502	●
F5-03	X4 Terminal function selection	10: Running pause 11: External water shortage signal input	9	0x0503	●
F5-04	X5 Terminal function selection	12: Multi-segment speed command terminal 1 13: Multi-segment speed command terminal 2	12	0x0504	●
F5-05	X6 Terminal function selection	14: Multi-segment speed command terminal 3 15: Multi-segment speed command terminal 4 18: Primary and secondary frequency source switching	13	0x0505	●

Function code	Description	Set range	Default	address s	Revision level
		19: UP/DOWN Set clear 20: Remote command source switches terminals/communications and panels 23: One control two mode 1 pump trouble/shielding 24: One control two mode 2 pump trouble/shielding 25: Timer enable 26: Timer reset 28: External overpressure signal input 29: Manual (local)/ Automatic (remote) switching (constant speed) 30: Start fire mode (including run commands) 31: Enable the cleaning function (including run commands) 37: Remote command source switching terminals and communication control 47: emergency stop 50: This run time is cleared to zero			
F5-06	Xn Terminal filtering time	0.000s~1.000s	0.010s	0x0506	○
F5-07	Terminal command mode	0: two-wire 1 1: two-wire 2 2: three-wire 1 3: three-wire 2	0	0x0507	●
F5-08	UP/DOWN Rate of change per s	0.001Hz~65.535Hz	0.500Hz	0x0508	○
F5-09	X1 Closing delay time	0.0s~3600.0s	1.0s	0x0509	○
F5-10	X2 Closing delay time	0.0s~3600.0s	1.0s	0x050A	○
F5-11	X3 Closing delay time	0.0s~3600.0s	1.0s	0x050B	○
F5-12	X1 Turn-off delay time	0.0s~3600.0s	0.0s	0x050C	○
F5-13	X2 Turn-off delay time	0.0s~3600.0s	0.0s	0x050D	○
F5-14	X3 Turn-off delay time	0.0s~3600.0s	0.0s	0x050E	○
F5-15	Enter terminal 1 valid status Settings	0: high level 1: low level Bit 0: X1 Bit 1: X2 Bit 2: X3	00000	0x050F	●

Function code	Description	Set range	Default	address	Revision level
		Bit 3: X4 Bit 4: X5			
F5-16	Enter terminal 2 valid status Settings	0: high level 1: low level Bit 0: X6 bit 1~others: reserve	00000	0x0510	●
F5-17	Relay 1 output selection	0: non-function 1: Run output 2: Fault output	1	0x0511	○
F5-18	Relay 2 output selection	3: Frequency level detection FDT1 output 4: Frequency arrival 5: Zero speed operation, shutdown does not output 6: Motor overload forecast alarm 7: Inverter overload forecast alarm 8: Timer output	2	0x0512	○
F5-19	Y1 output selection	12: Cumulative running time arrived 15: Operational readiness 16: AI1>AI2 17: Upper frequency arrival 18: The lower limit frequency is reached, the shutdown is not output 19: under-voltage condition 23: Zero speed running 2, shutdown also output 24: The cumulative power-on time is reached 25: Frequency level detection FDT2 output 26: Frequency 1 reaches output 27: Frequency 2 reaches output 28: Current 1 reaches the output 29: Current 2 reaches the output 34: Zero current state 35: Module temperature arrival 36: The output current exceeds the limit 37: reach the lower frequency, in the stop state also output 40: The arrival time of this run 42: Run output (including run command) 43: One control two mode No. 1 pump output control 44: One control two mode No. 2	1	0x0513	○

Function code	Description	Set range	Default	address s	Revision level
		pump output control 45: The pool level is above the upper limit 46: The pool level is below the lower limit 47: The pool level is below the water shortage level			
F5-21	Relay 1 output delay time	0.0s～3600.0s	0.0s	0x0515	○
F5-22	Relay 2 output delay time	0.0s～3600.0s	0.0s	0x0516	○
F5-23	Y1 Output delay time	0.0s～3600.0s	0.0s	0x0517	○
F5-25	Output terminal valid state selection	0- positive logic; 1-negetive logic bit 0: relay1 bit 1: relay2 bit 2: Y1 others: reserved	00000	0x0519	●
F6 Group Analog input and output terminal subgroups					
F6-00	AI1 Enter function selection	0: 4～20mA 1: 0～20mA	0	0x0600	○
F6-01	AI2 Enter function selection	2: 0～10V 3: 0～5V 4: 0.5～4.5V	2	0x0601	○
F6-02	AI1 input the correction coefficient	0.500～1.500	1.000	0x0602	○
F6-03	AI2 input the correction coefficient		1.000	0x0603	○
F6-06	AI1 Minimum input	0.00V～F6-08	2.00V	0x0606	○
F6-07	AI1 minimum input corresponding to set	-100.0%～+100.0%	0.0%	0x0607	○
F6-08	AI1 Max input	F6-06～+10.00V	10.00V	0x0608	○
F6-09	AI1 maximum input corresponding to set	-100.0%～+100.0%	100.0%	0x0609	○
F6-10	AI1 filtering time	0.00s～10.00s	0.10s	0x060A	○
F6-11	AI2 Minimum input	0.00V～F6-13	0.00V	0x060B	○
F6-12	AI2 minimum input corresponding to the setting	-100.0%～+100.0%	0.0%	0x060 C	○
F6-13	AI2 Max input	F6-11～+10.00V	10.00V	0x060 D	○
F6-14	AI2 maximum input corresponding to the setting	-100.0%～+100.0%	100.0%	0x060E	○
F6-15	AI2 filtering time	0.00s～10.00s	0.10s	0x060F	○
F6-16	VO output selection	0: Frequency of operation 1: Set frequency 2: Output current (2 times rated	6	0x0610	○

Function code	Description	Set range	Default	address	Revision level
		motor current) 3：Output torque (200% corresponding to 0~10V) 4：output power 5：output voltage 6：Fixed 5V power supply output 7：AI1 8：AI2 11：Fixed 10V power supply output 13：motor speed 14：Output current (100.0% to 1000.0A) 15：Output voltage (100.0% to 1000.0V)			
F6-17	VO Zero bias coefficient	-100.0%～100.0%	0.00%	0x0611	○
F6-18	VO gain	-10.00～10.00	1.00	0x0612	○
F7 Group　Keyboard and display parameter groups					
F7-00	Function key function selection	0：invalid 1：Local remote mode switching 2：Forward and reverse switching 3：normal inching turning 4：reverse inching turning	1	0x0700	●
F7-01	Stop key function selection	0：Stop button stop function is invalid 1：Stop button stop function are effective	1	0x0701	○
F7-02	The first line LED runs display parameters	0000～FFFF Bit00：run frequency (Hz) Bit01：set frequency (Hz) Bit02：busbar voltage (V) Bit03：output voltage (V) Bit04：output current(A) Bit05：output power(kW)	0x0814	0x0702	○
F7-03	First line LED stop display parameters	Bit06：output torque (%) Bit07：Numeric input status Bit08：Digital output status Bit09：AI1 voltage (V) Bit10：AI2 voltage (V) Bit11：setting pressure (Bar)/ temperature (℃) Bit12：Feedback pressure (Bar)/ temperature (℃) Bit13：Heat sink temperature (°C) Bit14：Operating speed (rpm)	0x0804	0x0703	○

Function code	Description	Set range	Default	address s	Revision level
		Bit15: Inlet Pressure (Bar)/ Liquid level (m)			
F7-04	The second line LED fixed display parameters	00: run frequency (Hz) 01: set frequency (Hz) 02: busbar voltage (V)	0	0x0704	○
F7-05	The first line of the LCD keyboard displays parameters	03: output voltage V 04: output current (A)	11	0x0705	○
F7-06	The second line of the LCD keyboard displays parameters	05: output power (kW) 06: output torque (%) 07: Numeric input status 08: Digital output status 09: AI1 voltage(V) 10: AI2 voltage(V) 11: set pressure (Bar)/ temperature (℃) 12: Feedback pressure (Bar) temperature (℃) 13: Radiator temperature (℃) 14: running speed (rpm) 15: Inlet pressure (Bar)/ Pool level (m)	12	0x0706	○
F7-07	The third line of the LCD keyboard displays the parameters	Same as F7-02	0x201D	0x0707	○
F7-08	LCD Keyboard language selection	0: Chinese 1: English	0	0x0708	○
F7-09	Converter radiator temperature	-20.0℃～120℃	-	0x0709	◎
F7-10	software version	-	-	0x070A	◎
F7-11	Cumulative power-up time	0h～65535h	-	0x070B	◎
F7-12	Cumulative running time	0h～65535h	-	0x070 C	◎
F7-13	Cumulative power consumption is low	0kWh～65535kWh	-	0x070 D	◎
F7-14	Cumulative power consumption is high	0MWh～65535MWh	-	0x070E	◎
F7-15	Pressure display mode	0: Set pressure - Feedback pressure 1: D set pressure, P feedback pressure	0	0x070F	◎
F8 Group Accessibility function group					
F8-00	Point operation frequency	0.00Hz～max frequency(F1-06)	10.00Hz	0x0800	○
F8-01	Point acceleration time	0.1s～6500.0s	10.0s	0x0801	○
F8-02	Point deceleration time	0.1s～6500.0s	10.0s	0x0802	○

Function code	Description	Set range	Default	address s	Revision level
F8-03	acceleration time 2	0.1s～6500.0s	model depend ent	0x0803	○
F8-04	deceleration time 2	0.1s～6500.0s	model depend ent	0x0804	○
F8-05	acceleration time 3	0.1s～6500.0s	model depend ent	0x0805	○
F8-06	deceleration time 3	0.1s～6500.0s	model depend ent	0x0806	○
F8-07	acceleration time 4	0.1s～6500.0s	model depend ent	0x0807	○
F8-08	deceleration time 4	0.1s～6500.0s	model depend ent	0x0808	○
F8-09	hopping frequency 1	0.00Hz～max frequency (F1-06)	0.00Hz	0x0809	○
F8-10	hopping frequency 2	0.00Hz～max frequency (F1-06)	0.00Hz	0x080A	○
F8-11	Range of hopping frequency	0.00Hz～max frequency (F1-06)	0.00Hz	0x080B	○
F8-12	Forward and reverse dead zone time	0.0s～3000.0s	0.0s	0x080 C	○
F8-13	Reverse control	0： Allow reversal 1： forbid reversal	0	0x080 D	○
F8-14	Lower frequency action selection	0： Operate at the lower frequency 1： stop 2： Zero speed operation	0	0x080E	○
F8-15	droop control	0.00Hz～10.00Hz	0.00Hz	0x080F	○
F8-16	Set the cumulative power-on arrival time	0h～65000h	0h	0x0810	○
F8-17	Set the cumulative run arrival time	0h～65000h	0h	0x0811	○
F8-18	Enable protection selection	0： no protection 1： protection	0	0x0812	○
F8-19	Frequency detection value 1	0.00Hz～F1-06(max frequency)	50.00Hz	0x0813	○
F8-20	Frequency detection lag rate 1	0.00%～100.0%(FDT1 electrical level)	5.0%	0x0814	○
F8-21	The frequency reaches the detection amplitude	0.00%～100.0%(max frequency)	0.0%	0x0815	○

Function code	Description	Set range	Default	address	Revision level
F8-27	Jog priority	0: invalid 1: valid	1	0x081B	○
F8-28	Frequency detection value 2	0.00Hz～F1-06(max)	50.00Hz	0x081C	○
F8-29	Frequency detection lag rate 2	0.00%～100.0%(FDT2 electric level)	5.0%	0x081D	○
F8-30	Arbitrary arrival frequency detection value 1	0.00Hz～F1-06 (maximum frequency)	50.00Hz	0x081E	○
F8-31	Detection amplitude at any arrival frequency 1	0.00%～100.0% (maximum frequency)	0.0%	0x081F	○
F8-32	Arbitrary arrival frequency detection value 2	0.00Hz～F1-06 (maximum frequency)	50.00Hz	0x0820	○
F8-33	Detection amplitude at any arrival frequency 2	0.00%～100.0%(maximum frequency)	0.0%	0x0821	○
F8-34	Zero current detection level	0.0%～300.0%(100% Motor rated current)	5.0%	0x0822	○
F8-35	Zero current detection delay time	0.01s～600.00s	0.10s	0x0823	○
F8-36	Output current limit value	0.0%～300.0%(0.0% no check)	200.0%	0x0824	○
F8-37	Output current overrun detection delay time	0.00s～600.00s	0.00s	0x0825	○
F8-38	Arbitrary arrival current 1	0.0%～300.0%(100% Motor rated current)	100.0%	0x0826	○
F8-39	Any arrival current amplitude 1	0.0%～300.0%(100% Motor rated current)	0.0%	0x0827	○
F8-40	Arbitrary arrival current 2	0.0%～300.0%(100% Motor rated current)	100.0%	0x0828	○
F8-41	Any arrival current amplitude 2	0.0%～300.0%(100% Motor rated current)	0.0%	0x0829	○
F8-42	Timing function selection	0: invalid 1: valid	0	0x082A	●
F8-43	Timed run time selection	0: F8-44 set 1: AI1 2: AI2	0	0x082B	●
F8-44	Timed run time	0.0min～6500.0min	0	0x082C	●
F8-47	Module temperature arrival	0℃～120℃	75℃	0x082F	○
F8-48	Fan control mode	0: Running constantly when start-up 1: Running constantly when power on 2: Temperature control fan start	0	0x0830	●
F8-49	Arrival time of this run	0.0min～6500.0min	0	0x0831	●
F8-50	Output power coefficient	0.00%～200.0%	100.0%	0x0832	○

Function code	Description	Set range	Default	address	Revision level
F8-51	Timer time setting	0.0min～6500.0min	0	0x0833	●
F9 Group Fault and protection parameter group					
F9-00	Motor overload software protection selection	0：forbid 1：allow	1	0x0900	○
F9-01	Motor overload software protection gain	0.20～10.00	1.00	0x0901	○
F9-02	Motor overload warning factor	50%～100%	80%	0x0902	○
F9-03	Overvoltage stall gain	0～100	40	0x0903	○
F9-04	Overvoltage stall protection voltage	330.0V～800.0V	S：380V T：760V	0x0904	●
F9-05	Overcurrent stall gain	0～100	20	0x0905	○
F9-06	Overcurrent Stall protection current	100%～200%	150%	0x0906	○
F9-07	Power-on to ground short circuit protection selection	0：invalid 1：valid	1	0x0907	○
F9-09	Number of automatic reset times	0～20 The maximum number of times the VFD is allowed to attempt automatic reset If the fault persists after the maximum number of times, the subsequent reset attempt will be delayed by 10 minutes. In case of failure, press the "Stop/Reset" key on the keyboard to clear the reset times.	5	0x0909	○
F9-10	Fault DO action selection during fault automatic reset	0：no action 1：action	0	0x090A	○
F9-11	fault automatic reset interval time	0.0s～100.0s The time to wait before attempting an automatic reset after a failure	6.0s	0x090B	○
F9-12	Input phase loss /contactor draw protection option	Units position: Input phase loss protection 0：Disable input phase loss protection 1：As long as the hardware input phase loss condition is met 2：As long as the software input phase condition is met Tens：Contactor suction protection selection 0：Disabled 1：Enabled	11	0x090C	○

Function code	Description	Set range	Default	address	Revision level
F9-13	Output phase loss protection selection	0: forbid 1: allow	1	0x090D	○
F9-14	First failure type	0: fault-free	0	0x090E	◎
F9-15	Second failure type	1: reserve	0	0x090F	◎
F9-16	The third (latest) fault type	2: Accelerating overcurrent (E002) 3: Decelerating overcurrent (E003) 4: Constant speed overcurrent (E004) 5: Accelerated overvoltage (E005) 6: Deceleration overvoltage (E006) 7: Constant speed overvoltage (E007) 9: Under voltage fault (E009) 10: Inverter overload (E010) 11: motor overload (E011) 12: Input phase missing (E012) 13: Output phase missing (E013) 14: Module overheating (E014) 15: External water shortage fault (E015) 16: Abnormal communication (E016) 17: Abnormal contactor (E017) 18: Current detection fault (E018) 19: Motor tuning fault (E019) 21: storage anomalies (E021) 22: Forced shutdown failure (E022) 23: Motor to ground short circuit fault (E023) 25: External overpressure fault (E025) 26: Run time arrival (E026) 27: User-defined faults 1 (E027) 28: User-defined faults 2(E028) 29: Power on time arrived (E029) 30: Drop of load (E030) 31: sensor fault (E031) 44: Low inlet pressure fault (E044) 46: Water pump block fault	0	0x0910	◎

Function code	Description	Set range	Default	address	Revision level
		(E046) 47：Water shortage fault（E047） 48：High water pressure fault（E048） 49：Low water pressure fault（E049） 50：Water pipe break fault（E050） 51：Initial magnetic pole error（E051） 55：Master and slave communication failure（E055） 64：Abnormal reactionary force（E064）			
F9-17	Frequency at the third (most recent) failure	0.00Hz～655.35Hz	0	0x0911	◎
F9-18	Current at the third (most recent) fault	0.00A～655.35A	0	0x0912	◎
F9-19	Bus voltage at the third (most recent) fault	0.0V～6553.5V	0	0x0913	◎
F9-20	Input terminal status at the third (most recent) failure	0～65535	0	0x0914	◎
F9-21	Output terminal state at the third (most recent) fault	0～65535	0	0x0915	◎
F9-22	Inverter state at the third (most recent) fault	0～65535	0	0x0916	◎
F9-23	Power on time at the third (most recent) failure	0～65535	0	0x0917	◎
F9-24	Run time during the third (most recent) failure	0.0～6553.5	0	0x0918	◎
F9-27	Frequency at the second fault	0.00Hz～655.35Hz	0	0x091B	◎
F9-28	Current at the second fault	0.00A～655.35A	0	0x091C	◎
F9-29	Bus voltage at the second fault	0.0V～6553.5V	0	0x091D	◎
F9-30	Input terminal state at the second fault	0～65535	0	0x091E	◎
F9-31	The state of the output terminal at the second fault	0～65535	0	0x091F	◎
F9-32	The state of the converter at the second fault	0～65535	0	0x0920	◎
F9-33	Time of the second failure (starting from	0～65535	0	0x0921	◎

Function code	Description	Set range	Default	address	Revision level
	power on)				
F9-34	Time of the second failure (time from the start of running)	0.0～6553.5	0	0x0922	◎
F9-37	Frequency at first failure	0.00Hz～655.35Hz	0	0x0925	◎
F9-38	Current at first failure	0.00A～655.35A	0	0x0926	◎
F9-39	Bus voltage at first failure	0.0V～6553.5V	0	0x0927	◎
F9-40	Input terminal state at the first failure	0～65535	0	0x0928	◎
F9-41	Output terminal state at the first fault	0～65535	0	0x0929	◎
F9-42	The state of the converter at the first fault	0～65535	0	0x092A	◎
F9-43	Time of the first failure (timed from power-on)	0～65535	0	0x092B	◎
F9-44	Time to first failure (timed from start of running)	0.0～6553.5	0	0x092C	◎
FA Group PID functional group					
FA-00	PID Given source	0：Fuction code F0-00 set 1：AI1 2：AI2	0	0x0A00	○
FA-01	PID Minimum holding frequency	0.00Hz～sleep frequency (F0-17)	20.00Hz	0x0A01	○
FA-02	PID Maintain frequency duration	0.0s～100.0s	2.0s	0x0A02	○
FA-03	PID Direction of action	0：Positive effect (pressure control) 1：Reaction (temperature control)	0	0x0A03	○
FA-04	Load current set percentage	50.0%～150.0%	100.0%	0x0A04	○
FA-05	Proportional gain P1	0.0～100.0	20.0	0x0A05	○
FA-06	Integration time I1	0.01s～10.00s	1.00s	0x0A06	○
FA-07	Differential time D1	0.000s～10.000s	0.000s	0x0A07	○
FA-09	PID deviation limit	0.0%～100.0%	0.0%	0x0A09	○
FA-10	PID differential limit	0.00%～100.00%	0.10%	0x0A0A	○
FB Group Multi-pump function parameter group					
FB-00	Multi-pump mode selection	1：ID1 host 2：ID2 slave 3：ID3 slave 4：ID4 slave 5：ID5 slave 6：ID6 slave	0	0x0B00	◎
FB-01	Number of multi-pump slaves	0～5	0	0x0B01	◎

Function code	Description	Set range	Default	address s	Revision level
FB-02	Multi-pump operation mode	0: master-slave control	0	0x0B02	◎
FB-03	Standby host mode	0: Invalid backup host 1: Valid backup host（Sensorless access according to the parameter FB-09 line break frequency operation, with sensor access constant voltage operation）	0	0x0B03	○
FB-04	Multi-pump configuration setting	0: Start with main pump 1: Determined by local automatic/remote command source F1-00	0	0x0B04	●
FB-05	Pump start time sequence	0: According to the pump serial number 1: According to operating time	1	0x0B05	●
FB-06	Multi-pump cycle rotation time	0.1～120.0h	24.0h	0x0B06	○
FB-07	Multi-pump increase pump start frequency	0.00Hz～upper limiting frequency (F1-07)	50.00Hz	0x0B07	○
FB-08	Detection time after multi-pump increase pump start frequency	0.0～100.0s	5.0s	0x0B08	○
FB-09	Pump disconnected operation frequency	0.00Hz～upper limiting frequency (F1-07)	40.00Hz	0x0B09	○
FB-15	Variable frequency motor operation selection	0: Fixed variable frequency motor Motor A is a frequency conversion motor, motor B is a power frequency motor 1: Cyclic variable frequency motor Motor A and motor B switch frequency conversion power frequency cycle according to wiring	1	0x0B0F	●
FB-16	Add motor pressure tolerance	0.0bar～100.0bar	0.5bar	0x0B10	○
FB-17	Add motor switching frequency	0.00Hz～upper limiting frequency (F1-07)	50.00Hz	0x0B11	○
FB-18	Add motor delay time	0.0s～100.0s	10.0s	0x0B12	○
FB-19	Reduce motor pressure tolerance	0.0bar～100.0bar	0.5bar	0x0B13	○
FB-20	Reduce motor switching frequency	0.00Hz～Add pump switching frequency (FB-17)	30.00Hz	0x0B11	○
FB-21	Reduce motor delay time	0.0s～100.0s	10.0s	0x0B15	○
FB-22	Motor cycle period	0.1～120.0h	24.0h	0x0B16	○
FB-23	Frequency	0.00Hz～upper limiting	45.00Hz	0x0B17	○

Function code	Description	Set range	Default	address	Revision level
	threshold for cyclic operation	frequency (F1-07)			
FB-24	Contactor opening and closing time	0.1~1.0s	0.5s	0x0B18	○
FC Group Pump protection parameter group					
FC-00	Outlet sensor breakage protection selection	0: forbid 1: Alarm	1	0x0C00	○
FC-01	Outlet sensor break line detection voltage	0.00~10.00V	0.40V	0x0C01	○
FC-02	Outlet sensor break line detection time	0.0s~120.0s	30.0s	0x0C02	○
FC-03	Water shortage dry pumping function selection	0: forbid 1: The running current determines the water shortage 2: The outlet pressure determines the lack of water 3: Current or outlet pressure judge water shortage 4: Inlet pressure determines water shortage	2	0x0C03	○
FC-04	Water shortage dry pumping detection pressure	0.0bar~setting pressure (F0-00)	0.5bar	0x0C04	○
FC-05	Frequency of dry pumping test	0.00Hz~upper limiting frequency (F1-07)	48.00Hz	0x0C05	○
FC-06	Water shortage dry pumping detection current	0.0%~100.0%	40.0%	0x0C06	○
FC-07	Delay of dry pumping test	0.0s~3600.0s	60.0s	0x0C07	○
FC-08	Water shortage dry pumping restart delay	0min~1000min	30min	0x0C08	○
FC-09	Number of dry pumping restarts due to water shortage	0~100	5	0x0C09	○
FC-10	A large number of leakage treatment options	0: forbid 1: alarm	0	0x0C0A	○
FC-11	Large amount of leakage pressure anomaly detection bias	0.0bar~set pressure (F0-00) After a large amount of water leakage, the frequency of inverter operation will rise to the upper limit frequency. When FC-10 is set to 0, the massive leakage detection function is invalid.	1.0bar	0x0C0B	○
FC-12	Large amount of water leakage anomaly detection	0.0s~3600.0s	120.0s	0x0C0C	○

Function code	Description	Set range	Default	address	Revision level
	time				
FC-13	Water pipe soft filling function selection	0: invalid 1: valid	0	0x0C0D	○
FC-14	The water pipe is soft-filled at a given frequency	0.00Hz～upper limiting frequency (F1-07)	30.00Hz	0x0C0E	○
FC-15	Duration of soft filling of water pipe	0.0s～3600.0s	30.0s	0x0C0F	○
FC-16	Soft filling cut-off level for water pipes	0.0%～100.0%	50.0%	0x0C10	○
FC-17	Frost protection function selection	0: forbid 1: enabled	0	0x0C11	○
FC-18	Frost protection operation frequency	0.00Hz～upper limiting frequency (F1-07)	10.00Hz	0x0C12	○
FC-19	Frost protection interval period	0 min～6000min	5min	0x0C13	○
FC-20	Frost protection run time	0 min～3000min	1min	0x0C14	○
FC-24	Pump blocking function selection	0: forbid 1: alarm	0	0x0C18	○
FC-25	Set value of blockage current of water pump	0.0%～200.0%	130.0%	0x0C19	○
FC-26	Upper limit of pump blocking frequency	0.00Hz～upper limiting frequency (F1-07)	15.00Hz	0x0C1A	○
FC-27	Pump blocking current delay time	0.0s～3600.0s	5.0s	0x0C1B	○
FC-28	Cleaning function	0: forbid 1: Enabled (cleaning is triggered by X terminal action)	0	0x0C1C	○
FC-29	Clean forward rotation frequency	0.00Hz～upper limiting frequency (F1-07)	50.00Hz	0x0C1D	○
FC-30	Clean dead zone frequency	0.00Hz～upper limiting frequency (F1-07)	0.00Hz	0x0C1E	○
FC-31	Clean reversal frequency	0.00Hz～upper limiting frequency (F1-07)	50.00Hz	0x0C1F	○
FC-32	Clean forward time	0.0s～3600.0s	5.0s	0x0C20	○
FC-33	Clean forward and reverse time interval	0.0s～3600.0s	1.0s	0x0C21	○
FC-34	Clean reversal time	0.0s～3600.0s	5.0s	0x0C22	○
FC-35	Number of cleaning cycles	1～1000	1	0x0C23	○
FC-36	Fire overcontrol mode function	0: invalid 1: valid	0	0x0C24	○
FC-37	Operating frequency of fire mode	0.00Hz～upper limiting frequency (F1-07)	50.00Hz	0x0C25	○
FC-38	Inlet pressure protection option	0: forbid 1: alarm	0	0x0C26	○
FC-39	Minimum inlet detection pressure	0.0bar～set pressure (F0-00)	1.0bar	0x0C27	○

Function code	Description	Set range	Default	address	Revision level
FC-40	Inlet recovery detection pressure	FC-39～set pressure (F0-00)	1.5bar	0x0C28	○
FC-41	Inlet pressure check delay	0.0s～120.0s	60.0s	0x0C29	○
FC-42	Pool level signal channel	0：invalid　　1：AI1　　2：AI2	0	0x0C2A	○
FC-43	Tank level sensor range	0.0m～30.0m	5.0m	0x0C2B	○
FC-44	Upper limit of pool level	0.00%~100.0%	60.0%	0x0C2C	○
FC-45	Lower water level of pool level	0.00%~100.0%	40.0%	0x0C2D	○
FC-46	Lack of water level in the pool	0.00%~100.0%	20.0%	0x0C2E	○
FD Group　　Communication parameter set					
FD-00	Local address	1～247，0 is the broadcast address	1	0x0D00	○
FD-01	Baud rate	0：300BPS 1：600BPS 2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS 8：57600BPS 9：115200BPS	5	0x0D01	○
FD-02	data format	0：No validation (8-N-2) 1：even parity check (8-E-1) 2：odd check (8-O-1) 3：No validation (8-N-1)	3	0x0D02	○
FD-03	answering delay	0ms～20ms	2	0x0D03	○
FD-04	Communication timeout period	0.0（invalid），0.1s～60.0s	0.0	0x0D04	○
FD-05	Data transfer format selection	0：The non-standard MODBUS protocol 1：The standard MODBUS protocol	1	0x0D05	○
FD-06	Communication read current resolution	0：0.01A　　1：0.1A	0	0x0D06	○
FD-11	Block transfer 1	0x0000~0xFFFF Corresponding to	set pressure	H.700B	0x0D0B	○
FD-12	Block transfer 2	F0-00~FE-xx, U0-xx~U0-xx,	Feedback pressure	H.700C	0x0D0C	○
FD-13	Block transfer 3	U3-xx~U3-xx. Users can fill the parameter address to read the	Frequency of operation	H.7000	0x0D0D	○
FD-14	Block transfer 4	data in the parameter FD-16　FD-11　~	busbar voltage	H.7002	0x0D0E	○

Function code	Description	Set range		Default	address s	Revision level
FD-15	Block transfer 5	FD-26, and then use the communication function code 03H to read the required parameter content once and return the data 0 at the incorrect address. When using the communication function code 06H and writing the EEPROM address, it should be noted that the data should not be written frequently.	output current	H.7004	0x0D0 F	○
FD-16	Block transfer 6		working speed	H.700E	0x0D1 0	○
FD-17	Block transfer 7		Temperat ure of machine	H.700D	0x0D1 1	○
FD-18	Block transfer 8		output power	H.7005	0x0D1 2	○
FD-19	Block transfer 9		Power on time	H.7010	0x0D1 3	○
FD-20	Block transfer 10		run time	H.7011	0x0D1 4	○
FD-21	Block transfer 11		machine state	H.7015	0x0D1 5	○
FD-22	Block transfer 12		fault code	H.7016	0x0D1 6	○
FD-23	Block transfer 13		control command	H.7311	0x0D1 7	○
FD-24	Block transfer 14		Set pressure	H.F000	0x0D1 8	○
FD-25	Block transfer 15		Wake-up pressure	H.F001	0x0D1 9	○
FD-26	Block transfer 16		Running steering	H.F002	0x0D1 A	○
FE Group Multi-segment speed parameter group						
FE-00	Multiple speed commands 0	0.00%~100.0%		80.0%	0x0E00	○
FE-01	Multiple speed commands 1	0.00%~100.0%		90.0%	0x0E01	○
FE-02	Multiple speed commands 2	0.00%~100.0%		100.0%	0x0E02	○
FE-03	Multiple speed commands 3	0.00%~100.0%		0.0%	0x0E03	○
FE-04	Multiple speed commands 4	0.00%~100.0%		0.0%	0x0E04	○
FE-05	Multiple speed commands 5	0.00%~100.0%		0.0%	0x0E05	○
FE-06	Multiple speed commands 6	0.00%~100.0%		0.0%	0x0E06	○
FE-07	Multiple speed commands 7	0.00%~100.0%		0.0%	0x0E07	○
FE-08	Multiple speed commands 8	0.00%~100.0%		0.0%	0x0E08	○
FE-09	Multiple speed commands 9	0.00%~100.0%		0.0%	0x0E09	○
FE-10	Multiple speed commands Multiple speed commands Multiple speed commands 10	0.00%~100.0%		0.0%	0x0E0 A	○
FE-11	Multiple speed commands 11	0.00%~100.0%		0.0%	0x0E0 B	○
FE-12	Multiple speed	0.00%~100.0%		0.0%	0x0E0	○

Function code	Description	Set range	Default	address s	Revision level
	commands 12			C	
FE-13	Multiple speed commands 13	0.00%~100.0%	0.0%	0x0E0D	○
FE-14	Multiple speed commands 14	0.00%~100.0%	0.0%	0x0E0E	○
FE-15	Multiple speed commands 15	0.00%~100.0%	0.0%	0x0E0F	○
FE-16	Multi-section speed instruction 0 given mode	0: The parameter FE-00 is given 1: Preset frequency F1-05 given, increase/decrease keys can be modified 2: AI1 Given	0	0x0E10	○
FE-17	Terminal multi -speed priority selection	0: invalid 1: valid	1	0x0E11	○
FP Group Function code management group					
FP-00	user password	0～65535	0	0x1F00	○
FP-01	parameter initialization	0: no-operation 1: Restore factory parameters (excluding motor parameters) 2: Clear logged information 3: Restore all parameters (including motor parameters)	0	0x1F01	●
FP-02	Parameter modification property	0: enable 1: disable	0	0x1F02	○
FP-05	Copy keyboard parameters	0: non-function 1: Upload parameters to keyboard 2: Download parameters to the inverter, excluding motor parameters 3: Download parameters to the inverter, including motor parameters	0	0x1F05	●

6.2 The U0 group monitors the parameter table

function code	name of parameter	Communication address	Display Range
U0-00	Frequency of operation (Hz)	0x7000	0.00Hz～500.00Hz
U0-01	Set frequency (Hz)	0x7001	0.00Hz～500.00Hz
U0-02	busbar voltage (V)	0x7002	0.0V～3000.0V
U0-03	output voltage (V)	0x7003	0V～1140V
U0-04	current output (A)	0x7004	0.01A～655.35A
U0-05	output power (kW)	0x7005	0.0kW～3276.7kW
U0-06	output torque (%)	0x7006	-200.0%～200.0%
U0-07	Digit input terminal status	0x7007	0～32767
U0-08	Digital output terminal status	0x7008	0～1023
U0-09	AI1 voltage (V)	0x7009	-10.57V～10.57V

U0-10	AI2 voltage (V)	0x700A	-10.57V～10.57V
U0-11	Set pressure	0x700B	0.0bar～200.0bar
U0-12	Feedback pressure	0x700C	0.0bar～200.0bar
U0-13	Radiator temperature	0x700D	-20℃～124.0℃
U0-14	Load speed display	0x700E	0RPM～65535RPM
U0-15	Inlet pressure/pool level height	0x700F	0.0bar～200.0bar 0.0m～30.0m
U0-16	Total power-on time	0x7010	0H～65535H
U0-17	Cumulative running time	0x7011	0H～65535H
U0-18	Low cumulative power consumption	0x7012	0kWh～65535kWh
U0-19	High cumulative power consumption	0x7013	0MWh～65535MWh
U0-20	Number of pumps on-line	0x7014	0～6
U0-21	Frequency converter state	0x7015(Same definition as 3000H)	1～8
U0-22	Inverter fault description	0x7016(Same definition as 8000H)	0～99
U3-16	Communication write set frequency	0x7310(Same definition as 1000H)	0.00～500.00Hz
U3-17	Communication write control command	0x7311(The definition is the same as 2000H)	1～7
U3-18	Correspondence writer from command	0x7312(Same as 2005H definition)	0～1
U3-19	Communication write set frequency	0x7313	-10000～10000

The Chapter 7: Parameter description

7.1 Parameter description

7.1.1 F0 Basic parameter group

F0-00	set pressure	1.0bar～hyperpressure (F0-07)	3.0bar	Set system target working pressure
F0-01	Starting pressure deviation	0.0bar～set pressure (F0-00)	0.3bar	Pressure less than set pressure - start pressure deviation to wake up

●F0-00 System pressure set value, for example: In the water pump system, the pressure value in this system is required to be 4bar, then F0-00=4.0.

●F0-01 Starting pressure deviation, for example: In the water pump system, the pressure value in the system wake-up value is required to be 3.6bar, then F0-01=0.4.

F0-03	Outlet sensor range	0.0bar～200.0bar	16.0bar	Maximum range of water outlet sensor
F0-04	Outlet pressure feedback channel	0：AI1 1：AI2 2：MAX(AI1，AI2) 3：MIN(AI1，AI2)	2	Outlet pressure signal access feedback channel
F0-05	Inlet sensor range	0.0bar～200.0bar	16.0bar	Maximum range of water inlet sensor
F0-06	Inlet pressure feedback channel	0：AI1 1：AI2	1	Inlet pressure signal access feedback channel

●F0-03 The range of the outlet pressure sensor or the remote pressure gauge is set according to the maximum range. For example, in the water pump system, the installed outlet sensor range is 0~1.6Mpa, then F0-03=16.0.

●F0-04 The pressure feedback channel of the water outlet is 2 by default (both AI1 and AI2 can automatically identify pressure signals). AI1 can access 4~20mA pressure sensor signals by default, and AI2 can access 0~10V remote pressure gauge signals by default.

●F0-05 The range of the inlet pressure sensor or remote pressure gauge is set according to the maximum range. For example, in the water pump system, the range of the installed inlet sensor is 0~1.6Mpa, then F0-05=16.0.

●F0-06 Inlet pressure feedback channel, default is 1, AI2 can access 0~10V remote pressure gauge signal by default.

●**Note**：If the inlet pressure sensor or remote pressure gauge is used to monitor the inlet pressure, it is necessary to set F0-04 to 0, and AI1 is connected to the outlet pressure feedback signal; AI2 is connected to the inlet pressure feedback signal. If the inlet feedback signal is 4-20mA, F0-06=0 and F6-01=0 should be set.

F0-07	hyperpressure	0.0bar～max range (F0-03)	15.0bar	E048 high water pressure alarm will be triggered when the feedback pressure is greater than or equal to the set value of F0-07

				and the delay is greater than F0-08
F0-08	Ultra-high pressure delay	0.0s～3600.0s	5.0s	High pressure alarm delay time
F0-09	Ultra-low pressure	0.0bar～set pressure (F0-00)	0.0bar	E049 low water pressure alarm is triggered when the feedback pressure is less than F0-09 set value and the delay is greater than F0-10
F0-10	Ultra-low pressure delay	0.0s～3600.0s	5.0s	Ultra-low pressure alarm delay time

●F0-08 When the ultra-high pressure delay is set to 0, the high water pressure alarm can be turned off.

●F0-10 When the ultra-low pressure delay is set to 0, the low water pressure alarm can be turned off.

F0-11	Restart option after power on/reset	0: invalid 1: valid	0	Set to 1 to enable the auto-start function after power on/fault reset
F0-12	Power on/reset restart delay	0.0s～100.0s	5.0s	The delay of the restart

●F0-11 If the value is set to 1, the automatic start function of the frequency converter after power-on/reset is enabled. After the function is enabled, the VFD will restart after power-on or fault automatic reset after a delay time of F0-12.

F0-13	Hibernation mode selection	0: non-sleep 1: Use sleep frequency to sleep 2: Use feedback bias dormancy	2	The choice of hibernation mode
F0-14	Resting pressure deviation	0.0bar～10.0bar	0.1bar	When the feedback pressure is within the deviation range, F0-16 delay is performed and sleep detection is performed, sleep pressure = set pressure-sleep pressure deviation
F0-15	Sleep detection time	0.0s～100.0s	2.0s	If the sleep is slow or cannot sleep, it can be reduced
F0-16	Pressure retention detection interval	0.0s～600.0s	60.0s	Sleep detection starts when the feedback pressure is greater than or equal to the sleep pressure and after F0-16 time
F0-17	Dormancy frequency	0.00～upper limiting frequency	25.00Hz	The operating frequency is less than the sleep frequency to enter the sleep

●F0-13 When the feedback pressure is greater than or equal to the set pressure, the system

adjusts to the stable state according to PID. The minimum operating frequency is FA-01 PID minimum holding frequency, which is suitable for applications where no shutdown is required.

●F0-13 If the value is set to 1, sleep frequency is used to sleep. The system does not actively detect sleep and relies on itself to sleep. When the feedback pressure is greater than or equal to the sleep pressure and the running frequency is less than the sleep frequency, the system sleeps.

●F0-13 When the value is set to 2, the feedback deviation hibernation is used. When the feedback pressure is greater than or equal to the hibernation pressure, the pressure retention detection is started. Timing system Feedback pressure After the F0-16 pressure retention detection, the feedback pressure is still greater than or equal to the hibernation pressure system enters the hibernation detection process. If the feedback pressure is greater than or equal to the sleep pressure after the sleep detection time in the process of continuously reducing the output frequency, the output frequency will be reduced to 0Hz and enter the sleep state; otherwise, the system will accelerate again.

7.1.2 F1 Start and stop parameter groups

F1-00	Start/stop signal source instruction (automatic/remote mode)	0: Keyboard command channel 1: Terminal command channel 2: Communication command channel	0	The default system is automatic/remote mode, and the start and stop signals are controlled by the keyboard panel
F1-01	Primary frequency source(Automatic/Remote mode)	0: Keyboard Settings, power down not memory 1: Keyboard Settings, power down memory 2: AI1 3: AI2 5: constant current 6: Multiple stage speed 8: PID 9: Communication given	8	The default automatic/remote mode frequency source is PID constant voltage control
F1-02	Start/stop signal source instruction (manual/local mode)	0: Keyboard command channel 1: Terminal command channel 2: Communication command channel	0	Manual/local mode start/stop signal source, default keyboard panel control
F1-03	Auxiliary frequency source(manual/local mode)	0: Keyboard Settings, power down not memory 1: Keyboard Settings, power down memory 2: AI1 3: AI2 5: constant current 6: Multiple stage speed 8: PID	1	The manual/local mode frequency source is set for the keyboard, and the operating frequency can be adjusted through the potentiometer and the up/down keyboard

		9: Communication given		
F1-04	Automatic/manual action selection	0: Standard HOA manual switching function (function key switching) 1: Automatic/manual switching by external signal (terminal/communication switching) 2: Function key, terminal, communication are effective	1	Automatic and manual mode selection

●F1-04 The default value of this parameter is 1, that is use external signal to switch the auto manual mode, F1-00, F1-01 are the operation and frequency source setting in auto mode, F1-02, F1-03 are the operation and frequency source setting in manual mode, at this time, when the function selection of the external terminal (Xn) is set to the auto/manual switching function and the terminal is closed or the communication switching command 2005H is set to 1, it is possible to switch the auto manual mode.

●F1-04 When it is set to 0, that is, the standard HOA function, the automatic manual mode can be switched by pressing the [Function] key. At this time, the external terminal (Xn) setting 29 Manual automatic switching and communication switching command 2005H are invalid.

●After the system is powered off and then powered on, the system restores to the automatic or remote mode. If F1-04=1 and the multi-function input terminal is set to automatic or manual switching, the multi-function input terminal has the highest priority.

F1-12	Stop method	0: Slow down and stop 1: free stop	0	The default is slow stop mode

●When F1-12 is set to 0，The VFD will slow down to 0Hz and stop according to the set deceleration

●When F1-12 is set to 1，The motor stops in free running mode, the inverter stops output immediately, and the motor stops according to inertia.

F1-14	Motor control mode	0: Speed sensorless vector control（SVC） 1: V/F control	1	The default value is VF control

●When the pump motor is controlled by asynchronous motor, set the F1-14 motor control mode to 1, and when the pump motor is controlled by synchronous motor, set the F1-14 motor control mode to 0.

7.1.3 F2 Motor parameter group

F2-00	Motor type Selection	0: Ordinary asynchronous motor 1: permanent magnet synchronous motor 2: single-phase motor	0	0

●When the pump motor is an asynchronous motor, F2-00 is set to 0, and F1-14 is automatically switched to VF control.

●When the pump motor is a synchronous motor, F2-00 is set to 1, and F1-14 is

automatically switched to SVC control. When the motor is a synchronous motor, F2-17=12 should be set to perform synchronous motor parameter self-learning for the first debugging.

7.1.4 F5 Digital input and output terminal sub-parameter groups

F5-00	X1 terminal function selection		1	This parameter needs to be matched with F1-00 automatic run command source. When F1-00 is set to 1, this terminal is effective in closed operation
F5-01	X2 terminal function selection		11	The default value is 11. You can connect the water float or liquid level switch to determine whether water is lacking. Closing the terminal triggers the E015 alarm
F5-02	X3 terminal function selection	0~50	29	The default value is 29. This parameter needs to be combined with F1-04 parameter to select automatic/manual action. Switch the automatic/manual command source and frequency source when the terminal is valid.
F5-03	X4 terminal function selection		9	The default value is 9 terminal reset
F5-04	X5 terminal function selection		12	Default multi-speed selection switching
F5-05	X6 terminal function selection		13	terminal, can be used with the FE group to switch between low, medium and high speeds.

●This parameter is the function corresponding to the multi-function input terminal.

●When this parameter is set to 23 and 24,that is in the state of the one-control-two-mode it is the input signal of the No.1 pump fault/shield and the No.2 pump fault/shield respectively.

●When this parameter is set to 31, the cleaning function of the pump will be started when the terminal is effective. Please refer to FC-28~FC-34 for setting the cleaning function.

F5-17	Relay 1 output selection		1	The default is 1 run output, this contact does not output when the inverter sleeps or stops
F5-18	Relay 2 output selection	0~47	2	Default is 2 fault output, this contact output when inverter fault
F5-19	Y1 Output selection		1	The default is 1 run output, this contact does not output when the inverter sleeps or stops

●This parameter is the function corresponding to the multi-function output terminal.

●When this parameter is set to 42, this node outputs the signal when the converter is in the non-shutdown state.

●When this parameter is set to 43 and 44, that is in the state of one-control-two-mode ,it is the output signal of pump No. 1 and pump No. 2 respectively.

7.1.5   F6 Analog input and output terminal parameter group

F6-00	AI1 Input function selection	0: 4~20mA 1: 0~20mA 2: 0~10V 3: 0~5V 4: 0.5~4.5V	0	AI1 terminal sensor voltage and current mode selection
F6-01	AI2 Input function selection		2	AI2 terminal sensor voltage and current mode selection
F6-02	AI1 Input correction factor	0.500~1.500	1.000	AI1 terminal input pressure and actual pressure correction coefficient
F6-03	AI2 input the correction coefficient		1.000	AI2 terminal input pressure and actual pressure correction coefficient

●In the use of water pump related functions, the default factory AI1 is connected to the outlet 4~20mA pressure sensor, AI2 can be connected to 0~10V remote pressure gauge, frequency converter automatically identify the source of pressure.

●If the inlet pressure feedback is used, please connect the outlet pressure signal to AI1 and the inlet pressure signal to AI2. Set F0-04, F6-00 and F6-01 parameters according to the pressure signal type.

F6-16	VO Output selection	0~15	6	The default is 6 fixed output 5V power supply

●This parameter is the function corresponding to the multi-function analog output terminal, the output range is 0~10V.

7.1.6 F7 Keyboard and display parameter group

F7-01	Stop the key function selection	0: Stop key shutdown function is invalid 1: Stop the key shutdown function is valid	1	Default to 1 The Stop key is valid in all control modes

● In the multi-pump system, for the convenience of the user, if the main station can stop the whole system, and then press the [run] key to restore the system; after the default setting parameter F 7-01=1, if the slave station presses [stop] key to leave the multi-pump system for repair and maintenance, the slave station will display [E022] fault code as the reminder, press the [stop] key again and reset [E022], and the slave station will automatically return the multi-pump system for operation.

F7-02	The first row of LED runs displays the parameters	0000～FFFF Bit 00: Operating Frequency (Hz) Bit 01: Set Frequency (Hz) Bit 02: Bus voltage (V) Bit 03: Output voltage (V) Bit 04: output current (A) Bit 05: Output power (kW)	0x0814	The default operating status of the first line of the LED keyboard displays the bus voltage (U), the output current (A), and the set pressure-feedback pressure
F7-03	The first line of LED shutdown display parameters	Bit 06: Output torque is (%) Bit 07: DI input status Bit 08: DO output status Bit 09: AI1 voltage (V) Bit 10: AI2 voltage (V) Bit 11: Set Pressure (Bar) Bit 12: Feedback Pressure (Bar) Bit 13: the radiator temperature is (℃) Bit 14: running speed (rpm) Bit 15: Inlet pressure (Bar) / fluid level	0x0804	The default shutdown state of the first line of the LED keyboard displays the bus voltage (U), set pressure-feedback pressure
F7-04	The second row LED fixed the display parameters	00: Operating Frequency (Hz) 01: Set Frequency (Hz) 02: Bus voltage (V)	0	The second row of the LED keyboard displays the running frequency by default (H)
F7-05	The first row of the LCD keyboard displays the parameters	03: Output voltage (V) 04: output current (A) 05: Output power (kW) 06: Output torque: (%)	11	The first line of the LCD keyboard displays the set pressure by default
F7-06	The second row of the LCD keyboard displays the parameters	07: DI input status 08: DO output status 09: AI1 voltage (V) 10: AI2 voltage (V) 11: Set pressure (Bar) 12: Feedback pressure (Bar) 13: the radiator temperature is (℃) 14: Operating speed (rpm) 15: Inlet pressure (Bar) / fluid level (m)	12	The second line of the LCD keyboard displays the feedback pressure by default
F7-07	The third row of the LCD keyboard displays the parameters	Same as the F7-02	0x201D	The third line shift of the LCD keyboard displays the operating frequency, bus voltage, output voltage, output current, machine temperature, and running speed

● F7-02, F7-03, F7-04 parameters are set to 16 decimal values, bit 15 to bit 12 to _ x x, bit 11 to bit 8 to x_xx, bit 7 to bit 4 to x _ x, bit 3 to bit 0 to xxx _, and xxxx value to BCD (8421).

7.1.7 FB multi-pump control parameter group

FB-03	Standby host mode	0: The backup host is	0	When set to 1, the

		invalid 1: The backup host is valid		non-sensor access runs according to the parameter FB-09, and the sensor access runs at constant voltage
FB-09	Operating frequency of water pump disconnection	0.00Hz ~ upper limit frequency	40.00Hz	

● This parameter is valid only for the secondary pump.

● When the multi-pump system is applied, if you want this station to become a standby main station, then set the station number parameter FB-03=1 to open the standby host function. After the host line is disconnected, if the standby host is not connected to the sensor system and automatically switch to the pump disconnected operating frequency, if the standby host is connected to the sensor system, the standby sensor system will automatically switch to the constant pressure operation of multiple pumps.

● The main pump has the function of redetecting secondary pump.

FB-04	Multi-pump configuration setting	0: Follow the main pump to start up 1: As determined by the native, automatic / remote command source F1-00	0	The default is 0 slave following the host

● This parameter is valid only for the auxiliary pump.

● When the multi-pump system is established, the inverter mainly connect each other, the slave parameters F 1-00 and F1-01 are automatically set as the communication control, and the master station of the multi-pump system is the keyboard control by using the [run] and [stop] key control system on the keyboard to connect the operation command of the main station, the parameter F1-00 is set as 2 communication control, and connect HMI with A + and B-, the operation command of the main station can be controlled by HMI. Note that the keyboard [Run] keyboard cannot control the system, and the [Stop] key can effectively control the system by default.

● If the slave station must also be connected to HMI to control the operation command of the slave station, set the slave station parameter FB-04 to 1, and connect HMI to A + and B-of the slave station. At this time, the operation command of the slave station can be controlled through HMI.

FB-05	Water pump start time sequence	0: According to the water pump serial number 1: According to the operation time	1	

● 0: According to the pump serial number (1-> 2-> 3-> 4-> 5-> 6->1).

● 1: Follow the minimum operating time.

FB-07	Multi-pump pump starting frequency	0.00 Hz to upper limit frequency (F1-07)	50.00Hz	Pump frequency of the system operation
FB-08	Detection time after starting frequency of multiple pump	0.0～100.0s	5.0s	

● This parameter is valid only for the main pump setting.

● Pump increase mechanism of multi-pump. When the operation frequency of the main

pump is> = the parameter FB-07 and the time exceeds the parameter FB-08, start the next set. If the water quantity is still insufficient, start the third and fourth sets according to the same conditions.

● Pump reduction mechanism of multiple pumps: the frequency converter will confirm the stable operation according to the detection time of parameter F0-14, parameter F0-15 and F0-16, and then reduce the pump according to the deceleration time of parameter F0-19.

7.1.8 FC water pump function parameter group

FC-00	Sensor disconnection protection selection	0: Prohibit 1: Call the police	1	When set to 1, E031 break alarm is triggered when the break condition is met
FC-01	Sensor line break detection voltage	0.00~10.00V	0.40V	
FC-02	Sensor disconnection detection time	0.0s~120.0s	30.0s	

● This parameter is only for the main pump and the outlet pressure sensor.

● When the parameter setting value of FC-00 is 1, when the sensor is disconnected and the frequency converter displays E031 alarm after the detection time of FC-02. When the sensor is restored, the alarm will automatically disappear.

● When the frequency converter stops, the alarm condition disappears, and the alarm automatically disappears.

FC-03	Lack of water and dry pumping function selection	0: Prohibit 1: Operating current determines the water shortage 2: the outlet pressure to judge the water shortage 3: Current or outlet pressure to judge the water shortage 4: Inlet pressure determines water shortage	2	When set to 2, E047 water shortage alarm is triggered when the disconnection condition is met
FC-04	Lack of water and dry pumping test pressure	0.0bar ~ set pressure (F0-00)	0.5bar	
FC-05	Detection frequency of water shortage and dry extraction	0.00 Hz to upper limit frequency (F1-07)	48.00Hz	
FC-06	Test the current for water shortage and dry pumping	0.0%~100.0%	40.0%	
FC-07	Detection delay of water shortage and dry extraction	0.0s ~3600.0s	60.0s	
FC-08	Reboot delay	0min ~1000min	30min	
FC-09	Number of water shortage dry pumping restart	0~1000	5	

● When FC-03 is set 1, the operating current is less than the set percentage of FC-06, the operating frequency is greater than FC-05, and the inverter will display the water shortage alarm of E047 after the detection time of FC-07.

● When FC-03 is set to 2, the outlet pressure is less than FC-04, the operating frequency is greater than FC-05, and the inverter will display E047 water shortage alarm after the detection time of FC-07.

● When FC-03 is set 3, the outlet pressure is less than FC-04 or the operating current is less than the set percentage of FC-06, the operating frequency is greater than FC-05 and the inverter will display E047 water shortage alarm after the detection time of FC-07.

● When FC-03 is set at 4, the inlet pressure is less than FC-04, the operating frequency is greater than FC-05, and the inverter will display E047 water shortage alarm after the detection time of FC-07.

● Clear the E047 water shortage alarm after the parameter FC-08 time, and redetect whether the condition of water shortage dry pumping is triggered. If the condition of water shortage dry pumping is still met, the E047 alarm will be triggered continuously.

● If the number of repeated attempts exceeds the parameter FC-09 setting, the E047 alarm maintenance will not be cleared and reset.

FC-10	Numerous water leakage treatment options	0: Prohibit 1: Call the police	0	When set to 1, a large number of leakage alarm triggers E050 when the leakage condition is met
FC-11	A large number of water leakage pressure abnormal detection deviation	0.0bar ~ set pressure (F 0-00)	1.0bar	
FC-12	A large number of water leakage abnormality detection time	0.0s ～3600.0s	120.0s	

● When the feedback pressure of the detection system is less than the set pressure-FC-11 deviation pressure, and after the continuous time parameter FC-12, the system load full frequency output, a large number of water leakage E050 alarm is triggered, and the system will not automatically reset after a large number of water leakage events are triggered.

FC-17	Frost protection function selection	0: Prohibit 1: Enable	0	When set to 1, open the frost protection function
FC-18	Frost-protected operating frequency	0.00 Hz to upper limit frequency (F1-07)	10.00Hz	
FC-19	Frost protection interval period	0 min～6000min	5min	
FC-20	Frost protection running time	0 min～3000min	1min	

● After FC-17 is set to 1, when the frequency converter is in the dormant state, it runs to FC-18 operating frequency after the time of FC-19, and stops after FC-20 time.

FC-24	Selection of water pump blocking function	0: Prohibit 1: Call the police	0	When set to 1, open the blocking and turning protection function
FC-25	Pump blocking	0.0%～200.0%	130.0%	

	rotating current setting point			
FC-26	Upper limit of water pump blocking rotation frequency	0.00 Hz to upper limit frequency (F1-07)	15.00Hz	
FC-27	Water pump block turn, current delay time	0.0s ～3600.0s	5.0s	

● After FC-24 is set to 1, the frequency converter opens the pump blocking protection. When the output current is greater than the parameter FC-25, the operating frequency is less than or equal to FC-26 and the maintenance parameter FC-27, E046 blocking alarm will be triggered.

FC-28	Cleaning function	0: Prohibit 1: Enable (trigger triggered during X terminal action)	0	When set to 1, enable the function with the multifunctional input terminal set value 31
FC-29	Clean forward turn frequency	0.00 Hz to upper limit frequency (F1-07)	50.00Hz	
FC-30	Clean the dead area frequency	0.00 Hz to upper limit frequency (F1-07)	0.00Hz	
FC-31	Clean the reversal frequency	0.00 Hz to upper limit frequency (F1-07)	50.00Hz	
FC-32	Clean the forward turn time	0.0s ～3600.0s	5.0s	
FC-33	Clean the forward and reverse time interval	0.0s ～3600.0s	1.0s	
FC-34	Clean the reversal time	0.0s ～3600.0s	5.0s	
FC-35	Number of cleaning cycles	0.～1000	1	

● Please note that the cleaning action will make the pump move forward and reverse. Since some pumps can only operate in one direction, this function does not support the pump that can only run in one direction to avoid damage to the pump.

● The cleaning function program setting will be run according to the parameters FC-29 to FC-35.

FC-36	Fire control control mode function	0: invalid 1: valid	0	When set to 1, enable the function with the multifunctional input terminal set value 30
FC-37	Operating frequency of the fire mode	0.00 Hz to upper limit frequency (F1-07)	50.00Hz	

● This parameter is combined with a multifunctional input terminal set value of 30. When FC-36 is set to 0, the fire detection function is invalid.

FC-38	Inlet pressure protection selection	0: Ban 1: alarm	0	When set to 1, the alarm of E044 inlet pressure is triggered when the condition is met
FC-39	Minimum inlet detection pressure	0.0bar ～F0-00	1.0bar	
FC-40	Entry recovery detection pressure	FC-39～ Set pressure (F0-00)	1.5bar	
FC-41	Inlet pressure check delay	0.0s～120.0s	60.0s	

● When the inlet pressure of the detection system is less than the minimum inlet detection

pressure FC-39, and after continuous time FC-41, the alarm E044 is triggered, the inlet pressure returns to FC-40 and the fault is automatically reset after continuous time FC-41.

FC-42	Pool fluid level signal channel	0: Invalid 1: AI1 2: AI2	0	Valid when the setting is not for 0
FC-43	Pool level sensor range	0.0m ～30.0m	5.0m	

● After the FC-42 parameter is set effectively, the inlet pressure switch is displayed as the high level of the pool.

7.1.9 FD communication parameter group

FD-11 ～ FD-26	Block transmission from 1 to block transmission from 16	0x0000~0xFFFF	0	MODBUS Communication pointer

● In order to improve the communication efficiency of HMI or PLC, the block transmission address is used to read or write the data, and the write value is the address corresponding to the functional code parameter. If the pressure F000 parameter is set, it is modified to H.0000 or H.F000(H.0000 power loss, H. F000 power loss storage), refer to the communication appendix for detail.

7.2 Commissioning and application cases

7.2.1 Application of single-pump water supply system

☑ The system uses 1.0 Mpa 24V 4 ~ 20 mA pressure sensor, requiring the system target pressure of 4.0bar.

☑Start and stop with the frequency converter panel button to start.

The parameter settings are set as follows:

Parameter code	The parameter name	parameter setting
F0-00	setting pressure	4.0bar
F0-03	Sensor range (outlet)	10.0bar

The wiring diagram is as follows:
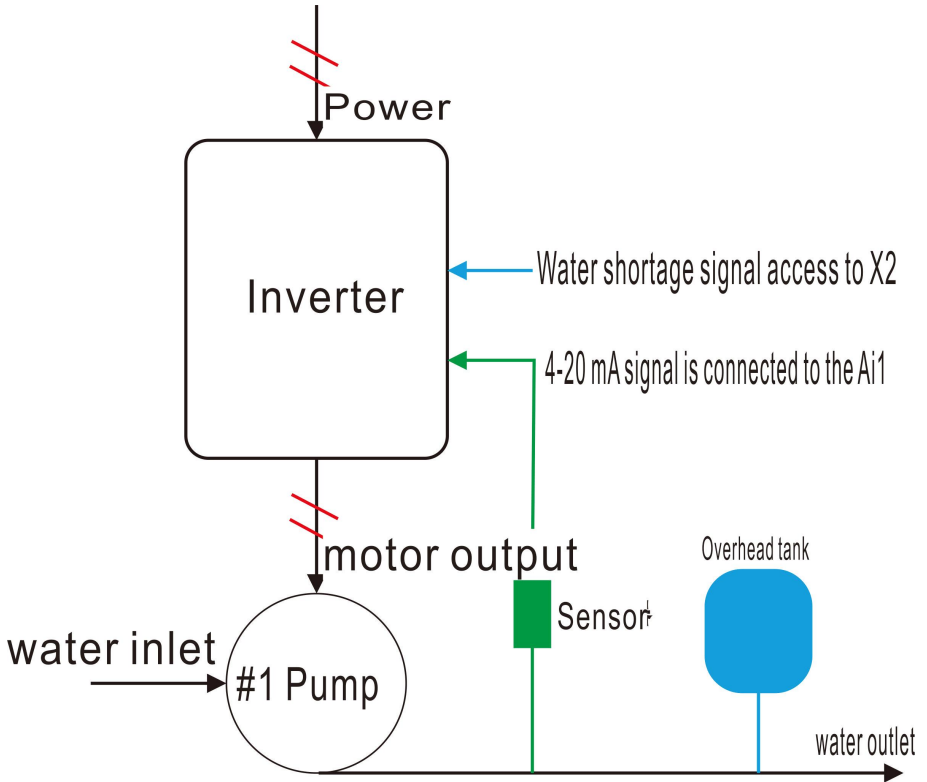
● single pump function

Under the default parameters, after the pressure sensor line is installed, the keyboard can be directly operated [start] and [stop] to control the start and stop of the pump. If the single pump system needs to add external switch to control start and stop, the parameter F1-00=1 can realize this function.

7.2.2 Application of multi-pump water supply system 1

☑ The system uses three pumps to form a multi-pump water supply system, using 1.6 Mpa 24V 4 ~ 20 mA pressure sensor, which requires setting the system target pressure of 4.0bar, and the multi-pump system needs to configure a standby master station; then the slave station only needs to set F0-20 for macro selection.

☑ After the multi-pump pump function is turned on, the wheel pump function is turned on by default (the pump with the smallest operation time starts first, and the wheel is followed every 24 hours) and the pump function is added.

☑Start and stop with the inverter keyboard button, start from the pump and the main pump, set by the PID using the external sensor in automatic mode. Enable the keyboard [function] key to realize manual / local and automatic / remote control. When switching to manual / local mode,

the keyboard [increase] and [reduce] keys set the speed, and the keyboard [start] and [stop] keys control the start and stop inverter (F1-02 and F1-03 default to 0).

The parameter settings are set as follows:

● Main pump station number (No.1 inverter)

Parameter code	The parameter name	parameter setting
F0-00	setting pressure	4.0bar
F0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	1 (Multi-pump main station)
F1-04	Automatic / manual action selection	0 (No keyboard switch to ignore)

● Standby main station (No.2 inverter)

Parameter code	The parameter name	parameter setting
F0-00	setting pressure	4.0bar
F0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	2 (Multi-pump No.1, slave station)
FB-03	Alternative function	1
F1-04	Automatic / manual action selection	0 (No keyboard switch to ignore)

● From station number (inverter 3)

Parameter code	The parameter name	parameter setting
F0-20	Apply macro selection	3 (Multipump # 2 slave station)
F1-04	Automatic / manual action selection	0 (No keyboard switch to ignore)

The wiring diagram is as follows:

Pressure 4-20mA | Inverter 1 | Pressure 4-20mA | Inverter 2 | Inverter 3

Inverter 1		Inverter 2		Inverter 3	
1	+24V	1	+24V	1	+24V
2	AI1	2	AI1	2	AI1
3	GND	3	GND	3	GND
4	AI2	4	AI2	4	AI2
5	VO	5	VO	5	VO
6	GND	6	GND	6	GND
7	X1	7	X1	7	X1
8	X2	8	X2	8	X2
9	X3	9	X3	9	X3
10	Y1	10	Y1	10	Y1

Relay K2

Hydropenia K2

Hydropenia sensor

Built-in multi-pump communication | Built-in multi-pump communication | Built-in multi-pump communication

11	S+	11	S+	11	S+
12	S-	12	S-	12	S-
13	SG	13	SG	13	SG

● Function keys to realize the automatic / remote mode

F1-00 and F1-01 are start-stop commands in automatic / remote mode (0: keyboard start-stop-host / 2: communication start / stop-slave) and frequency command source frequency command (8: PID setting-host / 9: Communication setting-slave), In the manual / local mode, Press the [function] key inverter to switch to automatic / remote mode to realize automatic constant pressure control, The keyboard [local] indicator light is turned out, The inverter pump set is started and stopped by the inverter 1; On individual maintenance, Press the [stop] key of the corresponding maintenance frequency conversion pump to stop the operation of this pump; The anhydrous sensor can connect the anhydrous signal to the inverter to realize the water shortage protection of the pump group.

● Function keys to implement the manual / local mode

F1-02 and F1-03 are the sources of start-stop commands in automatic / remote mode (0: keyboard start and stop) and frequency commands (0: keyboard setting) respectively, In the automatic / remote mode, Press [function] key inverter switch to manual / local, mode implementation, manual speed regulation control, Keyboard [local] indicator light is always on, Converter, started and stopped by the keyboard control, Keyboard [increase], [reduce] key set speed; On sensor failure or initial installation, Can be switched to the manual speed control and constant frequency mode; The anhydrous sensor distributes the waterless signal to each frequency converter by connecting the relay to realize the water shortage protection of the pump group in the manual mode.

● Multiple main pump function

The general multi-pump system can automatically increase or decrease the pump according to the water demand to improve the water efficiency. However, in order to maintain the stability of the system and keep the system in water, the multi-main station function of the system and the redundancy of the inverter and the pressure sensor are used to automatically replace the machine failure, power failure and disconnection, so as to improve the reliability of the system pump group and reduce the risk of water shutdown.

When the multi-pump system is applied, the main station is fixed as station number 1 and supports up to six units. For the convenience of the user, if the master station is pressed the [stop] key, stop the whole system, and then press the [Run] key to restore the system to

operation. After the default setting parameter F 7-01=1, if the slave station presses the [stop] key to remove the multi-pump system for repair and maintenance. At the same time, the [E022] fault code as the reminder will return the slave and press the [stop] key again to reset [E022], and the slave station will automatically return the multi-pump system for operation.

Regarding the alarm display, the pressure-related alarm (broken line, high water pressure, low water pressure, a large number of water leakage, low water pressure) in the main station, and the rest of the alarm (dry pumping, blocking rotation) determines the alarm according to their own parameters.

When using the multi-master station function, please set the hardware wiring and function parameters of the standby master station in the system to be the same as the main station to replace the function of the master station. Hardware wiring, refer to Section 3.5 Pressure sensor wiring and Section 3.6 Detailed description of multi-pump control communication wiring.

Multiple pump system station number definition

Communication main station	slave station	Absolute main station	Standby main station
Send the command to the station	The station receiving the command relative to the communication master station	The station number is 1, and it will definitely be the main communication station	The rest of the stations with the set parameter FB-03=1

Become the condition of the main station, the standby main station and the slave station

Set conditions		Absolute main station	Standby main station	slave station
certainly demand twig piece	Apply macro selection (parameter F0-20)	1	2~6 (non-repeatable setting)	2~6 (non-repeatable setting)
	Standby master station setting (parameter FB-03)		Standby master station switch FB-03=1	
Other conditions	communication ID (Parameter FB-00)	1	2~6 (Auto-Set) Note: It will automatically become a set of 1 when it becomes the main station	2~6 (Auto-Set)
	The main station has a fault	If the fault fails, the absolute main station will become a slave station, and the communication main station will be transferred to another station	If it occurs, it will not become the main communication station	

		number		
	other	There can be no other communication master station on the communication board	There are other main communication stations that will not become the main stations	

In case of line disconnection, power failure, failure, pressure sensor disconnection, the communication main station will stop for protection, and the communication main station will be transferred to other station numbers.

A. Communication disconnection / communication return:

a. When the communication line is disconnected, there is no communication block of the communication main station, and the standby main station will automatically become the main communication main station to control, and the smaller the ID station number, it is easy to become the main communication station.

b. If the standby main station is found without sensor connection, it will operate according to the FB-09 line break frequency until the communication line is connected.

c. When the communication line is connected, the absolute master station can control the system again (become the main communication station); if there is no absolute master station, the smaller the ID station can take over the system and can continue the previous status.

B. Power off, fault / restore power, reset:

a. After the power failure of the original main communication station or failure, the standby main station on the system will become the main communication station. And the smaller the ID station number, the easier it is to become the main communication station.

b. When the original main station is restored to normal (reset or re-powered), the absolute primary station will be retrieved; if the station is a standby one, the slave status will be maintained.

C. Pressure sensor break / pressure sensor back

a. When the absolute main station loses the pressure sensor signal, it will not become the communication station, and the standby main station on the system will become the communication station. The smaller the ID station number, the easier it is to become the communication station.

b. If the main communication station loses the pressure sensor signal, the main communication station losing the pressure sensor will operate according to the parameters FC-00 and FC-01 parameters. If there is no sensor connection to the standby main station on the system, the standby main station will operate according to the breaking frequency of the parameter FB-09 until the standby host has the pressure sensor signal or the main communication station.

FC-00	Exit sensor disconnection protection selection	0: Prohibit 1: Call the police	1	When set to 1, E031 break alarm is triggered when the break condition is met

7.2.3 Application of multi-pump water supply system II

☑ The system uses three pumps to form a multi-pump water supply system, using 1.6 Mpa 24V 4 ~ 20 mA pressure sensor, requiring the system target pressure of 4.0bar, and the multi-pump system requires the standby main station.

☑ After the multi-pump pump function is turned on, the wheel pump function is turned on by default (the pump with the smallest operation time starts first, and the wheel is followed every 24 hours) and the pump function is added.

☑The three machines control the start and stop through the external switch and enable the manual / local and automatic / remote control through the external switch, and the start and stop are controlled by the external switch. Set the speed to the [increase] and [decrease] keys when external switch to manual / local mode.

The parameter settings are set as follows:

● Main pump station number (No.1 inverter)

Parameter code	The parameter name	parameter setting
F 0-00	setting pressure	4.0bar
F 0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	1 (Multi-pump main station)
F1-00	Automatic / Remote mode start command	1 (Terminal start / stop)
F1-02	Manual / local mode start command	1 (Terminal start / stop)

● Standby main station (No.2 inverter)

Parameter code	The parameter name	parameter setting
F 0-00	setting pressure	4.0bar
F 0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	2 (Multi-pump No.1, slave station)
F1-00	Automatic / Remote mode start command	1 (Terminal start / stop)
F1-02	Manual / local mode start command	1 (Terminal start / stop)
FB-03	Alternative function	1 (the standby host is valid)
FB-04	Multi-pump configuration setting	1 (Independent control source)

● From station number (inverter 3)

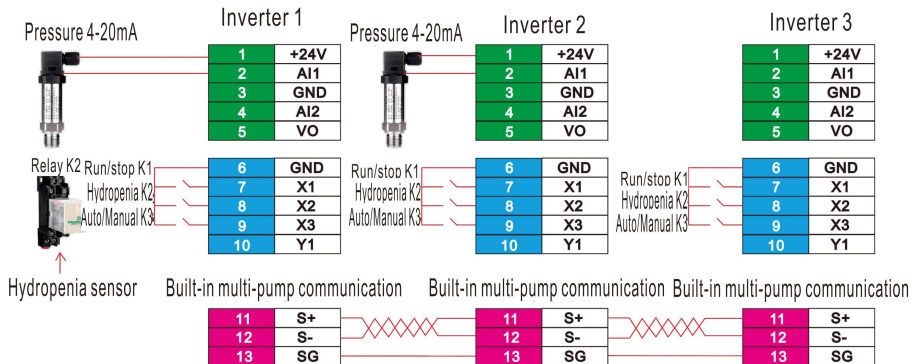| Parameter code	The parameter name	parameter setting
F0-20	Apply macro selection	3 (Multipump # 2 slave station)
F1-00	Automatic / Remote mode start command	1 (Terminal start / stop)
F1-02	Manual / local mode start command	1 (Terminal start / stop)
FB-04	Multi-pump configuration setting	1 (Independent control source)

The wiring diagram is as follows:

● Running the allowable and switching signals

X1 enables the system start (start / stop), X2 operation permit (dry pump sensor connection), and X3 automatic manual mode switch

● The external switch implements the automatic / remote mode

F1-00 and F1-01 are start-stop commands in automatic / remote mode (1: terminal start-stop-master-slave) and frequency command source frequency command source (8: PID setting-Host / 9: Communication setting-slave), When the external hand automatic switch K3 is turned off, The frequency converter is in automatic / remote mode to realize automatic constant voltage control, The keyboard [local] indicator light is out, inverter 1,2 and 3 are independently started and stopped by the external start-stop switch K1; On individual maintenance, Disconnect the start-stop switch K1 of the frequency converter to stop the operation of this pump; The anhydrous sensor can connect the anhydrous signal to the inverter to realize the water shortage protection of the pump group.

● The external switch implements the manual / local mode

F1-02 and F1-03 are sources of start-stop commands in automatic / remote mode (1: terminal start-stop-master-slave) and frequency commands (0: keyboard setting-master-slave) respectively, When the external hand automatic switch K3 is turned on, The frequency converter is in manual / local mode to achieve constant frequency speed control, Keyboard [local] indicator light is always on, inverter 1,2 and 3 are independently started and stopped by the external start-stop switch K1; When the inverter switches to the manual / local mode, Start / stop switch K1 controls the operation stop of this pump, Keyboard [increase], [reduce] the keyboard can control the running speed of this pump; The waterless sensor distributes the waterless signal to each frequency converter by connecting the relay to realize the water shortage protection of the pump group in manual mode.

7.2.4 Application of multi-pump water supply system III

☑ The system uses three pumps to form a multi-pump water supply system, using 1.6 Mpa 24V 4 ~ 20 mA pressure sensor, requiring the system target pressure of 4.0bar, and the multi-pump system requires the standby main station.

☑ After the multi-pump pump function is turned on, the wheel pump function is turned on by default (the pump with the smallest operation time starts first, and the wheel is followed every 24 hours) and the pump function is added.

☑The three machines control the start and stop and enable manual / local and automatic and remote control through HMI communication. They start and stop by HMI communication, and then the speed is set by HMI communication when the communication is switched to manual / local mode.

The parameter settings are set as follows:

● Main pump station number (No.1 inverter)

Parameter code	The parameter name	parameter setting
F 0-00	setting pressure	4.0bar
F 0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	1 (Multi-pump main station)
F1-00	Automatic / Remote mode start command	2 (Communication start / stop)
F1-02	Manual / local mode start command	2 (Communication start / stop)
F1-03	Manual / local mode frequency command	9 (Communication settings)

● Standby main station (No.2 inverter)

Parameter code	The parameter name	parameter setting
F 0-00	setting pressure	4.0bar
F 0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	2 (Multi-pump No.1, slave station)
F1-00	Automatic / Remote mode start command	2 (Communication start / stop)
F1-02	Manual / local mode start command	2 (Communication start / stop)
F1-03	Manual / local mode frequency command	9 (Communication settings)
FB-03	Alternative function	1 (the standby host is valid)
FB-04	Multi-pump configuration setting	1 (Independent control source)

● From station number (inverter 3)

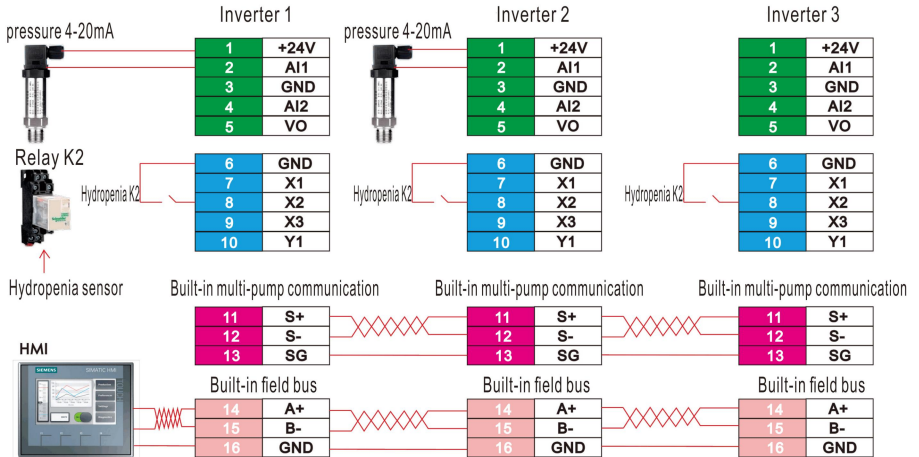| Parameter code	The parameter name	parameter setting
F0-20	Apply macro selection	3 (Multipump # 2 slave station)
F1-00	Automatic / Remote mode start command	2 (Communication start / stop)
F1-02	Manual / local mode start command	2 (Communication start / stop)
F1-03	Manual / local mode frequency command	9 (Communication settings)
FB-04	Multi-pump configuration setting	1 (Independent control source)

The wiring diagram is as follows:

Inverter 1		Inverter 2		Inverter 3	

pressure 4-20mA   Inverter 1   pressure 4-20mA   Inverter 2   Inverter 3

1	+24V		1	+24V		1	+24V
2	AI1		2	AI1		2	AI1
3	GND		3	GND		3	GND
4	AI2		4	AI2		4	AI2
5	VO		5	VO		5	VO

Relay K2

6	GND		6	GND		6	GND
7	X1		7	X1		7	X1
8	X2		8	X2		8	X2
9	X3		9	X3		9	X3
10	Y1		10	Y1		10	Y1

Hydropenia K2   Hydropenia K2   Hydropenia K2

Hydropenia sensor   Built-in multi-pump communication   Built-in multi-pump communication   Built-in multi-pump communication

11	S+		11	S+		11	S+
12	S-		12	S-		12	S-
13	SG		13	SG		13	SG

HMI   Built-in field bus   Built-in field bus   Built-in field bus

14	A+		14	A+		14	A+
15	B-		15	B-		15	B-
16	GND		16	GND		16	GND

● HMI communication implements automatic / remote mode

F1-00 and F1-01 are sources of start-stop commands in automatic / remote mode (2: communication start-stop-slave) and frequency commands (8: PID setting-host / 9: Communication setting-slave), When the mailing address 2005H writes to 0, The frequency converter is in automatic / remote mode to realize automatic constant voltage control, The keyboard [local] indicator light is turned out, inverter 1, inverter 2 and inverter 3 are respectively controlled by HMI man-machine interface; On individual maintenance, HMI MI sends the stop command to stop the operation of this pump; The anhydrous sensor can connect the anhydrous signal to the inverter to realize the water shortage protection of the pump group.

● HMI communication implements the manual / local mode

F1-02 and F1-03 are the sources of start-stop commands in automatic / remote mode (2: communication start-stop-master-slave) and frequency commands (9: communication setting-master-slave) respectively, When the correspondence address 2005H writes to 1, , The inverter is in manual / local mode to achieve constant frequency speed control, Keyboard [local] indicator light is always on, inverter 1, inverter 2 and inverter 3 are respectively controlled by HMI man-machine interface; When the inverter switches to the manual / local mode, HMI issue start and stop command to control the operation stop of this pump, When writing the frequency command to the mailing address 1000H (frequency setting), Can control the running speed of the water pump; The waterless sensor distributes the waterless signal to each frequency converter by connecting the relay to realize the water shortage protection of the pump group in manual mode.

7.2.5 Application of water supply system and two multi-pump water supply system

☑ The system uses two pumps to form one control and two water supply systems, using 1.6 Mpa 24V 4 ~ 20 mA pressure sensor, and set the system target pressure of 4.0bar.

☑ After the function of the first control and second pump is turned on, the timing wheel pump function is turned on by default (the start of pump 1 is preferred, and the rotation will occur every

24 hours), pump function and pump maintenance mode.

☑ Taking a typical frequency converter controlling two water pump motors as an example, the frequency converter must use two relay function terminals TA1-TB1, TA2-TB2, and two groups of contactors KM to switch two working states of the pump: frequency converter control operation and power frequency operation. All the motors start and stop at the ramp speed, to realize the soft switching of the motor, ensure the stability of the water supply pressure, and reduce the impact on the water pipe. The user shall connect the multi-pump frequency conversion control main circuit and the external relay control circuit according to Figure 7-2-3.

☑ After enabling the one-control and two-control functions, the inverter output frequency is given by the PID, and the operation command is controlled by the X1 terminal.

☑It is not recommended to use one control and two multiple pump control functions at the rated power of 30kW and above, and the connected pump motor needs to have the same rated power.

The parameter settings are set as follows:

Parameter code	The parameter name	parameter setting
F0-00	setting pressure	4.0bar
F0-03	Sensor range (outlet)	16.0bar
F0-20	Apply macro selection	7 (One control and two control mode)
FB -15	Frequency frequency motor, operation selection	1 (circulating frequency conversion motor)
FB -16	Add the motor pressure tolerance	0.5bar
FB -17	Add the motor switching frequency	50.00Hz
FB -18	Add the motor delay time	10.0s
FB -19	Reduce the motor pressure tolerance	0.5bar
FB -20	Reduce the motor and cutting frequency	30.00Hz
FB -21	Reduce the motor delay time	10.0s
FB -22	Motor wheel follows cycle	24.0h
FB -23	Wheel running frequency valve	45.00Hz
FB -24	Conactor opening and closing time	0.5s

● plus motor

☑The initial state is inverter output control motor M1, and M2 motor is shutdown state. At this time, if the output frequency is greater than or equal to FB-17 plus the motor operating frequency, and the feedback pressure <set pressure-add motor pressure tolerance FB-16, the duration exceeds the FB-18 plus motor delay, the motor function is triggered. After the duration exceeds the motor delay FB-18, add the motor, the inverter will stop freely, immediately disconnect the corresponding contactor KM1, and close KM3 of the contactor after the closing time to ensure the complete closure of the contactor. The relay action logic for the whole process is shown in the following below:

TA1-TB1	TA2-TB2	Motor M1	Motor M2
0	0	halt	halt

1	0	frequency conversion	halt
0	0	halt	halt
0	1	halt	frequency conversion
1	1	power frequency	frequency conversion

● reduction motor

☑The initial state is the inverter output control motor M2, and the M1 motor is the power frequency operation. At this time, if the inverter feedback pressure is greater than the set pressure and the output frequency is less than or equal to FB-20 minus the motor cutting frequency or feedback pressure> = set pressure + reduced motor pressure tolerance FB-19, and the duration exceeds the FB-21 minus motor delay, the reduced motor function will be triggered. Direct disconnect the M1 motor with power frequency operation, and adjust the frequency of the variable frequency motor through PID to reach the given water pressure. The relay action logic for the whole motor reduction process is shown in the following table:

TA1-TB1	TA2-TB2	Motor M1	Motor M2
1	1	power frequency	frequency conversion
0	1	halt	frequency conversion

● automatic wheel follow

☑One control and two support the automatic timing wheel tracking function of the pump. The timing switching function has two purposes: one is to keep the running time of each pump as the same, so as to balance the mechanical loss of different motors; the other is to prevent any pump from stopping running for too long, resulting in obstruction. When the initial motor running time exceeds the FB-22 variable frequency motor wheel cycle, and only one pump is running and the operating frequency is less than the FB-23 wheel running frequency threshold, the frequency converter will start automatic wheel running, change the motor object by adding the motor and reducing the motor, and then recalculate the wheel running time.
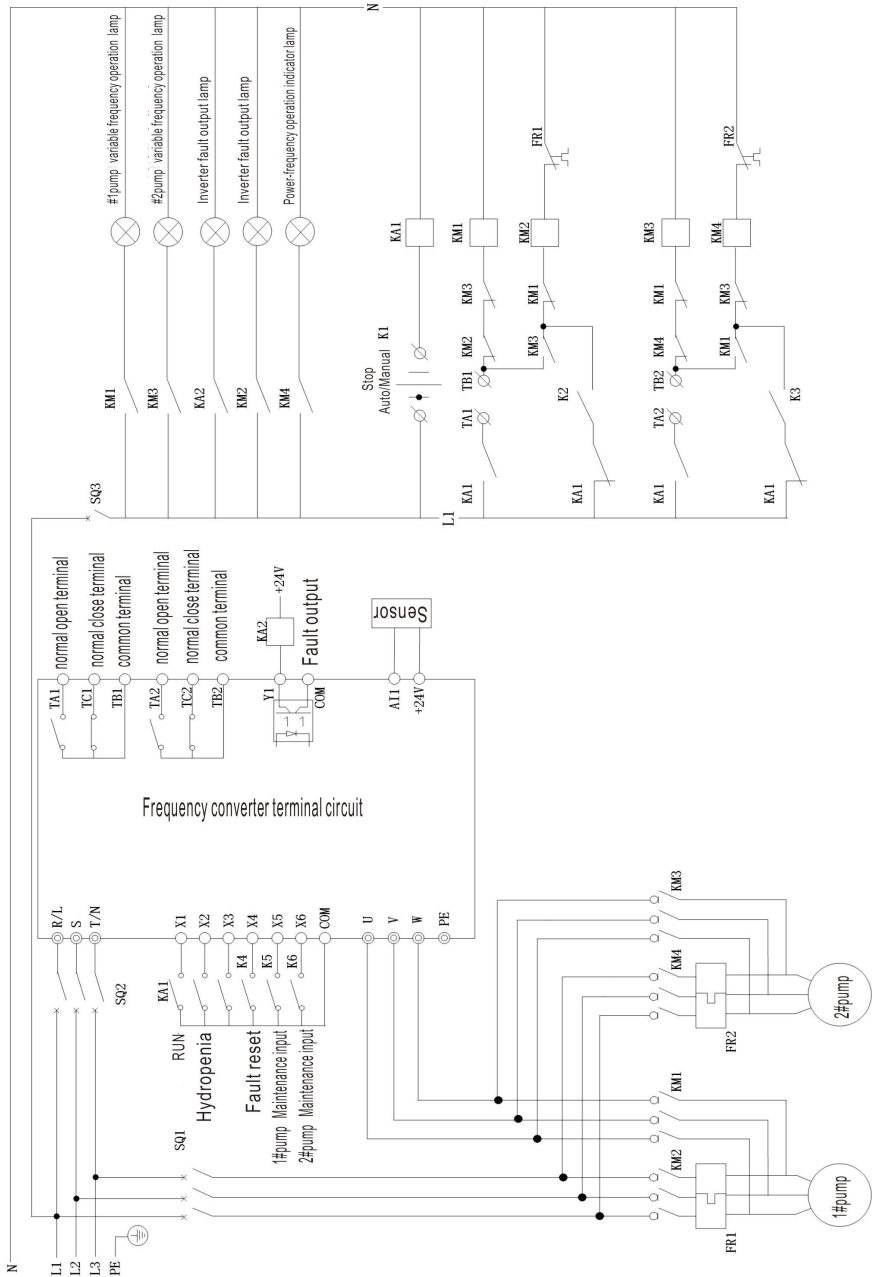
● Water pump maintenance mode

☑Users can configure the X digital input terminal function and set it to 23~24 (X5 and X6 terminal functions are in default) to lock the corresponding motor M1~M2. When the input of the corresponding X terminal is effective, the corresponding motor will no longer participate in the multi-pump control at this time. The user does not need to adjust the existing wiring mode, but only needs the motor and the wiring contactor of the power grid to be disconnected to carry out the pump maintenance.

● Smooth switching function

☑When the frequency conversion pump switches to the power frequency pump, it will bring a large fluctuation of water pressure. The switching frequency of the added motor FB-17 can be set, so that the frequency converter runs to a higher switching frequency, and then cuts to the power frequency operation, to prevent the water pressure from falling too fast and ensure the fast and stable water pressure.

The wiring diagram is as follows:

N

#1pump variable frequency operation lamp
#2pump variable frequency operation lamp
Inverter fault output lamp
Inverter fault output lamp
Power-frequency operation indicator lamp

FR1

FR2

KA1 KM1 KM2 KM3 KM4

KM1 KM3 KA2 KM2 KM4

Stop
Auto/Manual   K1

KM3   KM1

KM2   KM3

TB1   KM3   TB2   KM1

TA1   K2   TA2   K3

KA1   KA1   KA1   KA1

SQ3

L1

normal open terminal   TA1
normal close terminal   TC1
common terminal   TB1
normal open terminal   TA2
normal close terminal   TC2
common terminal   TB2

+24V
KA2
Fault output   Y1   COM

Sensor

AI1   +24V

Frequency converter terminal circuit

R/L   S   T/N   X1   X2   X3   X4   X5   X6   COM   U   V   W   PE

SQ2

KA1   K4   K5   K6

RUN
Hydropenia
Fault reset
1#pump Maintenance input
2#pump Maintenance input

SQ1

KM3

KM4

FR2

2#pump

KM1

KM2

FR1

1#pump

N   L1   L2   L3   PE

7.2.6 Application of one-control lot pump water supply system
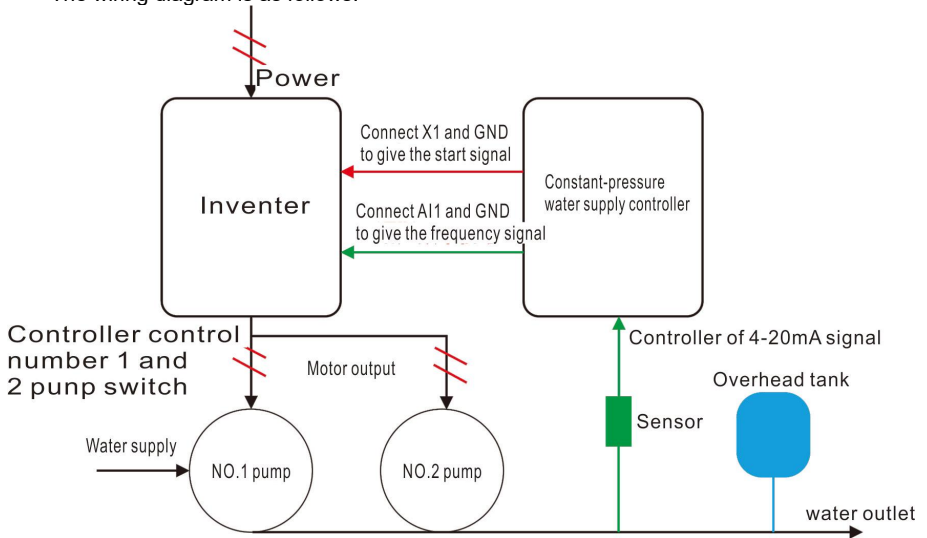
☑ The system uses two pumps, one frequency converter and one constant pressure water supply controller to form a control and multiple water supply system.

☑After the application function of the constant pressure water supply controller is turned on, the free parking function, terminal start function and AI2 frequency given function are turned on by default. The frequency converter start signal is connected to the X1 terminal, and the given frequency signal is connected to the AI2 terminal.

The parameter settings are set as follows:

Parameter code	The parameter name	parameter setting
F0-20	Apply macro selection	8 (One control and multimode)

The wiring diagram is as follows:

7.2.7 deep well pump system application one

☑ The system uses a water pump and a frequency converter to form a deep well pump water supply system.

☑It is suitable for deep well pump applications that do not require constant pressure. The output frequency can be automatically adjusted according to the running load current of the motor. When the constant current is controlled, the water shortage protection function of the software is effective and can be turned off.

The parameter settings are set as follows:

Parameter code	The parameter name	parameter setting
F0-20	Apply macro selection	9 (Deep well pump constant current mode)
FA-04	Load control percentage	100% (relative to the rated current of the motor)

| FC-03 | Lack of water and dry pumping function selection | 1 (Operating current judging water shortage) |

Wiring schematic diagram is omitted:

When the deep well pump control, the frequency converter can be directly connected to the water pump.

7.2.8 deep well pump system application two

☑ The system uses a water pump and a frequency converter to form a deep well pump water supply system.

☑Suitable for deep well pump applications without constant pressure, the pump can be switched automatically according to the water level signal or the switch signal.

The parameter settings are set as follows:

Parameter code	The parameter name	parameter setting
F0-20	Apply macro selection	10 (deep well pump multi-speed mode)
FE-00	Multisection speed instruction 0	80% -Low speed (relative to maximum frequency)
FE-01	Multisection speed instruction 1	90% -Medium speed (relative to maximum frequency)
FE-02	Multisection speed instruction 2	100% -High speed (relative to maximum frequency)

Wiring schematic diagram is omitted:
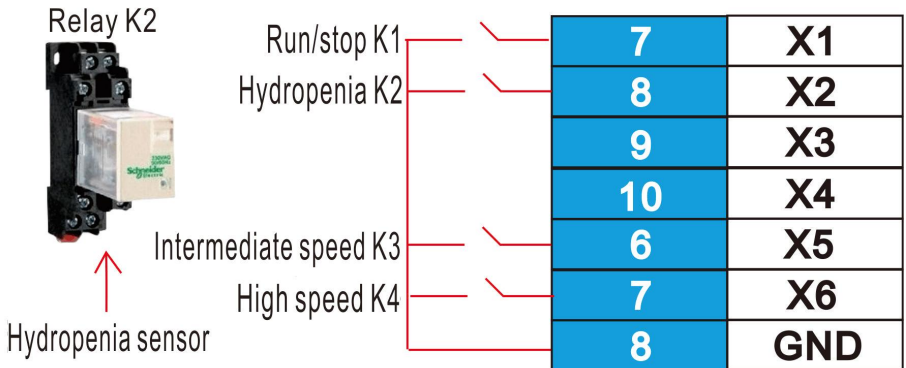
● runs at low speed

☑The initial state is shutdown state, the start-stop switch K1 is closed, X1 and GND are on, the inverter drives the pump at low speed, the running speed source is FE-00 multiple speed command 0, the default is 80% rated speed;

● runs at medium speed

☑Medium speed switch K3 (three gear switch) remains closed, medium and high speed

three gear switch K3 is turned on X5 and GND, the inverter drives the pump to run at medium speed, the running speed source is FE-01 multi-section speed command 0, the default is 90% rated speed;

● runs at high speed

☑The high speed switch K3 (three gear switch) remains closed, the medium and high speed three gear switch K3 is turned on X6 and GND, the inverter drives the pump to run at medium speed, the running speed source is FE-02 multi-section speed command 0, the default is 100% rated speed;

● excessive low water level protection

☑After the low water level protection sensor detects the water shortage, the water shortage switch K2 closes, and the frequency converter triggers the external water shortage E015 protection shutdown;

7.2.9 Application of permanent magnet synchronous motor

☑The system uses the permanent magnet synchronous motor water pump and frequency converter to form a constant voltage water supply system, and the parameters are set as follows:

Parameter code	The parameter name	parameter setting
F1-06	max-frequency	Set up according to the motor nameplate
F1-07	upper limiting frequency	Set up according to the motor nameplate
F2-00	Motor type selection	1 (permanent magnet synchronous motor)
F2-01	The motor is rated power	Set up according to the motor nameplate
F2-02	The motor is rated voltage	Set up according to the motor nameplate
F2-03	Rated current of motor	Set up according to the motor nameplate
F2-04	Rated frequency of motor	Set up according to the motor nameplate
F2-06	Motor rated speed	Set up according to the motor nameplate
F2-17	Tune selection	12 (Dynamic self-learning)
For other application parameters, refer to 7.2.1~7.2.2		

● debugging steps

☑1. Set the maximum frequency, upper limit frequency and motor parameters according to the nameplate of permanent magnet synchronous motor;

☑2. After setting the motor parameters, set F2-17=12, the panel shows FUNE and the alarm light flashes, press the running key to start the rotation self-learning, wait for restoring the shutdown state after about 30s motor parameter learning; If the unsuccessful frequency converter will trigger E019 motor tuning fault or abnormal alarm of E064 anti-motive force, check whether the motor parameters are set correctly;

☑3, the motor since successful learning, the pump motor can be directly operated.

7.2.10 Application of single-phase motor

☑The system uses a single-phase electric machine water pump and frequency converter to form a constant voltage water supply system, and the parameters are set as follows:

Parameter code	The parameter name	parameter setting
F2-00	Motor type	2 (Single-phase motor)
F2-11	Voltage ratio of the primary and secondary winding of the single-phase motor	1.00

The wiring diagram is as follows:

☑1. Under general circumstances, the output U and W of the frequency converter are connected to the phase line of the single-phase electric machine;

☑2. If the single-phase water pump cannot be started, a two-phase control mode is used to remove the operating capacitor of the motor. The internal wiring of the ordinary single-phase electric generator is as follows in Figure 1. L1 is the running winding, L2 is the starting winding, and C1 is the operating capacitor; the wiring diagram after removing the operating capacitor C1 is shown in Figure 2.
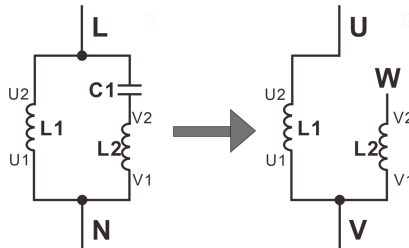

Figure 1, Figure 2

U1 and V1 are the common end of the winding, which is connected to the V phase output of the frequency converter, and the U2 end of the running winding is connected to the U phase output of the frequency converter. The V2 of the starting winding is connected to the W phase output of the frequency converter. The voltage ratio of the motor can be set to adjust the operating performance through F2-11.

Chapter 8 Fault diagnosis and Countermeasures

8.1 Common faults and their handling methods

fault code	fault type	Possible Cause	Action
E002	Accelerate over current	Ground or short circuit in the converter output circuit	Check peripheral faults and check for short circuit at the motor end
		The acceleration time is set for too short time	Increase acceleration time
		Start up the rotating motor	Start again after the motor stops
		Inadequate power rating of the AC drive	select an AC drive with a higher power rating.
E003	Slow down over current	Ground or short circuit in the converter output circuit	To blt peripheral faults and check for short circuit at the motor end
		Whether the deceleration time is too short	Increase deceleration time
E004	Constant speed over current	Ground or short circuit in the converter output circuit	To blt peripheral faults and check for short circuit at the motor end
		Inadequate power rating of the AC drive	Choose the frequency converter matching with the motor power and load situation
E005	Accelerated overvoltage	The input voltage is high	Adjust the input voltage to the normal range
		There is an external force dragging the motor during the acceleration process	Cancel in addition to motivation
		The acceleration time is too short	Increase acceleration time
E006	Slow down over voltage	The input voltage is high	Adjust the input voltage to the normal range
		Slow down has an external force dragging the motor for operation	Cancel in addition to motivation
		The deceleration time is too short	Increase deceleration time
E007	Constant speed overvoltage	The input voltage is high	Adjust the input voltage to the normal range
		Operation process with external force dragging the motor operation	Cancel in addition to motivation
E009	Undervoltage	The input voltage of the frequency converter is not within the requirements of the specification	Adjust the input voltage to the normal range
		device failure	Seek technical support
E010	Frequency converter overload	Excessive load or motor blocking	Reduce the load and check the motor and mechanical condition
		Inadequate power rating of the AC drive	Choose a large power of the frequency converter

fault code	fault type	Possible Cause	Action
E011	Motor overload	Excessive load or motor blockage	Reduce the load and check the motor and mechanical condition
		The overload protection parameter of the motor F 9.01-F 9.02 is not appropriate	This parameter is set correctly
E012	Input phase loss	Three-phase input power supply is abnormal	Check and exclude the problems in the peripheral lines
		Drive board and control board are abnormal	Seek technical support
E013	Output lack of phase	Motor failure	Check the motor winding for open circuit
		Abnormal lead wire connecting the AC drive to the motor	Rectify external faults.
		The three-phase output of the frequency converter is unbalanced during the motor operation	Check whether the three-phase winding of the motor is correct and troubleshooting
		Drive board, IGBT module is abnormal	Seek technical support
E014	IGBT overtemperature	The ambient temperature is too high	Reduce ambient temperature
		The air duct is blocked	Clean the air duct
		Damaged fan	Change the fan
		Thermally sensitive resistor of IGBT is damaged	Seek technical support
E015	External water shortage failure	Enter the signal of the external water shortage failure through the multifunctional terminal X	Check for external water shortage signal sources
E016	Communication failure	The upper computer computer is working abnormally	Check the wiring of the upper machine
		The RS485 communication line is abnormal	Check the communication cable
		Communication parameter FD group was not set correctly	Set the communication parameters correctly (mailing address, port rate, check bit)
E017	Contactor fault	The main contactor did not engage	Seek technical support
E018	Current detection failure	Current detection circuit is abnormal	Seek technical support
		Damaged current sensor	Seek technical support
		Control plate abnormal	Seek technical support
E019	Motor auto-tuning fault	Motor capacity does not match the inverter capacity	Replace the frequency converter model
		Motor parameters are not set according to the nameplate	Set the motor parameters according to the nameplate

fault code	fault type	Possible Cause	Action
		Parameter auto-tuning timed out	Ensure that the motor is connected and there is no output phase loss.
E021	Memory exception	Control plate abnormal	Seek technical support
E022	Forced downtime failure	Keyboard stop key force the slave to stop to fail	For multi-pump control slave overhaul and maintenance operations
E023	Motor short-circuit to the ground fault	The motor or frequency converter output line short to ground	Check and replace the motor cables and motor if necessary.
		Exception of drive board	Seek technical support
E025	External overpressure failure	Enter the signal of the external overvoltage failure through the multifunctional terminal X	Check the external overpressure signal source
E026	Running time arrives	The cumulative run time reaches the Setpoint	Clear the record information by using the parameter initialization function
E027	User-defined fault 1	Enter the signal of the custom fault 1 through the multifunctional terminal X	Check and troubleshoot user custom faults 1
E028	User-defined fault 2	Enter the signal of the custom fault 2 through the multifunctional terminal X	Check and troubleshoot user custom faults 2
E029	Accumulative power-on time reached	The cumulative power time reaches the set point	Clear the record information by using the parameter initialization function
E031	Sensor feedback is lost	The sensor feedback signal is abnormal	Check the sensor feedback signal source
		The actual sensor feedback is less than the feedback loss detection value	Set the sensor feedback loss detection value and time correctly
E044	The inlet pressure is too low	The water inlet pressure is too low or the sensor is abnormal	Check whether the incoming water is scarce or if the sensor is abnormal
E046	Water pump blocking and turning failure	The water pump is blocked or the parameter setting is unreasonable	Set the parameters reasonably and turn off the alarm
E047	Water shortage failure	Low inlet water pressure or unreasonable parameter setting	Set the parameters reasonably and turn off the alarm
E048	High water pressure failure	High water pressure or unreasonable parameter setting (outlet)	Set the parameters reasonably and turn off the alarm
E049	Low water pressure failure	Low inlet water pressure or unreasonable parameter setting (outlet)	Check whether the inlet pressure is too low and reasonable set parameters
E050	A lot of water leakage (pipe burst) failure	A lot of water leakage or unreasonable parameter setting	Check whether the outlet pipe and parameter settings are incorrect
E051	Initial magnetic	The parameter setting is	Check the motor and the reasonable

fault code	fault type	Possible Cause	Action
	pole detection error	not reasonable	setting parameters
E055	Primary and secondary communication failure	Primary and slave parameters do not match	Check for the same station number in the system
E064	The reverse electric potential is abnormal	Re-perform the dynamic self-learning	Check whether the F2-16 parameter is about 80% of the rated voltage of the motor
E096	Parameter copy failure	Keyboard parameter upload is interrupted or the drive type does not match	Re-upload the update parameters and then download the parameters to the frequency converter
E098	Keyboard communication error	Keyboard and control board communication line interference	Check the keyboard communication extension cord for interference
E099	Keyboard communication is interrupted	Keyboard and control board communication is interrupted	Check the keyboard communication line for abnormalities

8.2 Fault diagnosis and countermeasures

NO.	Symptom	Possible cause	Action
1	The display does not work upon power-on.	The frequency converter input power supply is abnormal	Check whether the input power supply voltage is within the specified range
		Poor line contact for keyboard connection	Unplug and line again
		Internal components of the frequency converter are damaged	Seek manufacturer service
2	The motor does not turn after the frequency converter is running	Motor is damaged or blocked	Replace the motor or remove the mechanical faults
		Motor connection line is abnormal	Reconfirm whether the connection between the inverter and the motor is correct
		Poor connection contact between drive board and control board	Replug the cable
		Internal components of the frequency converter are damaged	Seek technical support
3	X terminal fails	Parameter setting error	Check and reset the F5 group related parameters
		The external signal is abnormal	Check the external input signal
		Control board failure	Seek technical support
4	Frequency converter interference	Inappropriate carrier frequency	Reduce the carrier frequency appropriately
		Error in grounding	The frequency converter and the motor are effectively grounded, while being separated from the external equipment

		The motor wire is too long	Install the output reactor or reduce the lead distance
5	The motor is loud	Motor damage or mechanical failure	Replace the motor or remove the mechanical faults
		The carrier frequency is small	Increase the carrier frequency appropriately
6	air-break switch trip	air-break switch is small	Replace the air-break switch for a larger current
		The frequency converter input power supply is abnormal	Check that the input power supply is in the safe range
		Internal components of the frequency converter are damaged	Seek technical support

Appendix A MODBUS communication protocol

Appendix A: G1 MODBUS communication protocol

G1 series inverter provides RS485 communication interface and supports MODBUS communication protocol. Users can realize centralized control through the computer or PLC, set the operation command of the frequency converter, modify or read the function code parameters, and read the working state and fault information of the frequency converter.

1. Agreement content

The serial communication protocol defines the information content and usage format transmitted in the serial communication. This includes: host polling (or broadcast) format; host coding method, including: required action function code, transmission data and error check. The response of the slave also adopts the same structure, including: action confirmation, return data and error verification, etc. If the slave has an error while receiving the information, or cannot complete the action required by the host, it will organize a failure information and feed it back to the host in response.

2. Application mode

The inverter is connected to the "single-master and multi-slave" PC / PLC control network with RS485 bus.

3. Bus structure

(1) Interface mode
The RS485 hardware interface
(2) Transmission mode
Aynchronous serial, semi-duplex transmission mode. At the same time the host and slave can only have one send data and the other can only receive data. In the process of serial asynchronous communication, the data is sent in the form of packets, frame by frame.
(3) Topology and structure
Single-host multi-slave system. The setting range of the slave address is 1~247,0 is the broadcast communication address. The slave address in the network must be unique.

4. protocol specification

The G 1 series inverter communication protocol is an asynchronous serial master and slave Modbus communication protocol, where only one device (host) in the network can establish the protocol (called "query / command"). Other devices (slave) can only respond accordingly by providing data to the "query / command" of the host, or according to the "query / command" of the host. Host in this case refers to the personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the slave refers to the G 1 frequency converter. The host can communicate with a slave alone and publish broadcast information to all lower servers. For the individually accessed host "query / command", the slave will return a message (called a

response), for the host broadcast information, the slave need no feedback response to the host.

5. Communication data structure

The MODBUS protocol communication data format of G1 series inverter is as follows:

In RTU mode, message sending starts at a minimum of 3.5 characters. Diverse character time at the network wave rate, which is the easiest to achieve (as shown in T1-T2-T3-T4 below). The first domain to transport is the device address. The transfer character that you can use is a hex of 0...9,A...F。 The network device constantly detects the network bus, including during the pause interval. When the first domain (address domain) receives it, each device decodes to determine whether it is sent to it. After the last transmission character, a pause of at least 3.5 character time calibrates the end of the message. A new message can start after this pause.

The entire message frame must be transferred as a continuous stream. If there is a pause time of more than 1.5 characters before the frame completes, the receiving device will refresh the incomplete message and assume that the next byte is the address field for a new message. Similarly, if a new message starts in less than 3.5 characters, the receiving device will regard it as a continuation of the previous message. This would lead to an error because the value in the last CRC domain could not be correct.

RTU frame format:

Frame-head, START	More than 3.5 characters of the transfer time is idle
Slave address(ADR)	Address: 1~247
command code CMD	03: read slave parameter; 06: write slave parameter 83: read answer error 86: write answer error
Data Content DATA (N-1)	data content: Functional code parameter address, number of functional code parameters, value of functional code parameters, etc.
Data Content DATA (N-2)	
……	
Data content, DATA 0	
CRC CHK Low bytes	Detection value: CRC 16 check value. When transmitting, low bytes are in front and high bytes are behind.
CRC CHK High bytes	
END	A 3.5-character time

CMD (command instruction) and DATA (data word description)

Command code: 03H, read N words (Word) (up to 12 words)

For example: the starting address F000 of the slave address 01,

the host sends 01 03 F0 00 00 03 36 CB,

and the slave response 01 03 06 00 1E 00 03 00 00 79 77.

Host command information:

ADR	01H
CMD	03H
The opening address is high	F0H
The address of the beginning is low	00H
High number of registers	00H
Low number of registers	03H
CRC CHK Low bytes	36H
CRC CHK High bytes	CBH

Responses information from the machine

ADR	01H
CMD	03H
Number of bytes	06H
Data F000H high bytes	00H
Data: F000H low	1E H
Data F001H high bytes	00H
Data F001H low	03H
Data F002H high bytes	00H
Data F002H low	00H
CRC CHK Low bytes	79H
CRC CHK High bytes	77H

Command code: 06H, write a word (Word), 06H command write function code after the power save

For example, write 5000 (1388H) to the 1000H address of the slave address 01H inverter, the host sends 01 06 10 00 13 88 805C, and the slave response 01 06 10 00 13 88 80 5C.
Host command information

ADR	01H
CMD	06H
The information address is high	10H
Information address low	00H
The information content is high	13H
The information content is low	88H
CRC CHK Low bytes	80H
CRC CHK High bytes	5C H

Responses information from the machine

ADR	01H
CMD	06H
The information address is high	10H
Information address low	00H
The information content is high	13H
The information content is low	88H
CRC CHK Low bytes	80H
CRC CHK High bytes	5C H

If a communication frame error is detected by the machine or unsuccessful reading for other reasons, the error frame will be answered.

Note: The CRC check error will not reply.

Read response error command is 0x83 and write response error command is 0x86:

Error frame type	Read the answer error frame from the station	From the station write answer error frame
Target station address	01H	01H
CMD	83H	86H
type of error	01: Command code error 02: Wrong address 03: Data error 04: The command cannot be processed	
CRC CHK Low bytes	Check the low	Check the low
CRC CHK High bytes	Check the high	Check the high

6. Communication data address definition

◆ parameter data

Parameter data are the important setting parameters of the frequency converter as follows:

Parameter data	Group F (readable and written)	F0、F1、F2、F3、F4、F5、F6、F7、F8、F9、FA、FB、FC、FD、FE、FF

The parameter data mailing address is defined as follows:

◆ When the parameter data is read for the communication

For the parameter data of the F0~FF group, the communication address higher 16 directly the functional group number, and the lower 16 directly the parameter number in the functional group. The examples are as follows:

Read the functional parameters of F0-18, of which the mailing address is F012H. F0H represents the functional parameters of group F0, and 12H represents the hexadecimal data format of the parameter number 18 in the functional group;

◆ When the parameter data is written for the communication

For the parameter data of the F0~FF group, its communication address is 16 points high, and according to whether EEPROM is written, it is distinguished into 00~0F or F0~FF. The lower 16 points directly is the serial number of parameters in the functional group. The examples are as follows:

Write the F0-18 functional parameters:

When no EEPROM is required to write, its mailing address is 0010H;

When the EEPROM is required to be written, its mailing address is F010H;

◆ non-parametric data

Non-para metric data	Status Data (read-only)	Monitoring parameters of U group, fault description of converter and operating status of converter
	Control parameters (write-only)	Control command, communication setting value, parameter initialization

◆ status data

The status data is divided into U group monitoring parameters, converter fault description and converter operating status.

The-U group parameter monitoring parameters

The address is defined as follows:

U0, whose mailing address is 16 is 70~7F, and 16 is the serial number of monitoring parameters in the group. Examples are as follows:

U0-10, whose mailing address is 700 AH.

-Description of the frequency converter fault

When reading the fault description of the frequency converter, the communication address is fixed to 8000H, and the upper computer communication reads the address data to obtain the current fault code of the frequency converter.

-Operation status of the frequency converter

Reading the operating state of the frequency converter, the communication address is fixed

to 3000H, and the communication data of the upper computer can obtain the current operating state information of the frequency converter.

◆ controlling parameter

-control command

When F1-00 (automatic / remote command source) is selected as 2: communication control, the upper computer can control the start and stop of the inverter through the communication address 2000H.

-Communication Settings

When F1-01 (◆ automatic / remote frequency) is selected as 9: communication control, the upper computer can set the communication address 1000H, and its data range is 0~50000, corresponding to the set frequency 0.00~500.00Hz.

-Parameter initialization

This function is required when the parameter initialization of the inverter is required by the upper computer.

If FP-00 (user password) is not 0, the password needs to be verified through communication first. After the verification, the upper computer will initialize the parameters within 30 seconds.

The communication address for user password verification is 1F00H. If the correct user password is written to the address, the password verification can be completed.

The address for communication parameter initialization is 1F01H, and its data content is defined as follows:

The parameter initializes the mailing address	Command function
1F01H	Command function
	1: Restore the factory parameters
	2: Clear the record information
	3: restore all the parameters

7. Parameter Address Representation Rules

Address definition of communication parameters This part is the content of communication, which is used to control the operation of the converter, the status of the converter and the setting of related parameters.

Represent the rule with the function code group number and the reference code as the parameter address:

High bytes: F0~FF (Group F), 70 (U0), 73 (U3)

Low Bytes: 00 to FF

in compliance with:

(1 To access the parameter F 0-00, the access address of the parameter is expressed as F 000H;

(2) To access the parameter F 0-18, the access address of the parameter is expressed as F 012H;

pay attention to:

FF group: parameters cannot be read, and parameters cannot be changed;

Group U: read only, not changing parameters;

Some parameters cannot be changed when the inverter is in operation; some parameters cannot be changed regardless of the inverter state, including the parameter range, units and related instructions.

Function parameter group number	Communication access address	The Communication modified the parameter address in the RAM
From the F 0 to the FE group	0xF000 ~ 0xFEFF	0x0000 ~ 0x0EFF
FP group	0x1F00 ~ 0x1FFF	
U0 group	0x7000 ~ 0x70FF	
U3 group	0x7300 ~ 0x73FF	

NOTE: ◆ Because EEPROM is frequently stored, will reduce the service life of EEPROM, so some parameter function codes in the communication mode, do not need to store, as long as the change of the value in RAM.

If it is an F group parameter, to achieve this function, as long as the high F of the function code address into 0.

The corresponding function code address is indicated as follows:

High bytes: 00~0F (Group F)

Low Bytes: 00 to FF

in compliance with:

(1) The parameter function code F0-00 is not stored in EEPROM, and the address is 0000H;

(2) The parameter function code F0-18 is not stored in EEPROM, and the address is 0012H;

This address means that can only write RAM, can not read the action, read, invalid address.

◆ Stop / operation parameters: (1000H / 7310H / 7311H / 7312H / 7313H address is read / write, other addresses are read-only)

Parameter address	parametric description
1000H	Communication setting value (0.00~500.00Hz) (decimal system, direct write frequency)
1001H	Operating frequency (0.00~500.00Hz)
1002H	Bus voltage (0.0V ~3000.0V)
1003H	Output voltage (0V~1140V)
1004H	Output current (0.01A~655.35A)
1005H	Output power (0.0kW~3276.7kW)
1006H	Output torque (-200.0%~200.0%)
1007H	Digital quantity input terminal flag (0~32767)
1008H	Digital quantity output terminal flag (0~1023)
1009H	AI1 Voltage (-10.57V~10.57V)
100AH	AI2 Voltage (-10.57V~10.57V)
100BH	Set Pressure (0.0bar~200.0bar)
100CH	Feedback pressure (outlet pressure) (0.0bar~200.0bar)
100D H	Radiator temperature (-20℃ ~124.0℃)
100E H	Operating speed (0 RPM ~ 65535 RPM)
100FH	Inlet pressure (0.0bar~200.0bar) / pool level height (0.0m ~30.0m)
1010H	Cumulative power-on time (0H~65535H)
1011H	Accumulated running time (0H~65535H)
1012H	Cumulative power consumption (0k Wh~65535k Wh)
1013H	Cumulative power consumption at high level (0 MWh ~ 65535 MWh)
1014H	Number of on-line pumps (0~6)
1015H	Frequency converter status, as defined by 3000H
1016H	Fof converter converter description, as 8000H

Parameter address	parametric description
7310H	Communication set point (0.00~500.00Hz) (decimal, direct write frequency), the same as 1000H
7311H	Communication control command, the same as the command corresponding to 2000H
7312H	Automatic remote control command, the same as in 2005H
7313H	Communication setting value(-10000~10000) (decimal system, directly write the maximum frequency percentage)

pay attention to:

The 1000H / 7310H communication set point is, direct write frequency, 0 corresponds to 0.00Hz and 5000 corresponds to 50.00Hz. For example, write communication set frequency of 25.00Hz: 1000 (hex) address write 2500 (decimal).

◆ Control command input to the frequency converter: (write only)

Command word address	Command function
2000H	0001: Forward turn operation
	0002: reverse operation
	0003: Positive turning point movement
	0004: reverse point movement
	0005: Free shutdown
	0006: deceleration stop
	0007: Fault reset
2005H	0000: Automatic remote mode
	0001: Manual local mode

◆ Read the inverter status: (read-only)

status word address	State word function
3000H	0001: Forward turn operation
	0002: reverse operation
	0003: shut down
	0004: Failure
	0005: Under pressure
	0006: Positive and reverse switch
	0007: self-taught learning
	0008: Sleeps down

◆ Frequter fault description: (read only)

Fault address of the frequency converter	Inverter fault information
8000H	0000: No fault 0001: Hold on 0002: accelerated overcurrent 0003: deceleration overcurrent 0004: Constant-speed over-current 0005: accelerated overvoltage 0006: decelerated overvoltage 0007: Constant-speed over-voltage 0009: undervoltage fault 000A: frequency converter overload 000B: Motor overload 000C: Enter the missing phase 000D: output output phase 000E: the module is overheating

	000F: External water shortage failure
	0010: The communication is abnormal
	0011: The main relay is abnormal
	0012: Current detection fault
	0013: Motor tuning fault
	0015: abnormal parameter read and write
	0016: Forced shutdown failure
	0017: Motor short circuit to ground fault
	0019: External overpressure fault
	001A: Run time arrives
	001B: User-defined fault 1
	001C: User-defined fault 2
	001D: Power-on time arrives
	001F: Lost in sensor feedback
	002C: The inlet pressure is too low
	002E: Water pump block turn fault
	002F: Water shortage failure
	0030: High water pressure fault
	0031: Low water pressure fault
	0032: Water pipe breakdown fault
	0033: Initial magnetic pole detection error
	0037: Primary and slave communication failure
	0040: abnormal fault of inF

8. Example of block transmission and communication applications

If the customer needs to start and stop the frequency converter through MODBUS communication, set the pressure, read the MODBUS state, send 01 03 0D0B 0007 7766, all the data can be read, the corresponding settings are as follows:

Read the data function code	Read the data corresponding to the address	Block transmission function code	The Block Transfer setting value	Communication transmission to read and write the address
The U3-17 control command	0x7311H	FD-11	H.7311	0x0D0BH
F0-00 setting pressure	0x0000H	FD-12	H.0000	0x0D0CH
U0-00 running frequency	0x7000H	FD-13	H.7000	0x0D0DH
U0-04 Output Current	0x7004H	FD-14	H.7004	0x0D0EH
U0-05 output power	0x7005H	FD-15	H.7005	0x0D0FH
U0-02 bus-bar voltage	0x7002H	FD-16	H.7002	0x0D10H
U0-21 Frequency conversion status	0x7015H	FD-17	H.7015	0x0D11H

Quality Commitment

This section states that if there is a quality problem with the "quality commitment" of this product, the company shall handle it in accordance with the following regulations, please read it carefully.

This product quality commitment regulations:

1.   Warranty scope: refers to the frequency converter itself;
2.   The start time of the warranty period: from the date of the user's theoretical receipt of goods;
3.   Warranty commitment: the company's products implement three guarantees
    A.   Non-human quality problems within one week after purchase are guaranteed to return.
    B.   Replacement of non-human quality problems within one month after purchase.
    C.   18 months warranty

4.   During the warranty period, due to the following reasons caused by failure or damage, will be paid maintenance:
    A.   Problems caused by incorrect operation or unauthorized repair and modification;
    B.   Problems caused by the use of frequency converters beyond the requirements of standard specifications;
    C.   After purchase, damage caused by falling or improper placement (such as water, etc.)
    D.   Troubles caused by using the VFD in an environment that does not meet the requirements of this manual;
    E.   Inverter damage caused by wiring errors;
    F.   Troubles caused by earthquake, fire, lightning strike, abnormal voltage or other force majeure;
5.   The company's sales in China, all the agency can provide after-sales service for this product.

Product warranty Card

Customer info.	Company address:	
	Company name: Zip Code：	Contact：
		TEL.：
Product info.	Product model:	
	SN code: （Paste here）：	
	Agency name：	
Fault info.	（The date of repairing and the content）： Repairer　Signature：：	

Version change log

Date	Version	Summary of changes
2023-09	A00	First version release
2023-11	A01	Updated power label, added single-phase motor and pool level control
2023-12	A02	Updated medium and high power chassis size, added built-in GPRS DTU interface.

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