ZVF600 Series Pump Inverter

Version：1. 08

2021-03

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ZVF600 Series Simple User Manual

1. Preface

Thank you for using ZVF600 series intelligent pump inverter. The inverter uses high-quality components, and integration of the latest DSP control technology made.

This manual provides instructions for user installation, parameter setting, abnormal diagnosis, troubleshooting, etc.

In order to ensure proper installation and operation of the frequency converter, please read this simple manual carefully before installing, and please keep it and send it to the user of the inverter. For more details, please refer to the company website related to download.

The following is a special note:

● When wiring is performed, be sure to turn off the power.

● The electronic components inside the inverter are particularly sensitive to static electricity, so you can not place foreign objects inside the inverter or touch the main circuit board.

● After turning off the AC power , the digital indicator of the inverter didn't light off . it indicates that there is still high voltage inside the inverter. Do not touch the internal circuit and parts.

● Be sure to properly ground terminal of inverter is correct connect.

● Never connect the inverter output terminals U, V, W to AC power supply.

2. Product Introduction

2.1 Inspection Upon Arrival

The inverter have excellent quality assurance system, Please passed strict test before shipment . and made a crash,shock or other package treatment.But we can not rule out the inverter subject to strong shock or extruded during transportation .Please check and confirm the products as follo when open the package .

①Check whether the case of inverter is deformed or damaged .or the components are damaged or drop off.

②Check the label of the inverter are matched with the product that you ordered.

③Check weather the items of packing list are complete .

If you find any of the above problems, please contact with our factory immediately.

2.2 Demonstration Of The Model

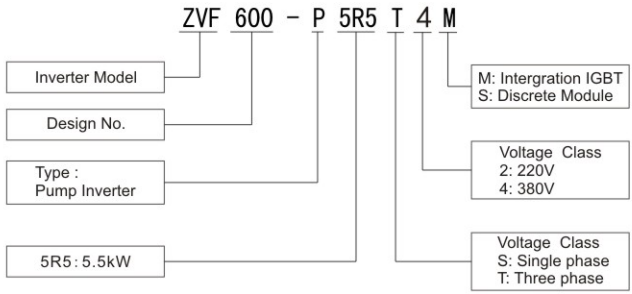


Fig.2-1 Inverter Model Demonstration

2.3 Specification Label

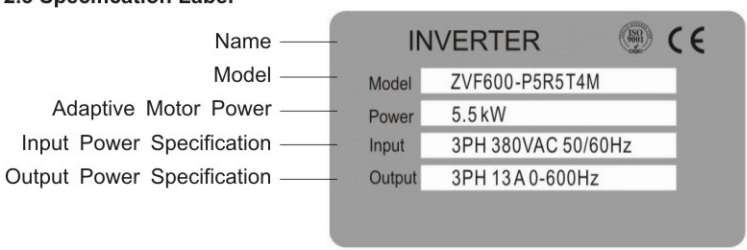


Fig.2-2 Inverter Label

2.4 Model Type

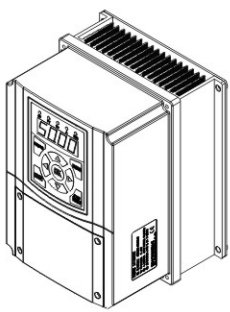


Fig.2-3 Wall-Mounted Plastic type

2.5 Model Specification

Sheet 2-1 Inverter Model and Specification

Inverter Model (P: Intelligent pump type)	Input Voltage (V)	Rated Output Current (A)	Adaptation motor power(kW)
ZVF600-P0R7T2/S2M	220	4.5	0.75
ZVF600-P1R5T2/S2M	220	7.0	1.5
ZVF600-P2R2T2/S2M	220	10	2.2
ZVF600-P3R7T2M	220	16	3.7
ZVF600-P0R7T4M	380	2.5	0.75
ZVF600-P1R5T4M	380	3.7	1.5
ZVF600-P2R2T4M	380	5.0	2.2
ZVF600-P3R0T4M	380	6.8	3.0
ZVF600-P4R0T4M	380	9.0	4.0
ZVF600-P5R5T4M	380	13	5.5
ZVF600-P7R5T4M	380	17	7.5

3. Wiring

3.1 Basic Wiring Diagram For Inverter

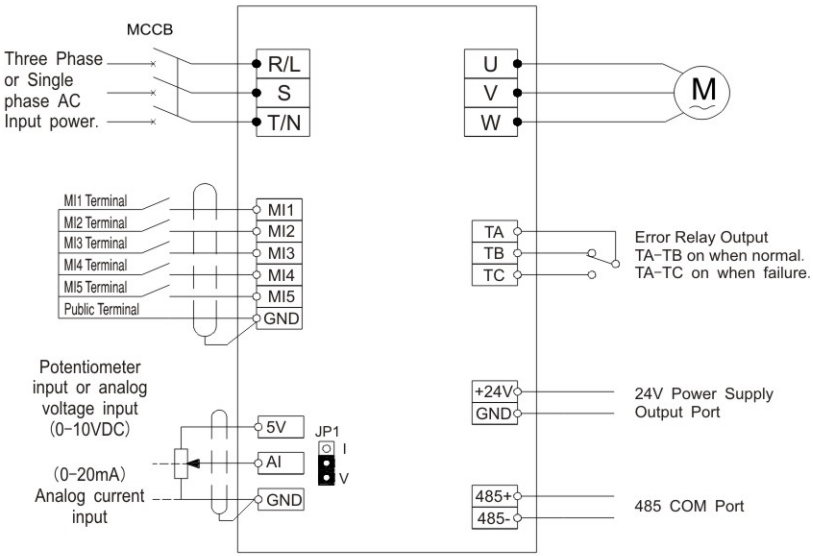


Fig. 3-1 Basic Wiring Diagram

3.2 Main Circuit Terminals

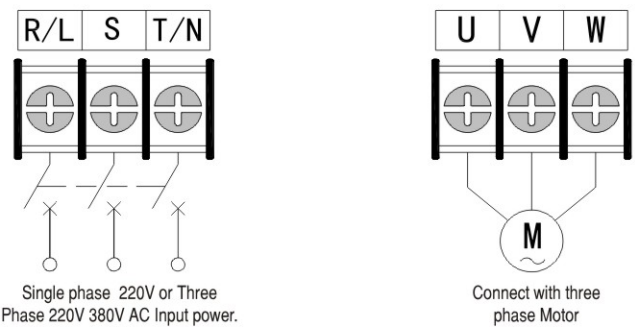


Fig.3-2 Diagram for Main Circuit Terminal

3.3 Description On Control Circuit Terminals

1.Control circuit terminal are shown in the Fig.3-3.

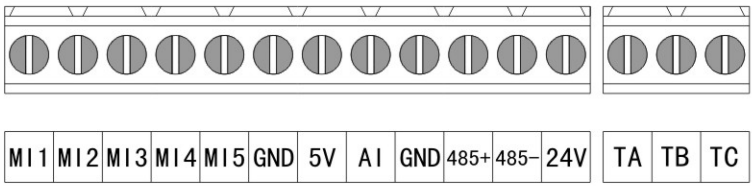


Fig.3-3 Control Circuit Terminal

2.Function Description on Control circuit Terminals

Sheet 3-1 Function Description on Control circuit Terminals

Type	Terminal Symbols	Function Description	Electrical Specification
Multi-Function Input Terminal	MI1	Valid only when there is a short circuit between MIn(n=1，2，3，4，5)－GND. The fnctions can be set by the parameter F1.04 –F1.08 separately .	INPUT, Power level signal, Low power level is valid. 5mA
	MI2		
	MI3		
	MI4		
	MI5		
Analog Input Terminal	5V	External analog given power, and GND, AI terminal connected potentiometer, the frequency can be set .	INPUT，10V DC Voltage
	AI	Analog voltage or current signal input, reference ground is GND	INPUT，0～10V DC Voltage INPUT，0～20mA DC Current
Public Port	GND	Signal Public Terminal	

Type	Terminal Symbols	Function Description	Electrical Specification
Power connector	+24V	24VDC Power Output (Control Power)	24VDC-100mA
Programmable output terminal	TA	Relay contact output, normal: TA-TB closed, TA-TC disconnect. During operation: TA-TB is disconnected and TA-TC is closed. The function is set by F1.10	Contact Rated Value: NO: 240VAC-3A NC: 240VAC-1A
	TB		
	TC		
Communication Port	485+	Communication Signal Positive	
	485-	Communication Signal Negative	

4. Keypad and its operation

4.1 Operation panel diagram

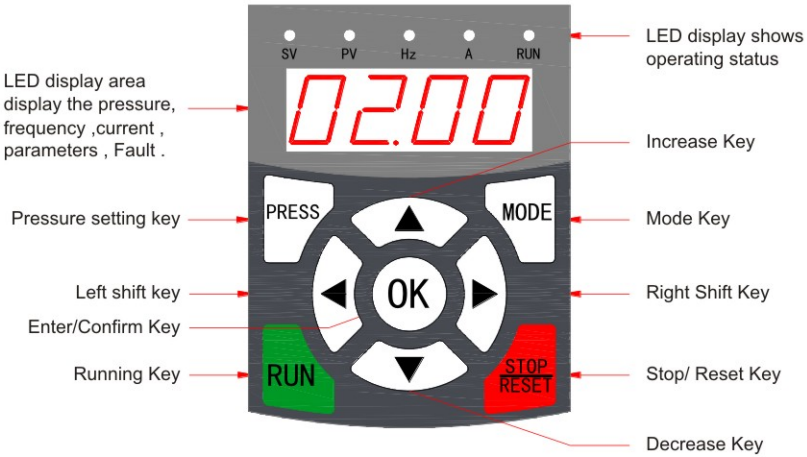
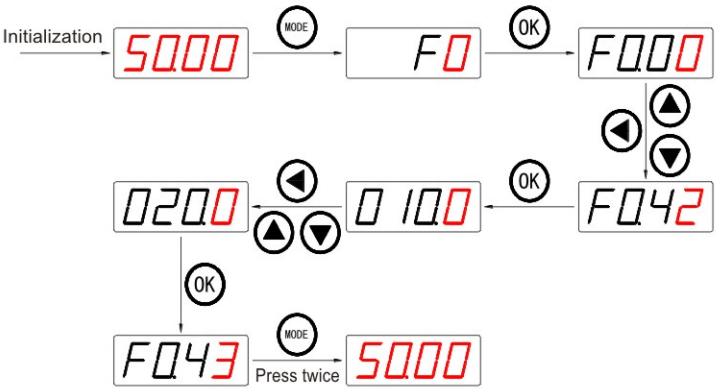


Fig.4-1 E-330MA Keypad schematic

4.2 Keypad Use

Change the function code parameter value (change F0.42 acceleration time parameter value from 10.0s to 20.0s)



5. Functional parameters

TIP

- The marked "√ " Indicate the setting value of parameter can be modified no matter when the inverter stop or running.
- The marked "X" indicates the setting value of parameter can be modified only when the inverter is shut down , and can not be modified when the inverter is running .
- The marked " _" indicates the parameter can be displayed only and can not be modified .

5.1 Function Parameters Sheet

5.1.1 F0 Basic function group

Code	Name	Setting Range	Min.Unit	Factory Setting	Running Modification
F0. 00	Pressure setting value	0. 00～F0. 04	0. 01	0. 50	√
F0. 01	Pressure value decimal place selection	0～3	1	2	√
F0. 02	Running Command Channel	0:Keypad Command Chanel 1:Terminal Command Chanel 2:Communication command Chanel	1	0	√
F0. 03	Motor running direction selection	0: Run in the default direction 1: Run in the opposite direction 2: Forbid reverse running	1	0	×
F0. 04	Sensor range setting	0. 00～99. 99	0. 01	1. 00	√
F0. 05	Sensor signal type selection	0:Voltage Signal(0-5V) 1:Current Signal (4-20mA)	1	0	√
F0. 06	AI input lower limit	0. 00～F0. 07	0. 01	0. 00	√
F0. 07	AI input upper limit	F0. 06～20. 00	0. 01	5. 00	√
F0. 08	PID output charact-eristics selection	0: PID output is positive 1: PID output is negative	1	0	√
F0. 09	Proportional gain(Kp)	0. 00～100. 00	0. 01	1. 00	√
F0. 10	Integration time(Ti)	0. 01～100. 00s	0. 1s	0. 10s	√
F0. 11	Differential time(Td)	0. 00～100. 00s	0. 1s	0. 00s	√
F0. 12	The sampling period(T)	0. 01～100. 00s	0. 1s	0. 10s	√
F0. 13	PID control deviation limit	0. 00～F0. 04	0. 01	0. 00	√
F0. 14	Feedback disconnection detection value	0. 00～F0. 04	0. 01	0. 00	√
F0. 15	Feedback disconnection detection time	0. 0～3600. 0s	0. 1s	20. 0s	√
F0. 16	Feedback gain	0～200%	0. 1%	100%	√
F0. 17	Awakening threshold width	0. 00～F0. 04	0. 01	0. 10	√
F0. 18	Awakening threshold detection time	0. 00～360. 00s	0. 01s	5. 00s	√

5.1.1 F0 Basic function group (Continued)

Code	Name	Setting Range	Min.Unit	Factory Setting	Running Modification
F0. 19	Sleep frequency	0. 00～50. 00Hz	0. 01Hz	30. 00Hz	√
F0. 20	Sleep frequency checkout time	0. 00～360. 00s	0. 01s	10. 00s	√
F0. 21	PID preset frequency	0. 00～50. 00Hz	0. 01Hz	0. 00Hz	√
F0. 22	Preset frequency hold time	0. 00～360. 00s	0. 01s	0. 00s	√
F0. 23	Auto start selection when Power on	0 : Invalid 1 : Valid	1	0	√
F0. 24	Auto start delay time when power on	0. 00～36000s	1s	5s	√
F0. 25	Antifreeze function selection	0 : Invalid 1 : Valid	1	0	√
F0. 26	Antifreeze running frequency	0. 00～50. 00Hz	0. 01Hz	8. 00Hz	√
F0. 27	Reserve				–
F0. 28	Reserve				–
F0. 29	High pressure alarm value	0. 00～F0. 04	0. 01	1. 00	√
F0. 30	High-pressure alarm detection time	0. 0～3600. 0s	0. 1s	3. 0s	√
F0. 31	Reserve				–
F0. 32	Water shortage current mode selection	0 : Invalid 1 : Valid	1	0	√
F0. 33	Water shortage protection detection frequency	0. 00～50. 00Hz	0. 01Hz	45. 00Hz	√
F0. 34	Water shortage protection detection current	0. 00～200%	1%	50%	√
F0. 35	Water shortage automatically restart delay time	0～36000m	1m	0m	√
F0. 36	Incoming water pressure test	0. 00～F0. 04	0. 01	0. 50	√
F0. 37	Incoming water detection delay time	0. 0～3600. 0s	0. 1s	2. 0s	√

5.1.1 F0 Basic function group (Continued)

Code	Name	Setting Range	Min.Unit	Factory Setting	Running Modification
F0. 38	Reserve				–
F0. 39	Reserve				–
F0. 40	Reserve				–
F0. 41	Lower limit frequency	0. 00～50. 00Hz	0. 01Hz	20. 00Hz	√
F0. 42	Acceleration time	0. 1～3600. 0s	0. 1s	Depend on the model	√
F0. 43	Deceleration time	0. 1～3600. 0s	0. 1s	Depend on the model	√
F0. 44	Carrier frequency setting	1. 0～15. 0kHz	0. 1kHz	Depend on the model	×
F0. 45 ～ F0. 50	Reserve				–
F0. 51	Parameter lock	0:unlocked 1:Locked	1	0	√
F0. 52	Parameter initialization	0:No operation 1:Restore factory setting 2:Clear the fault record	1	0	√

5.1.2 F1 Enhanced Function Group

Code	Name	Setting Range	Min.Unit	Factory Setting	Running Modification
F1. 00	Pump control mode selection	0 : Single pump mode 1 : Master-slave pump mode 2 : Multi-pump synchronization mode	1	0	√
F1. 01	Communication address	0 for the Master. 1 to 7 Slave.	1	1	√
F1. 02	Numbers of Auxiliary pump	0～7	1	1	√
F1. 03	Alternate time	0～36000min	1min	0min	√
F1. 04	MI1 terminal function selection	0 : No function 1 : Running 2 : Water shortage input 3 : PID paused 4 : Reset 5 : Jog 6～34 : Reserve	1	1	×
F1. 05	MI2 terminal function selection		1	2	×
F1. 06	MI3 Terminal function selection		1	3	×
F1. 07	MI4 terminal function selection		1	4	×
F1. 08	MI5 terminal function selection		1	5	×
F1. 09	Low water level control mode	0: Water level control is invalid 1: Low water level control is valid when normally open 2: Low water level control is valid when normally closed	1	0	√
F1. 10	Relay output selection	0 : No Output 1 : The motor is running forward 2 : The motor is running reverse 3 : Fault Output 4～8 : Reserve 9 : Running 10～15 : Reserve	1	3	√
F1. 11 ～ F1. 19	Reserve				–
F1· 20	Power on the initial display selection	LED The unit digit ,decade digit : running status display selection. 0x00 ~ 0x1F LED hundreds, thousands: stop status display selection. 0x00 ~ 0x0C	1	0	–

5.1.2 F1 Enhanced Function Group (To be continued)

Code	Name	Setting Range	Min.Unit	Factory Setting	Running Modification
F1. 21	Operation display parameter selection	0 ~ 0xFFFF BIT0: Operating frequency BIT1: Setting frequency BIT2: DC bus voltage BIT3: Output voltage BIT4: Output current BIT5: Running rotate speed BIT6: Output power BIT7: Reserved BIT8: PID setting value BIT9: PID feedback value BIT10: Input terminal status BIT11: Output terminal status BIT12: Analog AI value BIT13 ~ BIT15: Reserved	1	0x030F	√
F1. 22	Stop display parameter selection	0～0x1FFF BIT0：Setting frequency BIT1：DC Bus voltage BIT2：Input terminal status BIT3：Output terminal status BIT4：PID setting value BIT5：PID feedback value BIT6：Analog AI value BIT7～BIT9：Reserved BIT10：Input AC voltage BIT11～BIT15：Reserved	1	0x0031	√
F1. 23	Inverter module temperature	0～100. 0℃	0. 1℃		–
F1. 24	Software version	0. 00～9. 99	1. 00		–
F1. 25	The Inverter accumulates running time	0～65535h	1h	0	–
F1. 26 ～ F1. 29	Reserved				–

5.1.2 F1 Enhanced Function Group (To be continued)

Code	Name	Setting Range	Min.Unit	Factory Setting	Running Modification
F1. 30	The previous two fault Type	0～29 0:No Fault (nonE) 1: Over current when acceleration (ocA) 2: Over current when deceleration (ocd) 3: Over current when constant speed running(ocn) 4: Over Voltage when acceleration (ovA) 5: Over voltage when deceleration (ovd) 6: Over voltage when constant speed running (ovn) 7: Over voltage when stopping (ovS) 8: DC bus under voltage (Lv) 9: input phase loss (LP) 10：Reserved 11: Inverter overheat (OH1) 12: Motor overload (OL1) 13: Inverter overload (OL2) 14: External fault (EF) 15: RS485 communication fault (CE-1) 16：Reserved 17: Current Detection Fault (ItE) 18: Keypad Communication Fault (CE-4) 19: Reserved 20: EEPROM operation error (EEP) 21: PID Feedback Discoonect Error(PIDE) 22～24：Reserved 25：dCE 26～27：Reserved 28：Output phase loss (SPO)（SPO） 29：Reserved			–
F1. 31	The previous fault type				–
F1. 32	The current fault type				–
F1. 33	The current fault running frequency	0. 00～600. 00Hz	0. 01Hz		–
F1. 34	The current fault output current	0. 1～3000. 0A	0. 1A		–
F1. 35	The Current fault DC bus voltage	0～1000V	1V		–
F1. 36	The Current fault temperature	0～100. 0℃	0. 1℃		–

5.2 Detailed function description

F0.00 Pressure Setting	
Setting Range: 0.00～F0.04	Factory Setting:1.00

The desired target value of the system can also be set directly through PRESS key on the keypad.

F0.01 Decimal Place Selection Of The Pressure Value	
Setting Range: 0～3	Factory Setting:2

Set the decimal places of the pressure value .

F0.02 Run Command Channel	
Setting Range:0～2	Factory Setting: 0

This function is used to set the inverter to accept the control mode of start command.

0: Keyboard command channel

To control the inverter start and stop by the key RUN、STOP On the keypad.

1: Terminal command channel

To control the inverter start and stop by external control terminal MIn—GND on and off .

2. Communication command channel

To control the inverter start and stop by RS485 serial port.

F0.03 Operating Direction Selection	
Setting Range:0～2	Factory Setting:0

This function is used to change the running direction of the motor.

0: Run in the default direction

1: run in the opposite direction

2: Forbid reverse running

F0.04 Sensor Range Setting	
Setting Range: 0.00～99.99	Factory setting:1.00

Set the maximum range of the sensor.

F0.05 Sensor Signal Type Selection	
Setting Range: 0～1	Factory Setting:0

Set the anti-signal type of sensor

0: voltage signal (0-5V)).can be freely changed by F0.06 ~ F0.07.

1: Current signal (4-20mA). can be freely changed by F0.06 ~ F0.07.

F0.06 AI Input Lower Limit	
Setting Range:0.00～F0.07	Factory Setting:0.00
F0.07 AI Input Upper Limit	
Setting Range:F0.06～24.00	Factory Setting:5.00

Set the range of the sensor output signal.

F0.08 PID Output Characteristics Selection	
Setting Range:0～1	Factory Setting:0

0：PID output is positive. When the feedback value is greater than the preset value .Output frequency will be decreased .such as tension control in winding application .

1：PID output is negative . when the feedback value is greater than the preset value .Output frequency will be increased .such as tension control in unwinding application .

F0.09 Proportional Gain Kp	
Setting Range:0.00～100.00	Factory Setting:1.00

Proportional gain Kp determines the adjusting strength of the PID adjustor .the large the value of P .the stronger the adjusting strength is .

F0.10 Integral Time Ti	
Setting Range:0.01～100.00s	Factory Setting:0.10s

The Integral time Ti determines the ratio between the output frequency change speed and deviation. Integral role is the output value will integrate according to the deviation , to eliminate the deviation of feedback value and given value . Integration time is too large, the response is slow, slow response to external disturbances. The integration time is smaller, faster response speed, but too small and easy to cause oscillation.

F0.11 Differential time Td	
Setting Range:0.01～100.00s	Factory setting:0.00s

Differential time Td: when the error between the feedback and the reference . a proportional adjustment will be output. The adjustment only depends on the direction and value of the error change other than the error itself .The derivation adjustment controls the change of feedback signal according to the changing trend when it fluctuates. Because the derivation may enlarge the interference to the system ,especially the frequency-changing interference .Please use it carefully .

F0.12 Sample Cycle T	
Setting Range:0.01～100.00s	Factory Setting:0.10s

Sample cycle T refers to the sampling cycle of feedback value. The PI regulator calculates once in each sampling cycle .the bigger the sampling cycle .the slower the response is.

F0.13 Bias Limit	
Setting Range: 0.00～F0.04	Factory Setting:0.00

Bias limit defines the maximum bias between the feedback and the preset . PID stops operation when the bias is within this range . Setting this parameter correctly is helpful to improve the system output accuracy and stability .

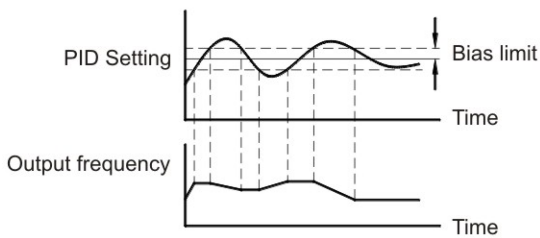


Fig. 5-1 Bias limit action diagram

F0.14 Feedback Disconnection Detecting Value Setting Range:0.00～f0.04	Factory Setting:0.00
F0.15 Feedback Disconnection Detecting Time Setting Range:0.0～3600.0s	Factory Setting:1.0s

Feedback disconnection detection value: The system always detects the PID feedback value. When the feedback value is less than or equal to the feedback disconnection detection value, the system starts to detect the timing. When the detection time exceeds the feedback disconnection detection time, the system will report the PID feedback disconnection fault (PIDE). This parameter also applies to the detection time in the current detection mode.

F0.16 Feedback Gain Setting Range:0～200%	Factory Setting:100%

When the feedback value is different from the actual target value, this parameter can be used to adjust the feedback signal.

F0.17 Awakening Threshold Width Setting Range:0.00～f0.04	Factory Setting:0.10
F0.18 Awakening Threshold Detection Time Setting Range:0.00～360.00s	Factory Setting:1.00s
F0.19 Sleep Frequency Setting Range:0.00～50.00hz	Factory Setting:30.00Hz
F0.20 Sleep Frequency Checkout Time Setting Range:0.00～360.00s	Factory Setting:1.00s

F0.17 is the threshold width of the PID system from the sleep state to the working state.

When the feedback value is less than the width of the set value, the inverter will wait for the delay of F0.18 and the PID system will automatically change from sleep state to working state.

F0.19 refers to the minimum operating frequency of state PID system from the working state to sleep state.

When the feedback value is greater than or equal to the set value, and the inverter PID system has adjusted the output frequency to sleep frequency when operation , the inverter will pass delay wait of F0.20 to enter into sleep state (zero speed operation). As shown in Figure 5-2.

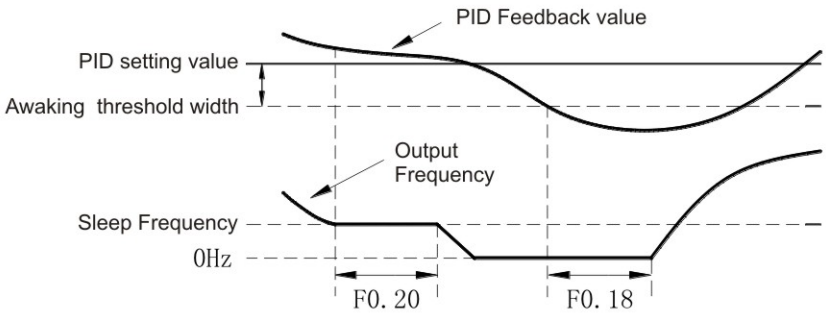


Fig.5-2 Sleep and Awake function diagram

F0.21 PID Preset Frequency Setting Range:0.00～50.00hz	Factory Setting:0.00Hz
F0.22 Preset frequency hold time Setting Range:0.00～360.00s	Factory setting:0.00s

This parameter is used to set the running frequency and running time before the PID is put into operation.

F0.23 Auto Start Selection When Power On Setting Range:0～1	Factory Setting:0
F0.24 Auto Start Delay Time When Power On Setting Range:0～36000s	Factory Setting:5s

This parameter is used to set whether to automatically restart and delay when the n running state is power on after power off .

F0.23=0 ,the function is invalid ; the function is valid when F0.23=1.

F0.25 Anti-freeze Function Selection Setting Range:0～1	Factory Setting:0

This parameter is used to set antifreeze function is valid or not ,The function is invalid when F0.25 = 0; while the function is valid when F0.25 = 1.

F0.26 Antifreeze Running Frequency	
Setting Range:0.00～50.00hz	Factory Setting:8.00Hz

The host and slave inverter will working at antifreeze frequency when antifreeze function is valid.

Note: 1, antifreeze mode, the inerter will run at anti-freeze frequency when in sleep mode and slave is standby. The alternate function (F1.03) is automatically shield under antifreeze mode.

Please note to selection F1.00 two control modes under antifreeze mode .

The action is as follows: Master-slave control mode, the host will always act as the main water pump, only in sleep / no water will run with anti-freeze frequency, the slave will only run in the anti-freeze frequency in standby mode .multi-pump synchronous control mode , The host will run at antifreeze frequency when it is sleep / no water use , and the slave will run at antifreeze frequency in standby mode.。

F0.27 Reserve	
F0.28 Reserve	
F0.29 High Pressure Alarm Value	
Setting Range: 0.00～f0.04	Factory Setting:1.00
F0.30 High Pressure Alarm Delay Time	
Setting Range: 0～9999s	Factory Setting:3s

When the feedback pressure exceeds the set value, all pumps will be shut off and alarm when the high pressure alarm delay time (F0.30) is reached. When the high pressure alarm delay time is set to 0, the function is invalid.

F0.31 Reserve	

F0.32 Water Shortage Current Mode Selection	
Setting Range:0～1	Factory Setting:0

It is used to set whether water shortage current detection mode is valid or not.

0: invalid

1: valid

F0.33 Water Shortage Protection Detection Frequency	
Setting Range:0.00～50.00hz	Factory Setting:45.00Hz
F0.34 Water Shortage Protection Detection Current	
Setting Range:0～200%	Factory Setting:50%
F0.35 Water Shortage Protection Automatically Restart Delay Time	
Setting Range:0～36000mins	Factory Setting:0mins

When the water shortage current mode selection is valid, the above three parameters to set the protection conditions.

F0.36 Incoming Water Pressure Detection Value	
Setting Range: 0.00～F0.04	Factory Setting:0.00

The parameters is used to detect water pressure in the water pipe to prevent pump idle.

F0.37 Incoming Water Pressure Detection Value Delay Time	
Setting Range:0.0～3600.0	Factory Setting:2.0s

The parameters is used to set incoming water pressure to maintain the time to prevent the pump wrong started.

F0.38 Reserve
F0.39 Reserve
F0.40 Reserve

F0.41 Operating Frequency Lower Limit	
Setting Range:0.00～50.00hz	Factory Setting:20.00Hz

The lower limit frequency is the minimum output frequency allowed by the inverter. When the setting frequency is lower than the lower limit frequency, the inverter working at lower limit frequency.

F0.42 Acceleration Time 1	
Setting Range:0.1～3600.0s	Factory Setting: Depend On The Model
F0.42 Acceleration Time 1	
Setting Range:0.1～3600.0s	Factory Setting: Depend On The Model

Acceleration time refers to the time required for the inverter to accelerate from 0.00Hz to the maximum output frequency, and the deceleration time is

Refers to the time required for the inverter from the maximum output frequency decelerate to 0.00Hz As shown in Figure 5-3.

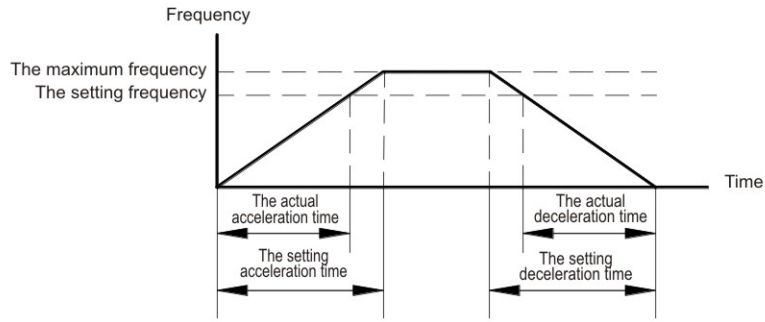


Fig 5-3 Acceleration and deceleration time diagram

F0.44 Carrier Frequency Setting	
Setting Range:1.0～15.0khz	Factory Setting: Depend On The Model

This function is used to set the carrier frequency of the inverter output PWM wave. should adjust correctly. The maximum value of the carrier frequency depend on power. The value of carrier frequency and electromagnetic noise, leakage current and heat dissipation as shown in Figure5-4

Carrier frequency	Electromagnetic noise	Leakage current	Heat Dissipation	Interference
1.0KHz ↕ 15.0 KHz	Big ↕ Small	Small ↕ Big	Small ↕ Big	Small ↕ Big

Fig 5-4 Carrier frequency diagram

F0.45 Reserve
F0.46 Reserve
F0.47 Reserve
F0.48 Reserve
F0.49 Reserve
F0.50 Reserve

F0.51 Parameter Locked.
Setting Range:0～1 Factory Setting:0

Used to set the parameter modification permission, the specific setting is:

0: All parameters allowed to be rewritten, but some parameters can not be modified during operation.

1: Except pressure setting and this parameter, other parameters are prohibited from overwriting.

F0.52 Parameter Initialization
Setting Range: 0～2 Factory Setting:0

0: No operation;

1: restore the factory value;

2: Restore all parameters to factory setting.

F1.00 Pump Control Mode Selection
Setting Range: 0～2 Factory Setting:0

0: Single pump mode

1: Master-slave pump mode

A master can not meet the pressure of water when water consumption increased. immediately aroused the first auxiliary pump run at full speed (50Hz) , the master still maintain variable frequency constant pressure water supply, if the first auxiliary pump still can not meet the water pressure, then continue to evoke the second auxiliary pump, so the system depending on the amount of water in turn to put in or out of operation.

2：Multi-pump synchronization control mode .

The master has run to 50Hz still can not meet the water pressure when the water consumption increases, , it will arouse the first auxiliary pump at this time.

When the auxiliary pump go up the speed and reaches the set pressure, the master will start to slow down to the same frequency with two pumps, and then the frequency of synchronous operation at the constant pressure , according to the amount of water with the same go up and drop to maintain the same pressure of the water.

When the amount of water increases, the order of synchronization in order to arouse other auxiliary pumps , when the amount of water decreases in turn out.

This mode of the pump speed limit F0.41 set value should be increased, generally above 35.0Hz, so that the pump to maintain the best water supply efficiency of the segment operation.

F1.01 Communication Address	
Setting Range: 0～7	Factory Setting:1

0：Master

1-7： Slave

This parameter is used to set the master or slave. During dual pump operation, you need to determine one as the master (one of the pressure sensors or remote pressure gauges must be set as master) and one slave.

Note: After setting communication address and auxiliary pump station number F1.02, please put the slave device into standby mode and then turn on the master.

F1.02 Numbers Of Auxiliary Pump	
Setting Range: 0～7	Factory Setting:1

This parameter is used to set the number of salve connected (Except the master).there only have master and no salve pumps when F1.02=0.(Single pumps running). F1.02 = 1 means there is a auxiliary pump. This parameter needs to be set for online communication control.

F1.03 Alternate Time	
Setting Range:0～36000m	Factory Setting:0m

In order to balance the service life of the pump to set the alternation time. In operation, the main pump and the sub-pump operate take turns as the master alternately according to the set alternating time, and 0 is not alternated.

F1.04 MI1 Input Terminal Selection Setting Range:0～34	Factory Setting:1
F1.05 Mi2 Input Terminal Selection Setting Range:0～34	Factory Setting:2
F1.06 Mi3 Input Terminal Selection Setting Range:0～34	Factory Setting:3
F1.07 MI4 Input Terminal Selection Setting Range:0～34	Factory Setting:4
F1.08 MI5 Input Terminal Selection Setting Range:0～34	Factory Setting:5

External input terminals MI1- MI5 are multi-function input terminals. the functions of MI1 ~ MI5 can be individually selected By setting the value of F1.04 ~ F1.08.The specific settings and functions are as follows:

0：No function.

1：Running

When the running command channel is terminal control, the inverter running command is given by the above terminal function.

2：Low water level control input.

set the control mode by F1.09 when this function is valid.

3：PID Control pause

PID temporarily invalid, inverter maintains the current frequency output.

4：Fault Reset.

When the frequency inverter fault alarm, , you can reset the fault through the terminal. Its role has the same function as STOP button on the keypad.

5： Jog

Jog operation control for external terminal control mode.

6-34：Reserve

F1.09	Low Water Level Control Mode	Setting Range:0～2	Factory Setting:0

The parameter is Used to set the low water level detection mode.

0：Low water level control is invalid；

1：Use low water level sensor, low water level detection normally open is effective, that is, MI1 and GND is closed. the controller will run at zero frequency.

2: Use low water level sensor, low water level detection normally closed is effective, MI1 and GND is closed. Otherwise the controller will run at zero frequency.

F1.10 Relay Output Selection	Setting Range:0～15	Factory Setting:3

This group of parameters defines what the relay says.

0: No output

1: Inverter forward running: When the inverter is running forward, outputs signal is ON .

2: Inverter reverse running: When inverter runs reverse, output signal is ON .

3: Fault output: When the inverter fails, the output signal is ON.

4-8: Reserve.

9: In operation: When the inverter is running, outputs signal is ON.

10-15: Reserve.

F1.11-F1.19 Reserve
F1.20 Power On The Initial Display Selection Setting Range:0x0000～0x0c1f Factory Setting:0x0000

This function code determines the content of the initial display when power on. The unit place, tens place of LED for setting the operating status display selection.

LED hundred place .thousands place for setting stop status display selection. The initial content display can only select one item, the data format is hexadecimal. The corresponding value of the specific content is described in F1.21 ~ F1.22.

For example, the operating state and stop sate need the initial output current and input AC voltage. Set to 0x0A04, because the output current is for the fourth bit, so the hexadecimal is 04; input AC voltage is tenth bit, so the hexadecimal is 0A.

F1.21 Operation Display Parameter Selection Setting Range:0～0xffff Factory Setting:0x00ff

When the inverter is running, the parameter display is affected by this function code, which is a 16-bit binary number. If a certain bit is 1, the corresponding parameter of this bit can be checked by <or> at running. If this bit is 0, the corresponding parameter of this bit will not be displayed. Please change the binary number into hexadecimal number When setting function code F1.21 ~ F1.22, and write the function code.

The display of each bit is shown in the following table.

Table 5-1 The display content corresponding to Running

F1.21	BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
	Reserve	Reserve	Reserve	Analog AI value	Output terminal status	Input terminal status	PID feedback value	PID given frequency
	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
	Reserve	Output power	Operating frequency	Output Current	Output Voltage	Bus Voltage	Setting frequency	Running Frequency

F1.22 Stop Display Parameter Selection
Setting Range:0～0x1FFF Factory Setting:0x040F

The setting of this function is the same as that of F1.21. Only when the inverter is in stop state, the display of the parameter is affected by the function code.

Table 5-2 The display content corresponding to stop

BIT15-11	BIT10	BIT9-7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Reserve	Input AC voltage	Reserve	Analog AI value	PID feedback value	PID given value	Output terminal status	Input terminal status	Bus voltage	Setting Frequency

F1.23 Inverter Module Temperature
Setting Range: 0.0～100.0℃ Factory Setting:----

This function parameter displays the temperature value of the inverter heat sink.

F1.24 Software Version
Setting Range: 0.00～9.99 Factory Setting:----

This function parameter displays the inverter software version number.

F1.25 The Inverter Accumulates Running Time
Setting Range: 0～65535 Factory Setting:----

This function parameters display the accumulated time of the inverter running.

F1.26 Reserve	
F1.27 Reserve	
F1.28 Reserve	
F1.29 Reserve	
F1.30 The Previous Two Fault Type Setting Range:0～29	Factory Setting:----
F1.31 The Previous Fault Type Setting Range:0～29	Factory Setting:----
F1.32 The Current Fault Type Setting Range:0～29	Factory Setting:----
F1.33 The Current Fault Frequency Setting Range:0.00～600.00Hz	Factory Setting:----
F1.34 The Current Fault Output Current Setting Range:0.1～2000.0A	Factory Setting:----
F1.35 The Current Fault Dc Bus Voltage Setting Range:0～1000V	Factory Setting:----
F1.36 The Current Fault Temperature Setting Range: 0.0～100.0℃	Factory Setting:----

5.3 Typical Application Case Description

5.3.1 Single Pump Control (two-wire 4-20mA sensor)

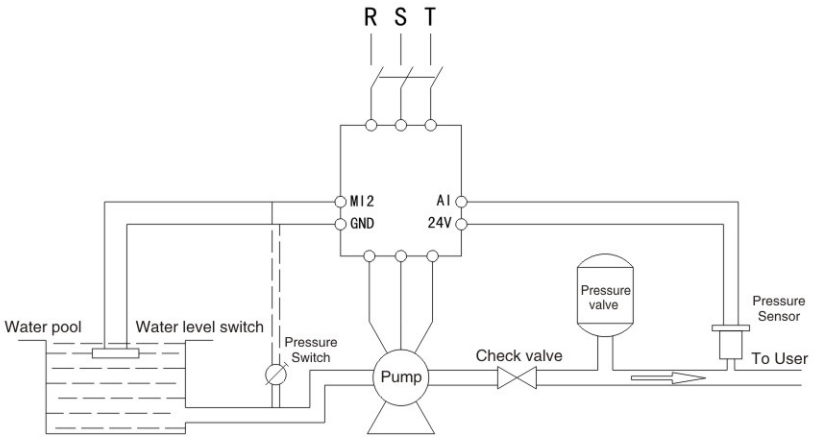


Fig.5-5 Schematic diagram of single pump control

Related parameters are shown in Table 5-3

Table 5-3

F0.00	Pressure Setting Value	Set the pressure value required by the user or direct keypad setting.
F0.04	Sensor range setting	Set by the sensor's range
F0.05	Sensor signal type selection	Set as current signal
F0.16	Feedback gain	Used to correct the deviation of display pressure and the actual pressure
F0.17	Awakening threshold width	Set the phase difference value from sleep to awake state
F0.19	Sleep frequency	When the operating frequency is less than this value and come to sleep state.
F0.23	Auto start selection when Power on	According to the actual requirements to select
F1.09	Low water level control mode	Select according to the water level switch signal type.
F1.00	Pump control mode selection	Select single pump mode

Note: The user can also modify other relevant parameters according to their own requirements.

5.3.2 Single Pump Control(Remote pressure gauge)

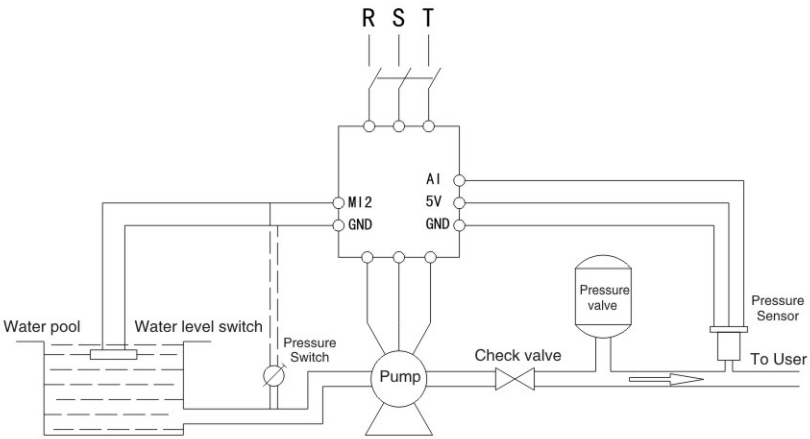


Fig.5-6 Single pump control Schematic diagram

Related parameters are shown in Table 5-4

Table 5-4

F0.00	Pressure Setting Value	Set the pressure value required by the user or direct keypad setting.
F0.04	Sensor range setting	Set by the sensor's range
F0.05	Sensor signal type selection	Set as voltage signal
F0.16	Feedback gain	Used to correct the deviation of display pressure and the actual pressure.
F0.17	Awakening threshold width	Set the phase difference value from sleep to awake state
F0.19	Sleep frequency	When the operating frequency is less than this value and come to sleep state.
F0.23	Auto start selection when Power on	According to the actual requirements to select
F1.09	Low water level control mode	Select according to the water level switch signal type.
F1.00	Pump control mode selection	Select single pump mode

Note: The user can also modify other relevant parameters according to their own requirements.

5.3.3 Master-slave pump control (2-wire 4-20mA sensor)

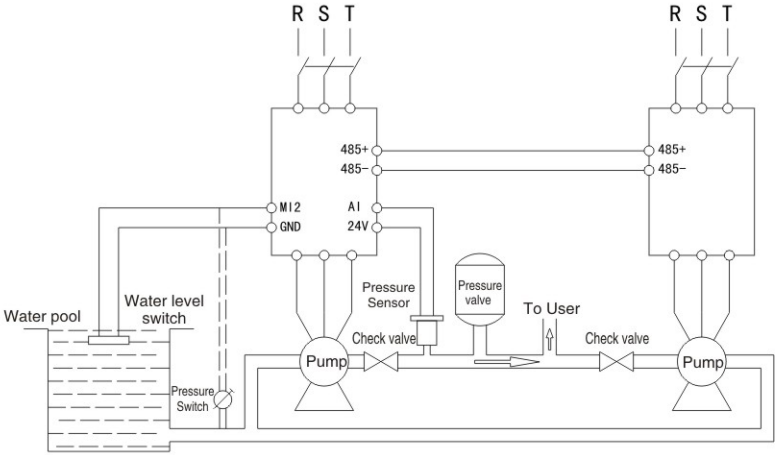


Fig.5-7 Master-slave pump control Schematic diagram

Master setting parameters as shown in Table 5-5

Table 5-5 Master Parameter

F0.00	Pressure Setting Value	Set the pressure value required by the user or direct keypad setting.
F0.04	Sensor range setting	Set by the sensor's range
F0.05	Sensor signal type selection	Set as current signal
F0.16	Feedback gain	Used to correct the deviation of display pressure and the actual pressure.
F0.17	Awakening threshold width	Set the phase difference value from sleep to awake state
F0.19	Sleep frequency	When the operating frequency is less than this value and come to sleep state.
F0.23	Auto start selection when Power on	According to the actual requirements to select
F1.09	Low water level control mode	Select according to the water level switch signal type.
F1.00	Pump control mode selection	Select master slave pump mode
F1.01	Communication address	Set as master
F1.02	Numbers of Auxiliary pump	Select 2PCS

F1.03	Alternate time	Master and slave pump change time, set according to actual requirements.

Note: The user can also modify other relevant parameters according to their own requirements.

Slave setting parameters as shown in Table 5-6

Table 5-6 Slave Parameters

F1.00	Pump control mode selection	Select master slave pump mode
F1.01	Communication address	Set as slave
F1.02	Numbers of Auxiliary pump	Select 2PCS
F1.03	Alternate time	Master and slave pump change time, set according to actual requirements.

Master-slave pump control (remote pressure gauge)

Master setting parameters as shown in Table 5-6

Table 5-7 Master Parameters

F0.00	Pressure Setting Value	Set the pressure value required by the user or direct keypad setting.
F0.04	Sensor range setting	Set by the sensor's range
F0.05	Sensor signal type selection	Set as voltage signal
F0.16	Feedback gain	Used to correct the deviation of display pressure and the actual pressure.
F0.17	Awakening threshold width	Set the phase difference value from sleep to awake state
F0.19	Sleep frequency	When the operating frequency is less than this value and come to sleep state.
F0.23	Auto start selection when Power on	According to the actual requirements to select
F1.09	Low water level control mode	Select according to the water level switch signal type.
F1.00	Pump control mode selection	Select master slave pump mode
F1.01	Communication address	Set as master
F1.02	Numbers of Auxiliary pump	Select 2PCS

Note: The user can also modify other relevant parameters according to their own requirements., The slave is consistent with Table 5-6.

5.3.4 Master-slave multi-pump control (2-wire 4-20mA sensor)

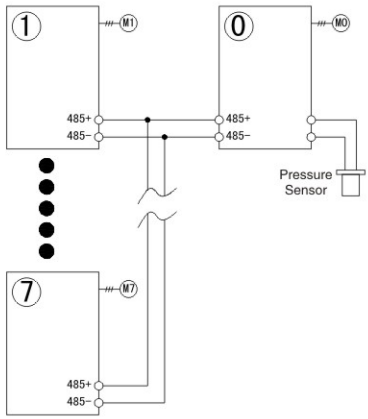


Fig. 5-8 Master-slave pump control schematic

Master setting parameters as shown in Table 5-8

Table 5-8 Master Parameter

F0.00	Pressure Setting Value	Set the pressure value required by the user or direct keypad setting.
F0.04	Sensor range setting	Set by the sensor's range
F0.05	Sensor signal type selection	Set as current signal
F0.16	Feedback gain	Used to correct the deviation of display pressure and the actual pressure.
F0.17	Awakening threshold width	Set the phase difference value from sleep to awake state
F0.19	Sleep frequency	When the operating frequency is less than this value and come to sleep state.
F0.23	Auto start selection when Power on	According to the actual requirements to select
F1.09	Low water level control mode	Select according to the water level switch signal type.
F1.00	Pump control mode selection	Select master slave pump mode
F1.01	Communication address	Set as master
F1.02	Numbers of Auxiliary pump	Set according to the actual number of units.

F1.03	Alternate time	Master and slave pump change time, set according to actual requirements.

Note: The user can also modify other relevant parameters according to their own requirements., Communication address can not be repeated.

Slave setting parameters as shown in Table 5-9.

Table 5-9 Slave Parameters

F1.00	Pump control mode selection	Select master slave pump mode
F1.01	Communication address	Set as slave
F1.02	Numbers of Auxiliary pump	Set according to the actual number of units.
F1.03	Alternate time	Master and slave pump change time, set according to actual requirements.

Note: Communication address can not be repeated.

Master-slave multi-pump control (remote pressure gauge)

Master setting parameters as shown in Table -10

Table 5-10 Master Parameter

F0.00	Pressure Setting Value	Set the pressure value required by the user or direct keypad setting.
F0.04	Sensor range setting	Set by the sensor's range
F0.05	Sensor signal type selection	Set as voltage signal
F0.16	Feedback gain	Used to correct the deviation of display pressure and the actual pressure.
F0.17	Awakening threshold width	Set the phase difference value from sleep to awake state.
F0.19	Sleep frequency	When the operating frequency is less than this value and come to sleep state.
F0.23	Auto start selection when Power on	According to the actual requirements to select
F1.09	Low water level control mode	Select according to the water level switch signal type.
F1.00	Pump control mode selection	Select master slave pump mode
F1.01	Communication address	Set as master
F1.02	Numbers of Auxiliary pump	Set according to the actual number of units.

Note: The user can also modify other relevant parameters according to their own requirements., The slave is consistent with Table 5-9.

6. Fault code and solutions

Table 6-1 Common problem and solutions

Fault Code	Fault Type	Reason	Solution
ocA	Over-current when acceleration	①Acc time is too short ②The load inertia is too big ③The torque increases too fast or V/F curve is abnormal ④The voltage of the power supply is too low ⑤The power of the inverter is too low ⑥Restart the rotating motor after sudden power loss	①Increase Acc time. ②Reduce the load inertia. ③Lower the load lift or adjust V/F curve. ④Check the power of supply line. ⑤Select a bigger capacity inverter. ⑥Set the start mode to rotating tracking start.
ocd	Over-current when deceleration	①Dec time is too short ②The inertia of the load inertia is too strong ③The power of the inverter is too low	①Increase Dec time. ②Decrease the inertia of the load. ③Select a bigger capacity inverter.
ocn	Over-current when constant speed running	①The input power is abnormal ②The inertia of the load inertia is too strong ③The power of the inverter is too low	①Check the input power. ②Decrease the inertia of the load. ③Select a bigger capacity inverter.
ouA	Over-voltage when acceleration	①The input power changes abnormally ②Restart the rotating motor after sudden power loss	①Check the input power. ②Set the start mode to rotating tracking start.
oud	Over-voltage when deceleration	①Dec time is too short ②Energy feedback loads ③The input power is abnormal	①Increase Dec time . ②Select the proper energy–consumption braking components. ③Check the input power.

Fault Code	Fault Type	Reason	Solution
oun	Over-voltage when constant speed running	①The input power is abnormal ②Energy feedback loads ③The input power is abnormal	①Check the input power. ②Install or select the proper energy–consumption braking components. ③Ask for service.
ouS	Over-voltage when stop	①The input power is abnormal.	①Check the power.
Lu	Under Voltage when running	①The input voltage is too low ②Sudden power loss ③Input power fault ④Poor contact of the DC circuit ⑤Contactor with poor contact	①Check the input voltage. ②Reset the inverter and check the input power. ③Check the input power of the grid . ④Check the main circuit or ask for service. ⑤Check the contactor or ask for service.
LP	Input phase loss	①R,S and T phase loss	①Check the input voltage . ②Check installation distribution.
SPO	Output phase loss	①U,V. W phase loss or serious asymmetrical three phase of the load	①Check the installation distribution. ②Check the motor and cable.
oH1	Cooler Overheat	①Ambient temperature is too high. ②Fan damage. ③Air duct jam.	①Low the ambient. ②Change the fan. ③Degree the wind channel.
oL1	Motor Overload	①The torque increases too fast or V/F curve is abnormal. ②The voltage of the power supply is too low. ③The motor stall or load transients is too strong. ④The setting of motor overload coefficient is improper.	①Lower the value of torque increases or adjust V/F curve. ②Check the power of supply line. ③Check the load and motor. ④Set the motor overload protection coefficient correctly..

Fault Code	Fault Type	Reason	Solution
oL2	Inverter overload	①The torque increases too fast or V/F curve is abnormal ②Acc time is too short ③The load is too large ④The voltage of the grid is too low.	①Lower the value of torque increases or adjust V/F curve ②Increase the Acc. time ③Select a large power inverter ④Check the voltage of the grid
EF	External Fault	①The input terminal of external fault takes effect .	① Disconnect the external device fault input terminal and clear the fault.
I tE	Current Detection Fault	①Hoare components is broken or circuit fault. ②The DC assistant power fault.	①Ask for service. ②Ask for service.
EEP	EEPROM Read and write fault	① the write and read of the controlling parameters get error. ②Damage to EEPROM	①Ask for service. ②Ask for service.
PI dE	PID feedback disconnection Error	①PID feedback disconnect. ②PID feedback source disappear.	①Check PID feedback signal wires. ②Check PID feedback source.
dCE	The main chip fault	①Damage to the main chip	①Ask for service.
CE-1	RS485 communication fault	①The baud rate setting is incorrect. ②Communication fault. ③The communication is off for a long time.	①Set proper baud rate. ②Check the communication wires. ③Check the communication connection disconnection.
CE-4	Keypad communication fault	①The circuit of connecting board and keypad is out of work. ②The wires between connecting board and keypad disconnect.	①Ask for service. ②Check and reconnect it.

7.Outline Dimension & Installation Dimension

7.1 Inverter Outline Dimension & Installation Dimension

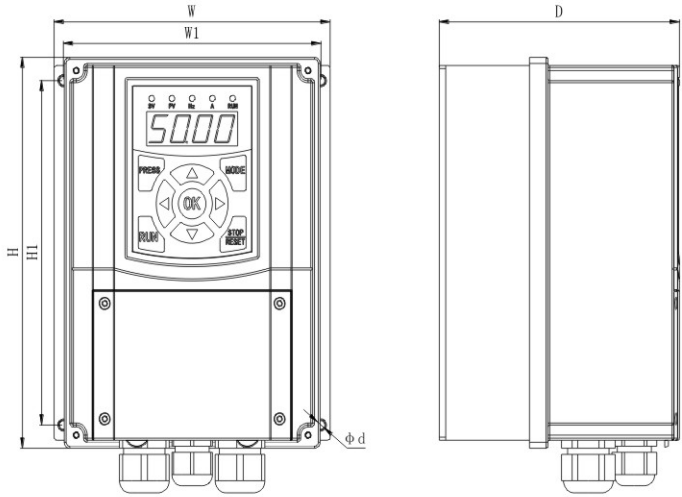


Fig.8-1 Inverter Outline Schematic Diagram

Inverter Model	Power (KW)	Dimension(MM)						Fig.
		H	H1	W	W1	D	d	
ZVF600-P0R7T2/S2M	0.75	193	170	150	140	131	Φ4.5	Fig. 8-1
ZVF600-P1R5T2/S2M	1.5							
ZVF600-P2R2T2/S2M	2.2							
ZVF600-P0R7T4M	0.75							
ZVF600-P1R5T4M	1.5							
ZVF600-P2R2T4M	2.2							
ZVF600-P3R0T4M	3.0							

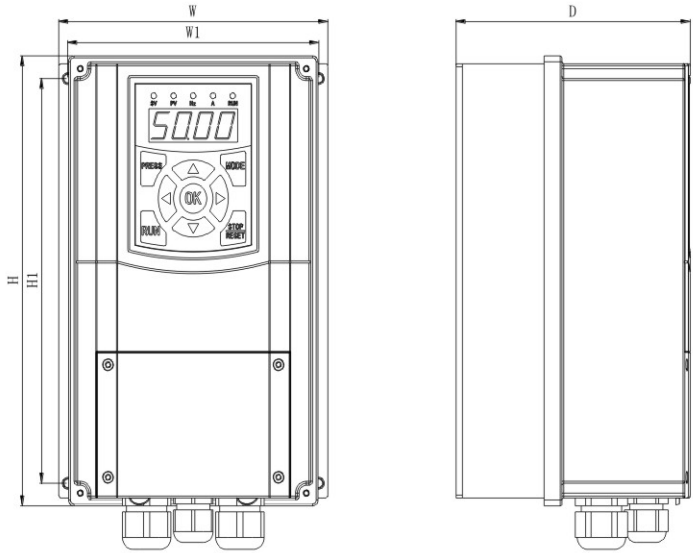


Fig.8-2 Inverter Outline Schematic Diagram

Inverter Model	Power (KW)	Dimension(MM)						Fig.
		H	H1	W	W1	D	d	
ZVF600-P3R7T2M	3.7	228	205	150	140	131	Φ4.5	Fig. 8-2
ZVF600-P4R0T4M	4.0							
ZVF600-P5R5T4M	5.5							
ZVF600-P7R5T4M	7.5							

8. Quality Warranty

8.1 Inverter's quality warranty

1. warranty period under normal conditions

- Provide repair, replacement and return due to quality problem in a month from the date of purchase
- Provide repair and replacement due to quality problem in 3 months from the date of purchase.
- Provide repair as quality problem in 12 months from the date of purchase

2. If the date of purchase can not be verified, then warranty period will according to the date of manufacturer. Service exceeding the warranty period shall be charged to the purchaser. The purchaser enjoys life-long paid service whenever and whatever the uses and controller made in out factory.

3. Service in the following cases, even in the warranty period, shall be charged to the purchaser.

- Damaged caused by mal-operation in violation of this manual.
- Damaged caused by improper use of an controller that is off technical standard.
- Malfunction or damage caused by fire, earthquake, flood, abnormal input voltage or other natural disasters.
- Artificial damage caused by unauthorized repair or renovation.
- Include failure or aging of the device due to poor ambient.
- Delayed or unsatisfied payment in violation of purchase appointment.
- Malfunction or damage caused by improper transit or storage after purchaser.
- Fail to give an objective description on the use of installation, wiring, operation, maintenance or else.
- Defective products should be sent to us for repair, replacement and return, which can be proceeded only after verifying the burden of liability.

4. In case there is any quality problem or accident, we merely promise to bear the above-mentioned responsibilities. If a user needs more guarantees for liabilities, please assure on the insurance company voluntarily.

Inverter user warranty bill

User's Company Name		Tel.	
Address		Postal Code	
Contact Person		Department	

Distributor Name		Address/Tel.	
Buying date		Invoice No.:	

Inverter Model		Serial No.:	
Equipment name		Motor Power	
Installation date		Use date	

Use Description:
Parameter Modification Description:

- Need users to fill out truthfully and carefully, and send beck to our company. So that we can provide you with better service. In case your installation and use is wrong, cause trouble or loss to you.