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## Preface

Thank you for purchasing our special frequency inverter for constant pressure water supply.

This manual describes how to use inverter properly. Please read it carefully before installation, operation, maintenance and inspection. Besides, please use the product after understanding the safety precautions.

Precautions
<ul style="list-style-type: none"><li>● In order to describe the product's details, the drawings presented in this instruction are sometimes shown without covers or protective guards. When using the product, please make sure to install the cover or protective guard as specified firstly, and operate the products in accordance with the instructions.</li><li>● Since the drawings in this manual are represented examples, some are subject to differ from delivered products.</li><li>● This manual may be modified when necessary because of improvement of the product, modification or changes in specifications. Such modifications are denoted by a revised manual No.</li><li>● If you want to order the manual due to loss or damage, please contact our company agents in each region or our company customer service center directly.</li><li>● If there is still any problem during using the products, please contact our company customer service center directly.</li></ul>

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## Chapter 1 Safety and preclusions

 <p>Danger</p>	<ul style="list-style-type: none"><li>● Forbid to operate with wet hands.</li><li>● Forbid to carry out wiring distribution operation when the power source is not completely cut off.</li><li>● Please do not open the cover or carry out wiring distribution operation when the inverter is electrified and operating. Or otherwise, there will be danger of electric shock.</li><li>● Carry out wiring distribution and inspection operation after cutting off power source for 10 minutes. Or otherwise, there will be danger of electric shock.</li><li>● The inverter will automatically start if its power source is cut off in operation and then connected. Please make sure operation safety before electrifying the converter. Or otherwise, there may be chances of personal injury accident.</li></ul>
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 <p>Warning</p>	<ul style="list-style-type: none"><li>● Please do not install the inverter whose components are damaged or missing to avoid personal injury and property loss.</li><li>● The connection between the terminal of main circuit and the cable must be tight. Or otherwise, there may be damage the inverter due to poor contact.</li><li>● Make sure the inverter is installed on the fireproof materials (such as metal) to avoid fire disaster.</li><li>● Make sure there is no foreign matter entering into the inverter, such as electricity wire fragment, soldering tin, zinc-iron sheet to avoid short circuit, which may cause the inverter being burned.</li></ul>
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Obligatory

- Please configure non-fuse breaker or breaker with earth leakage protection used for protection the circuit at the input power source side of the inverter in order to avoid the expansion of accident caused by fault in the intelligent constant-pressure water-supply frequency converter.
- Carry out wiring distribution and inspection operation after cutting off power source for 10 minutes. Or otherwise, there will be danger of electric shock.



Caution

- Please cut off the power source of the inverter which is not used for a long time to prevent it from being damaged by foreign matter or other factors, or even fire disaster.
- Do not install capacitance or surge current absorber (such as piezoresistor) at the output side, because the output voltage of the inverter is PWM pulse wave. Or otherwise, the inverter will be tripped and the power elements will be damaged. If the capacitance or surge current absorber is installed at the output side, please must disassemble it.

## Chapter 2 Product Information

### 2.1 Selection Guide

Power ratings (kW)	Motor		Rated Input Current (A)	Rated Output Current (A)
	kW	HP		
<b>1AC 220V±15%</b>				
0.75	0.75	1	8.2	4
1.5	1.5	2	14	7
2.2	2.2	3	24	9.6
4.0	4.0	5	30	17
5.5	5.5	7.5	45	25
<b>3AC 220V±15%</b>				
0.75	0.75	1	5	4
1.5	1.5	2	9.5	7
2.2	2.2	3	11	9.6
4.0	4.0	5	20.5	17
5.5	5.5	7.5	27	25
7.5	7.5	10	35	32
11	11	15	46.5	45
15	15	20	62.5	60
18.5	18.5	25	76	75
22	22	30	92	90
30	30	40	113	110
37	37	50	157	152
45	45	60	180	176
55	55	75	214	210
75	75	100	307	304
<b>3AC 380V±15%</b>				
0.75	0.75	1	3.4	2.8
1.5	1.5	2	5	4.4
2.2	2.2	3	6.5	5.8
4.0	4.0	5	11	10
5.5	5.5	7.5	14.6	13
7.5	7.5	10	20.5	17
11	11	15	26	25

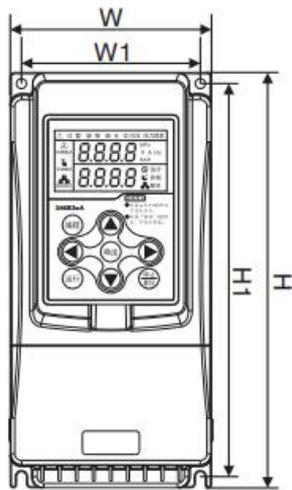
15	15	20	35	32
18.5	18.5	25	38.5	37
22	22	30	46.5	45
30	30	40	62	60
37	37	50	76	75
45	45	60	92	90
55	55	75	113	110
75	75	100	157	152
90	90	125	180	176
110	110	150	214	210
132	132	175	260	253
160	160	210	310	304
185	185	250	365	350
200	200	260	385	380
220	220	300	430	426
250	250	330	485	465
280	280	370	531	520
315	315	420	620	585
350	350	470	665	650
400	400	530	785	725
450	450	600	880	820

## 2.3 Technical Specifications

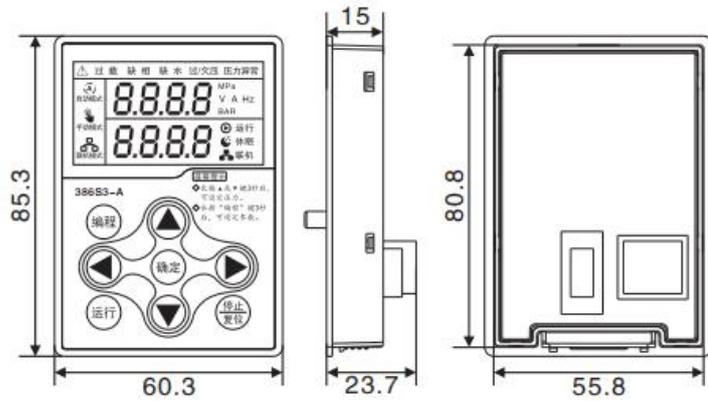
Item	Technical Index	Specification
Input	Input voltage	1AC/3AC 220V±15%, 3AC 380V±15%
	Input frequency	50/60Hz±5%
Control functions	Output voltage	0~rated input voltage
	Output frequency	0~600Hz
	Operation command mode	Keypad control Terminal control Serial communication control (Modbus)
	Overload capacity	150% / 60s, 180% / 10s, 200% / 1s.
	Built-in PID	Built-in PID control function, special for constant pressure water supply.
Input/output terminals	Input terminals	Programmable digital input: 5 multifunctional inputs 2 programmable analog input: VI: 0~10V CI: 4~20mA
	Output terminals	Refer to typical wiring for details
	Communication terminals	RS485 communication interface, support MODBUS-RTU communication protocol
Display	LED display	Display frequency setting, output frequency, output voltage, output current, etc. Two lines display.
Environment	Ambient temperature	-10°C~40°C, without direct sunshine.
	Humidity	90%RH or less (non-condensing)
	Altitude	≤1000M: output rated power, > 1000M: output derated.
	Storage temperature	-20°C~60°C

## 2.4 External and keypad dimensions

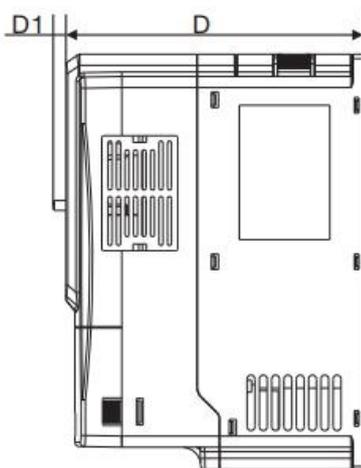
### 2.4.1 0.75~7.5kW



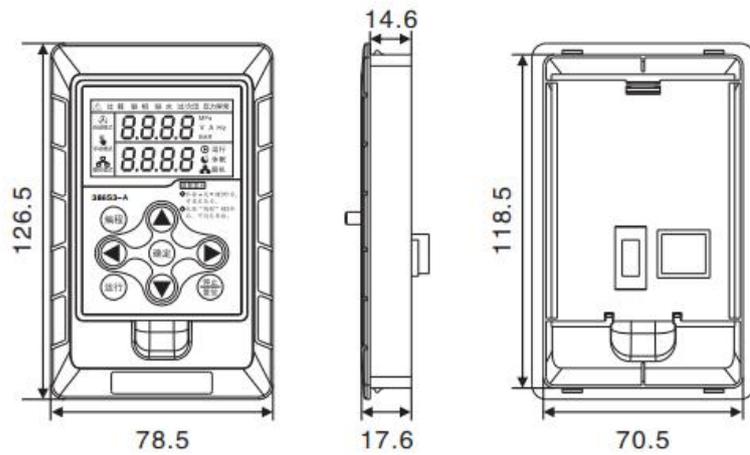
Front view



Keypad dimensions



Side view



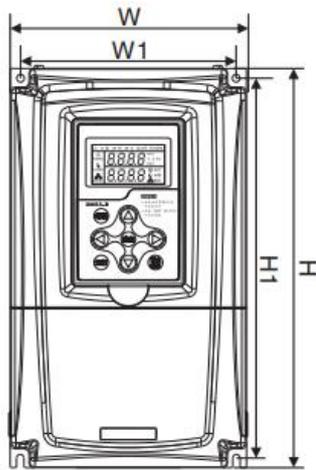
Keypad bracket dimensions

Unit (mm)

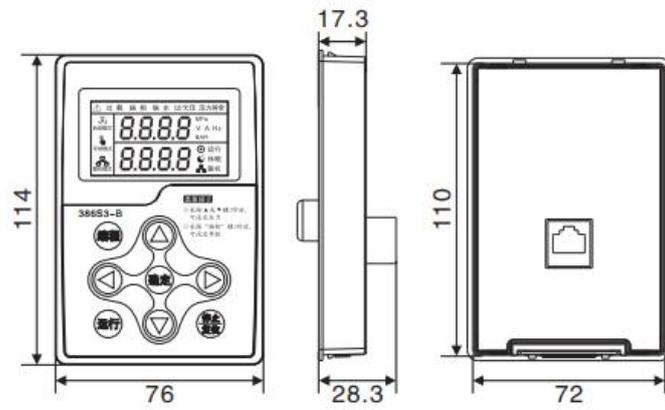
Model	W	H	D	W1	H1	D1
<b>1AC / 3AC 220V</b>						
0.75kW	90	187	133	80	177	5.7
1.5kW						
2.2kW						
4.0kW	130	247	162	115	236.5	5.7

3AC 380V						
0.75kW	90	187	133	80	177	5.7
1.5kW						
2.2kW						
4.0kW	100	207	142	90	197	5.7
5.5kW	130	247	162	115	236.5	5.7
7.5kW						

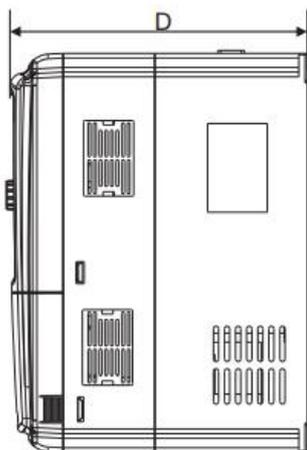
### 2.4.2 11~37kW



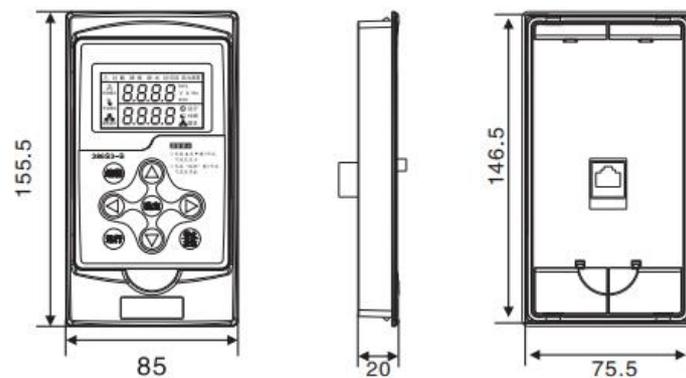
Front view



Keypad dimensions



Side View

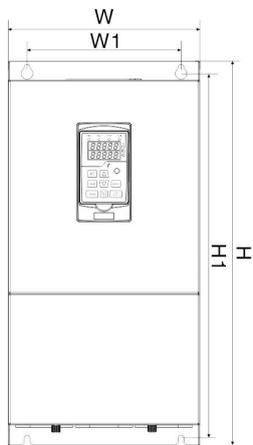


Keypad bracket dimensions

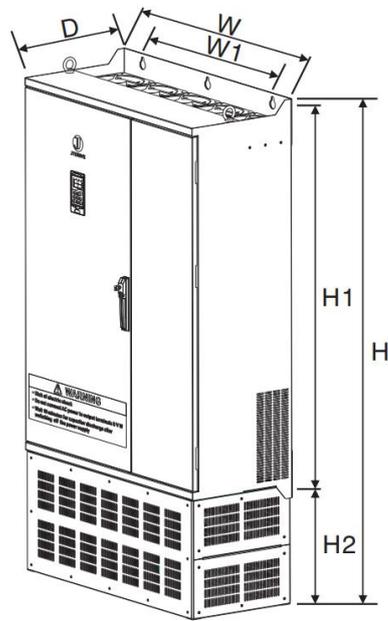
Unit (mm)

Model	W	H	D	W1	H1
<b>1AC / 3AC 220V</b>					
5.5kW	272	160	201	259	146
7.5kW					
11kW	313	211	202	299	196
15kW	400	230	220	384	212
18.5kW					
<b>3AC 380V</b>					
11kW	272	160	201	259	146
15kW					
18.5kW	313	211	202	299	196
22kW					
30kW	400	230	220	384	212
37kW					

### 2.4.3 45~630kW



37~315kW



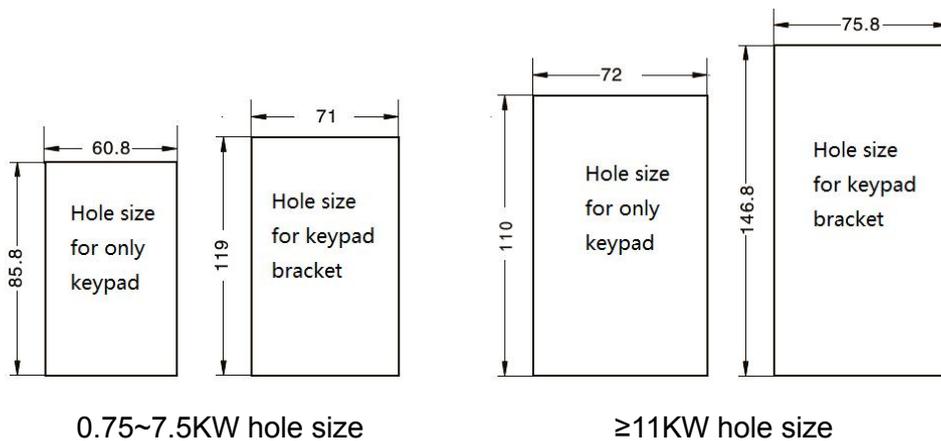
355~630kW

Unit (mm)

Model	H	W	D	H1	W1	Aperture
<b>3AC 220V</b>						
22kW	603	299	276.7	571	240	10
37~55kW	643	338	312	618	280	12
75kW	803	410	383.7	776 (without base)	320	12
<b>3AC 380V</b>						
45~55kW	603	299	276.7	571	240	10
75~110kW	643	338	312	618	280	12
132~200kW	803	410	383.7	776 (without base)	320	12
220~315kW	1472	650	430.2	1046.8 (without base)	520	13
355~450kW	1698	800	438	1280 (without base)	700	16
500~630	1900	1028	450	1460 (without base)	800	16

Note: 45~630KW keypad is same as 11~37KW.

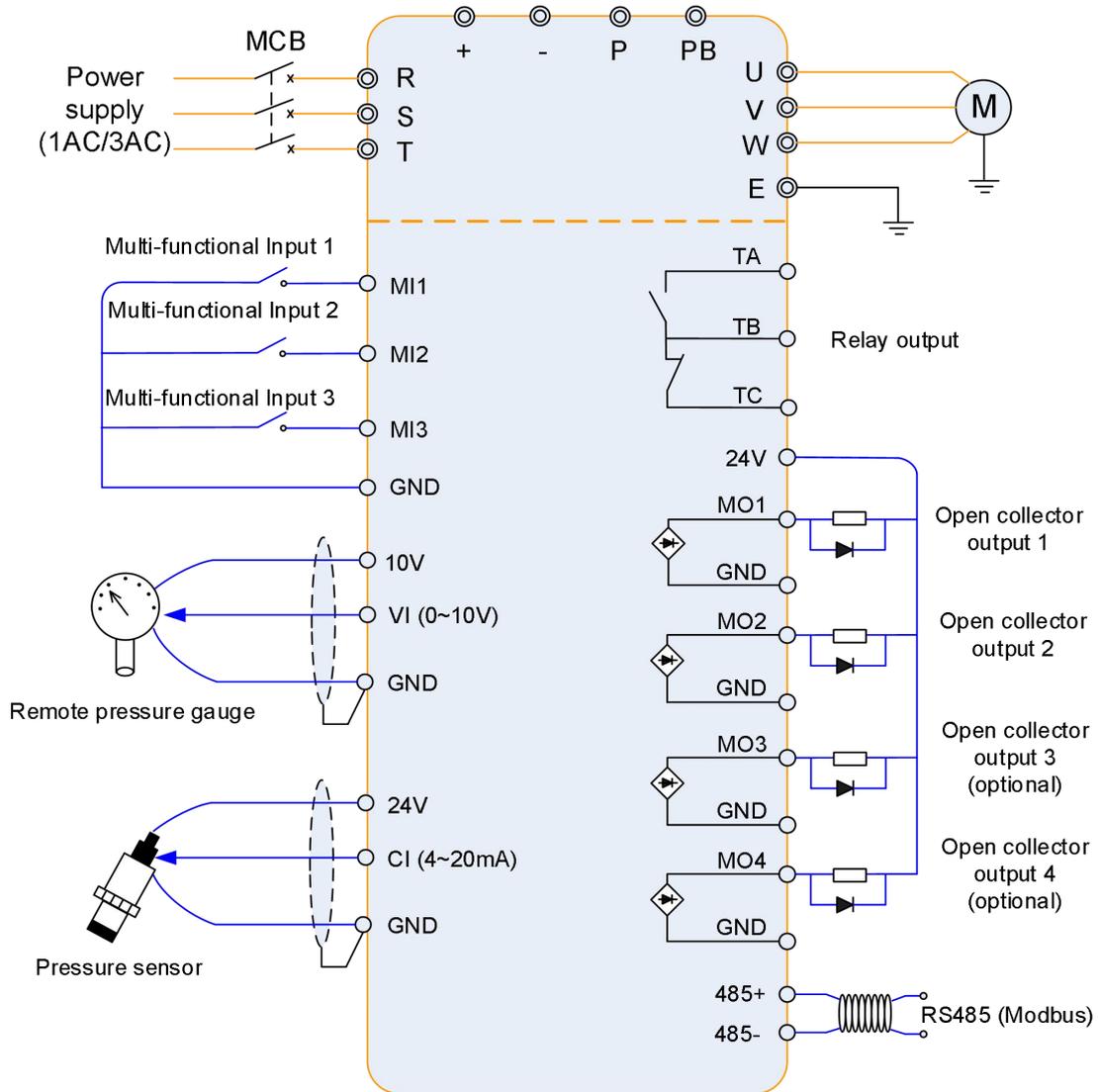
#### 2.4.4 hole size for keypad



# Chapter 3 Installation and wiring

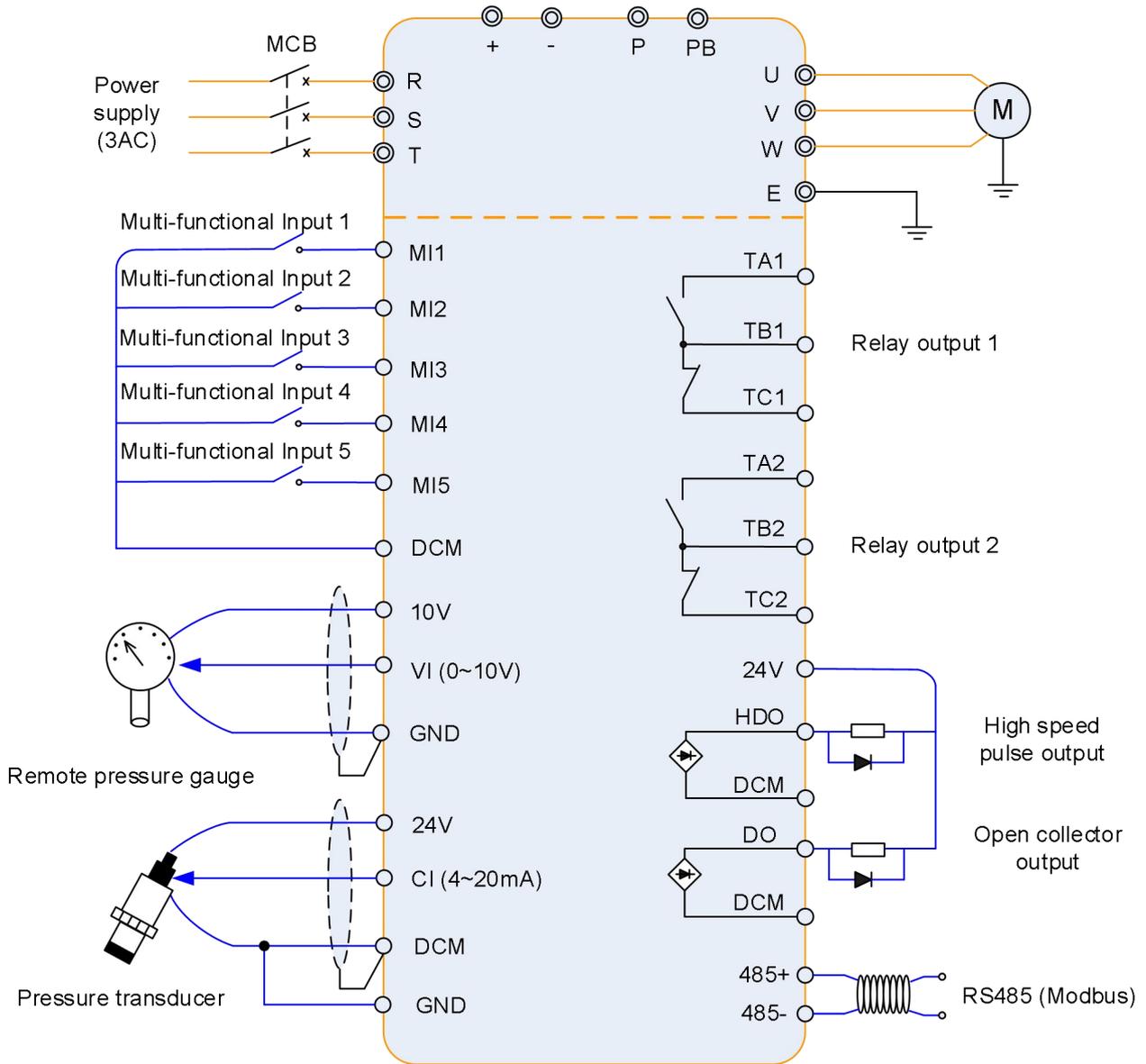
## 3.1 System wiring connection

### 3.1.1 0.75~7.5kW



**Note:** Most or the pressure sensors only have two wires, please only connect with 24V and CI.

**3.1.2 11~630kW**

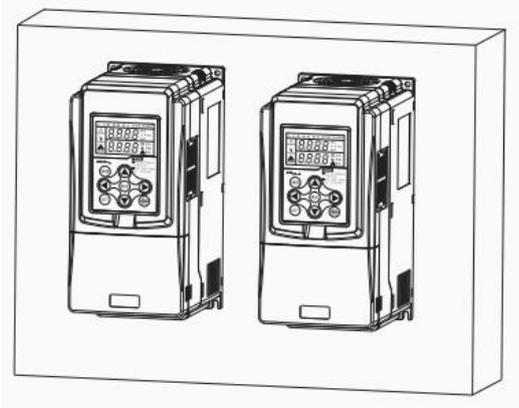


**Note:** Most of the pressure transducers only have two wires; please only connect with 24V and CI.

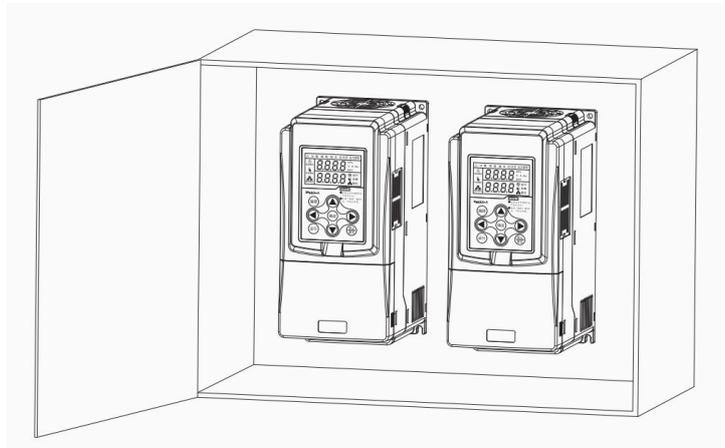
- (1) The inverter build-in a lightning protection device, it will be self-protected for induction thunder. But for some special places where the thunder happens very frequently, it is better to add an additional lightning protection device.
- (2) If the installation place's altitude is higher than 1000m, the output power of the inverter will be derated.

### 3.2 Installation

It is designed to install on the wall or in the control cabinet.



On the wall



In the control cabinet

### 3.3 Instructions of main circuit terminals

Terminal	Description
R, T	Connect to single-phase AC power
R, S, T	Connect to three-phase AC power
(+), (-)	Reserved terminals for external brake unit
(+), PB	Reserved terminals for braking resistor
U, V, W	Connect to three phase motor
	Ground connection terminal

### 3.4 Description of Control Terminals Function

Type	Terminal Symbol	Terminal Name	Function Description
Power Supply	10V	10V power supply	Provide +10V power supply for external units, and the maximum output current is 100mA.
	24V	24V power supply	Provide +24V power supply for external units. It is generally used as the operating power supply for the external pressure transducer. The maximum output current is 150mA.
Analog Input	VI	Analog input terminal 1	1. Input range: DC 0~10V. 2. Input impedance: 6.8kΩ.
	CI	Analog input terminal 2	1. Input range: 4~20mA 2. Input impedance: 500Ω.
	GND	Zero potential	Zero potential reference of 10V and 24V ( $\leq 7.5\text{kW}$ )
	DCM	Zero potential	Zero potential reference of 24V ( $> 7.5\text{kW}$ )
Digital Input	MI1	Digital input 1	1. Optical coupling isolation, compatible with dual polarity input 2. Input impedance: 2.4kΩ 3. Voltage range for level input: 9V~30V
	MI2	Digital input 2	
	MI3	Digital input 3	
	MI4	Digital input 4	
	MI5	Digital input 5	
Digital Output	MO1	Open-collector	Correspond common terminal is GND ( $\leq 7.5\text{kW}$ ). Correspond common terminal is DCM ( $> 7.5\text{kW}$ ). External connection voltage range: 0~24V Output current range: 0mA~50mA
	MO2	Open-collector	
	DO	Open-collector	
	HDO	High speed pulse	
	MO3	Optional	
	MO4	Optional	
Relay Output 1	TB1-TC1	Normally close terminal	Driving capacity: AC 250V/3A, DC 30V/1A
	TB1-TA1	Normally open terminal	
Relay Output 2	TB2-TC2	Normally close terminal	
	TB2-TA2	Normally open terminal	
RS485	485+	RS485+	Communication interface of Modbus, it is suggested to use twisted-pair cable or shielded cable.
	485-	RS485-	

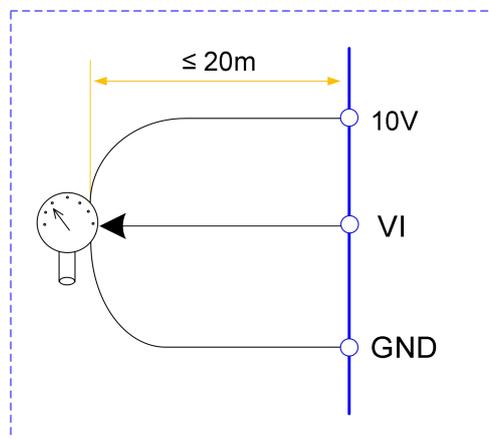
### 3.5 Principle of wiring connection

#### (1) Power cables

- ◆ Please select the cables size (diameter) properly based on the power rating, current and electrician standard.
- ◆ It is suggested to install a MCB (Main Circuit Breaker) between power supply and R, S, T terminals, and the MCB should not be interfered by high frequency signals.
- ◆ The power cables must keep safe distance with control cables, don't put them in one wire casing.
- ◆ Never connect the power supply to U, V, W terminals.
- ◆ The output power cables cannot touch any point of frequency inverter's metal case, otherwise it will cause grounding short-circuited.
- ◆ The power cables must keep safe distance with other devices.
- ◆ If the cables' length between motor and frequency inverter is longer than 50 meters (220V inverter) or 100 meters (380V inverter), it must install an additional output reactor in the system.
- ◆ If the cables' length between motor and frequency inverter is long, please reduce the carrier frequency, if the carrier frequency is bigger, the leakage current of higher harmonic on the cable will be bigger, which will bring bad effect to frequency inverter and other devices.

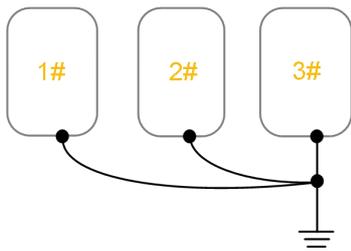
#### (2) Control cables

- ◆ Don't put the power cables and control cables in one wire casing, otherwise it will cause interferences.
- ◆ Please use shield cables for control circuit, and it is suggested to use 1mm<sup>2</sup> shield cables.
- ◆ Don't make the analog signal cables' length longer than 20 meters.

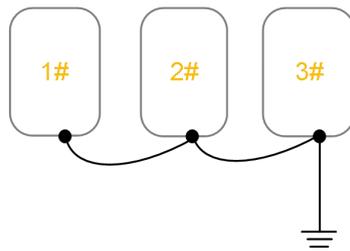


### (3) Ground connection

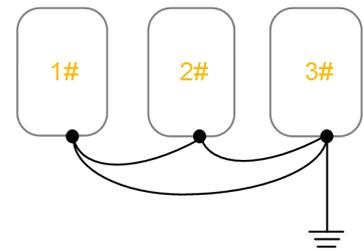
- ◆ The grounding resistor should be less than  $100\ \Omega$ .
- ◆ The grounding cables length is the shorter the better.
- ◆ Please don't make frequency inverters' grounding point separated with other big power equipment (like electric welder and other large-scale mechanical devices)
- ◆ Please make correct grounding as below diagram



A: Correct



B: Wrong



C: Wrong



## Chapter 4 Keypad operation instruction

### 4.1 diagram of keypad

#### 4.1.1 Keypad



### 4.2 functions description of keypad

Button	Name	Function
	Programming key	Entry and exit of primary menu
	Confirmation key	Progressively enter menu, and confirm parameters
	Run key	Start the inverter under keyboard control mode (F1-00=0)
	Stop / Reset	Stop the inverter in running status and reset operation in fault alarm status.
	Increase key	Increase the setting value or function codes

	Decrease key	Decrease the setting value or function codes
	Left shift key	Left shift while parameters changing, shift the parameters display on main LED (Top LED)
	Right shift key	Right shift while parameters changing, shift the parameters display on main LED (Top LED)

### 4.3 Functions description of indicators



Indicator	Name	Function
<b>Operation mode indicators</b>		
	Automatic running	VFD is automatic running mode
	Manual running	VFD is manual running mode
	Online mode	Multiple VFDs are working at online operation mode
<b>VFD status indicators</b>		
	Running status	VFD is running
	Sleep status	VFD is sleeping
	Online status	Multiple VFDs are online operation

<b>Unit indicators</b>	
MPa	Pressure
V	Voltage
A	Current
Hz	Frequency
Bar	Pressure
<b>Fault indicators</b>	
OV-L	Over load
PH-L	Phase lost
WA-S	Water is shortage
O/U-V	Over/under voltage
PR-A	Pressure abnormal

## 4.4 Operation

### 4.4.1 Brief introduction

This VFD has 8 operation buttons on the keypad; customers can achieve system monitoring, parameters modification easily.

Under auto operation mode, press [▲] or [▼] button for more than 3 seconds to set the target pressure, press [◀] or [▶] button can shift different display of real time pressure, current etc.

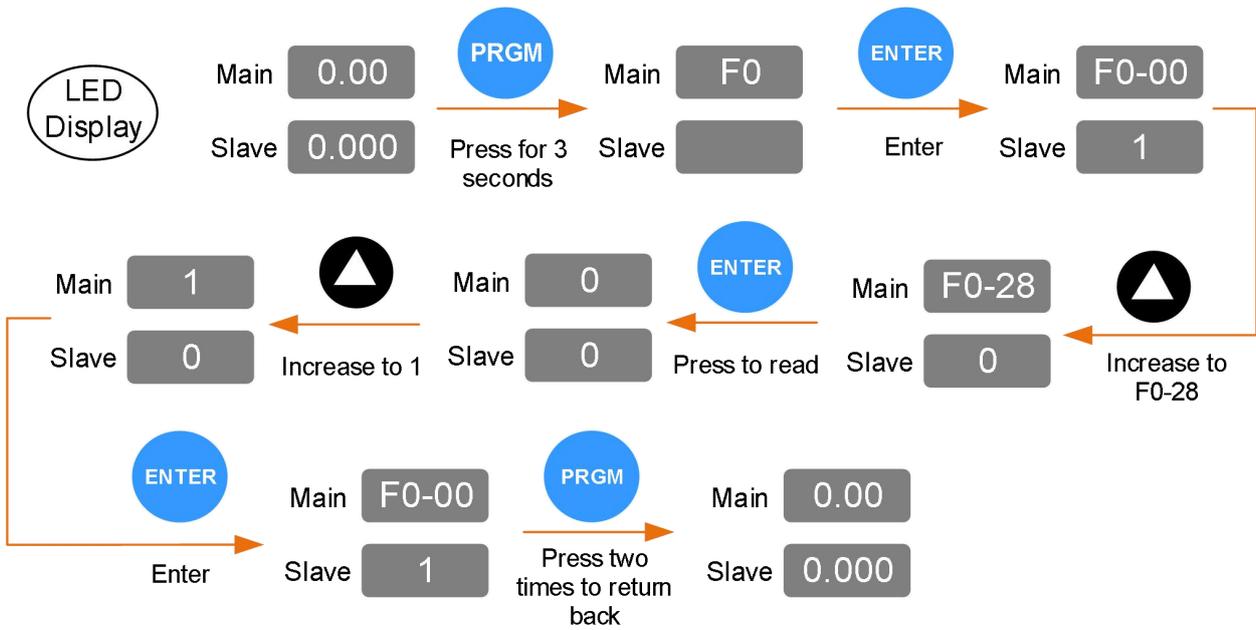
Under manual operation mode, press [▲] or [▼] button can change the running frequency.

### 4.4.2 Operation example

To change F0-28=1 (Restore factory setting)

Operation process	LED display	
	Main LED (UP)	Slave LED (DOWN)
Before operation	0.00	0.000
Press "PRGM" button for 3 seconds	F0	
Press "ENTER"	F0-00	1
Press [▲] button to F0-28	F0-28	0

Press "ENTER" to read	0	0
Press [▲] to 1	1	0
Press "ENTER" to confirm	F0-00	1
Press "PRGM" button two times to return back	0.00	0.000



## Chapter 5 Function Parameter List

“○” Means the parameter can be modified at stop and running status.

“◎” Means the parameter cannot be modified at the running status.

“●” Means the parameter is the real detection value which cannot be modified.

Function code	Name	Detailed instruction	Factory default	Modify
<b>F0 Group: Basic Functions</b>				
F0-00	Operation mode	0: Manual: the inverter can be operated manually 1: Single pump system 2: Multiple pumps system 3: General: the inverter is used as a general frequency inverter	1	◎
F0-01	Setting pressure	<b>Range:</b> F0-07~F0-05 Set the real requested pressure, the unit is Mpa, 1Mpa=10bar.	0.4Mpa	○
F0-02	Pump wake-up pressure	<b>Range:</b> 0.0%~100.0% It is the percentage of setting frequency (F0-01). For example, if F0-01=0.5Mpa, and set F0-02=90%, that means the wake up pressure is 0.45Mpa.	80.0%	○
F0-03	Pressure feedback channel	0: 0~10V, voltage signal, it is usually connect with remote pressure gage; 1: 4~20Ma, current signal, connect with pressure transducer.	0	◎
F0-04	Maximum measure range of pressure transducer	<b>Range:</b> 0.000~6.000Mpa Set it according to the real pressure transducer's measure range. <b>Note:</b> it must be set correctly,	1.600MPa	◎

Function code	Name	Detailed instruction	Factory default	Modify
		otherwise, may cause the water supply pressure incorrect.		
F0-05	Upper limitation pressure	<b>Range:</b> F0-01~F0-04 While the pipe line pressure higher than this value, after the delay time of F0-06, the inverter will stop. It is used to protect the pressure transducer.	1.5MPa	☉
F0-06	Time delay of upper limitation pressure	<b>Range:</b> 0~6000s Response time of upper limitation pressure, set 0 to disable this protection.	3s	○
F0-07	Lower limitation pressure	<b>Range:</b> 0.000~F0-01 While the pipe line pressure less than this value, after the delay time of F0-08, the inverter stops.	0.05Mpa	☉
F0-08	Time delay of lower limitation pressure	<b>Range:</b> 0~6000s Response time of lower limitation pressure, set 0 to disable this protection.	300s	○
F0-09	Lack of water protection	0~1000s 0: No protection	60s	☉
F0-10	Motor rated current	0.1~999.9kW	Model depend	☉
F0-11	Motor rated current	0.01~99.99A (≤55kW) 0.1~999.9A (>55kW)	Model depend	☉
F0-12	Pressure calibration	<b>Range:</b> 0.000~1.000 To adjust the difference between pressure gauge and the inverter display's pressure. If display pressure bigger than real pressure, it needs to reduce this value. Vice versa.	0.500	○
F0-13	Acceleration time	0.0~999.9s	Model depend	○

Function code	Name	Detailed instruction	Factory default	Modify
F0-14	Deceleration time	0.0~999.9s	Model depend	○
F0-15	Pressure maintaining detection time	3~6000s	30s	○
F0-16	Pressure maintaining detection coefficient	0: Disable 1~10: Increase this value will get faster pressure maintaining response.	2	○
F0-17	Dormancy frequency	0.00 ~ F1-23	20.00Hz	○
F0-18	Auto-reset times of pressure abnormal	<b>Range:</b> 0 ~ 1000 Auto-reset times of pressure abnormal. Set 0 means no auto-reset, set 1000 means no times limitation of auto-reset.	1000	○
F0-19	Interval of pressure abnormal auto-reset	<b>Range:</b> 0~9999min Pressure abnormal recovery time.	10min	○
F0-20	Time delay of rust-proof (freeze-proof)	<b>Range:</b> 3~9999min In the single pump system (F0-00=1), from the motor stopping moment, after the delay time of F0-20, the inverter will restart the pump, make it works at F0-22, and run it in the time setting of F0-21. This function will ensure the pump will not be Rusted or Frozen after long time stopping.	1500min	○
F0-21	Rust-proof (freeze-proof) duration	0: Disable rust-proof (freeze-proof) function. 0~6000s	10s	○
F0-22	Running frequency of rust-proof (freeze-proof)	0.00 ~ F1-23	30.00Hz	○

Function code	Name	Detailed instruction	Factory default	Modify
F0-23	User password	<b>Range:</b> 0000~9999 Customer can set a password if necessary, after setting the password, it will display “-----” while you need to enter the parameters setting again, it needs to input the correct password.	0000	○
F0-24	Pressure unit selection	0: MPa 1: Bar	0	◎
F0-25	Pump alternation time (Multiple pumps system)	<b>Range:</b> 0~60000min In multiple pumps system, when this pump needs to be alternated as master pump, F0-25 is to set the running time as master pump, when time arrive, it switches to next pump as master. When set F0-25=0, this pump will only work as slave pump.	300min	○
F0-26	V/f curve setting	0: liner V/f 2: square type V/f 3: 1.2 power V/f 4: 1.4 power V/f 6: 1.6 power V/f 8: 1.8 power V/f	0	◎
F0-27	Torque boost	0.0: automatic torque boost 0.1~30.0%	Model depend	◎
F0-28	Parameters initialization	0: no action 1: Initialize parameters to default setting	0	◎
<b>F1 Group: Control Parameters</b>				
F1-00	Running command source	0: keypad 1: terminal (digital input signal) 2: communication (Modbus)	0	○
F1-01	Selection of frequency	0: set by keypad [▲] and [▼]	9	◎

Function code	Name	Detailed instruction	Factory default	Modify
	source	buttons 1: VI (0~10V) 2: CI (4~20mA) 3: communication (Modbus) 9: PID		
F1-02	Running direction	0: same direction 1: reverse direction	0	○
F1-03	Stop mode	0: deceleration to stop 1. coast to stop	0	○
F1-04	Main LED display parameters	0000~1FF Bit00: running frequency Bit01: DC Bus voltage Bit02: output current Bit03: setting pressure Bit04: real time pressure Bit05: current power-on time Bit06: current running time Bit07: temperature of inverter Bit08: accumulated running time	00D	○
F1-05	Slave LED display parameters	0: running frequency 1: DC Bus voltage 2: output current 3: setting pressure 4: real time pressure 5: current power-on time 6: current running time 7: temperature of inverter 8: accumulated running time	4	○
F1-06	Protection of power supply voltage	70.0%~100.0% It is to set the voltage level of under voltage Error. 1AC/3AC 220V inverter, the default value is 220V.	100%	○

Function code	Name	Detailed instruction	Factory default	Modify
		3AC 380V inverter, the default value is 350V		
F1-07	Fault auto-reset times	0~20	3	○
F1-08	Fault auto-reset interval	0.1~100.0s	20.0s	○
F1-09	Baud rate	0: 300BPS            1: 600BPS 2: 1200BPS          3: 2400BPS 4: 4800BPS          5: 9600BPS 6: 19200BPS        7: 38400BPS 8: 57600BPS        9: 115200BPS	5	○
F1-10	Data format	0: No parity check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No parity check (8-N-1)	0	○
F1-11	Address of this inverter	Range: 1~4 In multiple pumps system, Set 1 or 2, this pump will be master pump; Set 3 or 4, this pump will be slave pump. In one water supply system, the addresses of different inverters cannot be set the same.	1	○
F1-12	Communication delay time	0ms ~ 20ms	2ms	○
F1-13	Communication timeout time	0.0 (invalid) 0.1s ~ 60.0s	0.0s	○
F1-14	MI1 terminal function	0: No function	1	◎
F1-15	MI2 terminal function	1: Forward (FWD)	0	◎
F1-16	MI3 terminal function	2: Reverse (REV)	0	◎
F1-17	MI4 terminal function (≥11kW)	3: Running command switch 4: Forward Jog (FJOG) 5: Reverse Jog (RJOG)	0	◎

Function code	Name	Detailed instruction	Factory default	Modify
		6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Pause running 11: External fault (normal open) input		
F1-18	Open collector output function MO1 ( $\leq 7.5\text{kW}$ ) HDO ( $\geq 11\text{kW}$ )	0: No output 1: Inverter is running 2: Fault output	0	○
F1-19	Relay output function TA, TB ( $\leq 7.5\text{kW}$ ) TA1, TB1, TC1 ( $\geq 11\text{kW}$ )	3: Zero-speed running 4: Inverter is ready to run 5: VI > CI	2	○
F1-20	Open collector output function MO2 ( $\leq 7.5\text{kW}$ ) DO ( $\geq 11\text{kW}$ )	6: Frequency upper limit arrival 7: Dormancy frequency arrival 8: Under voltage	0	○
F1-21	Open collector output function MO3 ( $\leq 7.5\text{kW}$ ) Relay output function TA2, TB2, TC2 ( $\geq 11\text{kW}$ )	9: Frequency 1 arrival 10: Frequency 2 arrival 11: Reverse running 12: Over temperature alarm 13: Fault output (output only fault stop)	0	○
F1-22	Open collector output function MO4 ( $\leq 7.5\text{kW}$ )	14: Reserved 15: Output current over limit	0	
F1-23	Frequency upper limit	10.00~99.99Hz	50.00Hz	◎
F1-24	Carrier frequency	0.5~10.0kHz	Model depend	○
F1-25	Frequency detection value 1	0.00Hz~F1-23	50.00Hz	○
F1-26	Frequency detection amplitude 1	0.0~100.0%	0.0%	○

Function code	Name	Detailed instruction	Factory default	Modify
F1-27	Frequency detection value 2	0.00Hz~F1-23	0.00Hz	○
F1-28	Frequency detection amplitude 2	0.0~100.0%	0.0%	○
F1-29	MO1 output delay time	0.0s~999.9s	0.0s	○
F1-30	Relay 1 (TA, TB, TC) output delay time	0.0s~999.9s	0.0s	○
F1-31	MO2 output delay time	0.0s~999.9s	0.0s	○
F1-32	MO3 / Relay 2 (TAI, TB1, TC1) output delay time	0.0s~999.9s	0.0s	○
F1-33	MO4 output delay time	0.0s~999.9s	0.0s	○
F1-34	Output terminal valid status selection	0: positive logic 1: negative logic Unit bit: MO1 Tens bit: relay 1 Hundreds bit: MO2 Thousand bit: MO3 / relay 2 Ten thousand bit: MO4	00000	○
F1-35	Pre-set frequency of manual operation mode	0.00Hz~F1-23 To set the running frequency of (1) Single pump system (F0-00=0). (2) Multiple pumps system (F0-00=3)	20.00Hz	○
F1-36	Auto restart selection after power recovery	0: No action 1: Auto restart <b>Note:</b> when set F1-36=1, if the pump is running before the power outage, after the power recovery, the inverter will restart the pump directly.	1	◎
F1-37	Lower limit frequency	0.00Hz~F1-23	0.00Hz	○

Function code	Name	Detailed instruction	Factory default	Modify
F1-38	Input phase failure protection selection	0: Invalid 1: Valid	1	<input type="radio"/>
F1-39	Motor rated voltage	1~2000V	Model depend	<input type="radio"/>
F1-40	Over current stall gain	0~100 Over-current stall gain is used to adjust the ability of the inverter to suppress over-current during acceleration and deceleration. The larger the value, the stronger the ability to suppress over-current. Under the premise that no overcurrent occurs, the smaller the gain setting, the better.	20	<input type="radio"/>
<b>F2 Group: Fault record</b>				
F2-00	The first fault type		—	<input checked="" type="radio"/>
F2-01	The second fault type		—	<input checked="" type="radio"/>
F2-02	The third (latest) fault type		—	<input checked="" type="radio"/>
F2-03	Frequency at the third (latest) fault	—	—	<input checked="" type="radio"/>
F2-04	Current at the third (latest) fault	—	—	<input checked="" type="radio"/>
F2-05	DC Bus voltage at the third (latest) fault	—	—	<input checked="" type="radio"/>
F2-06	Input terminal's status at the third (latest) fault	—	—	<input checked="" type="radio"/>
F2-07	Output terminal's status at the third (latest) fault	—	—	<input checked="" type="radio"/>
F2-08	Inverter status at the third (latest) fault	—	—	<input checked="" type="radio"/>

Function code	Name	Detailed instruction	Factory default	Modify
F2-09	Power-on time at the third (latest) fault	—	—	●
F2-10	Running time at the third (latest) fault	—	—	●
F2-11	Frequency at the second fault	—	—	●
F2-12	Current at the second fault	—	—	●
F2-13	DC Bus voltage at the second fault	—	—	●
F2-14	Input terminal's status at the second fault	—	—	●
F2-15	Output terminal's status at the second fault	—	—	●
F2-16	Inverter status at the second fault	—	—	●
F2-17	Power-on time at the second fault	—	—	●
F2-18	Running time at the second fault	—	—	●
F2-19	Frequency at the first fault	—	—	●
F2-20	Current at the first fault	—	—	●
F2-21	DC Bus voltage at the first fault	—	—	●
F2-22	Input terminal's status at the first fault	—	—	●
F2-23	Output terminal's status at the first fault	—	—	●
F2-24	Inverter status at the first fault	—	—	●
F2-25	Power-on time at the first	—	—	●

Function code	Name	Detailed instruction	Factory default	Modify
	fault			
F2-26	Running time at the first fault	—	—	●
<b>U0 Group: Monitoring Parameters</b>				
U0-00	Running frequency		Hz	●
U0-01	DC bus voltage		V	●
U0-02	Output current		A	●
U0-03	Setting pressure		MPa	●
U0-04	Real time feedback pressure		MPa	●
U0-05	Power-on time		Min	●
U0-06	Running time		Min	●
U0-07	Temperature		°C	●
U0-08	Accumulated running time		Min	●

## Chapter 6 MODBUS Communication Protocol

This series inverter provides RS485 communication interface, and adopts MODBUS communication protocol. User can realize centralized monitoring through PC/PLC, host computer, and also can set inverter's operating commands, modify or read function parameters, read operating status and fault information, etc.

### 6.1 About Protocol

This serial communication protocol defines the transmission information and use format in the series communication. It includes the formats of master-polling, broadcast and slave response frame, and master coding method with the content including slave address (or broadcast address), command, transmitting data and error checking. The response of slave adopts the same structure, including action confirmation, returning the data and error checking etc. If slave takes place the error while it is receiving the information or cannot finish the action demanded by master, it will send one fault signal to master as a response.

### 6.2 Protocol Description

This series inverter communication protocol is a kind of asynchronous serial master-slave communication protocol. In the network, only one equipment (master) can build a protocol (Named as "Inquiry/Command"). Other equipment (slave) response "Inquiry/Command" of master only by providing the data, or doing the action according to the master's "Inquiry/Command". Here, master is Personnel Computer, Industrial control equipment or Programmable logical controller, and the slave is inverter or other communication equipment with the same communication protocol. Master not only can visit some slave separately for communication, but also sends the broadcast information to all the slaves. For the single "Inquiry/Command" of master, all of slaves will return a signal that is a response; for the broadcast information provided by master, slave needs not feedback a response to master.

### 6.3 Communication Data Structure

MODBUS protocol communication data format of this series inverter is shown as below:

In RTU mode, the Modbus minimum idle time between frames should be no less than 3.5 bytes. The checksum adopts CRC-16 method. All data except checksum itself sent will be counted into the calculation. Please refer to section: CRC Check for more information. Note that at least 3.5 bytes of Modbus idle time should be kept and the start and end idle time need not be summed up to it.

The entire message frame must be transmitted as a continuous data stream. If an idle time is more than 1.5 bytes before completion of the frame, the receiving device flushes the incomplete message

and assumes that the next byte will be the address field of a new message. Similarly, if a new message begins earlier than 3.5 bytes interval following a previous message, the receiving device will consider it as a continuation of the previous message. Because of the frame's confusion, at last the CRC value is incorrect and communication fault will occur.

RTU frame format:

START	Transmission time of 3.5 bytes
Slave Address	Communication address : 0 ~ 4
Command Code	03H: Read slave parameters 06H: Write slave parameters
DATA (N-1)	Data: Function code parameter address, the number of function code parameter, Function code parameter, etc.
DATA (N-2)	
.....	
DATA 0	
CRC Low byte	Detection Value: CRC value
CRC High byte	
END	Transmission time of 3.5 bytes

## 6.7 Parameters address list

Classification	Address	Parameters	Description
Function codes	F000H ~ F028H	F0-00 ~ F0-28	F0 group parameters
	F100H ~ F140H	F1-00 ~ F1-40	F1 group parameters
	F200H ~ F226H	F2-00 ~ F2-26	F2 group parameters
	7000H ~ 7008H	U0-00 ~ U0-08	U0 group parameters
Frequency setting by communication	1000H	-10000~10000	10000 corresponds 100% -10000 corresponds -100%
Control command (Write only)	2000H	0001	Forward run
		0002	Reverse run
		0003	Forward jog
		0004	Reverse jog
		0005	Coast to stop
		0006	Decelerate to stop
		0007	Fault reset
Inverter status (Read only)	3000H	0001	Forward running
		0002	Reverse running
		0003	Stop

Fault information (Read only)	8000H	0000	No fault
		0001	Reserved
		0002	Over current when acceleration
		0003	Over current when deceleration
		0004	Over current when constant speed running
		0005	Over voltage when acceleration
		0006	Over voltage when deceleration
		0007	Over voltage when constant speed running
		0008	Reserved
		0009	Under voltage
		000A	Overload
		000B	Motor overload
		000C	Reserved
		000D	Output phase failure
		000E	IGBT overheat
		000F	External fault
0010	Communication fault		

Besides, due to EEPROM be frequently stored, it will reduce the lifetime of EEPROM. So in the communication mode, some function codes needn't be stored, only change the RAM value.

For F group parameters, to achieve this function, just change high bit F of the function code into 0.

## Chapter 7 Troubles Shooting

### 7.1 Fault and Trouble Shooting

Fault Name	Converter short circuit protection
Fault Code	<b>Err01</b>
Reason	<ol style="list-style-type: none"> <li>1. Short-circuit or ground fault occurred at inverter output side</li> <li>2. The cable connecting the motor with the inverter is too long</li> <li>3. The module is over-heat</li> <li>4. The cable connections inside the inverter are loosen</li> <li>5. The control board is abnormal</li> <li>6. The power board is abnormal</li> <li>7. The IGBT module is abnormal</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Install a reactor or output filter</li> <li>3. Check if the air duct is blocked and if the fan is in normal status, and resolve the existing problems</li> <li>4. Make sure the cables are connected well</li> <li>5, 6, 7. Ask for technical support</li> </ol>

Fault Name	Over current when acceleration
Fault Code	<b>Err02</b>
Reason	<ol style="list-style-type: none"> <li>1. Short-circuit or ground fault occurred at inverter output side</li> <li>2. Control mode is vector control but don't perform auto-tuning</li> <li>3. The acceleration time is too short</li> <li>4. The manual torque boost or V/f curve is not proper</li> <li>5. The voltage is too low</li> <li>6. Start the running motor</li> <li>7. Load is added suddenly during the acceleration</li> <li>8. Power selection of inverter is too small</li> </ol>

Solution	<ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Identify the motor parameters</li> <li>3. Increase the acceleration time</li> <li>4. Adjust the manual torque boost or V/F curve</li> <li>5. Make the voltage in the normal range</li> <li>6. Select speed tracking start or start the motor till it stops</li> <li>7. Cancel the sudden added load</li> <li>8. Select bigger power inverter</li> </ol>
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Fault Name	Over current when deceleration
Fault Code	<b>Err03</b>
Reason	<ol style="list-style-type: none"> <li>1. Short-circuit or ground fault occurred at inverter output side</li> <li>2. The deceleration time is too short</li> <li>3. The voltage is too low</li> <li>4. Load is added suddenly during the deceleration</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Increase the deceleration time</li> <li>3. Make the voltage in the normal range</li> <li>4. Remove the sudden added load</li> </ol>

Fault Name	Over-current when constant speed running
Fault Code	<b>Err04</b>
Reason	<ol style="list-style-type: none"> <li>1. Short-circuit or ground fault occurred at inverter output</li> <li>2. The voltage is too low</li> <li>3. Load is added suddenly during running</li> <li>4. Power selection of inverter is too small</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Make the voltage in the normal range</li> <li>3. Remove the sudden added load</li> <li>4. Select bigger power inverter</li> </ol>

Fault Name	Over-voltage when acceleration
Fault Code	<b>Err05</b>
Reason	<ol style="list-style-type: none"> <li>1. The input voltage is too high</li> <li>2. There is an external force driving the motor to run during acceleration</li> <li>3. The acceleration time is too short</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Make the voltage in the normal range</li> <li>2. Remove the external force</li> <li>3. Increase the acceleration time</li> </ol>

Fault Name	Over-voltage when deceleration
Fault Code	<b>Err06</b>
Reason	<ol style="list-style-type: none"> <li>1. The input voltage is too high</li> <li>2. There is an external force driving the motor to run during deceleration</li> <li>3. The deceleration time is too short</li> <li>4. Have not installed braking unit and braking resistor</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Make the voltage in the normal range</li> <li>2. Remove the external force</li> <li>3. Increase the deceleration time</li> <li>4. Install braking unit and braking resistor</li> </ol>

Fault Name	Over-voltage when constant speed running
Fault Code	<b>Err07</b>
Reason	<ol style="list-style-type: none"> <li>1. The input voltage is too high</li> <li>2. There is external force driving the motor to run during the inverter running</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Make the voltage in the normal range</li> <li>2. Remove the external force or install braking resistor</li> </ol>

Fault Name	Power-supply fault
Fault Code	<b>Err08</b>
Reason	<ol style="list-style-type: none"> <li>1. The input voltage is out of range</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Make the voltage in the normal range</li> </ol>

Fault Name	Under-voltage
Fault Code	<b>Err09</b>
Reason	<ol style="list-style-type: none"> <li>1. Instantaneous power-off</li> <li>2. The input voltage is out of range</li> <li>3. DC Bus voltage is abnormal</li> <li>4. The rectifier bridge and buffer resistor are abnormal</li> <li>5. The power board is abnormal</li> <li>6. The control board is abnormal</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Fault Reset</li> <li>2, 3. Make the voltage in the normal range</li> <li>4, 5, 6. ask for technical support</li> </ol>

Fault Name	Inverter over load
Fault Code	<b>Err10</b>
Reason	<ol style="list-style-type: none"> <li>1. The load is too heavy or motor blockage occurs</li> <li>2. Power selection of inverter is too small</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Reduce the load, check the status of motor &amp; machinery</li> <li>2. Select bigger power inverter</li> </ol>

Fault Name	Motor over load
Fault Code	<b>Err11</b>
Reason	<ol style="list-style-type: none"> <li>1. F0-10 and F0-11 are set improperly</li> <li>2. The load is too heavy or motor blockage occurs</li> <li>3. Power selection of inverter is too small</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Set F0-10 and F0-11 properly</li> <li>2. Reduce the load, check the status of motor &amp; machinery</li> <li>3. Select bigger power inverter</li> </ol>

Fault Name	Input phase failure
Fault Code	<b>Err12</b>
Reason	<ol style="list-style-type: none"> <li>1. The power supply is abnormal</li> <li>2. The power board is abnormal</li> <li>3. The control board is abnormal</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Check the power supply of the inverter, make it be normal</li> <li>2, 3. Ask for technical support</li> </ol>

Fault Name	Output phase failure
Fault Code	<b>Err13</b>
Reason	<ol style="list-style-type: none"> <li>1. The connection between inverter and motor is abnormal</li> <li>2. Output voltage unbalance during the motor running</li> <li>3. The power board is abnormal</li> <li>4. The IGBT module is abnormal</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Make sure the motor three phase winding is normal</li> <li>3, 4. Ask for technical support</li> </ol>

Fault Name	IGBT module over-heat
Fault Code	<b>Err14</b>
Reason	<ol style="list-style-type: none"> <li>1. Ambient temperature is too high</li> <li>2. Air duct is blocked</li> <li>3. Cooling fans are broken</li> <li>4. Thermal resistor(temperature sensor) of the module is broken</li> <li>5. IGBT module is broken</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Reduce the ambient temperature</li> <li>2. Clear the air duct</li> <li>3. Replace cooling fans</li> <li>4, 5. Ask for technical support</li> </ol>

Fault Name	External device fault
Fault Code	<b>Err15</b>
Reason	MI terminal receives an external fault signal generated by peripheral device
Solution	Find out the fault source, solve it and reset the inverter

Fault Name	Communication fault
Fault Code	<b>Err16</b>
Reason	<ol style="list-style-type: none"> <li>1. Master computer works abnormal</li> <li>2. Communication cable is abnormal</li> <li>3. Communication parameters (F1-09~F1-13) are set improperly</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Check the connection of master computer</li> <li>2. Check the communication connection</li> <li>3. Set communication parameters properly</li> </ol>

Fault Name	Contactor fault
Fault Code	<b>Err17</b>
Reason	<ol style="list-style-type: none"> <li>1. Power board is abnormal</li> <li>2. Contactor is abnormal</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Replace a new power board</li> <li>2. Replace a new contactor</li> </ol>

Fault Name	Current detection fault
Fault Code	<b>Err18</b>
Reason	<ol style="list-style-type: none"> <li>1. Hall sensor is abnormal</li> <li>2. The power board is abnormal</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Check hall sensor and connection</li> <li>2. Replace the power board</li> </ol>

Fault Name	Motor auto-tuning fault
Fault Code	<b>Err19</b>
Reason	<ol style="list-style-type: none"> <li>1. Motor parameters are set incorrect</li> <li>2. Auto-tuning over time</li> </ol>
Solution	<ol style="list-style-type: none"> <li>1. Set correct motor parameters</li> <li>2. Check the cable between motor and inverter</li> </ol>

Fault Name	Reserved
Fault Code	<b>Err20</b>

Fault Name	EEPROM read/write fault
Fault Code	<b>Err21</b>
Reason	1. EEPROM chip is broken
Solution	1. Replace the control board

Fault Name	Inverter hardware fault
Fault Code	<b>Err22</b>
Reason	1. Over voltage 2. Over current
Solution	1. Handle as over voltage fault 2. Handle as over current fault

Fault Name	Motor short-circuit to ground
Fault Code	<b>Err23</b>
Reason	1. The motor is short-circuit to ground
Solution	1. Replace cables or motor

Fault Name	Current-limiting fault
Fault Code	<b>Err40</b>
Reason	1. Whether the load is heavy or the motor is blocked 2. Power selection of inverter is too small.
Solution	1. Reduce the load and detect the motor & machinery condition 2. Select bigger power inverter

Fault Name	Abnormal of high pressure
Fault Code	<b>Err60</b>
Reason	The real feedback pressure is higher than upper limitation pressure (F0-05), and it has passed the delay time.
Solution	1. Wiring connection of pressure transducer is wrong or pressure transducer is damaged 2. Increase the value of F0-05 3. The pressure of pipe line is too high 4. Ask for technical support

Fault Name	Abnormal of low pressure
Fault Code	<b>Err61</b>
Reason	The real feedback pressure is lower than lower limitation pressure (F0-07), and it has passed the delay time.
Solution	<ol style="list-style-type: none"> <li>1. Wiring connection of pressure transducer is wrong or pressure transducer is damaged</li> <li>2. Reduce the value of F0-07</li> <li>3. Change the selection of F0-03</li> <li>4. Connect the pressure transducer with master inverter</li> <li>5. Check whether the pipe line is broken somewhere</li> <li>6, Open the valve and discharge the air inside the pipe line</li> </ol>

Fault Name	Abnormal of lack water
Fault Code	<b>Err63</b>
Reason	The inverter runs at 50Hz, feedback pressure is less than 0.05MPa, and the running current is less than 80% of its rated current.
Solution	<ol style="list-style-type: none"> <li>1. Wiring connection of pressure transducer is wrong or pressure transducer is damaged.</li> <li>2. Change the selection of F0-03</li> <li>3. Connect the pressure transducer with master inverter</li> <li>4. Check whether the pipe line is broken somewhere</li> <li>5, Open the valve and discharge the air inside the pipe line</li> <li>6. Ask for technical support</li> </ol>

## 7.2 Common Faults and Solutions

Fault	Reason	Solution
<p>The inverter stops after running for 10s. The indicator of “Auto” flakers</p>	<ol style="list-style-type: none"> <li>1. Wiring connection of pressure transducer is wrong or pressure sensor is damaged.</li> <li>2. Setting of F0-03 is wrong.</li> <li>3. Without connecting pressure sensor for multiple pumps system.</li> <li>4. No output 10V or 24V voltage from the inverter.</li> <li>5. The valve for pressure transducer is not opened.</li> <li>6. Air inside the pump or pipe line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wiring connection of pressure transducer or change a new transducer.</li> <li>2. Change the setting of F0-03.</li> <li>3. Connect pressure sensor with master inverter</li> <li>4. Replace a new control board.</li> <li>5. Open the valve make pressure sensor is working.</li> <li>6. Discharge the air in the pump or pipe line.</li> </ol>
<p>Communication is abnormal under multiple pumps system.</p> <p>1, water pressure is low, cannot start next pump.</p> <p>2, The feedback pressure displayed on different inverters are unbalance, system cannot work normally.</p> <p>3, pumps cannot be alternated while set F0-25 properly.</p>	<ol style="list-style-type: none"> <li>1. Communication terminals 485+, 485- are not connected or wrongly connected.</li> <li>2. F1-11 doesn't set as master (should be set as 1 or 2)</li> <li>3. F1-11 is set the same value in different inverters</li> <li>4. Communication terminals 485+, 485- are fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Connect 485+, 485- terminals correctly, and confirm the communication is normal.</li> <li>2. Reset F1-11, make sure different Inverters are set different value</li> <li>3. Initialize parameters to factory default (F0-28)</li> <li>4. Ask for technical support.</li> </ol>
<p>Pump doesn't stop while nobody use the water</p>	<ol style="list-style-type: none"> <li>1. The pipe line is broken, water leakage happen.</li> <li>2. The one-way valve is broken.</li> <li>3. The pressure transducer is broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the pipe line, valve and pressure transducer.</li> <li>2. Increase the value of F0-16.</li> <li>3. Change a new pressure transducer.</li> <li>4, Ask for technical support.</li> </ol>

<p>The displayed pressure values on inverter and pressure gauge (transducer) have big difference.</p>	<ol style="list-style-type: none"> <li>1. The measure range of F0-04 is set incorrect.</li> <li>2. The pressure gauge (transducer) itself has big deviation, or it's broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set a correct value in F0-04.</li> <li>2. Set a suitable value to adjust the pressure.</li> <li>3. Change a new pressure gauge (transducer).</li> <li>4, Ask for technical support.</li> </ol>
<p>The inverter is running at highest frequency level but the feedback pressure still very low.</p>	<ol style="list-style-type: none"> <li>1. Motor running direction is reversed.</li> <li>2, Air inside the pump or pipe line.</li> <li>3. The pressure gauge (transducer) is broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Change any two motor cables of output side, or change the value of F0-02.</li> <li>2, Discharge the air in the pump or pipe line.</li> <li>4. Change a new pressure gauge (transducer)</li> <li>4, Ask for technical support.</li> </ol>
<p>The frequency with big fluctuation, cannot keep stable while the inverter is running.</p>	<ol style="list-style-type: none"> <li>1, The dormancy frequency of F0-17 is set too big.</li> <li>2, F0-05 is set too small.</li> <li>3. The feedback pressure is abnormal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set suitable value of F0-17.</li> <li>2. Set suitable value of F0-05.</li> <li>3. Change a new pressure transducer.</li> </ol>
<p>After pressing "RUN" button, the pump cannot run.</p>	<ol style="list-style-type: none"> <li>1. The inverter is under dormancy status.</li> <li>2. F1-11 is not set suitable.</li> <li>3. F1-00 is not set suitable.</li> <li>4. Wiring connection of pressure transducer is incorrect, or the pressure transducer is broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open the value to discharge the pipe line pressure.</li> <li>2. Set suitable value in F1-00 and F1-11.</li> <li>3. Reconnect the wiring connection of pressure transducer, or change a new pressure transducer.</li> <li>4. Ask for technical support.</li> </ol>

# Chapter 8 Commissioning

## 8.1 One pump system

### 8.1.1 Wiring connection

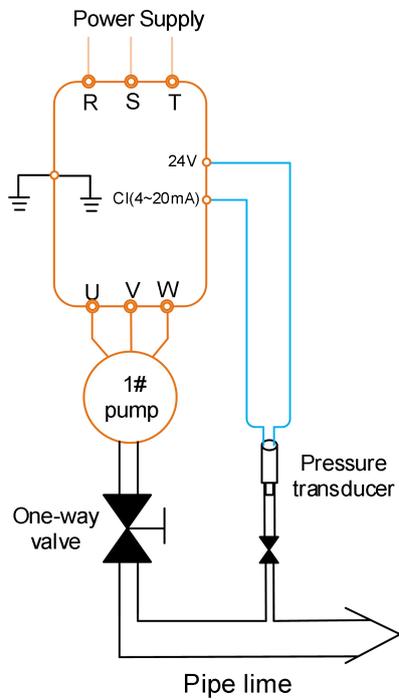


Fig 8.1 Connect with pressure transducer

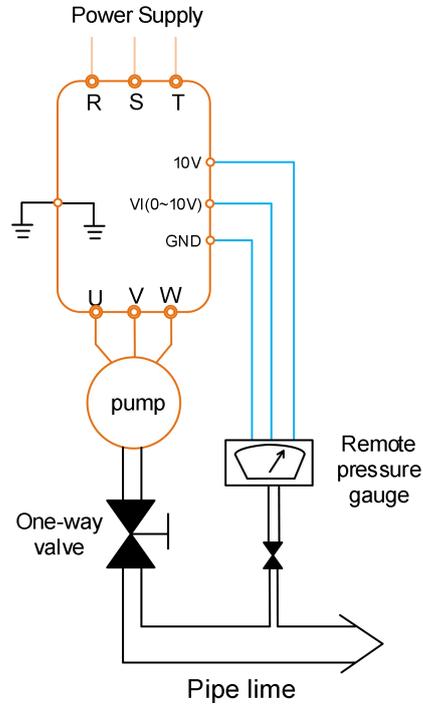


Fig 8.2 Connect with remote pressure gauge

### 8.1.2 Parameters setting

Function code	Default value	Set value	Description
F0-00	1	1	Single pump system
F0-01	0.4MPa	Customer set	<ol style="list-style-type: none"> <li>Please set it correctly based on requested pressure, the unit is MPa, 1MPa=10bar.</li> <li>Most of the family used systems, the pressure is 0.3~0.4MPa (3~4bar)</li> </ol>
F0-02	80%	Customer set	Wake up pressure; it is the percentage of F0-01.
F0-03	0	0	It must be set as "0" while use 0~10V remote pressure gauge.
		1	It must be set as "1" while use 4~20mA pressure transducer.
F0-04	1.6MPa	1.6MPa	<ol style="list-style-type: none"> <li>To set the maximum measure range of pressure transducer.</li> <li>It must be set correctly, otherwise it may cause pressure is inaccurate.</li> </ol>

**For more parameters setting, please refer to chapter 5 in details.**

### **8.1.3 Process of fast operation and commissioning**

**1) Please check all the packing in the inverter is in good condition;**

**2) Wiring connection**

- ① Main circuit, please connect the power supply to R, S, T (Single phase please connect R, T), and output side please connect U, V, W with pump.
- ② Connect the pressure transducer or remote pressure gauge to the inverter correctly, please refer to Fig 8.1 and Fig 8.2 for details.

**3) After confirm the wiring connection, switch on the power supply.**

- ① Set F0-00=0 (Manual operation mode) firstly, start the inverter and check whether the running direction of pump is correct. If the running direction is incorrect, change the value of F0-02 or change any two motor cables connection.
- ② Under manual operation mode, discharge the air inside the pump and pipe line.

**4) Check whether the pressure transducer is connected correctly.**

- ① Set correct value in F0-04.
- ② Under manual operation mode, start the inverter and check whether the feedback pressure and real time display pressure on the inverter are the same. Long time press [▲] or [▼] to increase or decrease pump speed to check whether the feedback pressure is changed accordingly, if the feedback changes, it means the pressures transducer's wiring connection is correct,

**5) Parameters setting**

- ① While start the inverter at the first time or forget some parameters, please set F0-28=1 to initialize the factory default value.
- ② Set parameters one by one based on the parameters list.

**6) Routine inspection**

- ① Check the constant water supply function, the water pressure can be keep at a stable level..
- ② Check the dormancy function, while close all the valves in the water system, the inverter can enter into dormancy status automatically.
- ③ Check the wake up function, under dormancy status, open some of valves in the water system, the inverter can wake up automatically.

**NOTE:** If any failures happen, please refer to chapter 7 to find the solutions.

## 8.2 Two pumps system

### 8.2.1 Wiring connection

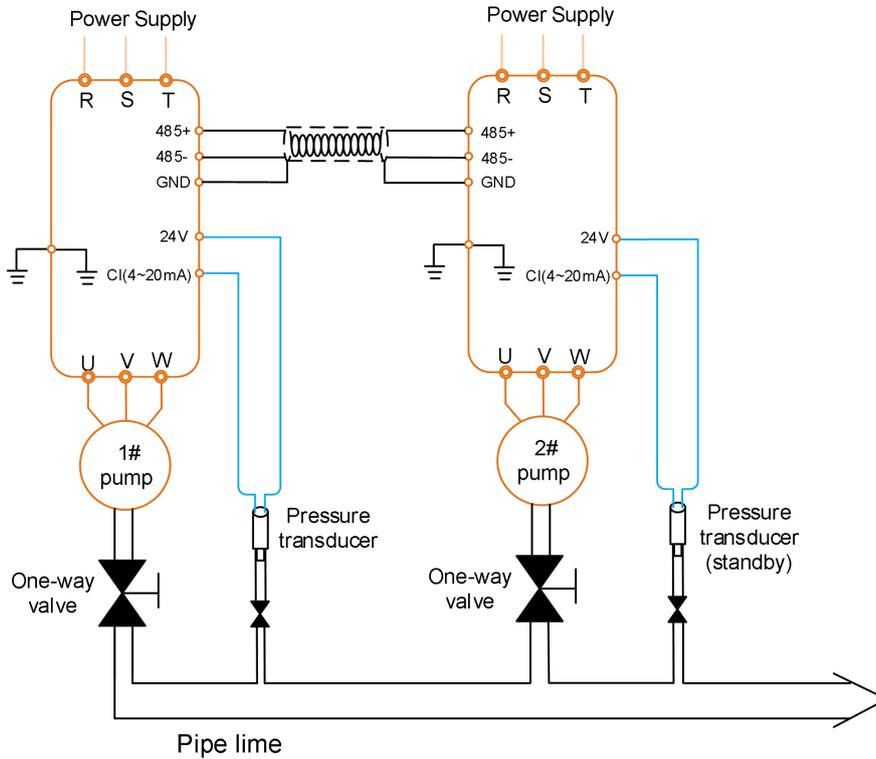


Fig 8.3 Connect with pressure transducer

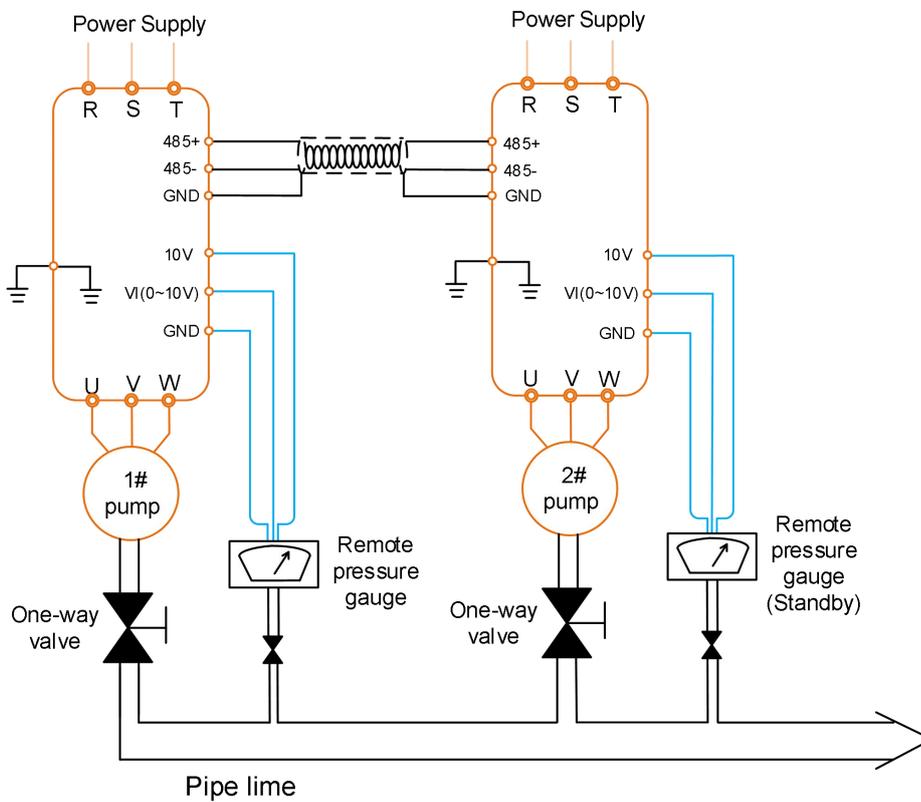


Fig 8.4 Connect with remote pressure gauge

### 8.2.2 Parameters setting

Function code	Default value	Set value	Description
F1-11	1	1# inverter 1	1# inverter (master), it must connect the pressure sensor. 2# inverter (slave / standby master), connect the pressure sensor. <b>Warning:</b> the address of each inverter cannot be the same, otherwise, the system will work abnormally.
		2# inverter 2	
F0-00	1	2	Multiple pumps system
F0-01	0.4MPa	Customer set	1. Please set it correctly based on requested pressure, the unit is MPa, 1MPa=10bar. 2. Most of the family used systems, the pressure is 0.3~0.4MPa (3~4bar)
F0-02	80%	Customer set	Wake up pressure; it is the percentage of F0-01.
F0-03	0	0	It must be set as "0" while use 0~10V remote pressure gauge.
		1	It must be set as "1" while use 4~20mA pressure transducer.
F0-04	1.6MPa	1.6MPa	1. To set the maximum measure range of pressure transducer. 2. It must be set correctly, otherwise it may cause pressure is inaccurate.
F0-25	300Min	Customer set	To set the running time as master pump, when time arrive, it switches to next pump as master. When set F0-25=0, this pump will only work as slave pump.

For more parameters setting, please refer to chapter 5 in details.

### 8.2.3 Process of fast operation and commissioning

1) Please check all the packing in the inverter is in good condition;

2) Wiring connection

- ① Main circuit, please connect the power supply to R, S, T (Single phase please connect R, T), and output side please connect U, V, W with pump.

- ② Connect the pressure transducer or remote pressure gauge to the inverter correctly, please refer to Fig 8.3 and Fig 8.4 for details.
- ③ Connect the communication cables, please select shielded twisted-pair cable to connect the 485+ and 485- of the two inverters together.

**3) After confirm the wiring connection, switch on the power supply.**

- ① Set F0-00=0 (Manual operation mode) firstly, start the inverter and check whether the running direction of pump is correct. If the running direction is incorrect, change the value of F0-02 or change any two motor cables connection.
- ② Under manual operation mode, discharge the air inside the pump and pipe line.

**4) Check whether the pressure transducer is connected correctly.**

- ① Set correct value in F0-04.
- ② Under manual operation mode, start the inverter and check whether the feedback pressure and real time display pressure on the inverter are the same. Long time press [▲] or [▼] to increase or decrease pump speed to check whether the feedback pressure is changed accordingly, if the feedback changes, it means the pressures transducer's wiring connection is correct (watch 1# pump).

**5) Parameters setting**

- ① While start the inverter at the first time or forget some parameters, please set F0-28=1 to initialize the factory default value.
- ② Set parameters one by one based on the above mentioned parameters list, F1-01 ~ F1-04 parameters are only needed to set in master inverter, but for two master system, it needs to set the parameters both in 1# inverter and 2 # inverter..

**6) Routine inspection**

Before inspecting, please start these two inverters, make them both work at running condition.

- ① Check the constant pressure water supply function, the water pressure can be keep at a stable level, 1# and 2# inverters display the same feedback pressure.
- ② Check the pump adding function, increase the water flow, while the master pump cannot get the target pressure, the slave pump will be started.
- ③ Check the pump remove function, decrease the water flow, while the master pump can get the target pressure, the salve pump will be stopped.
- ④ Check the dormancy function, while close all the valves in the water system, these two inverters can enter into dormancy status automatically.
- ⑤ Check the wake up function, under dormancy status, open some of valves in the water system, the master pump will be woken up by the setting wake up value of F0-02 automatically, then system enter into normal working conditions.

NOTE: If any failures happen, please refer to chapter 7 to find the solutions.

### 8.3 Three pumps system

#### 8.3.1 Wiring connection

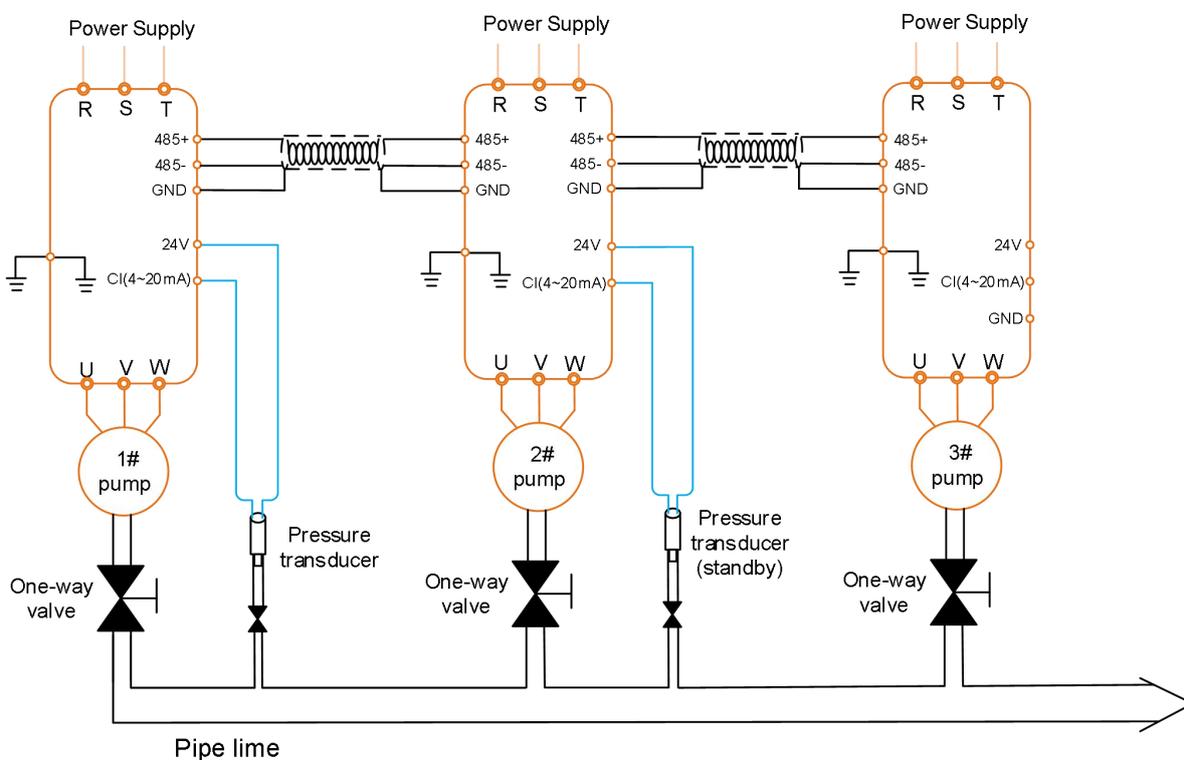


Fig 8.5 Connect with remote pressure transducer

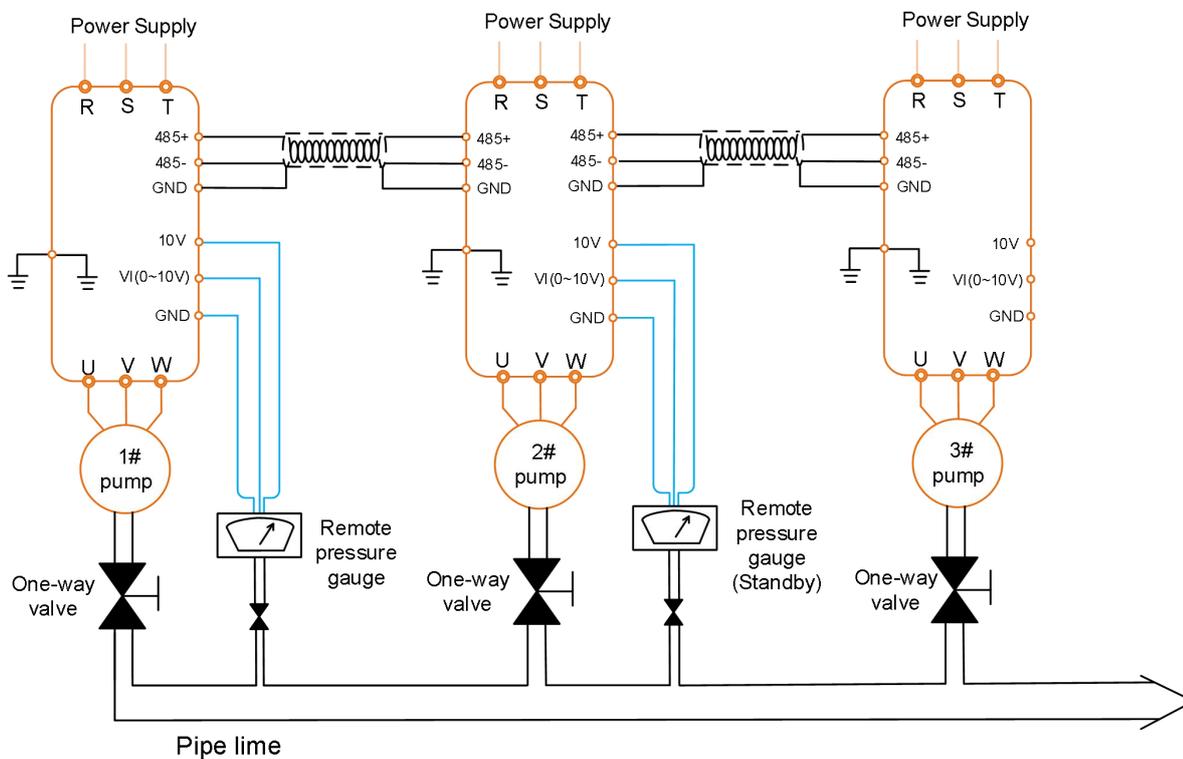


Fig 8.6 Connect with remote pressure gauge

### 8.3.2 Parameters setting

Function code	Default value	Set value	Description	
F1-11	1	1# inverter	1 1# inverter (master), it must connect the pressure sensor. 2# inverter (slave / standby master), connect the pressure sensor. 3# inverter (slave) <b>Warning:</b> the address of each inverter cannot be the same, otherwise, the system will work abnormally.	
		2# inverter		2
		3# inverter		3
F0-00	1	2	Multiple pumps system	
F0-01	0.4MPa	Customer set	1. Please set it correctly based on requested pressure, the unit is MPa, 1MPa=10bar. 2. Most of the family used systems, the pressure is 0.3~0.4MPa (3~4bar)	
F0-02	80%	Customer set	Wake up pressure; it is the percentage of F0-01.	
F0-03	0	0	It must be set as "0" while use 0~10V remote pressure gauge.	
		1	It must be set as "1" while use 4~20mA pressure transducer.	
F0-04	1.6MPa	1.6MPa	1. To set the maximum measure range of pressure transducer. 2. It must be set correctly, otherwise it may cause pressure is inaccurate.	
F0-25	300Min	Customer set	To set the running time as master pump, when time arrive, it switches to next pump as master. When set F0-25=0, this pump will only work as slave pump.	

**For more parameters setting, please refer to chapter 5 in details.**

### 8.3.3 Process of fast operation and commissioning

1) Please check all the packing in the inverter is in good condition;

2) Wiring connection

- ① Main circuit, please connect the power supply to R, S, T (Single phase please connect R, T), and output side please connect U, V, W with pump.

- ② Connect the pressure transducer or remote pressure gauge to the inverter correctly, please refer to Fig 8.5 and Fig 8.6 for details.
- ③ Connect the communication cables, please select shielded twisted-pair cable to connect the 485+ and 485- of the three inverters together.

**3) After confirm the wiring connection, switch on the power supply.**

- ① Set F0-00=0 (Manual operation mode) firstly, start the inverter and check whether the running direction of pump is correct. If the running direction is incorrect, change the value of F0-02 or change any two motor cables connection.
- ② Under manual operation mode, discharge the air inside the pump and pipe line.

**4) Check whether the pressure transducer is connected correctly.**

- ① Set correct value in F0-04.
- ② Under manual operation mode, start the inverter and check whether the feedback pressure and real time display pressure on the inverter are the same. Long time press [▲] or [▼] to increase or decrease pump speed to check whether the feedback pressure is changed accordingly, if the feedback changes, it means the pressures transducer's wiring connection is correct (watch 1# pump).

**5) Parameters setting**

- ① While start the inverter at the first time or forget some parameters, please set F0-28=1 to initialize the factory default value.
- ② Set parameters one by one based on the above mentioned parameters list, F1-01 ~ F1-04 parameters are only needed to set in master inverter, but for two master system, it needs to set the parameters both in 1# inverter and 2 # inverter..

**6) Routine inspection**

Before inspecting, please start these three inverters, make them work at running condition.

- ① Check the constant pressure water supply function, the water pressure can be keep at a stable level, 1#, 2# and 3# inverters display the same feedback pressure.
- ② Check the pump adding function, increase the water flow, while the master one pump cannot get the target pressure, the slave pumps will be started one by one.
- ③ Check the pump remove function, decrease the water flow, while the master pump can get the target pressure, the salve pumps will be stopped one by one.
- ④ Check the dormancy function, while close all the valves in the water system, all of the three inverters can enter into dormancy status automatically.
- ⑤ Check the wake up function, under dormancy status, open some of valves in the water system, the master pump will be woken up by the setting wake up value of F0-02 automatically, then system enter into normal working conditions.

NOTE: If any failures happen, please refer to chapter 7 to find the solutions.

## 8.4 Four pumps system

### 8.4.1 Wiring connection

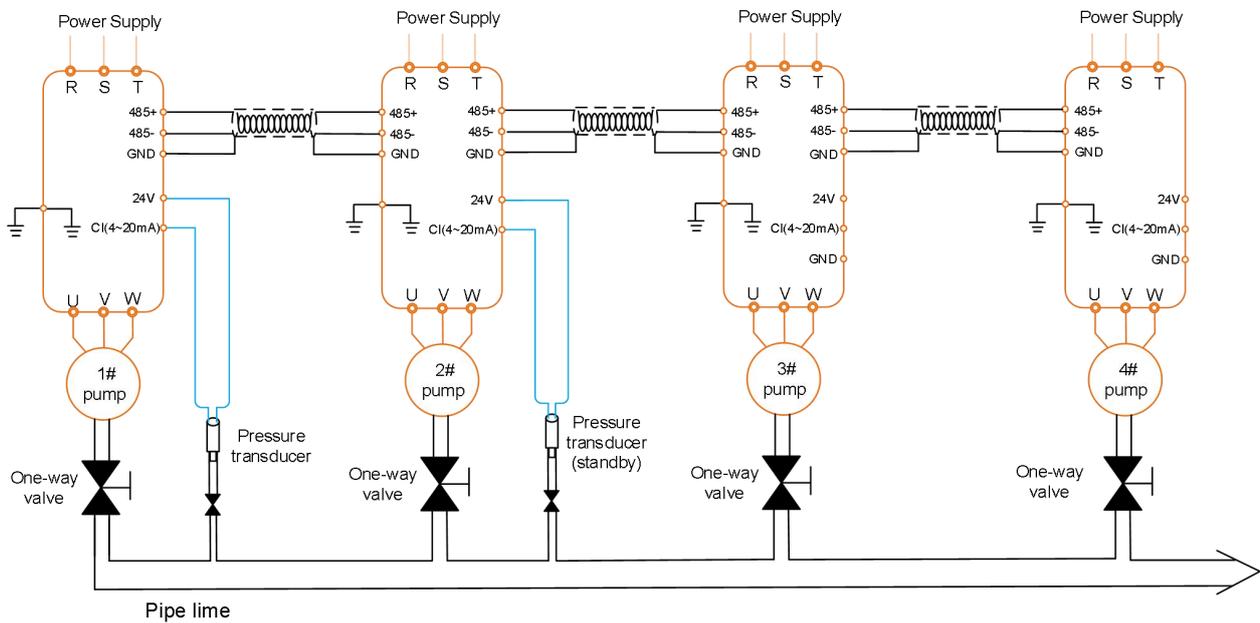


Fig 8.7 Connect with remote pressure transducer

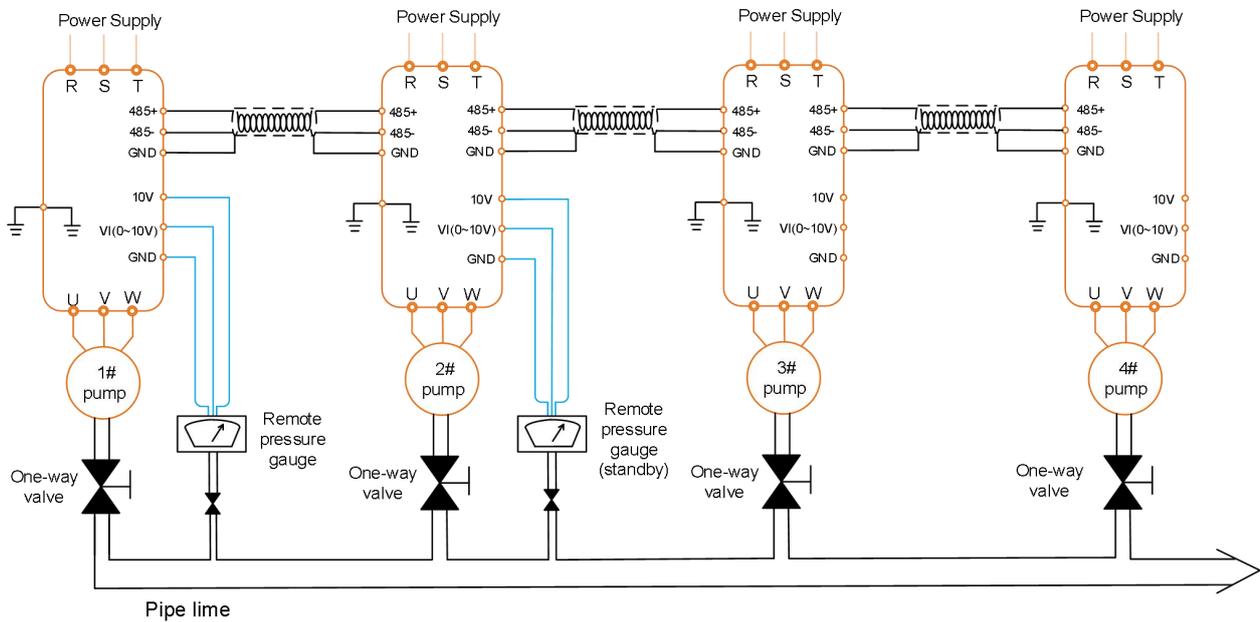


Fig 8.8 Connect with remote pressure gauge

### 8.4.2 Parameters setting

Function code	Default value	Set value	Description	
F1-11	1	1# inverter	1	1# inverter (master), it must connect the pressure sensor.
		2# inverter	2	2# inverter (slave / standby master), connect the pressure sensor.
		3# inverter	3	3# and 4# inverters (slave).
		4# inverter	4	<b>Warning:</b> the address of each inverter cannot be the same, otherwise, the system will work abnormally.
F0-00	1	2	Multiple pumps system	
F0-01	0.4MPa	Customer set	<p>1. Please set it correctly based on requested pressure, the unit is MPa, 1MPa=10bar.</p> <p>2. Most of the family used systems, the pressure is 0.3~0.4MPa (3~4bar)</p>	
F0-02	80%	Customer set	Wake up pressure; it is the percentage of F0-01.	
F0-03	0	0	It must be set as "0" while use 0~10V remote pressure gauge.	
		1	It must be set as "1" while use 4~20mA pressure transducer.	
F0-04	1.6MPa	1.6MPa	<p>1. To set the maximum measure range of pressure transducer.</p> <p>2. It must be set correctly, otherwise it may cause pressure is inaccurate.</p>	
F0-25	300Min	Customer set	<p>To set the running time as master pump, when time arrive, it switches to next pump as master.</p> <p>When set F0-25=0, this pump will only work as slave pump.</p>	

**For more parameters setting, please refer to chapter 5 in details.**

### 8.3.3 Process of fast operation and commissioning

1) Please check all the packing in the inverter is in good condition;

2) Wiring connection

- ① Main circuit, please connect the power supply to R, S, T (Single phase please connect R, T), and output side please connect U, V, W with pump.

- ② Connect the pressure transducer or remote pressure gauge to the inverter correctly, please refer to Fig 8.7 and Fig 8.8 for details.
- ③ Connect the communication cables, please select shielded twisted-pair cable to connect the 485+ and 485- of the four inverters together.

**3) After confirm the wiring connection, switch on the power supply.**

- ① Set F0-00=0 (Manual operation mode) firstly, start the inverter and check whether the running direction of pump is correct. If the running direction is incorrect, change the value of F0-02 or change any two motor cables connection.
- ② Under manual operation mode, discharge the air inside the pump and pipe line.

**4) Check whether the pressure transducer is connected correctly.**

- ① Set correct value in F0-04.
- ② Under manual operation mode, start the inverter and check whether the feedback pressure and real time display pressure on the inverter are the same. Long time press [▲] or [▼] to increase or decrease pump speed to check whether the feedback pressure is changed accordingly, if the feedback changes, it means the pressures transducer's wiring connection is correct (watch 1# pump).

**5) Parameters setting**

- ① While start the inverter at the first time or forget some parameters, please set F0-28=1 to initialize the factory default value.
- ② Set parameters one by one based on the above mentioned parameters list, F1-01 ~ F1-04 parameters are only needed to set in master inverter, but for two master system, it needs to set the parameters both in 1# inverter and 2 # inverter..

**6) Routine inspection**

Before inspecting, please start these four inverters, make them work at running condition.

- ① Check the constant pressure water supply function, the water pressure can be keep at a stable level, 1#, 2#, 3# and 4# inverters display the same feedback pressure.
- ② Check the pump adding function, increase the water flow, while the master one pump cannot get the target pressure, the slave pumps will be started one by one.
- ③ Check the pump remove function, decrease the water flow, while the master pump can get the target pressure, the salve pumps will be stopped one by one.
- ④ Check the dormancy function, while close all the valves in the water system, all of the four inverters can enter into dormancy status automatically.
- ⑤ Check the wake up function, under dormancy status, open some of valves in the water system, the master pump will be woken up by the setting wake up value of F0-02 automatically, then system enter into normal working conditions.

NOTE: If any failures happen, please refer to chapter 7 to find the solutions.