



FPC1000

ELECTRIC FIRE PUMP CONTROLLER

USER MANUAL



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Table 1 Software Version

Date	Version	Content
2024-4-8	1.0	Original release.
2024-7-31	1.1	<ol style="list-style-type: none">1. Modify the description of auxiliary inputs of FPC1000M in Table 12;2. Modify the definition of Terminal 17 and 18 of FPC1000T in Table 13;3. Modify the voltage precision of FPC1000M/FPC1000T as 1%;4. Modify the current precision of FPC1000M as 2%.
2024-11-11	1.2	<ol style="list-style-type: none">1. Modify “ms” to “mA” in Table 8 Alarm Information.
2024-12-24	1.3	<ol style="list-style-type: none">1. Modify the description of FPC1000D terminals;2. Add the description of “the module mounting part can’t withstand high temperature”.

Table 2 Notation Clarification

Sign	Instruction
 NOTE	Highlights an essential element of a procedure to ensure correctness.
 CAUTION!	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
 WARNING!	Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.

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1 OVERVIEW

The **FPC1000M Electric Fire Pump Controller** is used for starting or controlling the fire pumps driven by motors. It can manually start the fire pump through the local start button or automatically start the fire pump by detecting the pressure drop of the automatic fire sprinkler system. The controller is equipped with a pressure sensor. The fire pump can be manually stopped through the local stop button or automatically stopped after the timer ends, which can be programmed on site. In both cases, the fire pump can stop only when all the starting reasons disappear.

The **FPC1000D Electric Fire Pump Controller** adopts 32-bit microprocessor technology, which realizes precise measurement, fixed value adjustment, timing, and threshold setting functions for multiple parameters. Most parameters can be adjusted from the front panel of the controller, and all parameters can be adjusted by PC via USB or RS485 interface. It integrates digital, intelligent, and network technologies, and uses a 7-inch color LCD graphical display to display Chinese and English, which is easy to use and reliable to operate. With compact structure, easy connection system and high reliability, it is widely applied for various types of electric fire pump systems.

The **FPC1000T Electric Fire Pump Controller** is composed of a microprocessor that can accurately detect two lines of voltage, make accurate judgments and control outputs for abnormal voltage (overvoltage, undervoltage, overfrequency, underfrequency, loss of phase, phase reversal). It realizes the automatic and intelligent transfer of ATS. And the controller integrates digital communication and realizes good human-machine interaction.

2 PERFORMANCE FEATURES

- 7-inch large size color LCD screen, resistive touch screen, which supports one-click switching between Chinese and English;
- Collect and display three-phase AC voltage, current, and frequency;
- With detection functions of overvoltage, undervoltage, phase loss, phase reversal, voltage imbalance, overfrequency, underfrequency, overcurrent, undercurrent, grounding;
- Real-time display of alarm information from the master control module;
- Support multiple types of sensors, including resistance type, 4-20mA current type, 0-5V voltage type sensors with adjustable sensor parameters;
- Manual test function for fire motor to start and stop;
- Input lock function, the start and stop of motor can only be controlled by start and stop buttons on the panel when this function is active;
- All parameters can be programmed on site, with two-level password verification to prevent misoperations by non-professionals;
- Wide DC power supply range of (8~35)VDC;
- RS485 communication interface, and USB device interface for parameter configuration of upper computers and reading of histories;
- Real-time alarm event recording function, which can record up to 500 pieces of data cyclically;
- Timed recording function, which can record system pressure, voltage, and current for up to 500 pieces of data cyclically by the preset scheduled intervals;
- Display the number of start times, total accumulated running time, previous accumulated running time, and current accumulated running time of fire motors;
- Real-time clock display;
- Support multiple start control methods of fire motor;
- Adjustable screen brightness for display module based on the different requirements of environment;
- All parameters of the master control module can be adjusted, and the display module communicates with the master control module via the CANBUS interface;
- USB Type-C interface for convenient parameter debugging and program upgrade on site;
- USB host interface for exporting alarm event records and timed record data;
- Rubber sealing gasket design between the enclosure and controller screen for IP65 waterproof performance;
- Controller can be fixed by metal screw clamps;
- With modular structure design, pluggable terminals, embedded mounting, and compact structure, it is easy to install.

3 SPECIFICATIONS

Table 3 FPC1000D Technical Parameters

Item	Content
Operating Voltage	8VDC–35VDC, protection for DC reverse connection Resolution: 0.1V Precision: 1%
Power Consumption	<7W (Standby mode: ≤2.5W)
Analog Sensor	Resistance input Range: 0Ω – 6000Ω Resolution: 0.1Ω Precision: 1Ω (Below 300Ω)
	Voltage input Range: 0V – 5V Resolution: 0.01V Precision: 1%
	Current input Range: 4mA – 20mA Resolution: 0.1mA Precision: 1%
Extension Digital Output 1-3	Capacity 10A @ 250VAC passive output
Extension Aux. Input 1-2	Active when it is grounded (GND). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
RS485 Port	Isolated, half-duplex, baud rate at 9600, maximum communication distance at 1000m
MSC CAN Port	Isolated, maximum communication distance at 250m, Belden 9841 cable or other equal rating cable is required
CE-EMC Certification	EN 55032, EN 55024
Case Dimensions	209mmx189mmx59mm
Panel Cutout	188.5mmx165.5mm
Working Temperature	(-25~+70)°C
Working Humidity	(20~95)%RH
Storage Temperature	(-30~+80)°C
IP Rating	Front enclosure: IP65 when waterproof rubber gasket is installed between controller panel and enclosure. Back enclosure: IP20
Dielectric Strength	Apply voltage of 2.2kV AC between AC high voltage terminal and low voltage terminal, and the leakage current is below 3mA in one minute.
Weight	0.90kg

Table 4 FPC1000M Technical Parameters

Item	Content
Operating Voltage	8VDC–35VDC, protection for DC reverse connection Resolution: 0.1V Precision: 1%
Power Consumption	<7W (Standby mode: ≤2.5W)
AC Voltage	Line Voltage Range: 100VAC – 600VAC (ph-ph) Resolution: 1V Precision: 1%
AC Frequency	Range: 20Hz – 75Hz Resolution: 0.01Hz Precision: 0.1Hz
AC Current	Rated: 5A Resolution: 0.1A Precision: 2%
Analog Sensor	Resistance input Range: 0Ω – 6000Ω Resolution: 0.1Ω Precision: 1Ω (Below 300Ω)
	Voltage input Range: 0V – 5V Resolution: 0.01V Precision: 1%
	Current input Range: 4mA – 20mA Resolution: 0.1mA Precision: 1%
AB Output	Capacity 2A @ 24VDC active output
ST Output	Capacity 3A @ 24VDC active output
SV Output	Capacity 4A @ 24VDC active output
CR4 Output	Capacity 10A @ 250VAC active output
CR5 Output	Capacity 10A @ 250VAC active output
Digital Output 1–5	Capacity 8A @ 250VAC passive output
Digital Aux. Output 6–8	Capacity 8A @ 250VAC passive output
Digital Aux. Input 1–9	Active when it is grounded (B-). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
MSC CAN Port	Isolated, maximum communication distance at 250m, Belden 9841 cable or other equal rating cable is required
CE-EMC Certification	EN 55032, EN 55024
Case Dimensions	Installed on standard steel 35mm DIN rail, and the length of DIN rail is 335mm;
Working Temperature	(-25~+55)°C (The module mounting part cannot withstand high temperatures)

Item	Content
Working Humidity	(20~95)%RH
Storage Temperature	(-30~+55)°C (The module mounting part cannot withstand high temperatures)
Dielectric Strength	Apply voltage of 2.2kV AC between AC high voltage terminal and low voltage terminal, and the leakage current is below 3mA in one minute.
Weight	0.90kg

Table 5 FPC1000T Technical Parameters

Item	Content
Operating Voltage	24–36VAC/24–36VDC; Resolution: 0.1V Precision: 1%
Power Consumption	<7W (Standby mode: ≤2.5W)
AC Voltage	Line Voltage Range: 100VAC – 600VAC (ph-ph) Resolution: 1V Precision: 1%
AC Frequency	Range: 20Hz – 75Hz Resolution: 0.01Hz Precision: 0.1Hz
AST Output	10A @ 250VAC active output
N CLOSE Output	16A @ 250VAC passive output
A CLOSE Output	16A @ 250VAC passive output
Generator Start Output	8A @ 250VAC passive output
Main Path Close Signal Input	Active when it is grounded (B-). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
Backup Path Close Signal Input	Active when it is grounded (B-). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
Backup Power Isolating Switch Alarm Input	Active when it is grounded (B-). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
Backup Power Breaker Alarm Input	Active when it is grounded (B-). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
Backup Power Isolating Switch Status Input	Related to the dual power action position.
Backup Power Breaker Status Input	Related to the dual power action position.
Main Power Close Status Input	Related to the dual power action position.
Backup Power Close Status Input	Related to the dual power action position.
MSC CAN Port	Isolated, maximum communication distance at 250m, Belden 9841 cable or other equal rating cable is required
CE-EMC Certification	EN 55032, EN 55024
Case Dimensions	Installed on standard steel 35mm DIN rail, and the length of DIN rail is

Item	Content
	335mm;
Working Temperature	(-30~+55)°C (The module mounting part cannot withstand high temperatures)
Working Humidity	(20~95)%RH
Storage Temperature	(-30~+55)°C (The module mounting part cannot withstand high temperatures)
Dielectric Strength	Apply voltage of 2.2kV AC between AC high voltage terminal and low voltage terminal, and the leakage current is below 3mA in one minute.
Weight	0.65kg

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4 OPERATION

4.1 PANEL OF CONTROLLER



Fig. 1 FPC1000D Front Panel

Table 6 Instruction of Indicators

Type	Instruction
Running Indicator	It lights up when the motor of fire pump is running
Stop Indicator	It lights up when the motor of fire pump stops
Test Indicator	It lights up when the motor of fire pump is under test

4.2 FUNCTION OF BUTTONS

Table 7 Description of Buttons

Icon	Button	Description
	Start	Press the button to start the fire motor.
	Stop	Press the button to manually stop the motor, Press and hold the button for 2 seconds to forcedly stop the motor.
	Test	Press the button to test the start of fire motor.

4.3 START METHODS

4.3.1 AUTO START

When the pressure drops below the start pressure, the controller will automatically start when the pressure sensor detects the low pressure.

4.3.2 MANUAL START

The fire motor can be started by pressing the "Start" button regardless of the system pressure.

4.3.3 REMOTE MANUAL START

The fire motor can be started by closing the "Remote Manual Start" input.

4.3.4 REMOTE AUTO START

The fire motor can be started by opening the "Remote Auto Start" input.

4.3.5 EMERGENCY START

The fire motor can be manually started by pulling the emergency handle. The handle can be locked in the closed position.

Important note: To avoid damaging the contactor, it is recommended to start the fire motor in the following manner.

1. Shutdown the main power by the main disconnection method.
2. Pull the emergency handle and lock it in the closed position.
3. Reconnect the power by the main disconnection method.

4.3.6 FLOW START

High zone start: The fire motor can be started by closing the "Flow/Zone Start" input.

4.3.7 WEEKLY START

According to the set value of inspection parameters, the fire motor can be automatically started at a pre-programmed time.

4.3.8 TEST START

The fire motor can be manually started by pressing the "Test" button.

4.3.9 SEQUENTIAL START

For the application of multiple pumps, it is necessary to set an automatic start delay for all fire motors to prevent them from starting simultaneously when pressure drops.

4.4 STOP METHODS

4.4.1 MANUAL STOP

Press the "Stop" button to stop it manually. Please note that press and hold the Stop button for 2 seconds to prevent the fire motor from restarting.

4.4.2 AUTO STOP

The fire motor can only be automatically stopped after it has been started automatically and the automatic stop function is enabled. Once the automatic stop function is activated, if there are no other operation reasons, the fire motor will be automatically stopped when the pressure has recovered for 10 minutes (above the stop pressure set value).

4.4.3 FLOW STOP

High zone stop: If the controller has been started by 'Flow/Zone Start' input and the signal has returned to normal, the fire motor will be stopped if there are no any other operation reasons.

4.4.4 EMERGENCY STOP

The emergency stop may be required under any start conditions, which can be achieved by the main disconnection method.

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5 DISPLAY

5.1 FIRST START UP

When the controller is started for the first time, the “First Start Up” page appears. Click the “User Login”, then enter the valid password. After logging in, the icon in front of the “User Login” is unlocked and the unlock level will be displayed.



Fig. 2 Page of First Start Up

5.2 POWER INFORMATION CONFIRM

After logging in, click the “Power” button. Verify that the voltage between L1-L2, L2-L3, and L3-L1 matches the information on the nameplate of fire motor. If everything is correct, click the “OK” button to confirm the power information and return to the First Start Up page. After returning to the First Start Up page, the icon “√” will be displayed in front of the “Power” button.



Fig. 3 Power Information Page

5.3 PRESSURE INFORMATION CONFIRM

Click the “Pressure” button, verify if the pressure reading on the screen matches the reading on the calibrated pressure meter installed beside the sensor.

*Pressure unit follows the default setting configured for the pressure sensor.

*If necessary, you can adjust the maximum value of the pressure sensor measuring range.

*If necessary, you can adjust the “Start Pressure” and “Stop Pressure” values of the fire pump.

Once adjustments are completed and you confirm that the current pressure is consistent with the pressure meter reading, click the “OK” button to confirm the pressure information and return to the First Start Up page.



Fig. 4 Pressure Information Page

5.4 MOTOR ROTATION CONFIRM

Click the “Motor Rotation” button to enter the motor rotation test page. Check the box besides Motor Rotation and click the “Start” button to start the fire motor and verify if the rotation direction of it is correct. If not, press the “Stop” button to stop the fire motor. Adjust the wiring of the fire motor and test again until the fire motor rotates correctly. Press the “OK” button to confirm the current information and return to the First Start Up page.



Fig. 5 Motor Rotation Test Page

5.5 DATE & TIME SETTING

If you want to adjust the date and time, click the “Date & Time” button to enter the date and time setting interface. After setting the date and time correctly, click the “Modify” button to save the setting. Then, click on the “Back” button to return to the First Start Up page.



Fig. 6 Date & Time Setting Page

5.6 PARAMETERS SETTING

If you need to adjust other parameters, click the “Other Configuration” button to enter the parameter setting page. The parameter setting page is divided into two levels of permissions. Under the second-level permission, all parameters can be set, while under the first-level permission, only some parameters can be set. You can refer to the chapter of PARAMETER SETTING for more details.



Fig. 7 Parameters Setting Page

When the power, pressure, and motor rotation information is confirmed, the icon “√” will be displayed in front of the “Complete” button. Click the “Complete” button to complete the confirmation of First Start Up and the display page will jump to the home page.

Before completing the confirmation of First Start Up, the controller will not execute the automatic start logic for the fire motor. After the confirmation is completed, the First Start Up page will no longer be displayed when restarting the controller.

Completing the confirmation of First Start Up is the only way to access the home page and activate the controller’s auto mode.

5.7 HOME PAGE



Fig. 8 Home Page

The left main area of the home page is the pressure meter area, which displays the current set value of start and stop pressure, as well as the current real-time pressure value, and the pressure unit. Below the meter, when the motor performs the start or stop delay, it displays the current countdown for the delay. The right main area displays the present voltage and current values detected by the master control module. When an alarm occurs, the system status bar will flash and display the alarm.

“Start status” is to display whether the fire motor is in the start configuration (e.g. star connection) or the permanent running configuration (i.e. delta connection):

 Temporary star connection of fire motor

 Permanent delta connection of fire motor

“Start Reason” displays the current start reason of fire motor, including the following reasons:

1. Deluge valve start: the fire motor can be automatically started through the deluge valve.
2. Remote manual start: the fire motor can be manually started by closing the “Remote Manual Start” input.
3. Remote auto start: the fire motor can be automatically started through the remote control setting.
4. Flow/Zone start: the fire motor can be automatically started by closing the “Flow/Zone Start” input.
5. Timed inspection start: the fire motor can be automatically started through the preset time.
6. Button start: the fire motor can be manually started by pressing the “Start” button.
7. Low pressure start: the fire motor can be automatically started when the system pressure is lower than the start pressure.
8. Emergency start: The fire motor can be manually started by the emergency handle.
9. Test button start: The fire motor can be manually started by the “Test” button.

“Locked”: the controller is under locked status (Input Lock) and the fire motor can only be manually started by pressing the “Start” button under the status.

“System Status”: Click the button to enter the dual power status page when dual power transfer module is enabled.

“Alarm Display” will display one present system alarm, and switch to the “Alarms” page to check all present alarm information. There are two types of alarms, warning and fault. Warning is a mild type of alarm, which automatically disappears when the conditions that cause the alarm no longer exist. Fault is a more serious type of alarm, the alarm information will be latched, and even if the conditions that cause the alarm no longer exist, the fault will not automatically disappear and needs to be manually removed through the “Alarm Reset” button.

Table 8 Description of Alarms

No.	Alarm	Description
1	Blackout	The controller detects there is no voltage, and it can be set as warning or fault.
2	Overvoltage	The current voltage is too high, and it can be set as warning or fault.
3	Undervoltage	The current voltage is too low, and it can be set as warning or fault.
4	Overfrequency	The frequency of power is too high, and it can be set as warning or fault.
5	Underfrequency	The frequency of power is too low, and it can be set as warning or fault.
6	Over Current	The current is too large, and it can be set as warning or fault.
7	Under Current	The current is too small, and the fire motor has run for 15 seconds. It can be set as warning or fault.
8	Loss of Phase	The controller detects one phase of power is lost, and it can be set as warning or fault.

No.	Alarm	Description
9	Phase Reversal	The controller detects the phase sequence of power is incorrect, and it can be set as warning or fault.
10	Phase Imbalance	The controller detects difference between voltage readings exceeds 10% of the rated voltage, and it can be set as warning or fault.
11	Motor Fault	It will be displayed when over current, under current or ground fault occurs. It can be set as warning or fault.
12	Pump Room Alarm	It will be displayed when overvoltage, undervoltage or phase imbalance occurs. It can be set as warning or fault.
13	Sensor Fault	It will be displayed when the current is over 30mA or the voltage is over 6V. It can be set as warning or fault.
14	Test Solenoid Valve Fault	It will be displayed when the pressure can not drop 5psi after the output of solenoid valve (SV) ends. It can be set as warning or fault.
15	Start Failure	It will be displayed when under current occurs in two phases during the running of motor. It can be set as warning or fault.
16	1000M Communication Failure	The display module can not communicate with the master control module. It can only be set as warning.
17	Ground Fault	It will be displayed when the percentage of zero sequence current to rated current is greater than the set value of ground fault. It can be set as warning or fault.
18	Stalling Fault	It will be displayed when the current is greater than 4 times the rated current. It can be set as warning or fault.
19	Test Failure	It will be displayed when the motor can not start when the low pressure occurs, as well as the solenoid valve fault occurs. It can be set as warning or fault.
20	Sensor 1 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current sensor is greater than 0.4 mA. And it can be set as warning, fault or no action.
21	Sensor 2 Open	
22	Sensor 3 Open	
23	Sensor 4 Open	
24	Extension Sensor 1 Open	
25	Extension Sensor 2 Open	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current sensor is greater than 30mA. It is only a warning and cannot be set.
26	Sensor 1 Over Limit	
27	Sensor 2 Over Limit	
28	Sensor 3 Over Limit	
29	Sensor 4 Over Limit	
30	Extension Sensor 1 Over Limit	
31	Extension Sensor 2 Over Limit	The ambient temperature exceeds the high temperature set value.
32	High Temperature	

No.	Alarm	Description
		It can be set as warning or fault.
33	Low Temperature	The ambient temperature exceeds the low temperature set value. It can be set as warning or fault.
34	1000T Communication Failure	The display module can not communicate with the dual power control module. It can only be set as warning. It only occurs when communication failure lasts for more than 5 seconds, as well as the dual power transfer module is enabled.
35	S1 Close Failure	Main power close failure warning
36	S2 Close Failure	Backup power close failure warning
37	AST Trip Fault	Backup power breaker trip fault
38	S2 Isolating Switch Fault	Backup power isolating switch fault
39	S2 Breaker Fault	Backup power breaker fault

5.8 DUAL POWER STATUS PAGE



Fig. 9 Dual Power Status Page

If dual power transfer module is enabled in the parameters setting page, then click the “System Status” in the home page to enter the dual power status page. The following information will be displayed in the page:

- AC Voltage, phase sequence, frequency and power status of two lines of power supply;
- System topology diagram, switch closing and opening status;
- Main and backup setting, Auto transfer and restore/Auto transfer and non-auto restore setting status;
- Generator set start/stop status;
- Power supply status of load;

Table 9 S1 Power Status

No.	Status	Description
1	S1 Available	Delay of S1 available.
2	S1 Unavailable	Delay of S1 unavailable.
3	S1 Voltage Normal	The value of electricity is within the specified range.
4	S1 Blackout	The voltage is 0.
5	S1 Overvoltage	The voltage is greater than the preset upper limit.

No.	Status	Description
6	S1 Undervoltage	The voltage is below the preset lower limit.
7	S1 Overfrequency	The frequency is greater than the preset upper limit.
8	S1 Underfrequency	The frequency is below the preset lower limit.
9	S1 Loss of Phase	One or two phases of A/B/C phases are lost.
10	S1 Phase Reversal	Phase sequence of A-B-C phase is incorrect.

Table 10 S2 Power Status

No.	Status	Description
1	S2 Available	Delay of S2 available.
2	S2 Unavailable	Delay of S2 unavailable.
3	S2 Voltage Normal	The value of electricity is within the specified range.
4	S2 Blackout	The voltage is 0.
5	S2 Overvoltage	The voltage is greater than the preset upper limit.
6	S2 Undervoltage	The voltage is below the preset lower limit.
7	S2 Overfrequency	The frequency is greater than the preset upper limit.
8	S2 Underfrequency	The frequency is below the preset lower limit.
9	S2 Loss of Phase	One or two phases of A/B/C phases are lost.
10	S2 Phase Reversal	Phase sequence of A-B-C phase is incorrect.

Table 11 Genset Status

No.	Status	Description
1	Start Delay	The delay before genset starts.
2	Stop Delay	The delay before genset stops.
3	Genset Start	The generator start signal outputs.
4	Genset Standby	No genset start signal outputs.

Table 12 Switch Status

No.	Status	Description
1	Ready to Transfer	The switch begins to transfer.
2	S1 Closing	S1 is under the closing delay.
3	S1 Opening	S1 is under the opening delay.
4	S2 Closing	S2 is under the closing delay.
5	S2 Opening	S2 is under the opening delay.
6	Transfer Interval	The interval of switch transfer.
7	/	
8	/	
9	/	
10	/	
11	S1 On-load	S1 is closed and supplies the load.

No.	Status	Description
12	S2 On-load	S2 is closed and supplies the load.
13	Off-load	The switch is opened and disconnects the load.

5.9 CONFIGURATION PAGE



Fig. 10 Configuration Page

Click the “Parameters Setting” to enter the parameters setting page, all parameters of master control module can be set in this page. Password is required when entering the parameters setting page. The password can be up to 6-digit numbers. With the first-level password, you can only modify some parameters (the default password is 123456). With the second-level password, you can modify all parameters (the default password is 654321). After the password is entered successfully, it can be saved for a period of time. During this period, when entering the parameters setting page again, the password is not required until the backlight delay ends. The icon in the right side of the “Parameters Setting” button displays the current password status. If it is in the unlock status, click the icon to re-lock.



Fig. 11 Parameters Setting Page

Click the “Date & Time” button to enter the date and time setting interface. It can be set based on the real time. It doesn’t need to set if the current time is correct.



Fig. 12 Date & Time Setting

Click the “Language Set” button to select the default language of display module. The module now supports Chinese (Simplified) and English. You can modify the display module language in parameters setting page, with the same function as the above method.

Click “Factory” to set other items, such as power voltage, power current, and sensor calibrations, restoring the display module and master control module to their default factory values, resetting the master control module to its standard values, restoring the motor start total value recorded by the master control module, clearing event records, clearing timing records, and restoring first configuration.



Fig. 13 Data Calibration

Click the “Screen Calibration” button to start the touch screen calibration program. Then click the center of the “cross” displayed on the screen one by one to perform the screen calibration. The display module uses a resistive touch screen, and due to the characteristics of resistive touch screens, regular screen calibration may be required to prevent offset of touch screen contact points and ensure normal operation.

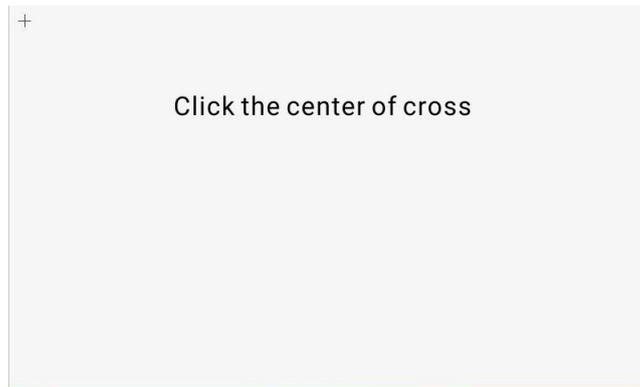


Fig. 14 Screen Calibration Page

5.10 ALARMS PAGE



Fig. 15 Alarms Page

The alarms page displays the real-time alarms. Warnings are general alarm events that automatically cancel when the alarm condition no longer exists, and they are displayed with a yellow alarm icon. Faults are serious alarm events that are latched, that means they will not automatically clear even if the alarm condition no longer exists. They are displayed with a red alarm icon.

The “Alarm Reset” button can reset the alarms of master control module.

The “Alarm Mute” button can mute the alarm sound of display module and master control module, and click it again to cancel the mute operation.

The “Alarm Test” button can send an alarm test command to the master control module to test the alarm bell of master control module, and click it again to cancel the alarm test.

5.11 HISTORY PAGE

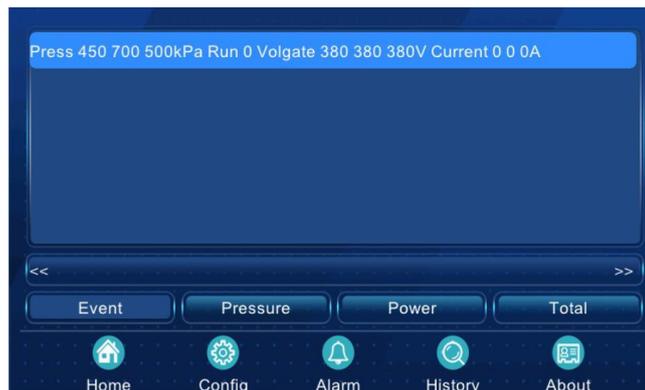


Fig. 16 History Page

The Event page displays records of warnings and faults, with all alarm information displayed on the page. The latest event is displayed at the top, with a maximum of 25 messages in one page, and a total of 500 records can be recorded. If there are more than one page of events, you can use the “<<” and “>>” buttons to scroll pages to view them. Click and hold the current alarm displayed, you can see details of pressure, voltage, current, and motor start status when the alarm occurred.

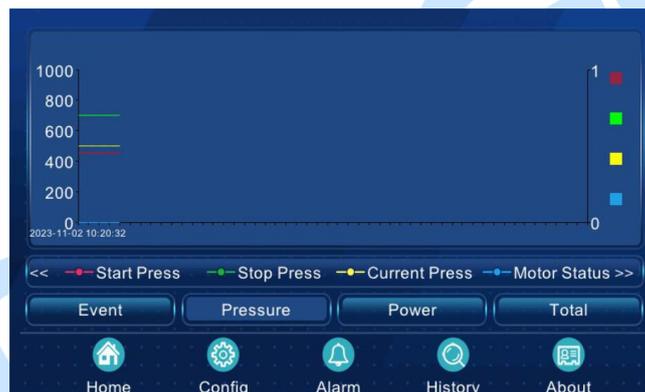


Fig. 17 Regular Pressure Record Page

The Pressure page displays regular records about the pressure and motor start status, which is displayed in the form of curve graph. The leftmost end of the coordinate axis displays the time information of the first recorded point, with each point arranged at a preset time interval. Up to 50 records can be displayed in one page, with a total of 500 records that can be recorded. Click a certain point on the curve will display a prompt box to show the data of this point. Click a color box in the right side will hide/show the current color curve. And click the “<<” and “>>” buttons to switch pages.

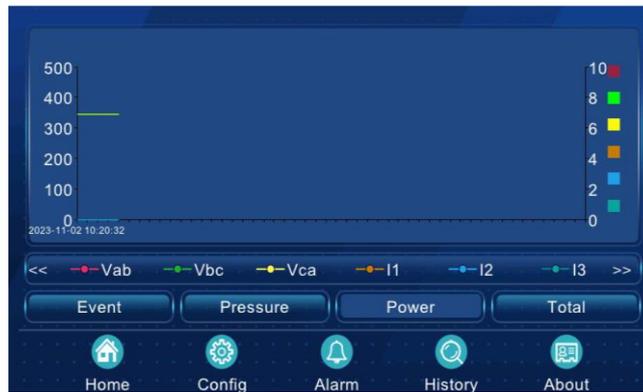


Fig. 18 Regular Power Record Page

The Power page displays regular records about the voltage and current, which is displayed in the form of curve graph. The leftmost end of the coordinate axis displays the time information of the first recorded point, with each point arranged at a preset time interval. Up to 50 records can be displayed in one page, with a total of 500 records that can be recorded. Click a certain point on the curve will display a prompt box to show the data of this point. Click a color box in the right side will hide/show the current color curve. And click the “<<” and “>>” buttons to switch pages.

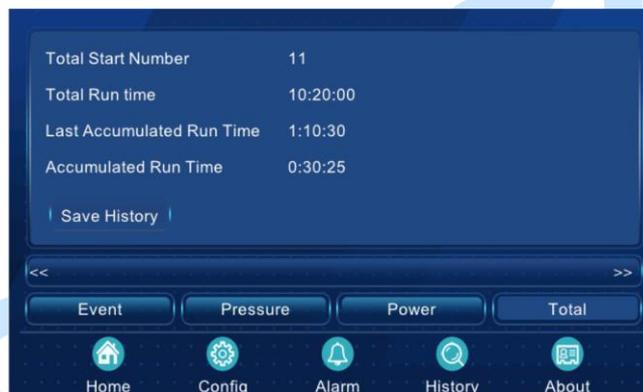


Fig. 19 Total Page of Fire Motor Running

The Total page displays information such as the total start number, the total run time, the last accumulated run time, and the accumulated run time of fire motor.

Click the “Save History” button to save event history information and regular history record information as a document into a USB flash drive for easy viewing and problem analysis.

5.12 ABOUT PAGE



Fig. 20 About Page

The About page displays information such as the current product model, display module number (DPD), master control module number (MPD), software release date, company name, LOGO, website, address, phone number, etc.

6 LOGIC

6.1 LOGIC OF FPC1000M

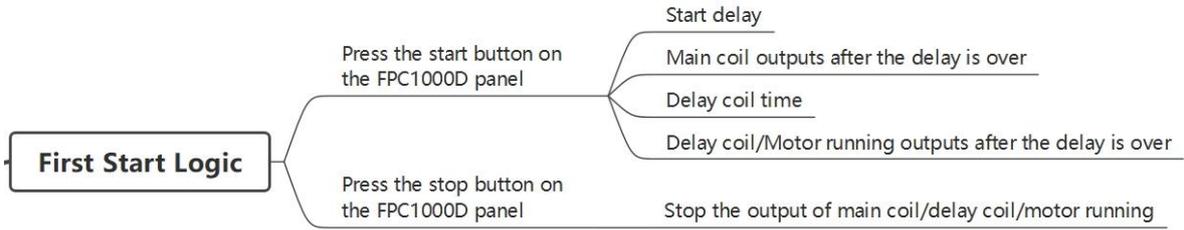


Fig. 21 First Start

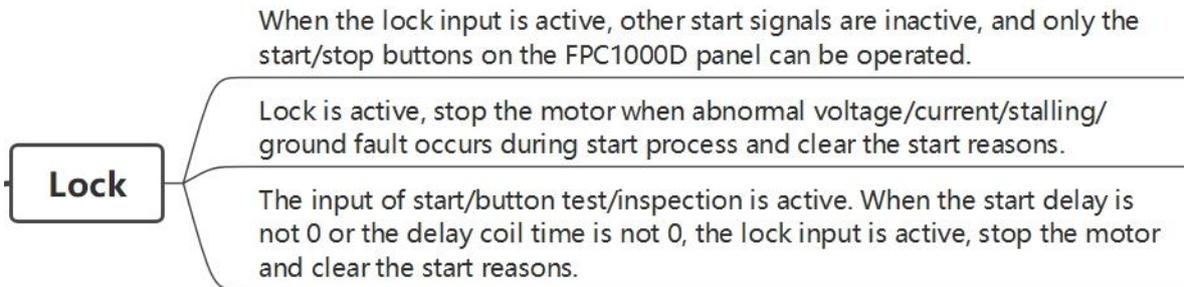


Fig. 22 Lock

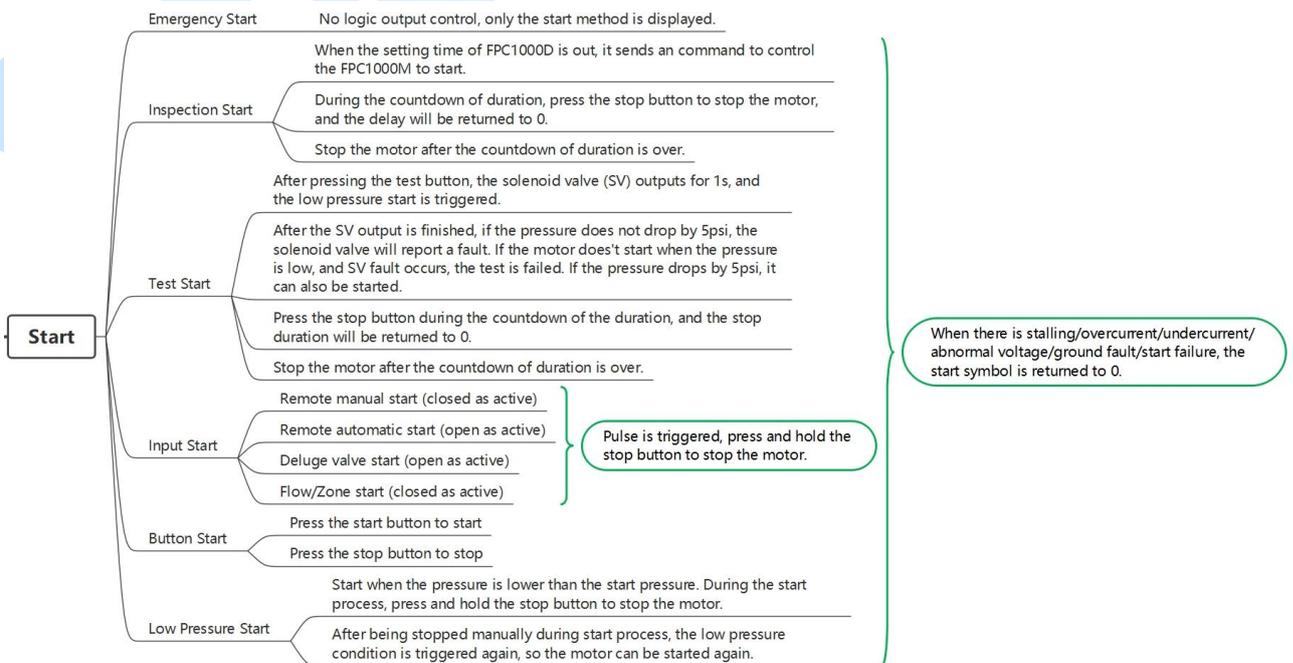


Fig. 23 Logic of Start

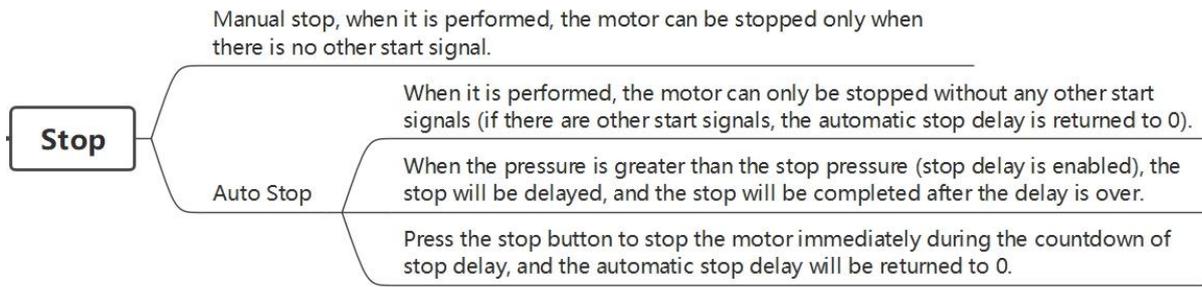


Fig. 24 Logic of Stop

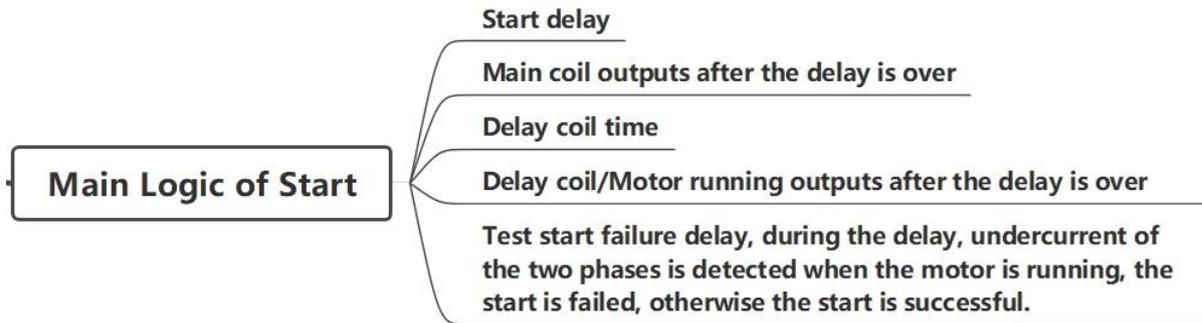


Fig. 25 Main Logic of Start

6.2 LOGIC OF FPC1000T

6.2.1 AUTO TRANSFER/AUTO RESTORE

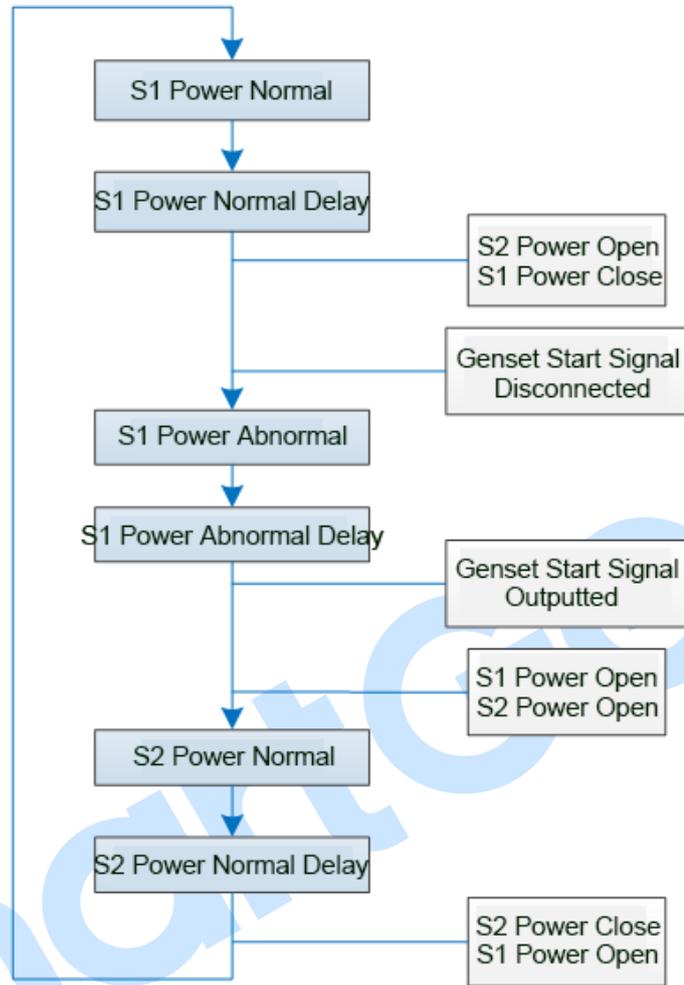


Fig. 26 Auto Transfer/Auto Restore Flowchart

6.2.2 AUTO TRANSFER AND NON-AUTO RESTORE (MUTUAL BACKUP IS ACTIVE)

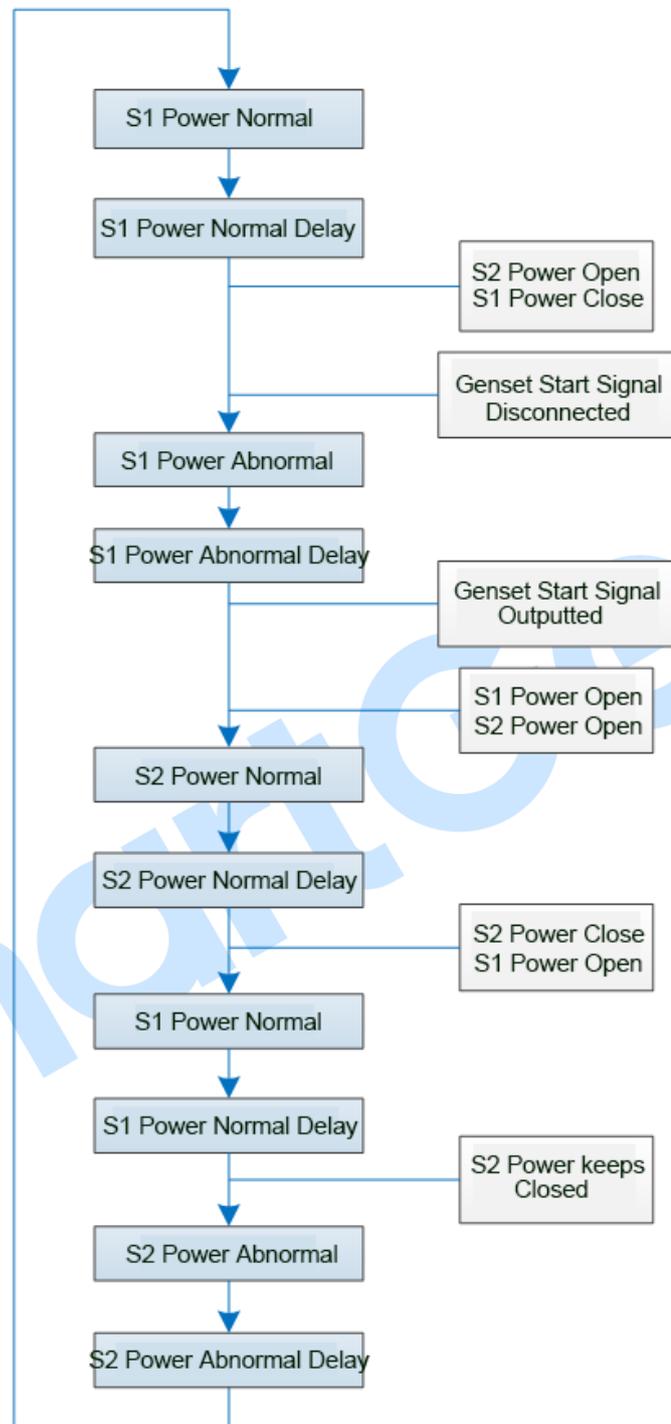


Fig. 27 Auto Transfer and Non-Auto Restore (Mutual Backup is Active) Flowchart

7 WIRING CONNECTION

7.1 DESCRIPTION OF FPC1000D DISPLAY MODULE TERMINALS

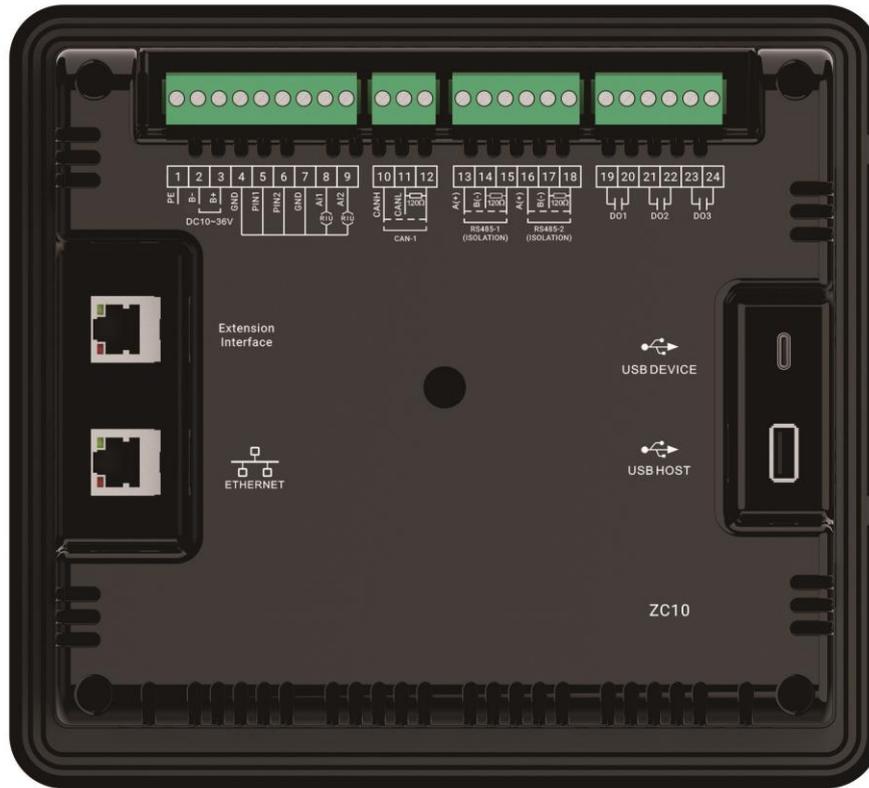


Fig. 28 Back Panel of Display Module

Table 13 Description of Display Module Connection Terminals

No.	Function	Cable Size	Remarks
1	PE	1.0mm ²	Ground terminal
2	DC Power Input B-	1.0mm ²	Connect with the negative of DC power supply
3	DC Power Input B+	1.0mm ²	Connect with the positive of DC power supply
4	GND	1.0mm ²	Common terminal of digital input
5	Extension Digital Input 1	1.0mm ²	It is used as the digital input of master control module
6	Extension Digital Input 2	1.0mm ²	It is used as the digital input of master control module
7	GND	1.0mm ²	Ground terminal of analog input
8	Extension Analog Input 1		It is used as the analog input of master control module
9	Extension Analog Input 2		It is used as the analog input of master control module
10	CAN-1	CAN H	Reserved ports. 120Ω impedance shielded twisted pair cable is recommended, and one end of the cable must be grounded. 120Ω termination resistor will be connected if Terminal 10 is connected with Terminal 12 directly.
11		CAN L	
12		Termination Resistor (120Ω)	

No.	Function	Cable Size	Remarks
13	RS485-1	A(+)	It is used for the connection with upper computer. 120Ω impedance shielded twisted pair cable is recommended, and one end of the cable must be grounded. 120Ω termination resistor will be connected if Terminal 13 is connected with Terminal 15 directly.
14		B(-)	
15		Termination Resistor (120Ω)	
16	RS485-2	A(+)	It is used for the connection with upper computer. 120Ω impedance shielded twisted pair cable is recommended, and one end of the cable must be grounded. 120Ω termination resistor will be connected if Terminal 16 is connected with Terminal 18 directly.
17		B(-)	
18		Termination Resistor (120Ω)	
19	Extension Output 1	1.5mm ²	Normally open output, rated 10A, and it is used as the extension output of master control module
20		1.5mm ²	
21	Extension Output 2	1.5mm ²	Normally open output, rated 10A, and it is used as the extension output of master control module
22		1.5mm ²	
23	Extension Output 3	1.5mm ²	Normally open output, rated 10A, and it is used as the extension output of master control module
24		1.5mm ²	
Extension Interface	CAN-2	0.5mm ²	It is used for the data communication between display module and master control module. It can be powered by master control module. Category 5 network cable is required.
ETHERNET	Network Interface		Reserved interface.
USB DEVICE	USB Device Interface		It is used for the communication between display module and upper computer, and the software upgrade of display module.
USB HOST	USB Host Interface		It is used for the export of history record files

7.2 DESCRIPTION OF FPC1000M TERMINALS

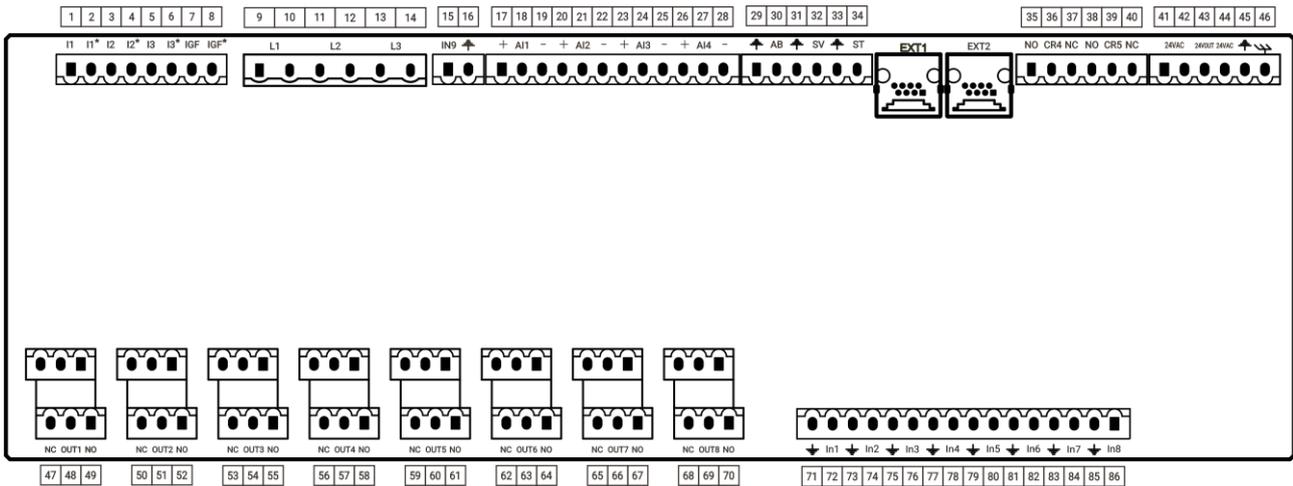


Fig. 29 FPC1000M Terminals Diagram

Table 14 Description of FPC1000M Terminals

No.	Function	Cable Size	Remarks
1	L1 Current Sample Input	I1	The current sample input of L1.
2		I1*	
3	L2 Current Sample Input	I2	The current sample input of L2.
4		I2*	
5	L3 Current Sample Input	I3	The current sample input of L3.
6		I3*	
7	L4 Current Sample Input	I4	The current sample input of ground.
8		I4*	
9	3-Phase AC Input	L1	The L1 input of 3-Phase AC power supply.
10		L2	The L2 input of 3-Phase AC power supply.
11		L3	The L3 input of 3-Phase AC power supply.
12			
13			
14			
15	Emergency Button Limit Switch	In9	Programmable input, active when it is grounded. Default function is emergency start input (active when it is closed).
16		GND	
17	Sensor 1	+	Programmable analog input, and it supports sensors of 0-6000Ω resistance type, 4-20mA current type, and 0-5V voltage type.
18		AI1	
19		-	
20	Sensor 2	+	Programmable analog input, and it supports sensors of 0-6000Ω resistance type, 4-20mA current type, and 0-5V voltage type.
21		AI2	
22		-	
23	Sensor 3	+	Programmable analog input, and it supports sensors of 0-6000Ω resistance
24		AI3	

No.	Function		Cable Size	Remarks
25		-	0.5mm ²	type, 4-20mA current type, and 0-5V voltage type.
26	Sensor 4	+	0.5mm ²	Programmable analog input, and it supports sensors of 0-6000Ω resistance type, 4-20mA current type, and 0-5V voltage type.
27		AI4	0.5mm ²	
28		-	0.5mm ²	
29	Alarm Bell Output	GND	1.5mm ²	Normally open output, rated 7A, alarm bell output signal.
30		AB	1.5mm ²	
31	Solenoid Valve Output	GND	1.5mm ²	Normally open output, rated 3A, test solenoid valve output signal.
32		SV	1.5mm ²	
33	Switch Transfer Output	GND	1.5mm ²	Normally open output, rated 3A, switch transfer output signal.
34		ST	1.5mm ²	
CAN1	CAN communication port			
CAN2				
35	Main Coil Power Relay (24VAC active output)	NO	1.5mm ²	
36		CR4	1.5mm ²	
37		NC	1.5mm ²	
38	Delay Coil Power Relay (24VAC active output)	NO	1.5mm ²	
39		CR4	1.5mm ²	
40		NC	1.5mm ²	
41	24VAC Input		1.5mm ²	The AC power supply of master control module.
42			1.5mm ²	
43	24VDC Output		1.0mm ²	The DC power supply of sensor.
44	24VDC Input		1.0mm ²	The DC power supply of master control module.
45	Negative of DC Power Supply	GND	1.0mm ²	
46	Ground Terminal of Enclosure	PE	1.0mm ²	
47	Motor Running	NC1	1.5mm ²	Normally open output, rated 10A, output motor running signal.
48		C1	1.5mm ²	
49		NO1	1.5mm ²	
50	Power Available	NC2	1.5mm ²	Normally open output, rated 10A, output power available signal.
51		C2	1.5mm ²	
52		NO2	1.5mm ²	
53	Phase Reversal	NC3	1.5mm ²	Normally open output, rated 10A, output phase reversal fault signal.
54		C3	1.5mm ²	
55		NO3	1.5mm ²	
56	Pump Room Alarm	NC4	1.5mm ²	Normally open output, rated 10A, output pump room alarm signal.
57		C4	1.5mm ²	
58		NO4	1.5mm ²	
59	Motor Fault	NC5	1.5mm ²	Normally open output, rated 10A, output motor fault signal.
60		C5	1.5mm ²	
61		NO5	1.5mm ²	

No.	Function	Cable Size	Remarks
62	Aux. Output 6	NC6	One group for transfer, rated 10A, programmable output, the function will be confirmed by the setting.
63		C6	
64		NO6	
65	Aux. Output 7	NC7	One group for transfer, rated 10A, programmable output, the function will be confirmed by the setting.
66		C7	
67		NO7	
68	Aux. Output 8	NC8	One group for transfer, rated 10A, programmable output, the function will be confirmed by the setting.
69		C8	
70		NO8	
71	Aux. Input 1	GND	Programmable input, active when it is grounded, default function is reserved (active when it is closed).
72		PIN1	
73	Aux. Input 2	GND	Programmable input, active when it is grounded, default function is reserved (active when it is closed).
74		PIN2	
75	Aux. Input 3	GND	Programmable input, active when it is grounded, default function is flow/zone start (active when it is closed).
76		PIN3	
77	Aux. Input 4	GND	Programmable input, active when it is grounded, default function is reserved (active when it is closed).
78		PIN4	
79	Aux. Input 5	GND	Programmable input, active when it is grounded, default function is deluge valve input (active when it is opened).
80		PIN5	
81	Aux. Input 6	GND	Programmable input, active when it is grounded, default function is remote auto start (active when it is opened).
82		PIN6	
83	Aux. Input 7	GND	Programmable input, active when it is grounded, default function is input lock (active when it is closed).
84		PIN7	
85	Aux. Input 8	GND	Programmable input, active when it is grounded, default function is remote manual start input (active when it is closed).
86		PIN8	

7.3 DESCRIPTION OF FPC1000T TERMINALS

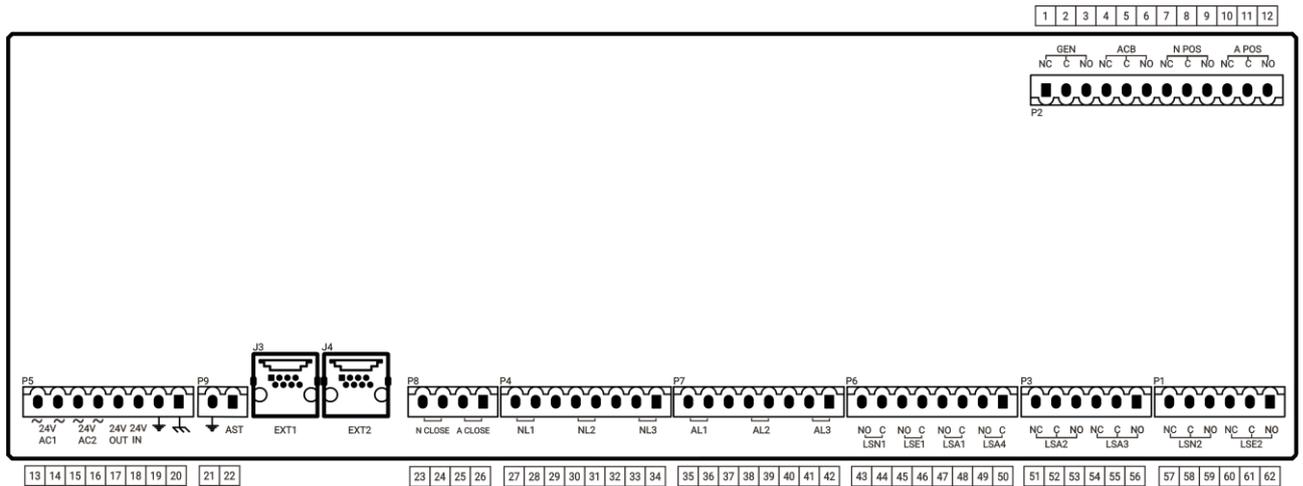


Fig. 30 FPC1000T Terminals Diagram

Table 15 Description of FPC1000T Terminals

No.	Function	Cable Size	Remarks
1	Generator Start Output	NC	Normally closed output, rated 10A, output generator start signal.
2		C	
3		NC	
4	S2 Power Breaker Status Output	NC	S2 Power Breaker Status Extension Output
5		C	
6		NC	
7	S1 Power Close Status Output	NC	S1 Power Close Status Extension Output
8		C	
9		NC	
10	S2 Power Close Status Output	NC	S2 Power Close Status Extension Output
11		C	
12		NC	
13	S1 Power Input (24VAC)	IN	The power supply input of S1
14		OUT	
15	S2 Power Input (24VAC)	IN	The power supply input of S2
16		OUT	
17	24V OUT	OUT	The output of 24VDC
18	24V IN	IN	The input of 24VDC
19	Negative of power supply.	GND	Negative of power supply.
20	Ground	PE	Ground terminal
21	S2 Power Breaker Trip Output	GND	Normally open output, rated 3A, output S2 power breaker trip signal.
22		AST	
CAN	CAN Communication Extension Port	EXT1 EXT2	CAN Communication Port
23	S1 Power Close Control Output	N CLOSE	Normally open output, rated 10A, output S1 power close relay signal.
24			

No.	Function	Cable Size	Remarks
25	S2 Power Close Control Output	A CLOSE	Normally open output , rated 10A, output S2 power close relay signal.
26			
27	S1 Power Input (AC-3P3W)	NL1	S1 Power Input (AC-3P3W)
28			
29			
30		NL2	
31			
32			
33		NL3	
34			
35	S2 Power Input (AC-3P3W)	AL1	S2 Power Input (AC-3P3W)
36			
37			
38		AL2	
39			
40			
41		AL3	
42			
43	S1 Power Close Feedback Input	NO	The input of S1 power close feedback signal, active when it is grounded.
44		C	
45	S2 Power Close Feedback Input	NO	The input of S2 power close feedback signal, active when it is grounded.
46		C	
47	S2 Power Isolating Switch Alarm Input	NO	The input of S2 power isolating switch alarm, active when it is grounded.
48		C	
49	S2 Power Breaker Alarm Input	NO	The input of S2 power isolating switch alarm, active when it is grounded.
50		C	
51	S2 Power Isolating Switch Status Input	NC	The extension input of S2 power isolating switch status.
52		C	
53		NO	
54	S2 Power Breaker Status Input	NC	The extension input of S2 power breaker status.
55		C	
56		NO	
57	S1 Power Close Status Input	NC	The extension input of S1 power close status.
58		C	
59		NO	
60	S2 Power Close Status Input	NC	The extension input of S2 power close status.
61		C	
62		NO	

8 SETTING AND DEFINITION OF PARAMETERS

8.1 SETTING CONTENTS AND RANGE OF PARAMETER

Table 16 Contents and Range of Parameter

No.	Item	Range	Default	Description
Module Setting				
1	Languages	(0-1)	0	0: Simplified Chinese; 1: English.
2	Password	(0-9999999)	123456	First-level password of parameters setting, only some parameters can be set.
3		(0-9999999)	654321	Second-level password of parameters setting, all parameters can be set.
4	Backlight Delay	(10-65535)s	300	When the backlight delay is over, the backlight brightness of display module will be the lowest (20%) without operation on it.
5	Communication Address	(1-254)	1	The address of display module when using 485 communication.
6	485-1 Baud Rate	(0-3)	2	0: 2400; 1: 4800; 2: 9600; 3: 19200.
7	485-1 Stop Bit	(0-1)	0	0: 1 stop bit; 1: 2 stop bits;
8	485-1 Parity Bit	(0-2)	0	0: No parity; 1: Odd parity; 2: Even parity;
9	485-2 Baud Rate	(0-3)	2	0: 2400; 1: 4800; 2: 9600; 3: 19200.
10	485-2 Stop Bit	(0-1)	0	0: 1 stop bit; 1: 2 stop bits;
11	485-2 Parity Bit	(0-2)	0	0: No parity; 1: Odd parity; 2: Even parity;
12	History Interval	(30-300)s	300	The interval time between regular records
13	Backlight Brightness	(20-100)%	80	The backlight brightness setting of display module
14	Dual Power Transfer Module	(0-1)	0	0: Disabled; 1: Enabled.
Pressure Setting				

No.	Item	Range	Default	Description
1	Pipeline Pressure Sensor Selection	(0-5)	0	0: Aux. sensor 1 1: Aux. sensor 2 2: Aux. sensor 3 3: Aux. sensor 4 4: Extension sensor 1 5: Extension sensor 2
2	Max. Pressure	(0-9000)kPa	1000	The maximum value of pressure sensor, which is used for the range of pressure gauge.
3	Start Pressure	(0-9000)kPa	450	The pressure when the fire pump starts.
4	Stop Pressure	(0-9000)kPa	700	The pressure when the fire pump stops.
Timed Inspection Setting				
1	Timed Inspection Enable	(0-1)	0	0: Disabled 1: Enabled.
2	Day of Week Selection	(0-127)	1	Bit0: Sunday Bit1: Monday Bit2: Tuesday Bit3: Wednesday Bit4: Thursday Bit5: Friday Bit6: Saturday
3	Timed Inspection Start Time/h	(0~23)h	0	The duration of timed start
4	Timed Inspection Start Time/min	(0~59)min	0	
5	Timed Inspection Running Time	(0~30)min	10	The duration of timed start running
Motor Control Setting				
1	Motor Start Method	(0-2)	2	0: Hard start; 1: Soft start; 2: Star/Delta.
2	Start Delay	(0-3600)s	10	The start delay of fire motor's main coil
3	Delay Coil Time	(0-3600)s	20	The start delay of fire motor's delay coil
4	Auto Stop Enable	(0-1)	1	0: Disabled; 1: Enabled.
5	Auto Stop Delay	(1-1440)min	10	The delay of fire motor's automatic start.
6	Test Running Time	(1-30)min	10	The duration of motor running after pressing the start test button manually.
7	Start Failure Delay	(0-3600)s	20	The detection time when the motor fails to start.
	First Test Boot Config	(0-1)	1	0: Not completed; 1: Completed.
Voltage Setting (Monitoring voltage of master control module)				

No.	Item	Range	Default	Description
1	Voltage Normal Delay	(0-3600)s	10	Time required to confirm the voltage from abnormal to normal.
2	Voltage Abnormal Delay	(0-3600)s	5	Time required to confirm the voltage from normal to abnormal.
3	Rated Voltage	(100-600)V	380	The rated voltage of AC system.
4	Rated Frequency	(20.0-75.0)Hz	50.0	The rated frequency of AC system.
5	Overvoltage Set Value	(0~200)%	115	Upper limit of voltage, it will be abnormal when it is greater than the upper limit.
6	Overvoltage Return Value	(0~200)%	110	Return value of voltage upper limit, it will be normal when it is less than the return value.
7	Overvoltage Delay	(0-3600)s	5	Time required to confirm the voltage from normal to overvoltage.
8	Undervoltage Set Value	(0~200)%	80	Lower limit of voltage, it will be abnormal when it is less than the lower limit.
9	Undervoltage Return Value	(0~200)%	85	Return value of voltage lower limit, it will be normal when it is more than the return value.
10	Undervoltage Delay	(0-3600)s	10	Time required to confirm the voltage from normal to undervoltage.
11	Overfrequency Set Value	(0~200)%	110	Upper limit of frequency, it will be abnormal when it is greater than the upper limit.
12	Overfrequency Return Value	(0~200)%	104	Return value of frequency upper limit, it will be normal when it is less than the return value.
13	Overfrequency Delay	(0-3600)s	5	Time required to confirm the voltage from normal to overfrequency.
14	Underfrequency Set Value	(0~200)%	90	Lower limit of frequency, it will be abnormal when it is less than the lower limit.
15	Underfrequency Return Value	(0~200)%	96	Return value of frequency lower limit, it will be normal when it is more than the return value.
16	Underfrequency Delay	(0-3600)s	3	Time required to confirm the voltage from normal to underfrequency.
17	Voltage Imbalance Set Value	(0~200)%	10	Upper limit of voltage imbalance, it will be abnormal when it is greater than the upper limit.
18	Voltage Imbalance Return Value	(0~200)%	5	Return value of voltage imbalance, it will be normal when it is less than the return value.

No.	Item	Range	Default	Description
19	Voltage Imbalance Delay	(0-3600)s	20	Time required to confirm the voltage from normal to imbalance.
Current Setting				
1	Rated Current	(5-6000)A	5	The rated current of electric fire pump.
2	CT Ratio	(5-6000)/5	5	The ratio of external current transformer.
3	Overcurrent Set Value	(0~200)%	150	Upper limit of current, it will be abnormal when it is greater than the upper limit.
4	Overcurrent Return Value	(0~200)%	145	Return value of current upper limit, it will be normal when it is less than the return value.
5	Overcurrent Delay	(0-3600)s	20	Time required to confirm the current from normal to overcurrent.
6	Undercurrent Set Value	(0~200)%	30	Lower limit of current, it will be abnormal when it is less than the lower limit.
7	Undercurrent Return Value	(0~200)%	35	Return value of current lower limit, it will be normal when it is more than the return value.
8	Undercurrent Delay	(0-3600)s	20	Time required to confirm the current from normal to undercurrent.
9	Ground Fault Set Value	(0~200)%	20	Upper limit of grounding current, it will be abnormal when it is greater than the upper limit.
10	Ground Fault Return Value	(0~200)%	18	Return value of grounding current upper limit, it will be normal when it is less than the return value.
11	Ground Fault Delay	(0-3600)s	5	Time required to confirm the current from normal to ground fault.
Alarm Setting				
1	Motor Fault Enable	(0-1)	1	0: Disabled 1: Enabled.
2	Motor Fault Alarm Type	(0-1)	1	0: Warning 1: Fault.
3	Motor Fault Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
4	Pump Room Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
5	Pump Room Alarm Type	(0-1)	1	0: Warning 1: Fault.
6	Pump Room Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
7	Start Failure Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
8	Start Failure Alarm Type	(0-1)	1	0: Warning 1: Fault.

No.	Item	Range	Default	Description
9	Start Failure Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
10	Comm. Failure Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
11	Comm. Failure Alarm Type	(0-1)	0	0: Warning 1: Fault.
12	Comm. Failure Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
13	Overvoltage Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
14	Overvoltage Alarm Type	(0-1)	0	0: Warning 1: Fault.
15	Overvoltage Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
16	Undervoltage Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
17	Undervoltage Alarm Type	(0-1)	0	0: Warning 1: Fault.
18	Undervoltage Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
19	Overfrequency Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
20	Overfrequency Alarm Type	(0-1)	0	0: Warning 1: Fault.
21	Overfrequency Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
22	Underfrequency Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
23	Underfrequency Alarm Type	(0-1)	0	0: Warning 1: Fault.
24	Underfrequency Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
25	Imbalance Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
26	Imbalance Alarm Type	(0-1)	0	0: Warning 1: Fault.
27	Imbalance Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
28	Phase Reversal Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
29	Phase Reversal Alarm Type	(0-1)	0	0: Warning 1: Fault.
30	Phase Reversal Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
31	Blackout Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
32	Blackout Alarm Type	(0-1)	0	0: Warning 1: Fault.
33	Blackout Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.

No.	Item	Range	Default	Description
34	Phase Loss Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
35	Phase Loss Alarm Type	(0-1)	0	0: Warning 1: Fault.
36	Phase Loss Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
37	Overcurrent Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
38	Overcurrent Alarm Type	(0-1)	0	0: Warning 1: Fault.
39	Overcurrent Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
40	Undercurrent Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
41	Undercurrent Alarm Type	(0-1)	0	0: Warning 1: Fault.
42	Undercurrent Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
43	Ground Fault Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
44	Ground Fault Alarm Type	(0-1)	0	0: Warning 1: Fault.
45	Ground Fault Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
46	Stalling Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
47	Stalling Alarm Type	(0-1)	1	0: Warning 1: Fault.
48	Stalling Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
49	Solenoid Valve Fault Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
50	Solenoid Valve Fault Alarm Type	(0-1)	1	0: Warning 1: Fault.
51	Solenoid Valve Fault Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
52	Test Failure Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
53	Test Failure Alarm Type	(0-1)	1	0: Warning 1: Fault.
54	Test Failure Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
55	Sensor Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
56	Sensor Alarm Type	(0-1)	1	0: Warning 1: Fault.
57	Sensor Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
58	High Temp. Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
59	High Temp. Alarm Type	(0-1)	0	0: Warning 1: Fault.
60	High Temp. Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.

No.	Item	Range	Default	Description
61	Low Temp. Alarm Enable	(0-1)	1	0: Disabled 1: Enabled.
62	Low Temp. Alarm Type	(0-1)	0	0: Warning 1: Fault.
63	Low Temp. Alarm Bell	(0-1)	1	0: No ringing 1: Ringing.
Aux. Inputs Setting				
1	Input 1 Function	(0-6)	0	Not Used.
2	Input 1 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
3	Input 2 Function	(0-6)	0	Not Used.
4	Input 2 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
5	Input 3 Function	(0-6)	5	Flow/Zone start.
6	Input 3 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
7	Input 4 Function	(0-6)	0	Not Used.
8	Input 4 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
9	Input 5 Function	(0-6)	4	Deluge valve start.
10	Input 5 Active Type	(0-1)	1	0: Closed as active 1: Open as active.
11	Input 6 Function	(0-6)	3	Remote auto start.
12	Input 6 Active Type	(0-1)	1	0: Closed as active 1: Open as active.
13	Input 7 Function	(0-6)	2	Input lock.
14	Input 7 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
15	Input 8 Function	(0-6)	1	Remote manual start.
16	Input 8 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
17	Input 9 Function	(0-6)	6	Emergency start.
18	Input 9 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
19	Extension Input 1 Function	(0-6)	0	Not Used.
20	Extension Input 1 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
21	Extension Input 2 Function	(0-6)	0	Not Used.
22	Extension Input 2 Active Type	(0-1)	0	0: Closed as active 1: Open as active.
Outputs Setting				
1	Fixed Output 1 Function	/	1	Motor running.
2	Fixed Output 1 Active Type	/	0	0: Normally open output.
3	Fixed Output 2 Function	/	2	Power available.
4	Fixed Output 2 Active Type	/	0	0: Normally open output.
5	Fixed Output 3 Function	/	3	Phase reversal.
6	Fixed Output 3 Active Type	/	0	0: Normally open output.

No.	Item	Range	Default	Description
7	Fixed Output 4 Function	/	4	Pump room alarm.
8	Fixed Output 4 Active Type	/	0	0: Normally open output.
9	Fixed Output 5 Function	/	5	Motor fault.
10	Fixed Output 5 Active Type	/	0	0: Normally open output.
11	Aux. Output 6 Function	(0-12)	1	Motor running.
12	Aux. Output 6 Active Type	(0-1)	0	0: Normally open output 1: Normally closed output.
13	Aux. Output 7 Function	(0-12)	2	Power available.
14	Aux. Output 7 Active Type	(0-1)	0	0: Normally open output 1: Normally closed output.
15	Aux. Output 8 Function	(0-12)	3	Phase reversal.
16	Aux. Output 8 Active Type	(0-1)	0	0: Normally open output 1: Normally closed output.
17	Fixed Output 9 Function	/	9	Main coil power.
18	Fixed Output 9 Active Type	/	0	0: Normally open output.
19	Fixed Output 10 Function	/	10	Delay coil power.
20	Fixed Output 10 Active Type	/	0	0: Normally open output.
21	Alarm Bell Output	/	6	AB output
22	AB Output Active Type	/	0	0: Normally open output.
23	Solenoid Valve Output	/	7	SV Output
24	SV Output Active Type	/	0	0: Normally open output.
25	Switch Transfer Output	/	8	ST output
26	ST Output Active Type	/	0	0: Normally open output.
27	Extension Aux. Output 1 Function	(0-12)	0	Not Used.
28	Extension Aux. Output 1 Active Type	(0-1)	0	0: Normally open output 1: Normally closed output.
29	Extension Aux. Output 2 Function	(0-12)	0	Not Used.
30	Extension Aux. Output 2 Active Type	(0-1)	0	0: Normally open output 1: Normally closed output.
31	Extension Aux. Output 3 Function	(0-12)	0	Not Used.
32	Extension Aux. Output 3 Active Type	(0-1)	0	0: Normally open output 1: Normally closed output.
Analog Sensor Setting				

No.	Item	Range	Default	Description
Sensor 1				
1	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
2	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
3	Open Alarm Bell	(0-1)	0	0: No ringing 1: Ringing.
4	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
5	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
6	X(1-8)	(0-6553.5)		X-axis coordinate of sensor curve, sensor sampling input value.
7	Y(1-8)	(0-6553.5)		Y-axis coordinate of sensor curve, sensor calculation output value.
Sensor 2				
1	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
2	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
3	Open Alarm Bell	(0-1)	0	0: No ringing 1: Ringing.
4	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
5	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
6	X(1-8)	(0-6553.5)		X-axis coordinate of sensor curve, sensor sampling input value.
7	Y(1-8)	(0-6553.5)		Y-axis coordinate of sensor curve, sensor calculation output value.
Sensor 3				
1	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.

No.	Item	Range	Default	Description
2	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
3	Open Alarm Bell	(0-1)	0	0: No ringing 1: Ringing.
4	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
5	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
6	X(1-8)	(0-6553.5)		X-axis coordinate of sensor curve, sensor sampling input value.
7	Y(1-8)	(0-6553.5)		Y-axis coordinate of sensor curve, sensor calculation output value.
Sensor 4				
1	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
2	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
3	Open Alarm Bell	(0-1)	0	0: No ringing 1: Ringing.
4	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
5	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
6	X(1-8)	(0-6553.5)		X-axis coordinate of sensor curve, sensor sampling input value.
7	Y(1-8)	(0-6553.5)		Y-axis coordinate of sensor curve, sensor calculation output value.
Extension Sensor 1				
1	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
2	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
3	Open Alarm Bell	(0-1)	0	0: No ringing 1: Ringing.

No.	Item	Range	Default	Description
4	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
5	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
6	X(1-8)	(0-6553.5)		X-axis coordinate of sensor curve, sensor sampling input value.
7	Y(1-8)	(0-6553.5)		Y-axis coordinate of sensor curve, sensor calculation output value.
Extension Sensor 2				
1	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
2	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
3	Open Alarm Bell	(0-1)	0	0: No ringing 1: Ringing.
4	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
5	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
6	X(1-8)	(0-6553.5)		X-axis coordinate of sensor curve, sensor sampling input value.
7	Y(1-8)	(0-6553.5)		Y-axis coordinate of sensor curve, sensor calculation output value.
Ambient Temperature Setting				
1	High Temp. Set Value	(-55~125)°C	50	Upper limit of high temperature, it will be abnormal when it is greater than the upper limit.
2	High Temp. Return Value	(-55~125)°C	45	Return value of high temperature, it will be normal when it is less than the return value.
3	High Temp. Delay	(0-3600)s	10	Time required to confirm the temperature from normal to high temperature.
4	Low Temp. Set Value	(-55~125)°C	5	Lower limit of low temperature, it will be abnormal when it is less than the lower limit.
5	Low Temp. Return Value	(-55~125)°C	7	Return value of low temperature, it will be normal when it is more than the return value.

No.	Item	Range	Default	Description
6	Low Temp. Delay	(0-3600)s	10	Time required to confirm the temperature from normal to low temperature.
AC Power Supply Setting				
1	S1 Voltage Normal Delay	(0-3600)s	10	Time required to confirm the S1 voltage from abnormal to normal.
2	S1 Voltage Abnormal Delay	(0-3600)s	5	Time required to confirm the S1 voltage from normal to abnormal.
3	S2 Voltage Normal Delay	(0-3600)s	10	Time required to confirm the S2 voltage from abnormal to normal.
4	S2 Voltage Abnormal Delay	(0-3600)s	5	Time required to confirm the S2 voltage from normal to abnormal.
5	Generator Start Delay	(0-3600)s	1	When the generator set is going to start, the delay will start, and after the delay is over, the genset start signal will be output.
6	Generator Stop Delay	(0-3600)s	5	When the generator set is going to stop, the delay will start, and after the delay is over, the genset start signal will be disconnected.
7	Main/Backup Setting	(0-1)	0	0: S1 as main 1: S2 as main
8	Phase Reversal Detection	(0-1)	1	0: Disabled 1: Enabled
9	Rated Voltage	(100-600)V	380	The rated voltage of AC system
10	Overvoltage Enable	(0-1)	1	0: Disabled 1: Enabled
11	Overvoltage Threshold	(0~200)%	115	Upper limit of voltage, it will be abnormal when it is greater than the upper limit.
12	Overvoltage Return Threshold	(0~200)%	110	Return value of voltage upper limit, it will be normal when it is less than the return value.
13	Undervoltage Enable	(0-1)	1	0: Disabled 1: Enabled
14	Undervoltage Threshold	(0~200)%	80	Lower limit of voltage, it will be abnormal when it is less than the lower limit.
15	Undervoltage Return Threshold	(0~200)%	85	Return value of voltage lower limit, it will be normal when it is more than the return value.
16	Rated Frequency	(20.0-75.0)Hz	50.0	The rated frequency of AC system
17	Overfrequency Detection Enable	(0-1)	1	0: Disabled 1: Enabled
18	Overfrequency Set Value	(0~200)%	110	Upper limit of frequency, it will be abnormal when it is greater than the upper limit.

No.	Item	Range	Default	Description
19	Overfrequency Return Value	(0~200)%	104	Return value of frequency upper limit, it will be normal when it is less than the return value.
20	Underfrequency Detection Enable	(0-1)	1	0: Disabled 1: Enabled
21	Underfrequency Set Value	(0~200)%	90	Lower limit of frequency, it will be abnormal when it is less than the lower limit.
22	Underfrequency Return Value	(0~200)%	96	Return value of frequency lower limit, it will be normal when it is more than the return value.
Switch Setting				
1	Close Time	(0.1~20.0)s	5.0	The pulse time of close relay output
2	Open Time	(0.1~20.0)s	5.0	The pulse time of open relay output
3	Auto Transfer/Auto Restore	(0-1)	1	0: Auto Transfer/Auto Restore 1: Auto Transfer/Non-Auto Restore
4	Continuous Close	(0-1)	0	0: Disabled 1: Enabled If the switch close control is a continuous signal, this function needs to be enabled, then the close time and open time are inactive.

8.2 AUX. INPUTS

Table 17 Definable Functions of Aux. Digital Inputs (Active When GND (B-) is Connected)

No.	Function	Description
0	Not Used	
1	Remote Manual Start	Remote manual start signal input.
2	Input Lock	When the input lock is active, the controller can only start the fire pump by pressing the start button.
3	Remote Auto Start	Remote automatic start signal input.
4	Deluge Valve Start	Deluge valve start signal input.
5	Flow/Zone Start	Flow/Zone start signal input.
6	Emergency Start	Emergency start signal input.

8.3 AUX. OUTPUTS

Table 18 Definable Functions of Aux. Digital Outputs

No.	Function	Description
0	Not Used	This output is not used.
1	Motor Running	Output when the motor is running.
2	Power Available	Output when the power is available.
3	Phase Reversal	Output when phase reversal is detected.
4	Pump Room Alarm	Output when there is pump room alarm.
5	Motor Fault	Output when there is motor fault.
6	AB Output	Alarm bell output.
7	SV Output	Solenoid valve output.
8	ST Output	Swith trip output.
9	Main Coil Power	Control the power output of the main coil when the motor starts.
10	Delay Coil Power	Control the power output of the delay coil when the motor starts.
11	Common Alarm Output	Output when the controller has a warning or fault.
12	Common Fault Output	Output when the controller has a fault.

9 SENSOR SETTING

When reselecting the sensor, standard value of selected sensor curve will be needed.

If the standard sensor curve is different from the default sensor curve, enter the parameters of user-defined sensor curve.

When the sensor curve type is selected as "Not Used", the sensor doesn't work.

When entering the parameters of sensor curve, the X value (resistance/current/voltage) must be entered in the order from small to large, otherwise an error will occur.

The first few points or the last few points of vertical coordinates can be set as the same value, as shown in the following graph:

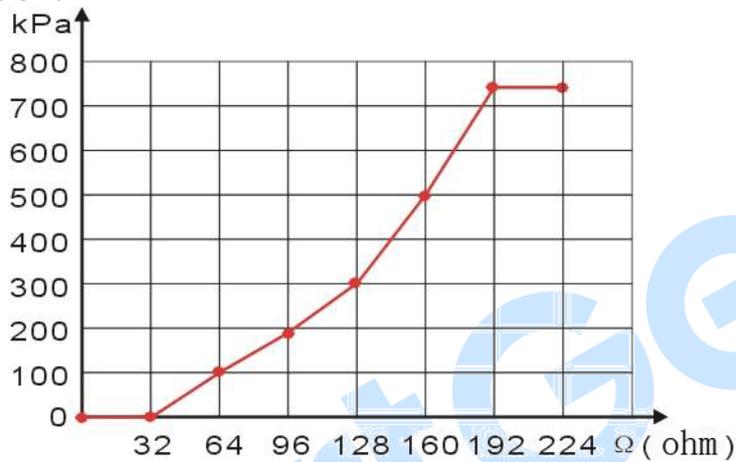


Fig. 31 Sensor Curve Setting Sample Graph

Table 19 Conversion of Pressure Unit

Unit	N/m ² (Pa)	kgf/cm ²	bar	psi
1Pa	1	1.02x10 ⁻⁵	1x10 ⁻⁵	1.45x10 ⁻⁴
1kgf/cm ²	9.8x10 ⁴	1	0.98	14.2
1bar	1x10 ⁵	1.02	1	14.5
1psi	6.89x10 ³	7.03x10 ⁻²	6.89x10 ⁻²	1

10 INSTALLATION

10.1 CLAMPS

- FPC1000D is designed to be panel-mounted, which is fixed by clamps during installation;
- Screw out the screw of fixed metal clamp counterclockwise to a proper position;
- Pull the metal clamps backward one by one to make all four fixed metal clamps fixed in the specified slots;
- Tighten the screw of the metal clamp clockwise and make sure it is fixed on the controller panel;
- Don't tighten the screws of metal clamps too tightly;
- FPC 1000M/T is installed on the din rail, with compact structure and convenient installation.

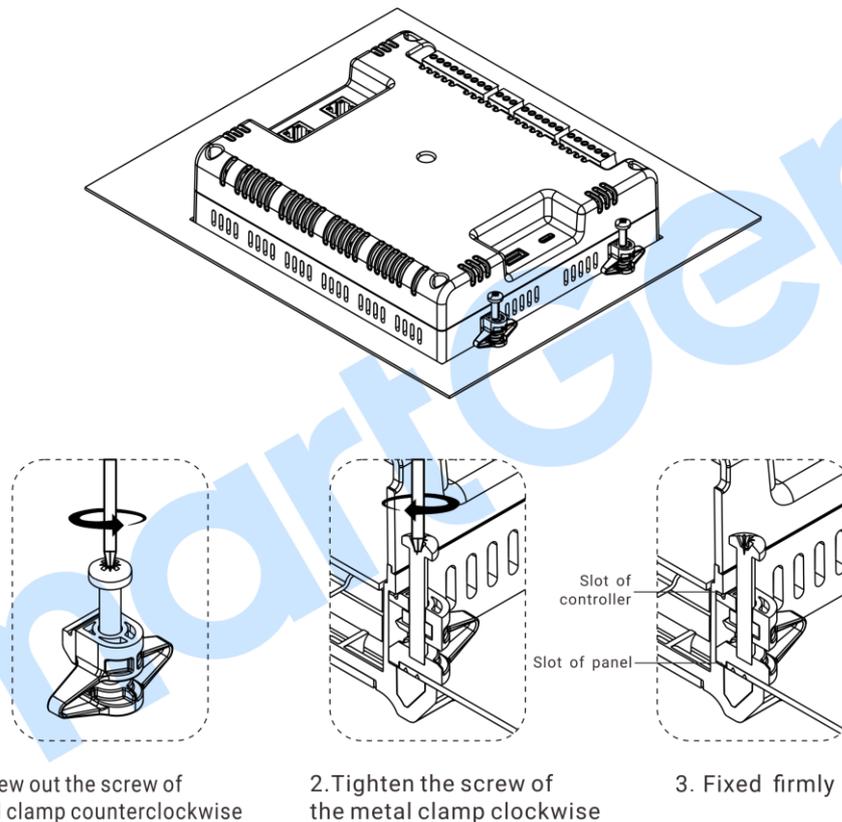


Fig. 32 FPC1000D Installation Instruction

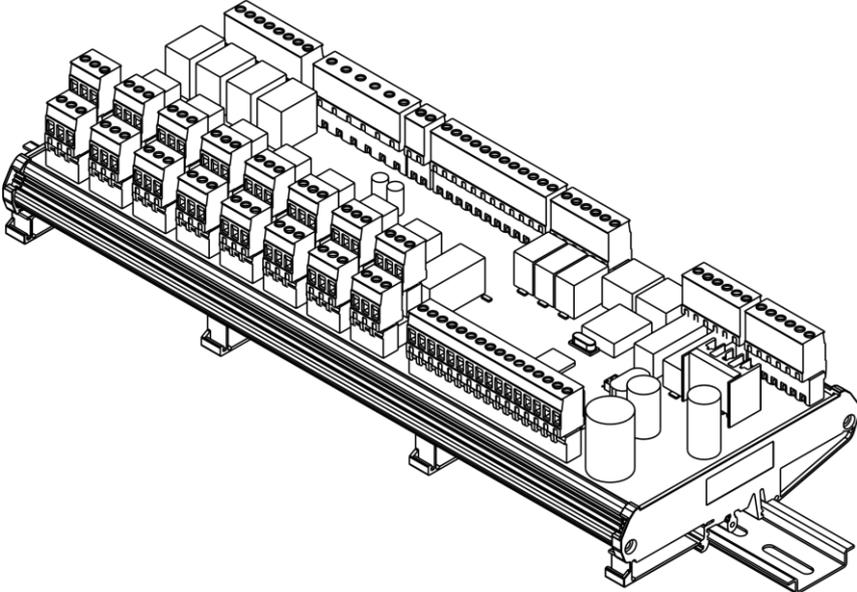


Fig. 33 FPC1000M Installation Instruction

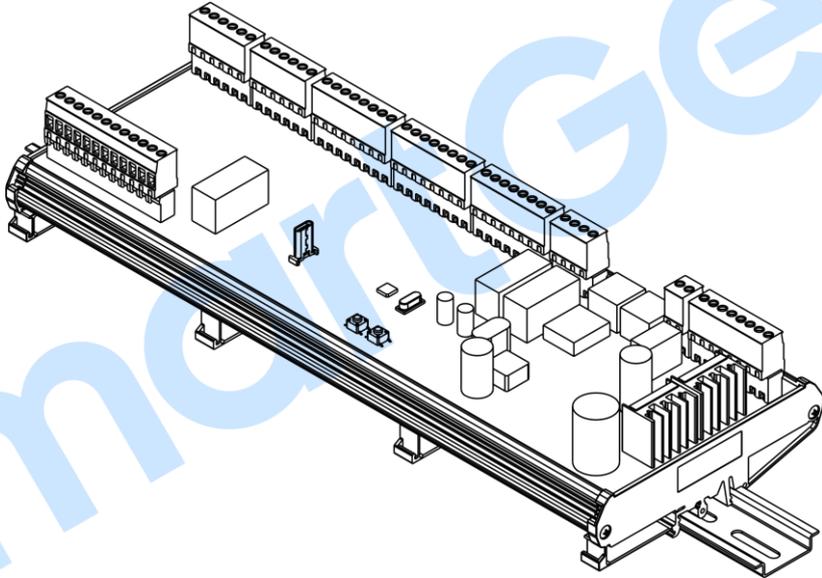


Fig. 34 FPC1000T Installation Instruction

10.2 OVERALL AND CUTOUT DIMENSIONS

Unit: mm

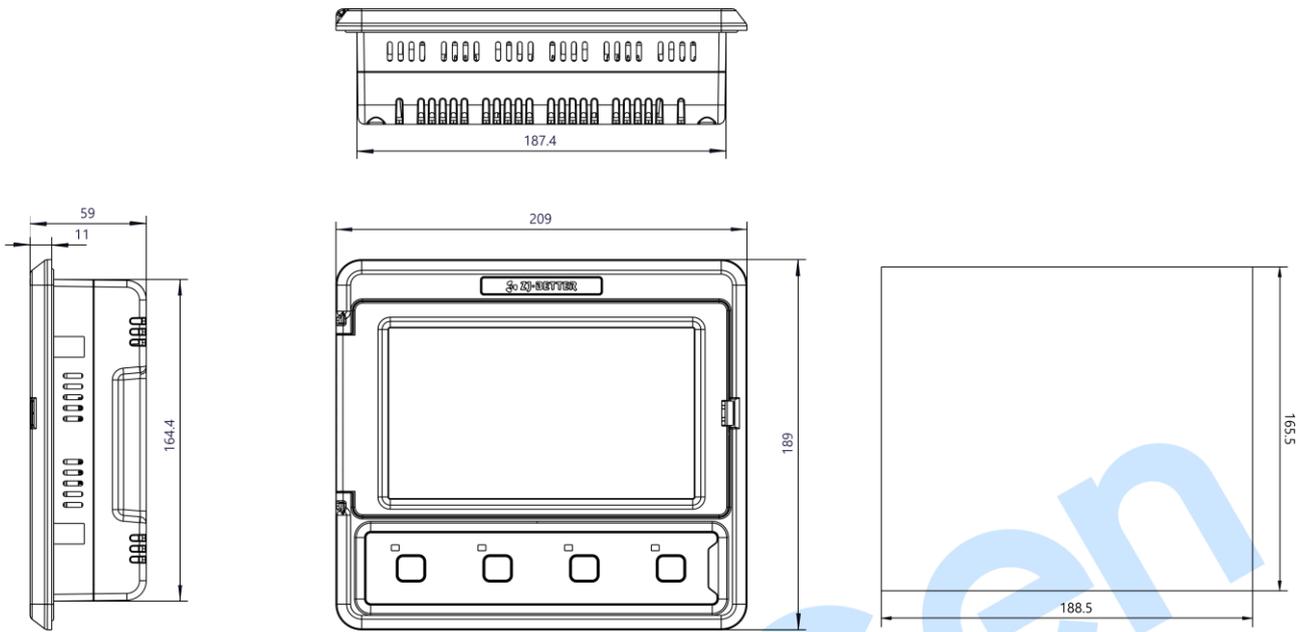


Fig. 35 FPC1000D Overall and Cutout Dimensions

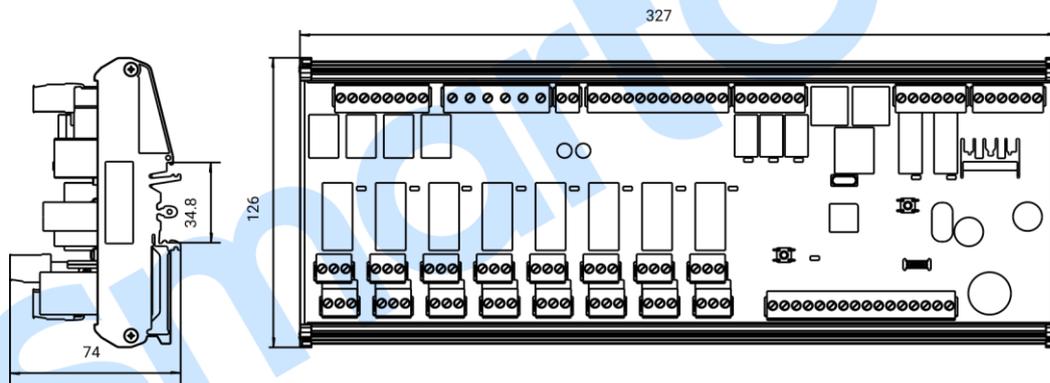


Fig. 36 FPC1000M Overall Dimensions

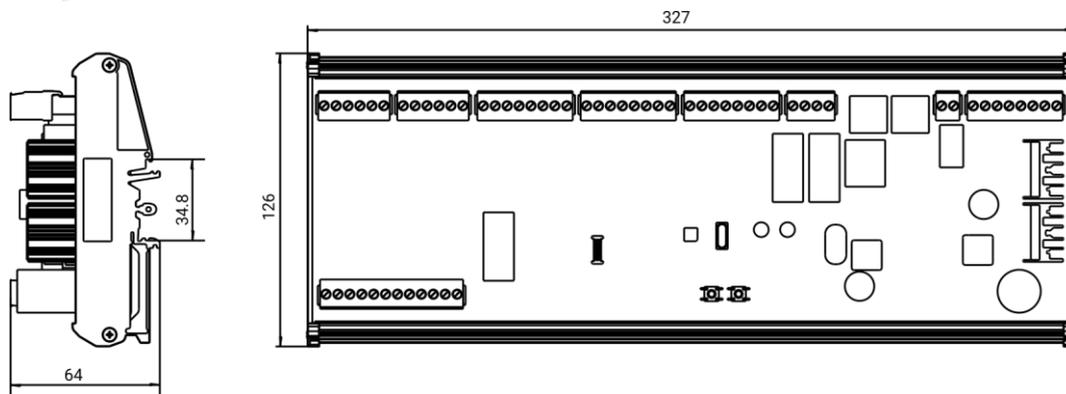


Fig. 37 FPC1000T Overall Dimensions

Table 20 Troubleshooting

Trouble	Possible Solutions
No response from display module	Check the voltage of DC power supply; Check the DC fuse.
No response from master control module	Check the voltage of DC power supply; Check the DC fuse; Check the AC power supply.
Incorrect output from auxiliary output	Check the wiring connection of auxiliary output, and pay attention to the normally open and normally closed terminal; Check the output function and active type in parameter setting.
Auxiliary input abnormal	Check whether the auxiliary input is reliably grounded when the input is active, and it should be floating when the input is inactive (Note: the input port may be damaged if it is connected with too high voltage); Check the input function and active type in parameter setting.
CAN communication abnormal	Check whether the CAN-H and CAN-L is connected correctly; Try to connect the 120Ω resistor between CAN-H and CAN-L in parallel.
RS485 communication abnormal	Check whether the positive and negative of RS485 is connected correctly; Check whether the RS485 converter is normal; Check whether the module address in parameters setting is correct; If none of the above methods work, try to connect the 120Ω resistor between A and B of RS485 in parallel.