SmartGen

MAKING CONTROL SMARTER

FPC2000

Diesel Fire Pump Controller

USER MANUAL

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CONTENTS

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Table 1 Software Version

Date	Version	Content
2024-11-08	1.0	Original release.

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.

1 OVERVIEW

The **FPC2000 Diesel Fire Pump Controller** is used for starting or controlling the diesel fire pumps. It provides manual and automatic start/stop function. The automatic start function can be controlled by pressure sensor or remote automation device (such as deluge valve), and the manual start function can be controlled by controller start button or remote manual button.

The controller supports alarm recording and timed recording functions, which can monitor system pressure, battery voltage, charging current and other data in real time. And the data can be exported through the USB host port for analyzing and diagnosing the system status.

The **FPC2000 Diesel 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 port. 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 diesel fire pump systems.

2 PERFORMANCE FEATURES

——7-inch large size color LCD screen, resistive touch screen, which supports one-click switching between Chinese and English;
——It can collect and display AC voltage, and frequency, and support overvoltage, undervoltage, overfrequency, underfrequency detection;
——Real-time monitoring of two-way charger voltage and current, two-way starter battery voltage;
——Real-time display of alarm information from the master control module;
——It supports multiple types of sensors, including resistance type, 4-20mA current type, 0-5V voltage type sensors. And it supplies the sensors with voltage of 5V or 24V. Sensor parameters are adjustable;
——In manual mode, it can control the start/stop of engine by buttons;
——Input lock function, the start/stop of engine 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 mis-operation by non-professionals;
——Wide DC power supply range of (8~35)VDC, which can be supplied by the engine's starting battery;
——RS485 communication port, and USB Type-C port 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 pump engine;
——Real-time clock display;
——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 port;
——USB Type-C port for convenient parameter debugging and program upgrade on site;
——USB host port for exporting alarm event records and timed record data;
——Rubber sealing gasket design between the enclosure and screen for IP65 waterproof performance;
——With modular structure design, pluggable terminals, embedded mounting, and compact structure, it is easy to install.

3 SPECIFICATIONS

Table 3 FPC2000D 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 FPC2000M Technical Parameters

Item	Content
Operating Voltage	8VDC–35VDC, protection for DC reverse connection Resolution: 0.1V Precision: 1%
Power Consumption	<8W (Standby mode: ≤3.5W)
AC Voltage	Range: 50VAC – 360VAC (L-N) Resolution: 1V Precision: 1%
AC Frequency	Range: 20Hz – 75Hz Resolution: 0.01Hz Precision: 0.1Hz
DC Voltage	Range: 0VDC – 60VDC Resolution: 0.1V Precision: 1%
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
SV Output	Capacity 2A @ 24VDC, active output
Boost Output	Capacity 10A @ 250VAC, passive output
Fuel Solenoid Valve (SV) Output	Capacity 16A, DC power supply output, active output
Crank Output	Capacity 16A, DC power supply output, active output
Digital Aux. Output 1–6	Capacity 8A @ 250VAC, passive output
Digital Aux. Input	Active when it is grounded (B-). Low threshold voltage is less than or equal to 1.6VDC, and maximum voltage input is 60VDC.
Engine Running Input	Active when it is high level. High threshold voltage is more than or equal to 3VDC, and maximum voltage input is 35V.
Overspeed Signal Input	Active when it is high level. High threshold voltage is more than or equal to 3VDC, and maximum voltage input is 35V.
RS485 Port	Isolated, half-duplex, baud rate at 9600, maximum communication distance at 1000m.
CAN Port	Isolated, maximum communication distance at 250m, Belden 9841 cable or other equal rating cable is required.

Item	Content
CE-EMC Certification	EN 55032, EN 55024
Case Dimensions	Installed on standard steel 35mm din rail, and the length of din rail is 400mm.
Working Temperature	(-25~+55)°C (The module mounting part can't withstand high temperature)
Working Humidity	(20~95)%RH
Storage Temperature	(-30~+55)°C (The module mounting part can't withstand high temperature)
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	1.02kg

4 OPERATION

4.1 PANEL OF CONTROLLER

Fig. 1 FPC2000D Front Panel

Table 5 Instruction of Indicators

Type	Instruction
Running I Indicator	It lights up when it starts successfully by Battery I
Running II Indicator	It lights up when it starts successfully by Battery II
Stop Indicator	It lights up when the running of engine stops
Test Indicator	It lights up when the engine is under test

4.2 FUNCTION OF BUTTONS

Table 6 Description of Buttons

Icon	Button	Description
	Start I	Press the button to start the engine by Battery I.
	Start II	Press the button to start the engine by Battery II.
	Stop	Press the button to manually stop the engine.
	Test	Press the button to open the bypass valve, so the sensor will detect the pressure drop.

4.3 START METHODS

4.3.1 MANUAL START

In manual mode, the fire pump engine can be started by pressing the “Start I”  button or “Start II”  button regardless of the system pressure.

4.3.2 REMOTE MANUAL START

In manual mode, the fire pump engine can be started by closing the “Remote Manual Start” input.

4.3.3 TEST START

In auto mode, press the “Test”  button to open the bypass valve, the sensor detects the pressure drop, then the fire pump engine will start.

4.3.4 AUTO START

In auto mode, when the pressure drops below the start pressure, the controller will automatically start the fire pump engine when the pressure sensor detects the low pressure.

4.3.5 REMOTE AUTO START

In auto mode, the fire pump engine can be started by opening the “Remote Auto Start” or “Deluge Valve Start” input.

4.3.6 FLOW START

In auto mode, the fire pump engine can be started by closing the “Flow/Zone Start” input.

4.3.7 WEEKLY START

In auto mode, according to the set value of scheduled start parameters, the fire pump engine can be automatically started at a pre-programmed time.

4.3.8 SEQUENTIAL START

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

4.3.9 AUTO START SEQUENCE

a) When the conditions for auto start are satisfied, it will enter the "Start delay";

b) After the start delay is over, the fuel relay will activate and the crank relay activates at the same time. If the pump unit does not start successfully within the "Crank Time", the fuel relay and the crank relay will deactivate, it will enter the "Crank Rest Time", and wait for the next start;

c) At any start, if the pump unit starts successfully, the fuel relay continues to activate, while the crank relay deactivates, and the pump unit enters the normal running status.

d) Within the set start times, if the pump unit does not start successfully, the controller will issue a start failure alarm, at the same time, the fuel relay and crank relay will deactivate, the ETS relay will activate, and it will deactivate after the stop detection time (10s) is over.

4.3.10 MANUAL START SEQUENCE

a) In manual mode, press Start I or Start II button, or when the manual remote start signal is active (jog signal), it will enter the "Start Delay";

b) After the start delay is over, the fuel relay and the crank relay will activate at the same time. If the engine starts successful within the "Crank Time", the fuel relay will continue to activate, the crank relay will deactivate, and the pump unit will enter the normal running status;

c) If the pump unit does not start successfully, the fuel relay and the crank relay will deactivate, the ETS relay will activate, and it will deactivate after the stop detection time (10s) is over.

4.4 STOP METHODS

4.4.1 MANUAL STOP

In manual mode, press the “Stop"  button to remove the manual start signal.

4.4.2 AUTO STOP

The fire pump engine 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 pump engine will be automatically stopped when the pressure has recovered for 10 minutes (above the stop pressure set value).

4.4.3 FLOW STOP

If the controller has been started by ‘Flow/Zone Start’ input and the signal has returned to normal, the fire pump engine will be stopped if there are no any other operation reasons.

4.4.4 STOP MODE

Regardless of the present starting reason, once the controller is switched to stop mode, the fire pump engine will be stopped.

4.4.5 STOP SEQUENCE

When all the start signals are removed or the controller is switched to the stop mode, the controller will execute the stop process, the fuel relay will deactivate, the ETS relay will activate, and it will deactivate after the stop detection time (10s) is over. In auto mode, if the engine running signal is detected, the stop failure fault will be issued.

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 of chargers and batteries matches the actual value. If everything is normal, click the ‘Confirm’ button to confirm the power information and return to the First Start page. After returning to the First Start page, the icon “√” will be displayed in front of the “Power” button.

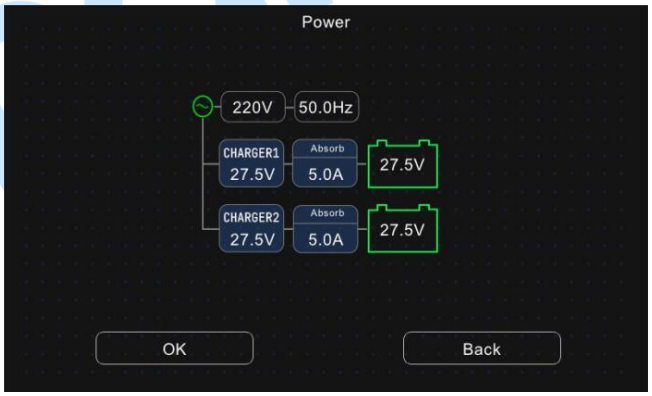

Fig. 3 Power Information Page

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 configuration of 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 “Confirm” button to confirm the pressure information and return to the First Start page.

Fig. 4 Pressure Information Page

5.4 ENGINE START CONFIRM

Click the “Engine Start Up” button to enter the Engine Start Test page. Click the “Start I” or “Start II” button to start the fire pump engine by Battery I or Battery II, and verify if the engine starts normally or not. Press the “Stop” button to stop the fire pump engine. Press the “Confirm” button to confirm the current information and return to the First Start page.

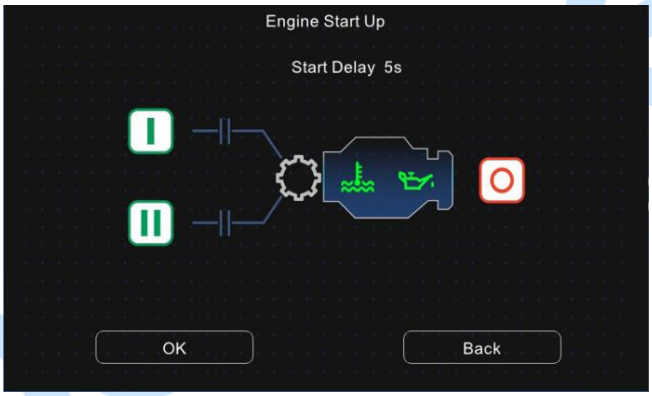

Fig. 5 Engine Start Test Page

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 page.

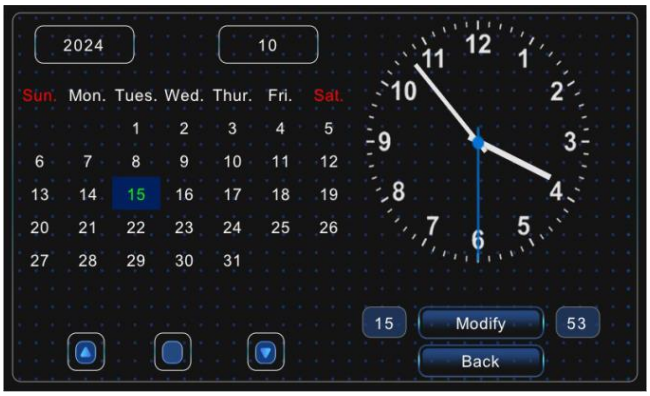

Fig. 6 Date & Time Setting Page

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 engine start information is confirmed, the icon "√" will be displayed in front of the "Complete" button. Click the "Complete" button to complete the confirm of First Start and the page of display module will jump to the home page.

Before confirming the First Start Up, the controller will not execute the automatic start logic for the fire pump engine. After it is completed, the First Start Up page will no longer be displayed when restarting the controller.

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

5.7 HOME PAGE

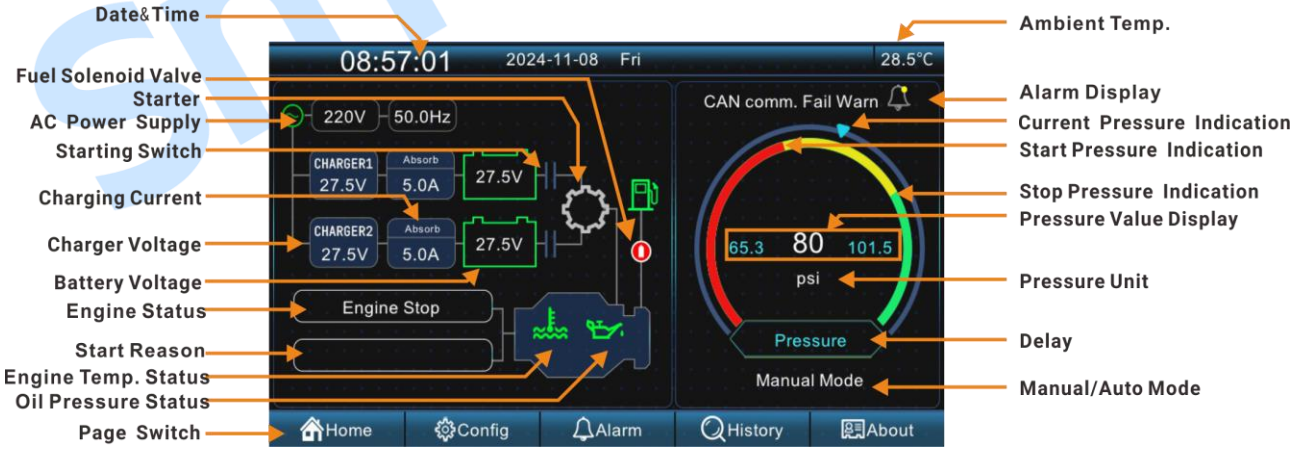

Fig. 8 Home Page

The left area of the home page will display the status information detected by master control module, including AC voltage, charger voltage, battery voltage, charging current and charging status, engine start/stop status, start reason, starter status, fuel output status, engine temperature status and engine oil pressure status.

The right 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 engine performs the start or stop delay, it displays the current countdown for the delay. When an alarm occurs, the top alarm bar will flash and display one current alarm.

"Start Reason" displays the current start reason of fire pump engine, including the following reasons:

1. Deluge valve start: the fire pump engine can be automatically started through the deluge valve.

2. Remote manual start: in manual mode, the fire pump engine can be manually started by closing the "Remote Manual Start" input.

3. Remote auto start: the fire pump engine can be automatically started by opening the "Remote Auto Start" input.

4. Flow/Zone start: the fire pump engine can be automatically started by closing the "Flow/Zone Start" input.

5. Scheduled start: the fire pump engine can be automatically started through the preset time.

6. Button start: in manual mode, the fire pump engine can be manually started by pressing the "Start I" or "Start II" button.

7. Low pressure start: the fire pump engine can be automatically started when the system pressure is lower than the start pressure.

8. Test button start: in auto mode, press the "Test" button to open the bypass valve, the sensor detects the pressure drop, then the fire pump engine will start.

"Ambient Temp." displays the real-time temperature detected by on-board temperature sensor.

"Manual/Auto Mode" displays that the controller is in auto mode, manual mode or stop mode now.

"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 7 Description of Alarms

No.	Alarm	Description
1	High Engine Temp.	HET input signal is active, and it can be set as warning or fault.
2	Low Engine Temp.	312 input signal is active, and it can be set as warning or fault.
3	Low Oil Pressure	LOP input signal is active, and it can be set as warning or fault.
4	Start Failure	Engine start failure, and it can be set as warning or fault.
5	Running Fault	After the engine has started, the engine running signal is lost, and it can be set as warning or fault.
6	Overspeed	If engine speed detection is enabled, and the speed signal is connected to the controller, the controller will alarm when it exceeds or falls below the set value, and it can be set as warning or fault. If overspeed input signal is active and it can also trigger the overspeed alarm.
7	Underspeed	
8	Stalling	
9	ECM in Standby	301 input signal is active, and it can be set as warning or fault.
10	ECM Fault	If 303 input signal is active, it will trigger ECM warning; If 304 input signal is active, it will trigger ECM fault.
11	Fuel Injection Fault	302 input signal is active, and it can be set as warning or fault.
12	Low PLD Suction	305 input signal is active, and it can be set as warning or fault.

No.	Alarm	Description
	Pressure	
13	High Raw Water Temp.	310 input signal is active, and it can be set as warning or fault.
14	Low Raw Water Flow	311 input signal is active, and it can be set as warning or fault.
15	Battery I Fault	The alarm will be issued when the voltage of Battery I is not detected, and it can be set as warning or fault.
16	Battery II Fault	The alarm will be issued when the voltage of Battery II is not detected, and it can be set as warning or fault.
17	Engine Fault	The alarm will be issued when any alarms above is issued, and it can be set as warning or fault.
18	Fuel Tank Leakage	Aux. input signal of fuel tank leakage is active, and it can be set as warning or fault.
19	Low Fuel Level	Aux. input signal of low fuel level is active, and it can be set as warning or fault.
20	High Fuel Level	Aux. input signal of high fuel level is active, and it can be set as warning or fault.
21	AC Voltage Unavailable	The controller detects there is no AC voltage, and it can be set as warning or fault.
22	High Ambient Temp.	The ambient temperature exceeds the high temperature set value. It can be set as warning or fault.
23	Low Ambient Temp.	The ambient temperature falls below the low temperature set value. It can be set as warning or fault.
24	Low Water Reservoir Level	Aux. input signal of low water reservoir level is active, and it can be set as warning or fault.
25	Water Reservoir Empty	Aux. input signal of water reservoir empty is active, and it can be set as warning or fault.
26	Pump Room Fault	The alarm will be issued when any alarms above is issued (No.18 – No.21, No.24 – No.25), and it can be set as warning or fault.
27	Charger I Fault	Input signal of Charger I Fault is active, and it can be set as warning or fault.
28	Charger II Fault	Input signal of Charger II Fault is active, and it can be set as warning or fault.
29	Solenoid Valve Fault	The alarm will be issued when the pressure can not drop by 5psi after the output of solenoid valve (SV) ends. It can be set as warning or fault.
30	Test Failure Fault	The alarm will be issued when the engine can not start when the low pressure occurs, as well as the solenoid valve fault occurs. It can be set as warning or fault.
31	Control Panel Fault	The alarm will be issued when any alarms of charger fault, SV fault, sensor fault and test failure fault is issued, and it can be set as warning or fault.
32	Battery I Overvoltage	The voltage of Battery I is more than upper set value, and it can be set as warning or fault.
33	Battery II Overvoltage	The voltage of Battery II is more than upper set value, and it can be set as warning or fault.

No.	Alarm	Description
34	Battery I Undervoltage	The voltage of Battery I is less than lower set value, and it can be set as warning or fault.
35	Battery II Undervoltage	The voltage of Battery II is less than lower set value, and it can be set as warning or fault.
36	CAN Communication Failure	The display module can not communicate with the master control module. It can only be set as warning.
37	AC Overvoltage	The AC voltage is too high, and it can be set as warning or fault.
38	AC Undervoltage	The AC voltage is too low, and it can be set as warning or fault.
39	AC Overfrequency	The AC frequency is too high, and it can be set as warning or fault.
40	AC Underfrequency	The AC frequency is too low, and it can be set as warning or fault.
41	Pressure Sensor Fault	The system pressure sensor fault, and it can be set as warning or fault.
42	Charger I Over Current	The charging current of Charger I is more than upper set value, and it can be set as warning or fault.
43	Charger II Over Current	The charging current of Charger II is more than upper set value, and it can be set as warning or fault.
44	Sensor 1 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
45	Sensor 1 Over Limit	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
46	Sensor 2 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
47	Sensor 2 Over Limit	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
48	Sensor 3 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
49	Sensor 3 Over Limit	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
50	Sensor 4 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
51	Sensor 4 Over Limit	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
52	Sensor 5 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
53	Sensor 5 Over Limit	The alarm will be issued when the value of voltage type sensor is

No.	Alarm	Description
		greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
54	Extension Sensor 1 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
55	Extension Sensor 1 Over Limit	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
56	Extension Sensor 2 Open	The alarm will be issued when the value of resistance type sensor is greater than 6K, or the value of current type sensor is less than 0.4mA. It can be set as warning, fault or no action.
57	Extension Sensor 2 Over Limit	The alarm will be issued when the value of voltage type sensor is greater than 6V, or the value of current type sensor is greater than 30mA. It is only a warning alarm and cannot be set.
58	Sensor Fault	The alarm will be issued when any alarms above is issued (No.44 – No.57), and it can be set as warning or fault.
59	Charger I Overvoltage	The voltage of Charger I is more than upper set value, and it can be set as warning or fault.
60	Charger I Undervoltage	The voltage of Charger I is less than lower set value, and it can be set as warning or fault.
61	Charger II Overvoltage	The voltage of Charger II is more than upper set value, and it can be set as warning or fault.
62	Charger II Undervoltage	The voltage of Charger II is less than lower set value, and it can be set as warning or fault.
63	Charger I Boost Alarm	The voltage boost of Charger I does not exceed 0.5V, and it can be set as warning or fault.
64	Charger II Boost Alarm	The voltage boost of Charger II does not exceed 0.5V, and it can be set as warning or fault.
65	Stop Failure	In auto mode, it will be issued when the controller detects that the signal of engine running input is active or the speed is not 0 after the stop delay is over. It is only a fault alarm.
66	Engine Status Warning	When the engine speed detection is enabled, it will be issued when the controller detects the speed is normal, but the signal of engine running input is inactive. It is only a warning alarm.

5.8 CONFIGURATION PAGE

Fig. 9 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 remains valid for five minutes. During this period, when entering the parameters setting page again, the password is not required. 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. 10 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.

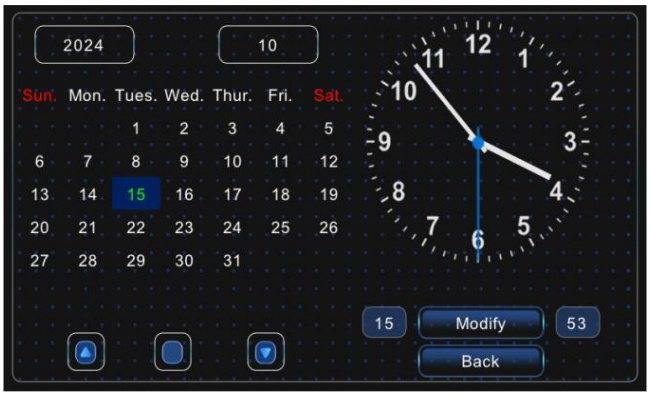

Fig. 11 Date & Time Setting

Click the “Languages” 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 AC voltage, charger DC voltage/current, battery voltage and sensor calibrations; restoring the default factory values and standard values; restoring the engine start total value recorded by the master control module; clearing event records; clearing timing records; and restoring first configuration.

Fig. 12 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.

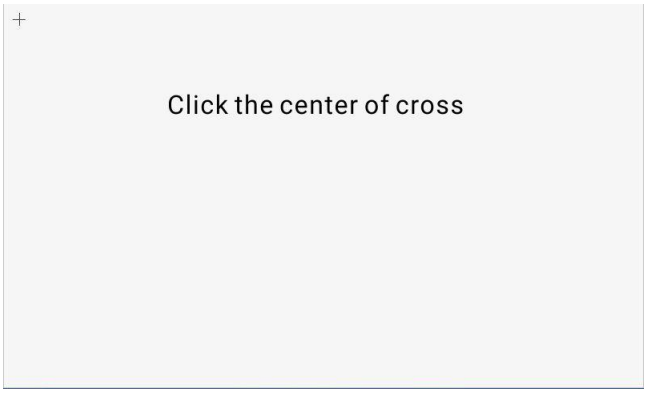

Fig. 13 Screen Calibration Page

5.9 ALARMS PAGE

Fig. 14 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 display module and 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.

5.10 HISTORY PAGE

Fig. 15 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 engine start status when the alarm occurred.

Fig. 16 Regular Pressure Record Page

The Pressure page displays regular records about the pressure and engine 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. 17 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. 18 Total Page of Fire Pump Engine 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 engine.

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.

5.11 ABOUT PAGE

Fig. 19 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. Apart from the version information, all other details can be modified via the upper computer.

6 WIRING CONNECTION

6.1 DESCRIPTION OF FPC2000D DISPLAY MODULE TERMINALS

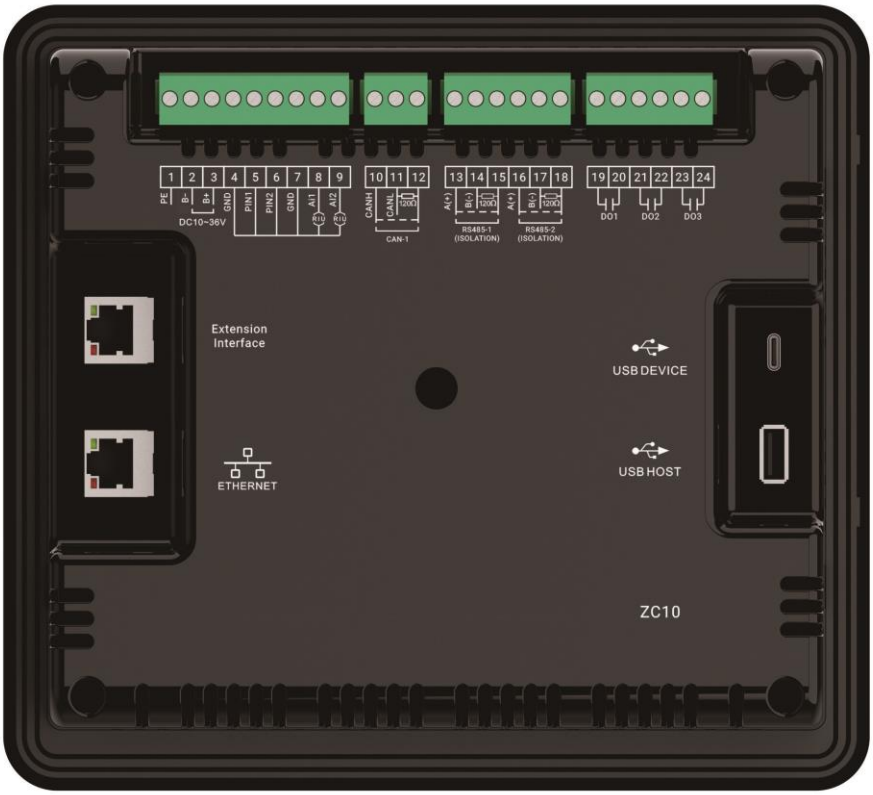

Fig. 20 Back Panel of Display Module

Table 8 Description of Display Module Connection Terminals

No.	Function		Cable Size	Remarks
1	PE		1.0mm²	Ground terminal.
2	DC Power Input B-		1.0mm²	Connect with the negative of DC power supply.
3	DC Power Input B+		1.0mm²	Connect with the positive of DC power supply.
4	GND		1.0mm²	Common terminal of digital input.
5	Extension Digital Input 1		1.0mm²	It is used as the digital input of master control module.
6	Extension Digital Input 2		1.0mm²	It is used as the digital input of master control module.
7	GND		1.0mm²	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	0.5mm²	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	0.5mm²	
12		Termination Resistor (120Ω)	0.5mm²	

No.	Function		Cable Size	Remarks
13	RS485-1	A(+)	0.5mm²	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(-)	0.5mm²	
15		Termination Resistor (120Ω)	0.5mm²	
16	RS485-2	A(+)	0.5mm²	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(-)	0.5mm²	
18		Termination Resistor (120Ω)	0.5mm²	
19	Extension Output 1		1.5mm²	Normally open output, rated 10A, and it is used as the extension output of master control module.
20			1.5mm²	
21	Extension Output 2		1.5mm²	Normally open output, rated 10A, and it is used as the extension output of master control module.
22			1.5mm²	
23	Extension Output 3		1.5mm²	Normally open output, rated 10A, and it is used as the extension output of master control module.
24			1.5mm²	
Extension Port	CAN-2		0.5mm²	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 Port			Reserved port.
USB DEVICE	USB Device Port			It is used for the communication between display module and upper computer, and the software upgrade of display module.
USB HOST	USB Host Port			It is used for the export of history record files.

6.2 DESCRIPTION OF FPC2000M TERMINALS

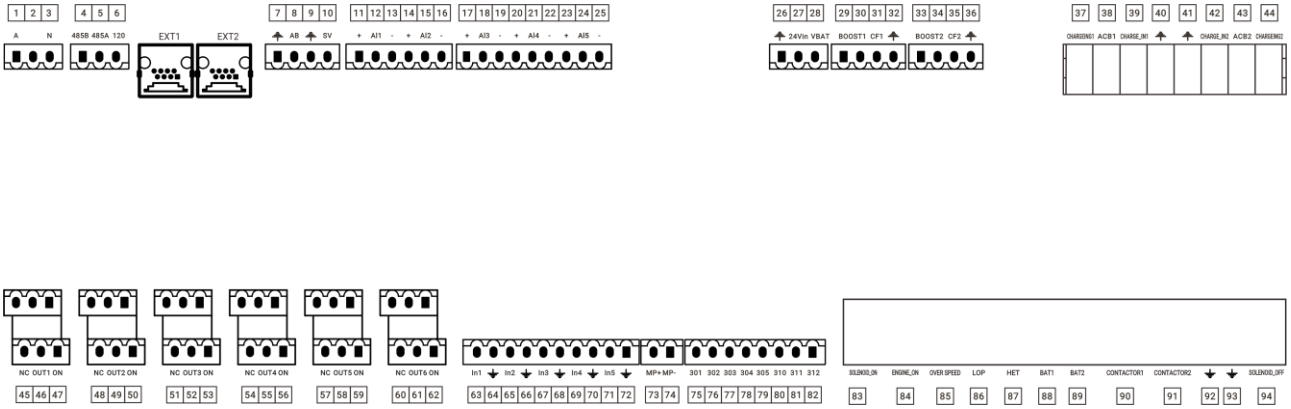

Fig. 21 FPC2000M Terminals Diagram

Table 9 Description of FPC2000M Terminals

No.	Function		Cable Size	Remarks
1	AC Voltage Sample Input	L	0.5mm²	
2				
3		N	0.5mm²	
4	RS485 Communication Port	RS485 B	0.5mm²	Terminals of RS485 communication port. Based on the on-site networking conditions, users should connect Terminal 5 with Terminal 6 if the 120Ω termination resistor inside controller is required.
5		RS485 A	0.5mm²	
6		120	0.5mm²	
EXT1	CAN Communication Port			RJ45 ports, and two ports are internally connected.
EXT2				
7	Alarm Bell Output	GND	1.0mm²	Normally open output, rated 2A, alarm bell output signal.
8		AB	1.0mm²	
9	Solenoid Valve Output	GND	1.0mm²	Normally open output, rated 2A, test solenoid valve output signal.
10		SV	1.0mm²	
11	Sensor 1	+	0.5mm²	Programmable analog input, and it supports sensors of resistance type, 4-20mA current type, and 0-5V voltage type.
12		AI1	0.5mm²	
13		-	0.5mm²	
14	Sensor 2	+	0.5mm²	Programmable analog input, and it supports sensors of 0-300Ω resistance type, 4-20mA current type, and 0-5V voltage type.
15		AI2	0.5mm²	
16		-	0.5mm²	
17	Sensor 3	+	0.5mm²	Programmable analog input, and it supports sensors of 0-300Ω resistance type, 4-20mA current type, and 0-5V voltage type.
18		AI3	0.5mm²	
19		-	0.5mm²	
20	Sensor 4	+	0.5mm²	Programmable analog input, and it supports sensors of 0-300Ω
21		AI4	0.5mm²	

No.	Function		Cable Size	Remarks
22		-	0.5mm²	resistance type, 4-20mA current type, and 0-5V voltage type.
23	Sensor 5	+	0.5mm²	Programmable analog input, and it supports sensors of 0-300Ω resistance type, 4-20mA current type, and 0-5V voltage type.
24		AI5	0.5mm²	
25		-	0.5mm²	
26	DC Power Supply Input	GND	1.0mm²	
27		24Vin	1.0mm²	
28	DC Power Supply Output	VBAT	1.0mm²	The DC voltage output of charger.
29	Boost1	B1+	0.5mm²	The voltage boost control of Charger I.
30		B1-	0.5mm²	
31	Charger I Fault Input	CF1	0.5mm²	The input of Charger I Fault, active when it is grounded.
32		GND	0.5mm²	
33	Boost2	B2+	0.5mm²	The voltage boost control of Charger II.
34		B2-	0.5mm²	
35	Charger II Fault Input	CF2	0.5mm²	The input of Charger II Fault, active when it is grounded.
36		GND	0.5mm²	
37	Charger I Charging Circuit	CHARGEING1	2.5mm²	It can be connected through miniature circuit breaker.
38		ACB1	2.5mm²	
39	Charger I Input Port	CHARGE_IN1	2.5mm²	
40		GND	2.5mm²	
41	Charger II Input Port	GND	2.5mm²	
42		CHARGE_IN2	2.5mm²	
43	Charger II Charging Circuit	ACB2	2.5mm²	It can be connected through miniature circuit breaker.
44		CHARGEING2	2.5mm²	
45	Aux. Output 1	NC	1.5mm²	Normally open output, rated 8A, programmable function output, default function is Control Panel Fault.
46		OUT1	1.5mm²	
47		NO	1.5mm²	
48	Aux. Output 2	NC	1.5mm²	Normally open output, rated 8A, programmable function output, default function is Engine Running.
49		OUT2	1.5mm²	
50		NO	1.5mm²	
51	Aux. Output 3	NC	1.5mm²	Normally open output, rated 8A, programmable function output, default function is HOA in Manual or OFF position.
52		OUT3	1.5mm²	
53		NO	1.5mm²	
54	Aux. Output 4	NC	1.5mm²	Normally open output, rated 8A, programmable function output, default function is Engine Fault.
55		OUT4	1.5mm²	
56		NO	1.5mm²	
57	Aux. Output 5	NC	1.5mm²	Normally open output, rated 8A, programmable function output, default function is Pump Room Alarm.
58		OUT5	1.5mm²	
59		NO	1.5mm²	

No.	Function		Cable Size	Remarks
60	Aux. Output 6	NC	1.5mm²	Normally open output, rated 8A, programmable function output, default function is reserved.
61		OUT6	1.5mm²	
62		NO	1.5mm²	
63	Aux. Input 1	IN1	0.5mm²	Programmable input, active when it is grounded, default function is Low Fuel Level (active when it is closed).
64		GND	0.5mm²	
65	Aux. Input 2	IN2	0.5mm²	Programmable input, active when it is grounded, default function is Remote Auto Start (active when it is opened)
66		GND	0.5mm²	
67	Aux. Input 3	IN3	0.5mm²	Programmable input, active when it is grounded, default function is Low Water Reservoir Level (active when it is closed).
68		GND	0.5mm²	
69	Aux. Input 4	IN4	0.5mm²	Programmable input, active when it is grounded, default function is Fuel Tank Leakage (active when it is closed).
70		GND	0.5mm²	
71	Aux. Input 5	IN5	0.5mm²	Programmable input, active when it is grounded, default function is High Fuel Level (active when it is closed).
72		GND	0.5mm²	
73	Engine Speed Detection	MP+	0.5mm²	Magnetic pickup, which is internally connected with GND.
74		MP-	0.5mm²	
75	ECM in Standby	TB-301	0.5mm²	Inputs of general engine faults, active when they are grounded.
76	Fuel Injection Fault	TB-302	0.5mm²	
77	ECM Warning	TB-303	0.5mm²	
78	ECM Fault	TB-304	0.5mm²	
79	Low PLD Suction Pressure	TB-305	0.5mm²	
80	High Raw Water Temp.	TB-310	0.5mm²	
81	Low Raw Water Flow	TB-311	0.5mm²	
82	Low Engine Temp. Input	TB-312	0.5mm²	
83	Fuel Solenoid Valve Open	TB-1	1.5mm²	Control terminal to open fuel solenoid valve, output is the voltage of charger.
84	Engine Running Signal Input	TB-2	0.5mm²	It is active when the input is high level.
85	Engine Overspeed Signal Input	TB-3	0.5mm²	
86	Low Oil Pressure Signal Input	TB-4	0.5mm²	Inputs of general engine faults, active when they are grounded.
87	High Engine Temp.	TB-5	0.5mm²	

No.	Function		Cable Size	Remarks
	Input			
88	Battery Positive Port	TB-6	2.5mm^2	
89		TB-8	2.5mm^2	
90	Starter Control Port	TB-9	2.5mm^2	It outputs when using Battery I to start the engine.
91		TB-10	2.5mm^2	It outputs when using Battery II to start the engine.
92	Battery Negative Port	TB-11a	2.5mm^2	
93		TB-11b	2.5mm^2	
94	ETS Signal Output	TB-12	1.5mm^2	Control terminal of ETS, output is the voltage of charger.

7 SETTING AND DEFINITION OF PARAMETERS

7.1 SETTING CONTENTS AND RANGE OF PARAMETER

Table 10 Contents and Range of Parameter

No.	Item		Range	Default	Description
Module Setting					
1	Languages		(0-1)	0	0: Simplified Chinese; 1: English.
2	Password		(0-999999)	123456	First-level password of parameters setting, only some parameters can be set.
3			(0-999999)	654321	Second-level password of parameters setting, all parameters can be set.
4	Backlight Delay		(10-65534)s	300	When the backlight delay is over, the backlight brightness of display module will be the lowest (20%) without operation on it.
5	RS485 Port of Display Module	Comm. 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	RS485 Port of	Comm. Address	(1-254)	1	The address of display module when using 485 communication.

No.	Item		Range	Default	Description
15	Master Control Module	Baud Rate	(0-3)	2	0: 2400; 1: 4800; 2: 9600; 3: 19200.
16		Stop Bit	(0-1)	0	0: 1 stop bit; 1: 2 stop bits.
17		Parity Bit	(0-2)	0	0: No parity; 1: Odd parity; 2: Even parity.
18	Charger I Address		(1-254)	10	The RS485 communication address with the external charger when the charger communication is enabled.
19	Charger II Address		(1-254)	11	
Pressure Setting					
1	Pipeline Pressure Sensor Selection		(0-6)	0	0: Aux. sensor 1 1: Aux. sensor 2 2: Aux. sensor 3 3: Aux. sensor 4 4: Aux. sensor 5 5: Extension sensor 1 6: 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.
Scheduled Start Setting					
1	Scheduled Start 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	Scheduled Start Time/h		(0~23)h	0	The duration of scheduled start.
4	Scheduled Start Time/min		(0~59)min	0	
5	Scheduled Start Running Time		(0~30)min	30	The duration of scheduled start running.
Delay Control Setting					
1	Start Method		(0-2)	2	0: Start I; 1: Start II; 2: Cyclic start.

No.	Item	Range	Default	Description
2	Start Delay	(0-3600)s	10	Engine start delay.
3	Start Time	(0-3600)s	8	The waiting time for engine running signal after engine starter outputs.
4	Start Interval	(0-3600)s	10	The interval for another start after the start failure.
5	Start Times	(1-10)	6	The re-start times when start fails.
6	Auto Stop Enable	(0-1)	1	0: Disabled; 1: Enabled.
7	Auto Stop Delay	(1-1440)min	1	The delay of fire pump engine's automatic stop.
8	Stop Detection Time	(0-3600)s	30	The duration of ETS signal output.
9	Test Running Time	(1-30)min	10	The duration of engine running after pressing the test start button manually.
10	Solenoid Valve Test	(0-3600)s	3	In test start mode, the duration of the solenoid valve pressure relief.
11	Dual-battery Start	(0-1)	0	0: Disabled; 1: Enabled.
AC Voltage Setting				
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	(0-600)V	220	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.

No.	Item	Range	Default	Description
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.
Engine Setting				
1	Flywheel Teeth	(10-300)	118	The number of flywheel teeth for engine speed detection.
2	Start Success Speed	(0-6000)rpm	360	The speed when the engine starts successfully.
3	Engine Speed Detection Enable	(0-1)	0	0: Disabled; 1: Enabled.
4	Overspeed Set Value	(0-6000)	1650	Upper limit of speed, engine will be abnormal when it is greater than the upper limit.
5	Overspeed Return Value	(0-6000)	1620	Return value of speed upper limit, engine will be normal when it is less than the return value.
6	Overspeed Delay	(0-3600)s	5	Time required to confirm the voltage from normal to overspeed.
7	Underspeed Set Value	(0-6000)	1290	Lower limit of speed, engine will be abnormal when it is less than the lower limit.
8	Underspeed Return Value	(0-6000)	1350	Return value of speed lower limit, engine will be normal when it is greater than the return value.
9	Underspeed Delay	(0-3600)s	5	Time required to confirm the voltage from normal to underspeed.
10	Stalling Set Value	(0-6000)	0	Lower limit of speed, engine will be abnormal when it is less than the lower limit.
11	Stalling Return Value	(0-6000)	10	Return value of speed lower limit, engine will be normal when it is greater than the return value.
12	Stalling Delay	(0-3600)s	5	Time required to confirm the voltage from normal to Stalling.

No.	Item	Range	Default	Description
Charger & Battery Setting				
1	Charger Comm. Enable	(0-1)	0	0: Disabled; 1: Enabled. Charging status will be required via communication when BACM2410 communication is enabled.
2	Boost End Voltage	(20.0-32.0)V	27.5	If the voltage of battery exceeds the value, Boost control signal will be off.
3	Auto Boost Voltage	(20.0-32.0)V	25.5	If the voltage of battery falls below the value, Boost control signal will output, quick charge mode of charger will start.
4	Auto Boost Delay	(0-3600)s	5	The delay of starting Boost charging.
5	Charger Overvoltage Set Value	(16.0-32.0)V	30.0	Upper limit of voltage, it will be abnormal when it is greater than the upper limit.
6	Charger Overvoltage Return Value	(16.0-32.0)V	28.5	Return value of voltage upper limit, it will be normal when it is less than the return value.
7	Charger Overvoltage Delay	(0-3600)s	10	Time required to confirm the voltage from normal to overvoltage.
8	Charger Undervoltage Set Value	(16.0-32.0)V	20.0	Lower limit of voltage, it will be abnormal when it is less than the lower limit.
9	Charger Undervoltage Return Value	(16.0-32.0)V	21.0	Return value of voltage lower limit, it will be normal when it is more than the return value.
10	Charger Undervoltage Delay	(0-3600)s	10	Time required to confirm the voltage from normal to undervoltage.
11	Charger Over Current Set Value	(0-20.0)A	12.0	Upper limit of current, it will be abnormal when it is greater than the upper limit.
12	Charger Over Current Return Value	(0-20.0)A	11.5	Return value of current upper limit, it will be normal when it is less than the return value.
13	Charger Over Current Delay	(0-3600)s	10	Time required to confirm the current from normal to Over Current.
14	Battery Overvoltage Set Value	(16.0-32.0)V	28.5	Upper limit of voltage, it will be abnormal when it is greater than the upper limit.
15	Battery Overvoltage Return Value	(16.0-32.0)V	27.5	Return value of voltage upper limit, it will be normal when it is less than the return value.
16	Battery Overvoltage Delay	(0-3600)s	60	Time required to confirm the voltage from normal to overvoltage.

No.	Item	Range	Default	Description
17	Battery Undervoltage Set Value	(16.0-32.0)V	20.5	Lower limit of voltage, it will be abnormal when it is less than the lower limit.
18	Battery Undervoltage Return Value	(16.0-32.0)V	21.5	Return value of voltage lower limit, it will be normal when it is more than the return value.
19	Battery Undervoltage Delay	(0-3600)s	60	Time required to confirm the voltage from normal to undervoltage.
20	Battery Loss Detection Enable	(0-1)	1	0: Disabled; 1: Enabled.
21	Battery Test Interval	(5-3600)min	60	At regular intervals, the charger disconnects from the battery, and detects the battery voltage.
22	Battery Test Delay	(1-3600)s	20	The time of battery test.
23	Voltage Boost Value	(0.1-5.0)V	0.5	The Boost function is normal if the value of charger voltage boost exceeds the value.
Alarm Setting				
1	Engine Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
2	Engine Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
3	Engine Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
4	High Engine Temp. Enable	(0-1)	1	0: Disabled; 1: Enabled.
5	High Engine Temp. Alarm Type	(0-1)	1	0: Warning; 1: Fault.
6	High Engine Temp. Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
7	Low Engine Temp. Enable	(0-1)	1	0: Disabled; 1: Enabled.
8	Low Engine Temp. Alarm Type	(0-1)	1	0: Warning; 1: Fault.
9	Low Engine Temp. Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
10	Low Oil Pressure Enable	(0-1)	1	0: Disabled; 1: Enabled.
11	Low Oil Pressure Alarm Type	(0-1)	1	0: Warning; 1: Fault.
12	Low Oil Pressure Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
13	Start Failure Enable	(0-1)	1	0: Disabled; 1: Enabled.
14	Start Failure Alarm Type	(0-1)	1	0: Warning; 1: Fault.
15	Start Failure Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.

No.	Item	Range	Default	Description
16	Running Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
17	Running Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
18	Running Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
19	Overspeed Enable	(0-1)	1	0: Disabled; 1: Enabled.
20	Overspeed Alarm Type	(0-1)	0	0: Warning; 1: Fault.
21	Overspeed Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
22	Underspeed Enable	(0-1)	0	0: Disabled; 1: Enabled.
23	Underspeed Alarm Type	(0-1)	0	0: Warning; 1: Fault.
24	Underspeed Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
25	Stalling Enable	(0-1)	0	0: Disabled; 1: Enabled.
26	Stalling Alarm Type	(0-1)	0	0: Warning; 1: Fault.
27	Stalling Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
28	ECM in Standby Enable	(0-1)	1	0: Disabled; 1: Enabled.
29	ECM in Standby Alarm Type	(0-1)	1	0: Warning; 1: Fault.
30	ECM in Standby Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
31	Fuel Injection Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
32	Fuel Injection Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
33	Fuel Injection Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
34	Low PLD Suction Pressure Enable	(0-1)	1	0: Disabled; 1: Enabled.
35	Low PLD Suction Pressure Alarm Type	(0-1)	1	0: Warning; 1: Fault.
36	Low PLD Suction Pressure Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
37	High Raw Water Temp. Enable	(0-1)	1	0: Disabled; 1: Enabled.
38	High Raw Water Temp. Alarm Type	(0-1)	1	0: Warning; 1: Fault.
39	High Raw Water Temp. Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
40	Low Raw Water Flow Enable	(0-1)	1	0: Disabled; 1: Enabled.
41	Low Raw Water Flow Alarm Type	(0-1)	1	0: Warning; 1: Fault.
42	Low Raw Water Flow Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.

No.	Item	Range	Default	Description
43	Battery I Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
44	Battery I Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
45	Battery I Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
46	Battery II Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
47	Battery II Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
48	Battery II Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
49	Battery Overvoltage Enable	(0-1)	1	0: Disabled; 1: Enabled.
50	Battery Overvoltage Alarm Type	(0-1)	0	0: Warning; 1: Fault.
51	Battery Overvoltage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
52	Battery Undervoltage Enable	(0-1)	1	0: Disabled; 1: Enabled.
53	Battery Undervoltage Alarm Type	(0-1)	0	0: Warning; 1: Fault.
54	Battery Undervoltage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
55	Pump Room Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
56	Pump Room Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
57	Pump Room Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
58	Fuel Tank Leakage Enable	(0-1)	1	0: Disabled; 1: Enabled.
59	Fuel Tank Leakage Alarm Type	(0-1)	1	0: Warning; 1: Fault.
60	Fuel Tank Leakage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
61	Low Fuel Level Enable	(0-1)	1	0: Disabled; 1: Enabled.
62	Low Fuel Level Alarm Type	(0-1)	1	0: Warning; 1: Fault.
63	Low Fuel Level Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
64	High Fuel Level Enable	(0-1)	1	0: Disabled; 1: Enabled.
65	High Fuel Level Alarm Type	(0-1)	1	0: Warning; 1: Fault.
66	High Fuel Level Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.

No.	Item	Range	Default	Description
67	AC Voltage Unavailable Enable	(0-1)	1	0: Disabled; 1: Enabled.
68	AC Voltage Unavailable Alarm Type	(0-1)	1	0: Warning; 1: Fault.
69	AC Voltage Unavailable Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
70	Low Water Reservoir Level Enable	(0-1)	1	0: Disabled; 1: Enabled.
71	Low Water Reservoir Level Alarm Type	(0-1)	1	0: Warning; 1: Fault.
72	Low Water Reservoir Level Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
73	Water Reservoir Empty Enable	(0-1)	1	0: Disabled; 1: Enabled.
74	Water Reservoir Empty Alarm Type	(0-1)	1	0: Warning; 1: Fault.
75	Water Reservoir Empty Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
76	High Ambient Temp. Enable	(0-1)	1	0: Disabled; 1: Enabled.
77	High Ambient Temp. Alarm Type	(0-1)	0	0: Warning; 1: Fault.
78	High Ambient Temp. Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
79	Low Ambient Temp. Enable	(0-1)	1	0: Disabled; 1: Enabled.
80	Low Ambient Temp. Alarm Type	(0-1)	0	0: Warning; 1: Fault.
81	Low Ambient Temp. Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
82	AC Overvoltage Enable	(0-1)	0	0: Disabled; 1: Enabled.
83	AC Overvoltage Alarm Type	(0-1)	0	0: Warning; 1: Fault.
84	AC Overvoltage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
85	AC Undervoltage Enable	(0-1)	0	0: Disabled; 1: Enabled.
86	AC Undervoltage Alarm Type	(0-1)	0	0: Warning; 1: Fault.
87	AC Undervoltage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
88	AC Overfrequency Enable	(0-1)	0	0: Disabled; 1: Enabled.

No.	Item	Range	Default	Description
89	AC Overfrequency Alarm Type	(0-1)	0	0: Warning; 1: Fault.
90	AC Overfrequency Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
91	AC Underfrequency Enable	(0-1)	0	0: Disabled; 1: Enabled.
92	AC Underfrequency Alarm Type	(0-1)	0	0: Warning; 1: Fault.
93	AC Underfrequency Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
94	Control Panel Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
95	Control Panel Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
96	Control Panel Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
97	Charger I Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
98	Charger I Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
99	Charger I Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
100	Charger II Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
101	Charger II Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
102	Charger II Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
103	Solenoid Valve Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
104	Solenoid Valve Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
105	Solenoid Valve Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
106	Test Failure Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
107	Test Failure Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
108	Test Failure Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
109	Pressure Sensor Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
110	Pressure Sensor Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
111	Pressure Sensor Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.

No.	Item	Range	Default	Description
112	Sensor Fault Enable	(0-1)	1	0: Disabled; 1: Enabled.
113	Sensor Fault Alarm Type	(0-1)	1	0: Warning; 1: Fault.
114	Sensor Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
115	Charger Overvoltage Enable	(0-1)	1	0: Disabled; 1: Enabled.
116	Charger Overvoltage Alarm Type	(0-1)	0	0: Warning; 1: Fault.
117	Charger Overvoltage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
118	Charger Undervoltage Enable	(0-1)	1	0: Disabled; 1: Enabled.
119	Charger Undervoltage Alarm Type	(0-1)	0	0: Warning; 1: Fault.
120	Charger Undervoltage Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
121	Charger Over Current Enable	(0-1)	1	0: Disabled; 1: Enabled.
122	Charger Over Current Alarm Type	(0-1)	0	0: Warning; 1: Fault.
123	Charger Over Current Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
124	Charger Boost Monitoring Enable	(0-1)	1	0: Disabled; 1: Enabled.
125	Charger Boost Fault Alarm Type	(0-1)	0	0: Warning; 1: Fault.
126	Charger Boost Fault Alarm Bell	(0-1)	1	0: No ringing; 1: Ringing.
Aux. Inputs Setting				
1	Input 1 Function	(0-16)	7	Low Fuel Level.
2	Input 1 Active Type	(0-1)	0	0: Closed as active; 1: Open as active.
3	Input 2 Function	(0-16)	3	Remote Auto Start.
4	Input 2 Active Type	(0-1)	1	0: Closed as active; 1: Open as active.
5	Input 3 Function	(0-16)	8	Low Water Reservoir Level.
6	Input 3 Active Type	(0-1)	0	0: Closed as active; 1: Open as active.
7	Input 4 Function	(0-16)	9	Fuel Tank Leakage.
8	Input 4 Active Type	(0-1)	0	0: Closed as active; 1: Open as active.
9	Input 5 Function	(0-16)	10	High Fuel Level.
10	Input 5 Active Type	(0-1)	0	0: Closed as active; 1: Open as active.
11	Input 6 Function	(0-16)	14	Manual Mode.
12	Input 6 Active Type	(0-1)	0	0: Closed as active; 1: Open as active.
13	Input 7 Function	(0-16)	16	Auto Mode.
14	Input 7 Active Type	(0-1)	0	0: Closed as active; 1: Open as active.

No.	Item	Range	Default	Description
Outputs Setting				
1	Aux. Output 1 Function	(0-20)	1	Control Panel Fault.
2	Aux. Output 1 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
3	Aux. Output 2 Function	(0-20)	2	Engine Running.
4	Aux. Output 2 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
5	Aux. Output 3 Function	(0-20)	3	HOA in Manual or OFF position.
6	Aux. Output 3 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
7	Aux. Output 4 Function	(0-20)	4	Engine Fault.
8	Aux. Output 4 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
9	Aux. Output 5 Function	(0-20)	5	Pump Room Alarm.
10	Aux. Output 5 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
11	Aux. Output 6 Function	(0-20)	0	Not Used.
12	Aux. Output 6 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
13	Alarm Bell Output	/	6	AB output
14	AB Output Active Type	/	0	0: Normally open output.
15	Solenoid Valve Output	/	7	SV Output
16	SV Output Active Type	/	0	0: Normally open output.
17	Extension Aux. Output 1 Function	(0-20)	0	Not Used.
18	Extension Aux. Output 1 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
19	Extension Aux. Output 2 Function	(0-20)	0	Not Used.
20	Extension Aux. Output 2 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
21	Extension Aux. Output 3 Function	(0-20)	0	Not Used.
22	Extension Aux. Output 3 Active Type	(0-1)	0	0: Normally open output; 1: Normally closed output.
Analog Sensor Setting				
Sensor 1				
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.

No.	Item	Range	Default	Description
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.
8	Y(1-8)	(0-10000)		Y-axis coordinate of sensor curve, sensor calculation output value.
Sensor 2				
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.
8	Y(1-8)	(0-10000)		Y-axis coordinate of sensor curve, sensor calculation output value.
Sensor 3				

No.	Item	Range	Default	Description
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.
8	Y(1-8)	(0-10000)		Y-axis coordinate of sensor curve, sensor calculation output value.
Sensor 4				
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.
8	Y(1-8)	(0-10000)		Y-axis coordinate of sensor curve, sensor calculation output value.

No.	Item	Range	Default	Description
Sensor 5				
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.
8	Y(1-8)	(0-10000)		Y-axis coordinate of sensor curve, sensor calculation output value.
Extension Sensor 1				
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.

No.	Item	Range	Default	Description
8	Y(1-8)	(0-10000)		Y-axis coordinate of sensor curve, sensor calculation output value.
Extension Sensor 2				
1	Sensor Type	(0-3)	2	0: Not Used; 1: Temperature sensor; 2: Pressure sensor; 3: Level sensor.
2	Curve Type	(0-3)	2	0: Not Used; 1: Resistance type; 2: 4-20mA Current type; 3: 0-5V Voltage type.
3	Open Action	(0-2)	2	0: Warning; 1: Fault; 2: No action.
4	Open Alarm Bell	(0-1)	0	0: No ringing; 1: Ringing.
5	Display Unit	(0-3)	2	0: kPa; 1: bar; 2: psi; 3: MPa.
6	Compensation Value	(-3276-3276)	0	Fine-tune the sensor value, and the unit follows the display unit.
7	X(1-8)	(0-10000)		X-axis coordinate of sensor curve, sensor sampling input value.
8	Y(1-8)	(0-10000)		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.
6	Low Temp. Delay	(0-3600)s	10	Time required to confirm the temperature from normal to low temperature.

7.2 AUX. INPUTS

Table 11 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.
7	Low Fuel Level	Emergency start signal input.
8	Low Water Reservoir Level	Low water reservoir level signal input.
9	Fuel Tank Leakage	Fuel tank leakage signal input.
10	High Fuel Level	High fuel level signal input.
11	Water Reservoir Empty	Water reservoir empty signal input.
12	Charger I On-load End	Charger I is forced to be in standby.
13	Charger II On-load End	Charger II is forced to be in standby.
14	Manual Mode	Manual mode signal input.
15	Stop Mode	Stop mode signal input.
16	Auto Mode	Auto mode signal input.

7.3 AUX. OUTPUTS

Table 12 Definable Functions of Aux. Digital Outputs

No.	Function	Description
0	Not Used	This output is not used.
1	Control Panel Fault	Output when control panel fault or warning is issued.
2	Engine Running	Output when the engine running signal is detected.
3	HOA in Manual or OFF position	Output when controller mode is not Auto Mode.
4	Engine Fault	Output when engine fault or warning is issued.
5	Pump Room Alarm	Output when pump room fault or warning is issued.
6	AB Output	Alarm bell output.
7	SV Output	Solenoid valve output.
8	Comm. Failure	Output when master control module fails to communicate with display module.
9	Pressure Sensor Fault	Output when pressure sensor fault is issued.
10	AC Voltage Unavailable	Output when AC voltage is unavailable.
11	Common Warning Output	Output when the controller has a warning.
12	Common Fault Output	Output when the controller has a fault.
13	Common Alarm Output	Output when the controller has a warning or fault.
14	Reserved	
15	Reserved	

No.	Function	Description
16	Input 1 Status	Output when Input 1 is active.
17	Input 2 Status	Output when Input 2 is active.
18	Input 3 Status	Output when Input 3 is active.
19	Input 4 Status	Output when Input 4 is active.
20	Input 5 Status	Output when Input 5 is active.

8 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:

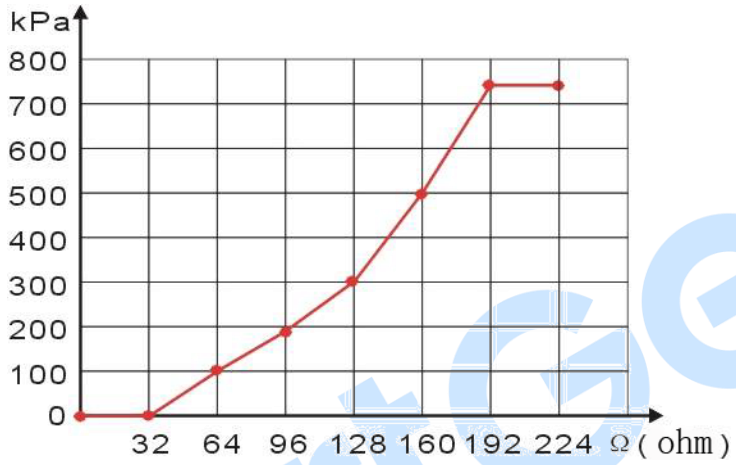

Fig. 22 Sensor Curve Setting Sample Graph

Table 13 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

9 INSTALLATION

9.1 CLAMPS

——FPC2000D 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 2000M is installed on the din rail, with compact structure and convenient installation.

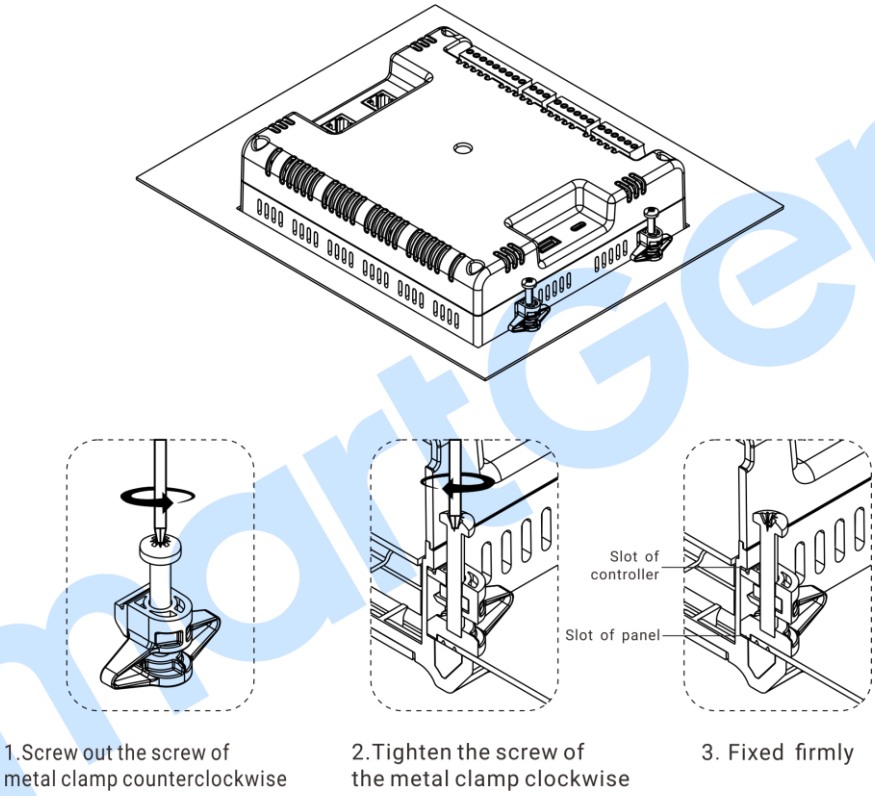

Fig. 23 FPC2000D Installation Instruction

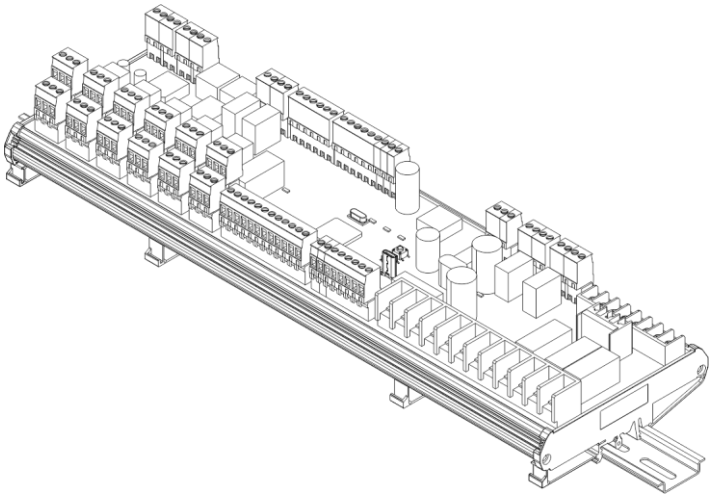

Fig. 24 FPC2000M Installation Instruction

9.2 OVERALL AND CUTOUT DIMENSIONS

Unit: mm

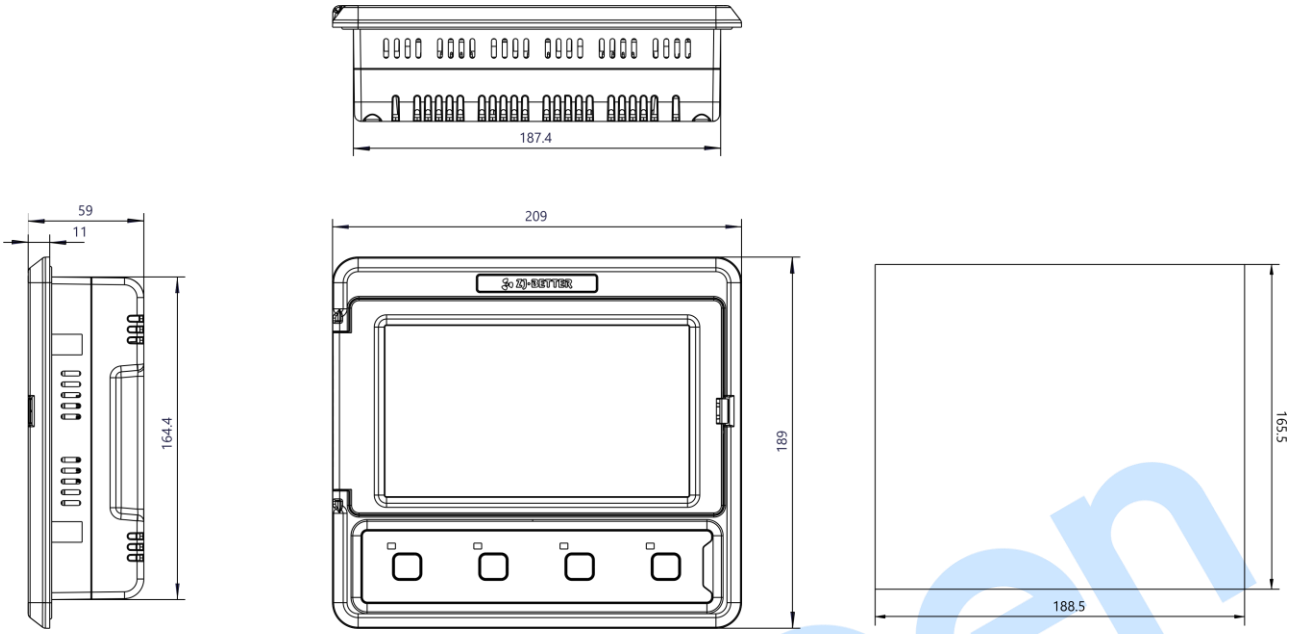

Fig. 25 FPC2000D Overall and Cutout Dimensions

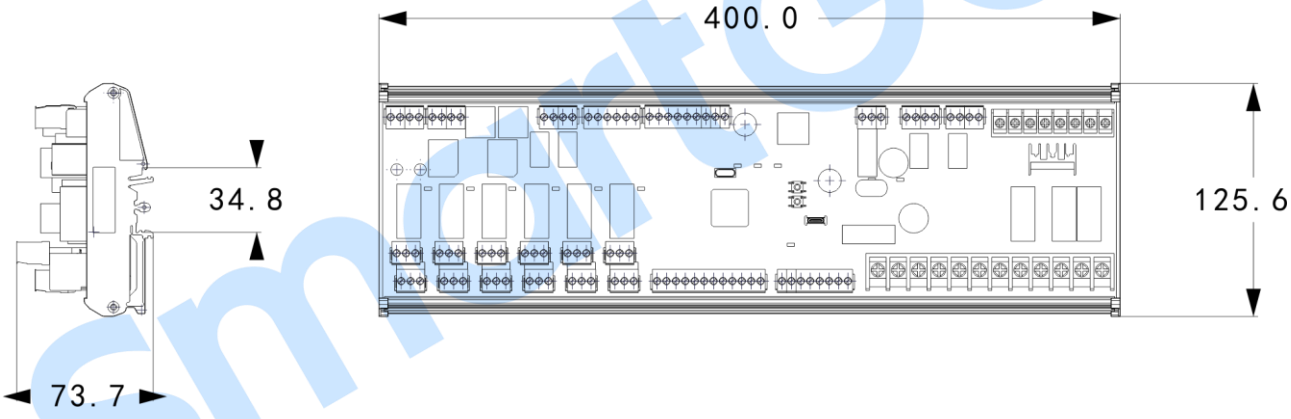

Fig. 26 FPC2000M Overall Dimensions

10 TROUBLESHOOTING

Table 14 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;
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.