SANNOVA

DIESEL ENGINE FIRE CONTROL CONTROLLER

OPERATING INSTRUCTIONS

MODEL FPD

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Security Introduction

For more information,please visit the official website of SANNOVA(www.sannova.biz)

dangerous

Do not attempt to install or maintain the device when it is powered on!Connecting powered devices may result in death, personal injury, or significant property damage.Before performing any operation, it is necessary to confirm that there is no voltage and always follow recognized safety procedures,The controller disconnect switch must be in the "off" position to open the chassis door.SANNOVA is not responsible for any misuse or incorrect installation of its products.

introduction

The diesel engine fire pump controller is used to start the diesel engine driven fire pump.The diesel engine fire pump controller should have automatic and manual start and stop functions.Automatic start is controlled by pressure sensors or remote automatic devices (such as rain valves).Manual start is controlled by a remote manual button or controller button.After automatic startup, once all startup conditions are restored to normal, the automatic stop option will execute an automatic stop within 30 minutes.The diesel engine fire pump controller includes two battery chargers to ensure that the engine battery can be continuously charged.

Diesel engine fire pump controller type

MODEL： FPD
Battery Voltage： 12V/24V
AC input voltage： 208/240V 50/60Hz

Methods of Starting/Stopping

The controller has two modes: automatic and non automatic,Used for manual and automatic stop (automatic stop can only be achieved after automatic start).

METHODS OF STARTING

AUTOMATIC START

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

MANUAL START

When the main selection switch (knob below the panel) is in the "manual" position,Regardless of the system pressure, the motor can be started by pressing start 1 or start 2   .After pressing the start button, the fuel solenoid valve will immediately open and remain in this state.

REMOTE MANUAL START

Start the motor by temporarily closing the contacts of the manual button.

REMOTE AUTOMATIC START,DELUGE VALVE START

The motor can be remotely started by temporarily opening the contacts connected to the automatic device.The controller must be in AUTO mode.

WEEKLY START

The engine can automatically start (stop) at pre programmed times.

TEST START

Manually press the run test button to start the motor.

METHODS OF STOPPING

MANUAL STOP

Press the priority 'stop' button to complete the manual stop.  The fragile glass panel/transparent cover visible main control switch in the operation controller,Or operate the power control switch protected by the stop button outside the controller casing.

AUTOMATIC STOP

It can only stop automatically when automatic start occurs and this feature is enabled.After enabling this feature, as long as there are no other operational reasons,After all starting speeds have returned to normal and the total running time has reached at least 30 minutes,The controller is required to stop the engine.

EMERGENCY STOP

Emergency stop may be required under any start-up conditions,The main selector switch can be placed in the OFF position to achieve emergency stop.

Installation

This diesel engine fire pump controller has passed FM certification and complies with FM1321/1323 and UL1247 standards.Installation shall be carried out in accordance with NFPA2-2013 and local electrical code standards.To ensure the seismic resistance of the product, the four metal mounting lugs provided on the controller should be used and fixed to the rigid wall structure with appropriate bolts.

Location

The controller should be located close to the engine being controlled and protected to prevent damage from water jets.The live parts of the controller shall not be lower than 12 inches (305 mm) above the ground.

The standard controller enclosure protection level is NEMA2.It needs to be installed in a standard compliant environment and provide appropriate protection,The controller needs to be installed inside the building, and prolonged exposure to ultraviolet radiation in the external environment can cause color changes on the paint surface.

Wiring and Connections

Water pipe joint

Connect the controller to the piping system and drainage pipes according to NFPA20.The water pipe joint is located on the left side of the controller.The pipeline joint for system pressure is 1/2NPT thread, and if drainage is required, the joint is 3/8 NPT thread.

ELECTRICAL WIRING

The electrical wiring between the power supply and the diesel engine fire pump controller should comply with chapters 12.3.5.1, 12.3.5.2, and 12.2.5.3 of NFPA 20, Article 695 of NFPA 70 National Electrical Code, or other local regulations.

Electrical connection

Electrical connections must be made under the supervision of a certified electrician.When entering the cabinet, waterproof hub accessories must be used to maintain the NEMA rating of the cabinet.The installation personnel are responsible for taking appropriate measures to protect the fire pump controller components from damage caused by metal fragments or drill cuttings.Otherwise, it may result in personal injury, damage to the controller, and ultimately void the warranty.

Energy Consumption

Diesel engine controller		
Model/Status	220/240VAC	VDC output
12VDC Not charging	0.1A	14.4V
12VDC Fully charged	1.0A	
24VDC Not charging	0.1A	28.8V
24VDC Fully charged	2.0A	

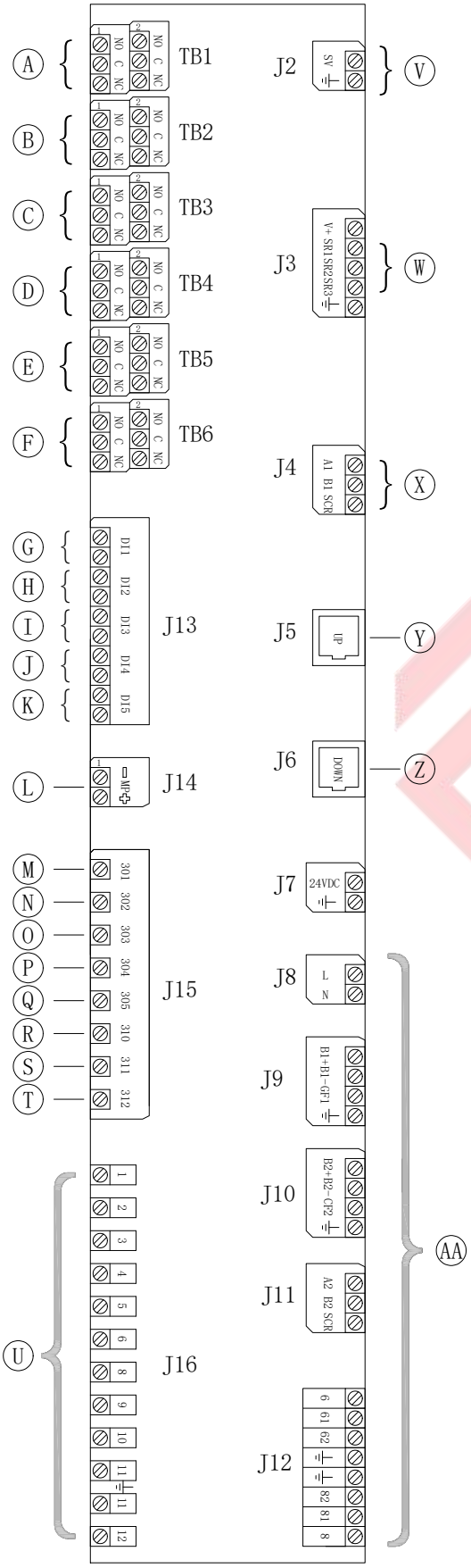
Input power connection

The diesel engine driven fire pump controller should be powered by a dedicated power supply protected by fuses or circuit breakers.Check the labels on the cabinet to select the correct protective measures.Always follow this step when connecting or disconnecting the controller:Before connecting the AC power source, first connect two batteries. Disconnect the AC power supply before disconnecting the battery.When connecting to AC power, disconnecting the battery may seriously damage the controller electronic board.

Circuit protection

MCB1 protects battery charger 1, MCB2 protects battery charger 2.MCB3 protects the control circuit from the influence of battery 1, while MCB4 protects the control circuit from the influence of battery 2.

Terminal board description



A-F：Alarm output terminal

A：configurable
B：configurable
C：configurable
D：configurable
E：configurable
F：configurable

G-T：On site input terminal

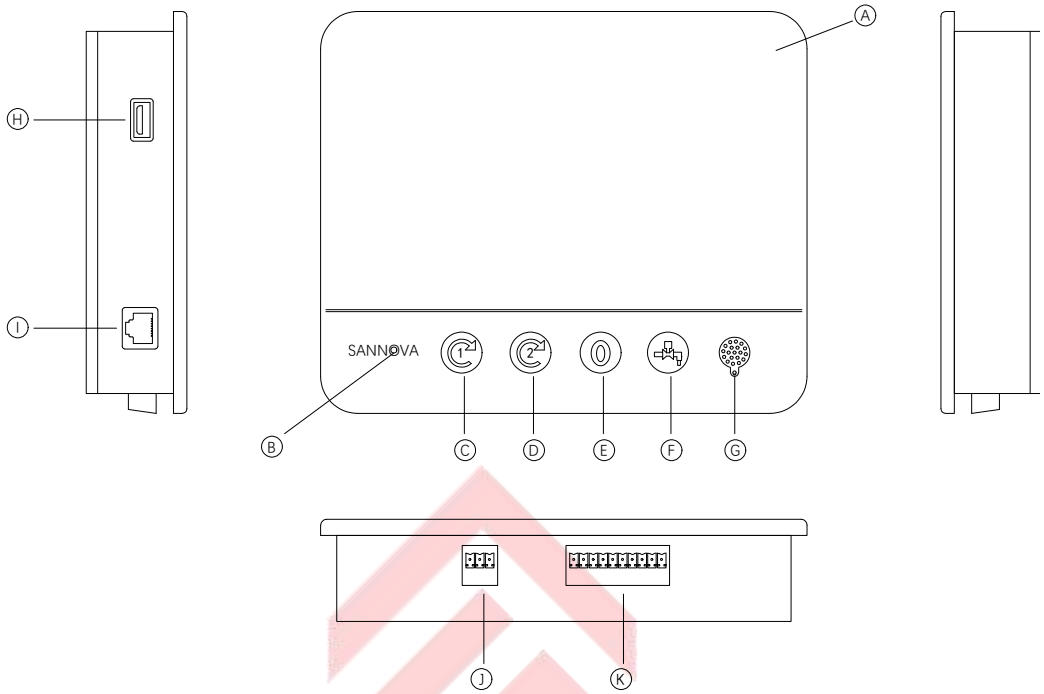
G：configurable
H：configurable
I：configurable
J：configurable
K：configurable
L：Speed Sensor
M：ECMB-ECM Select switch In standby position
N：FIM Fuel injection malfunction
O：ECMB-ECM warning
P：ECME B-CM fault
Q：Low suction pressure
R：High temperature of raw water
S：Low raw water flow rate
T：Low engine temperature

U：Engine terminals

1：fuel solenoid valve
2：engine run
3：engine over speed
4：Low engine oil pressure
5：High engine temperature
6：Battery 1+
8：Battery 2+
9：Crank contactor 1
10：Crank contactor 2
11：**GND**
11：**GND**
12：Stop the fuel solenoid valve

V：solenoid valve
W：Pressure sensor (configurable)
X：communication
Y：Connection between display board and IO
Z：IO board and expansion connection (reserved)
AA：Internal power interface of the factory

Major Function



A：Touch Screen：7-inch color capacitive screen.

B: Power indicator light(Normally, it will display green, and when an alarm occurs, it will display red)。

C：start button 1：In manual mode,Manually start the starter from Battery 1.

D：start button 2：In manual mode,Manually start the starter from battery 2.

E：stop button:Used to stop the engine when there are no starting conditions.

F：Run Test Button：Used for manually starting and running tests。

G：buzzer：When the alarm bell is activated, the buzzer will sound.

H：Backend USB interface：Used for software updates

I：Interface for communication with IO board.

J：power supply

K：Control panel input port

Warning

After 2 years of service, SANNOVA's battery efficiency may decrease,And it may lose time after shutting down.

Alarm Bell

To activate the alarm bell, you can configure it on the alarm configuration page,In some cases, the alarm can be silenced by pressing the alarm mute button on the alarm page.When silent, if a new fault condition occurs or the alarm condition remains unchanged after 24 hours (adjustable),The alarm bell will ring again.If the alarm condition no longer exists, the ringing will automatically stop.

First parameter setting

Before using the controller, the following parameters need to be set:

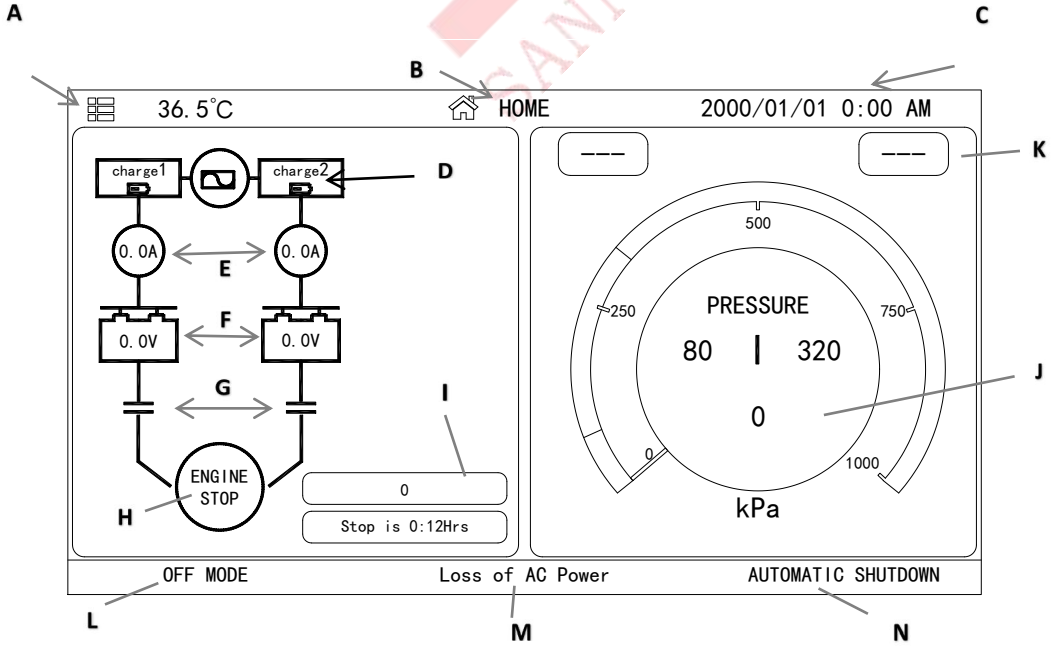
1. Pressure sensor calibration

There is a corresponding page for pressure calibration. After entering the password on the settings page, enter the Sensor ->Analog Input PT1 page.

Firstly, lower the system pressure to 0KPA, click to modify the parameter to 0, then increase the pressure to 2000KPA, click to modify the parameter to 2000, and finally press calculate.

be careful:During the calibration period, you should not leave this page.

Homepage



The homepage displays the status of all controllers and important information about

the controllers.Including voltage, current, pressure, engine status, and all timers.

A：navigation bar:Clicking on this icon will open the navigation menu on the left side of the screen:

1-Go to the 'home' page
2-Go to the 'Alarm' page
3-Go to the 'History' page
4-Go to the 'Settings' page

B：page name.

C：Display date, time, and ambient temperature.

D：Battery chargers 1 and 2

E：ammeter: Display the actual current (in amperes) between the charger and battery.

F：battery：The actual voltage (in volts) of the battery and charger is displayed.

G：Start contactor：When activated, a diagonal line will appear, and the state remains unchanged when not activated.

H： Diesel engine status： If the engine stops running, it will display "ENGINE STOP",If the engine is running, it will display "ENGINE RUN". Clicking this circular button will take you to the ″History″ page.

I： The number of engine starts and the cumulative running/stopping time of the engine.

J：Real time pressure gauge:Allow for precise reading of actual system pressure.The pressure gauge displays the settings for connection (between the yellow and red parts) and disconnection (between the green and yellow parts).These values will also be represented by the red and green lines on the pressure gauge for quick comparison between the actual pressure and the set value.The actual pressure and units (PSI, BAR, etc.) will be displayed at the bottom of the pressure gauge.The maximum allowable pressure will also be displayed on the pressure gauge with corresponding scales.

K：Reserved function.

L：HOA indicator：Display current mode: manual, off, automatic.

M： The alarm homepage displays:The existing alarm information will be displayed

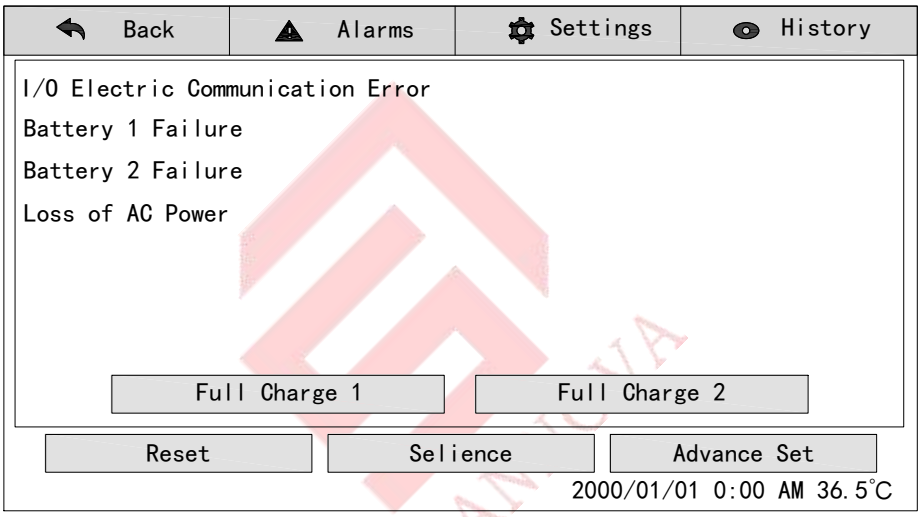
alternately within this box.

N： Off Mode:Is the display controller automatically or manually turned off.

Screen Saver

After being idle for 5 minutes, the screen brightness of SANNOVA will decrease to 0,Black screen protection is designed to extend the lifespan of LCD screens.

Alarm(menu)

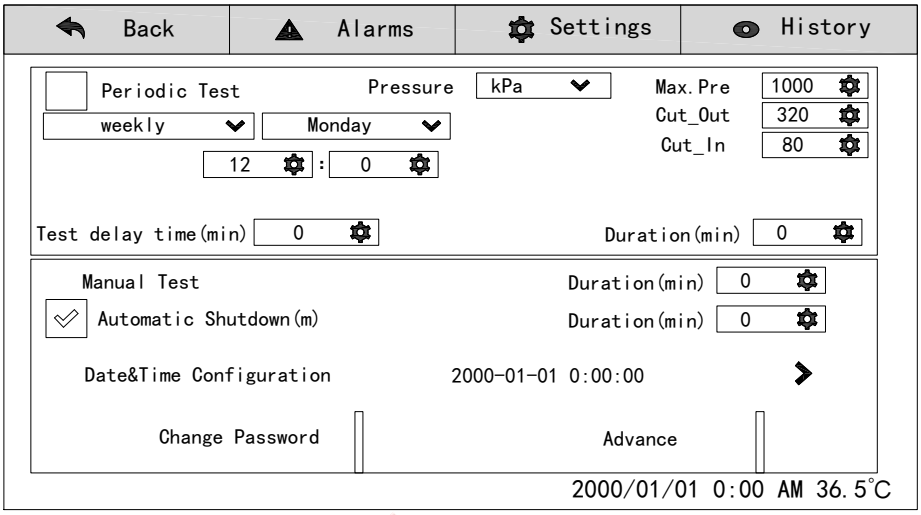


This page lists the current alerts that have occurred.You can set alarms with adjustable parameters on the "Configure Advanced Alarm" page.When its triggering condition is valid, the alarm will be displayed on the page.If there is currently an alarm bell ringing, please press the "mute" button to silence the alarm bell.Pressing the 'Reset' button will only reset alarms that have already occurred.

Complete alarm list for diesel engine controller
Pump Run:
Loss of AC Power
Failed to Start
Fail While Run
System Over Pressure
System Low Pressure
High Pump Room Temperature
Low Pump Room Temperature

I/O Electric Communication Error
Remote Start
Deluge Valve Start
Manual Mode
Auto Mode
Pump On Demand
Manual Test ON
Automatic Test ON
System Error
Common Alarm
Alarm Bell Silenced
Water Level Below Normal
Water Level Near Empty
Engine Low Oil Pressure
High Engine Temperature
Engine Over Speed
Battery 1 Failure
Battery 2 Failure
Battery 1 Charger Failure
Battery 2 Charger Failure
Cranking Coil 1 Failure
Cranking Coil 2 Failure
Low Fuel Level
High Fuel Level
Solenoid Valve Failure
DC Power Failure
ECM Selector Switch in Alternate ECM Position
Engine Fuel Injection Malfunction
ECM Warning
ECM Fault
Low Suction Pressure
High Raw Water Temperature
Low Raw Water Flow
Low Engine Temperature
Engine Instrument Panel on Manual Mode
Engine Instrument Panel on Auto Mode

Configuration(menu)



The settings page is used to set all basic configuration parameters and provides shortcuts for changing the most common settings.There are seven parameter boxes in total: pressure, periodic testing, running testing, automatic shutdown, date and time, advanced settings, and user password modification.

pressure:

The main parameters of pressure can be set in the box at the top of the page.

Pressure Unit: PSI,KPA,and BAR units can be selected.

Maximum pressure: It can be set between the "disconnect" value and 9999.

break : It can be set between the "on" value and the maximum pressure value.(The 'disconnect' value should be set before the 'connect' value)(The 'disconnect' value should be set before the 'connect' value)

Connect: Settings can be made below the 'disconnect' value.

Periodic testing:

Periodic testing can be selected as "weekly", "every other week", or "monthly".You can also select which day of the week, which time period of the day, and the duration of the test within this box.

Automatic shutdown:

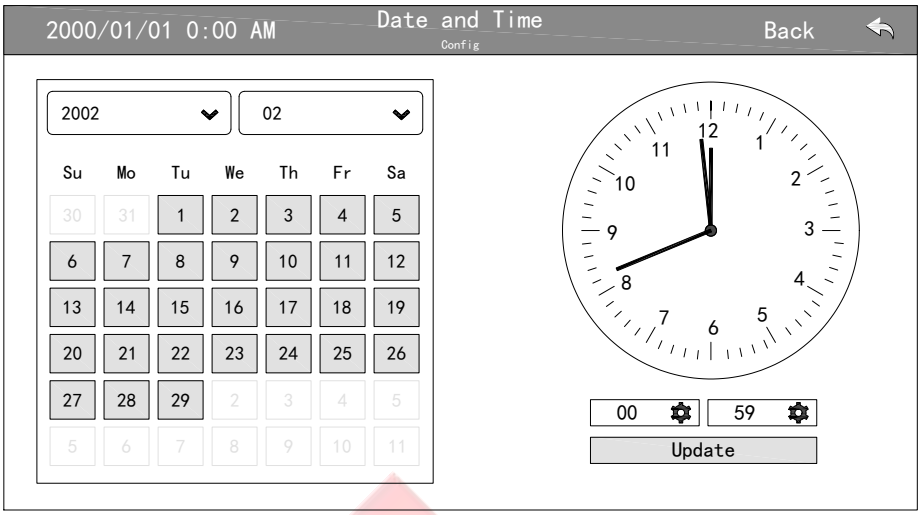
If enabled, the 'automatic shutdown' function will automatically stop the pump after the demand disappears.

Advance:

After entering the password, go to the advanced configuration page.

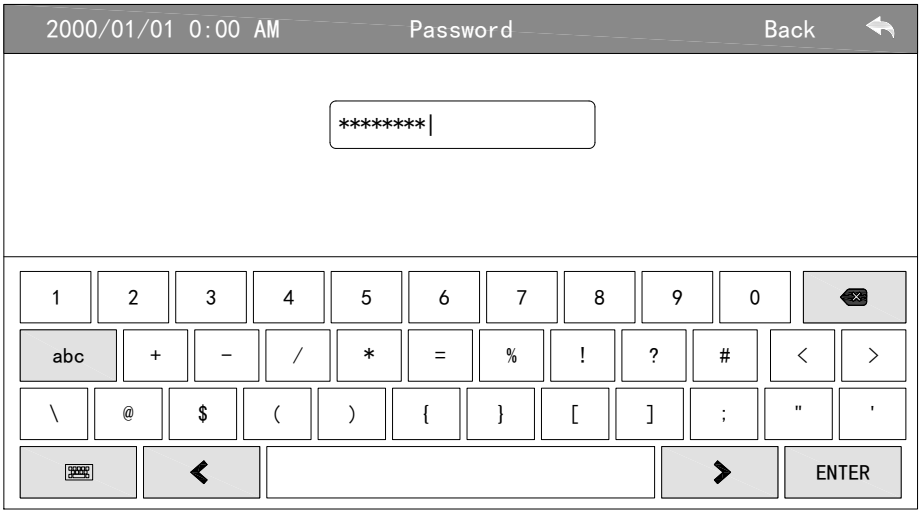
Time and date configuration

Enter the 'Date Time' page.

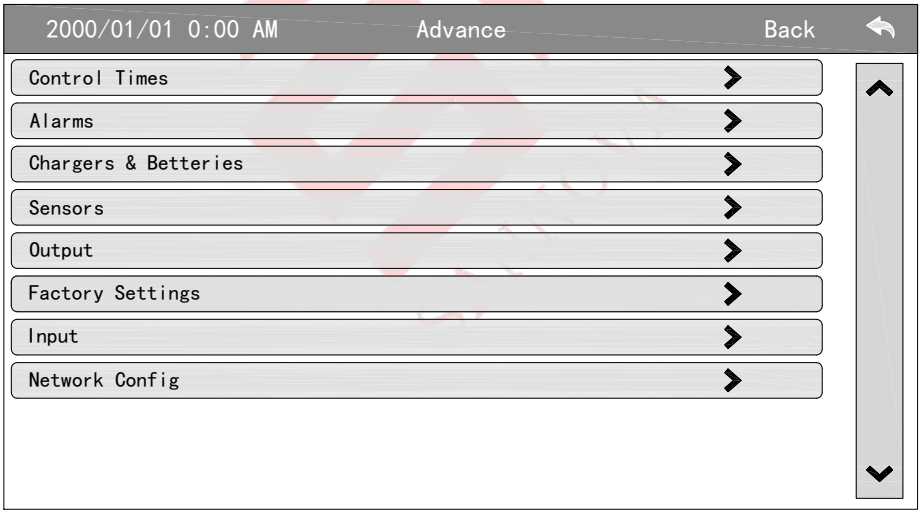


Click on the year box to select the year, swipe up and down to select the year value, and similarly, click on the month box to select the month, swipe up and down from the list to select the month.
After setting, if the dates are different, click on the appropriate date to select the actual date.
Press the two boxes below the clock to set the time;Set hours on the left and minutes on the right.Click the 'Update' button to submit the changes. Confirm the change to 'Date and Time' in the pop-up dialog box.Users can click the 'Cancel' button to cancel the changes. Please note that changing the date and time will affect the log table.

Note: The first time you click on the main settings page to modify parameters or jump to the page, you will enter the password input page,Entering the correct password will take you back to the settings page to continue with the setup process.



Advance



This page is the entrance to all advanced parameter configurations, clicking on the tab will direct you to the corresponding page.

Control Times

This page is used to adjust the timer.

Sequential Start Timer

This timer is used to set the time delay from demand activation to engine start
Time range: adjustable

Low Pressure Set Delay

When the system pressure exceeds the cut in pressure,The low-voltage start signal will only disappear after the delay setting time.

Low Pressure Reset Delay

When the system pressure is lower than the cut in pressure,The low-voltage start signal will only be effective after the delay setting time.

Engine Start Delay

This timer is used to receive the time delay for engine start.

Crank Time

This timer is used to start the time for the motor to drive the diesel engine.

Rest Between Cranking

This timer is used to start the time for the motor to cycle and drive the diesel engine

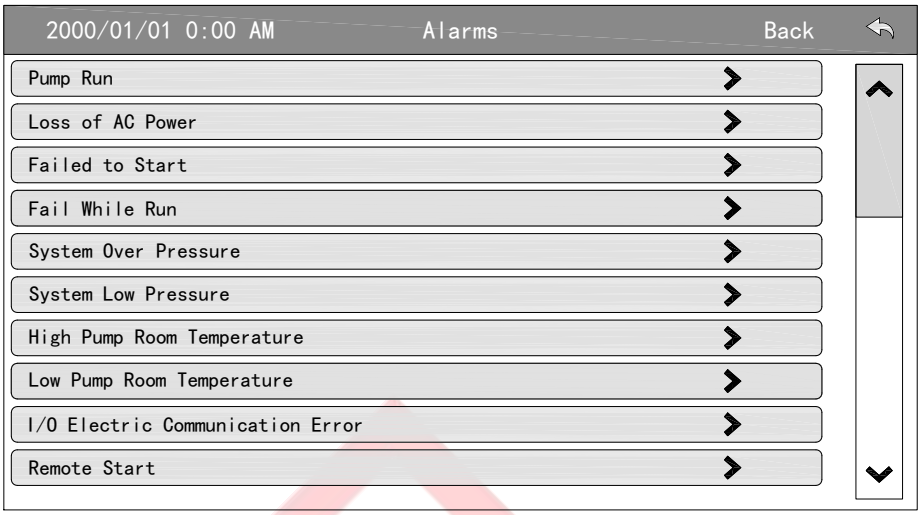
Cranking Steps

This timer is used to start the number of times the motor cycle starts

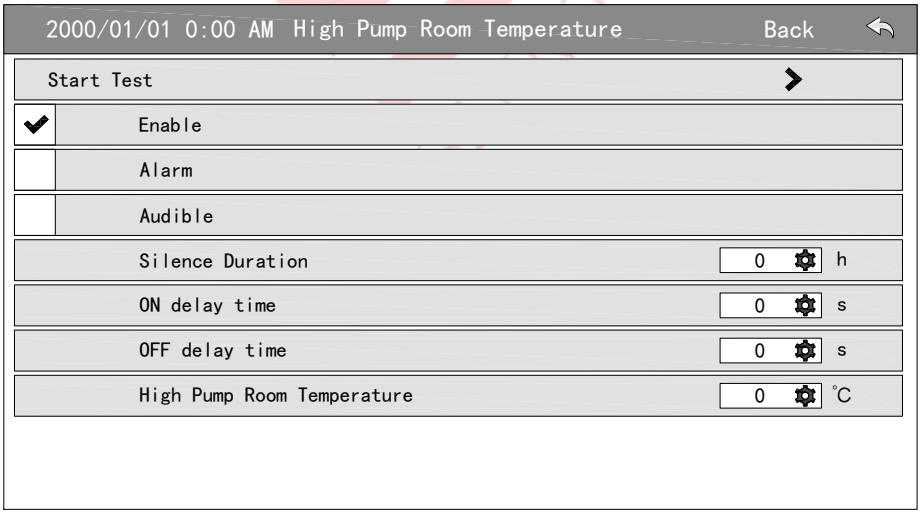
Stop/Fuel Solenoid Hold Time

This timer is used for the time of power on shutdown signal.

Alarms



All alarms can be configured,The last field does not always appear as 'high pump room temperature'.



Start Test： This button can be used to test the alarm.This button will only test the selected alarm.If an alarm can be heard, it will activate the alarm bell and activate any output relay associated with this alarm.

Enable： Check this box to enable alerts.

Alarm： Check this box to activate the alarm bell.

Audible： Check this box to ring when the alarm is activated.

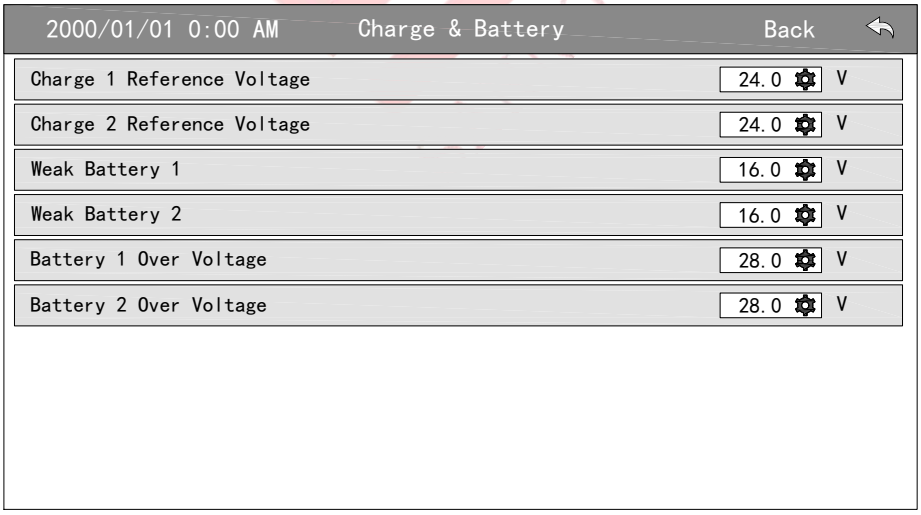
Slience Duration： Set the time for the alarm to remain silent.

ON delay time： If a corresponding alarm signal appears, a corresponding time delay is required to detect this alarm.

OFF delay time： If the alarm has already disappeared, the signal of the alarm disappearance can only be received after a delay.

High pump room temperature(Simulated value): Used to describe the activation range of an alarm,There are "below", "above", and "between". Corresponding values must be entered.

Charger and battery



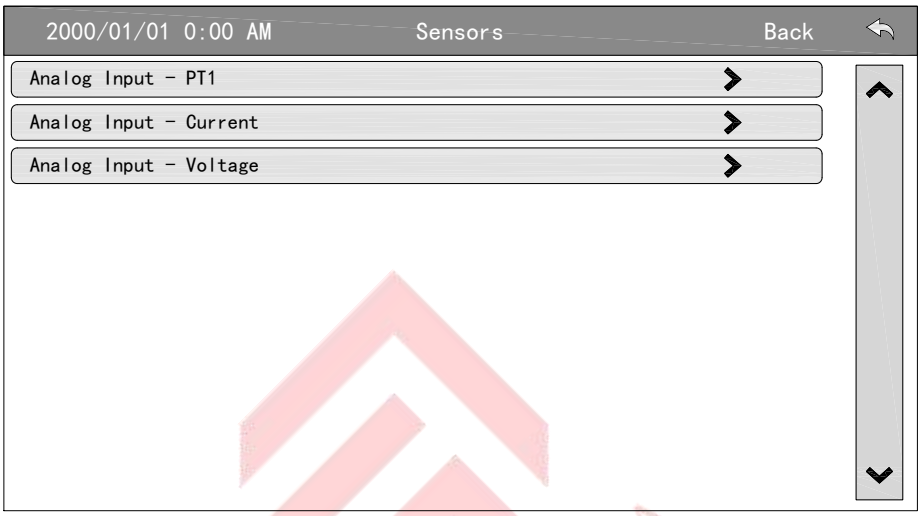
This page is used to adjust certain functions of the battery and charger.

Reference voltage for charger 1-2: This is the normal voltage of the charger in floating mode, used as a reference to trigger the 'charger fault' alarm.

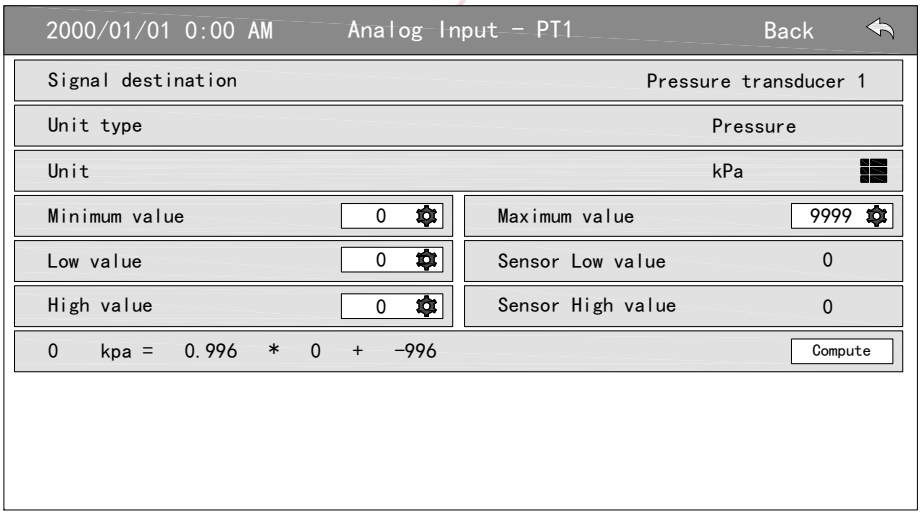
Battery 1-2 is weak: At this voltage, it will be considered that the battery is low. At this point, the corresponding alarm will be activated.

Battery 1-2 over voltage: At this voltage, the battery will be considered to be in an over voltage state. At this point, the corresponding alarm will be activated.

Sensor

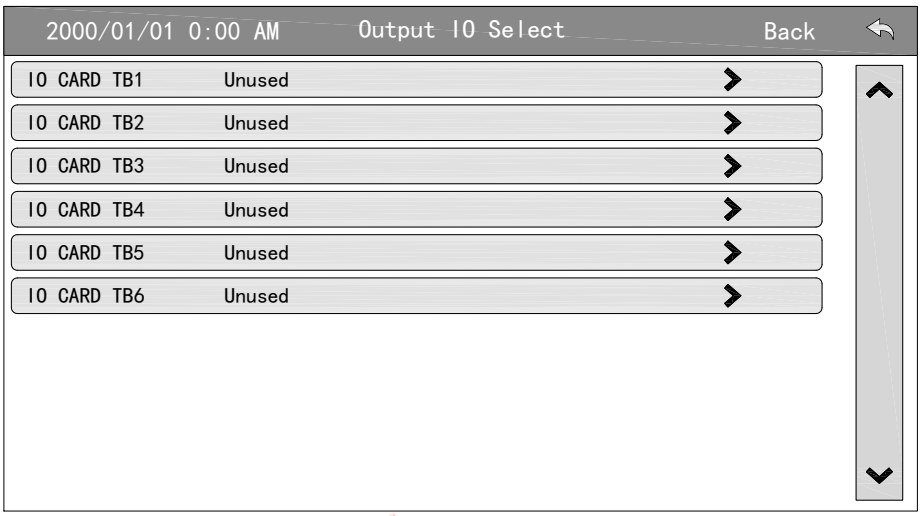


You can select calibration pressure sensor, voltage sensor, and battery current sensor on this page.Among them, Analog Input 1 (PT1) is dedicated to pressure sensors. Other analog inputs depend on the options of the controller.



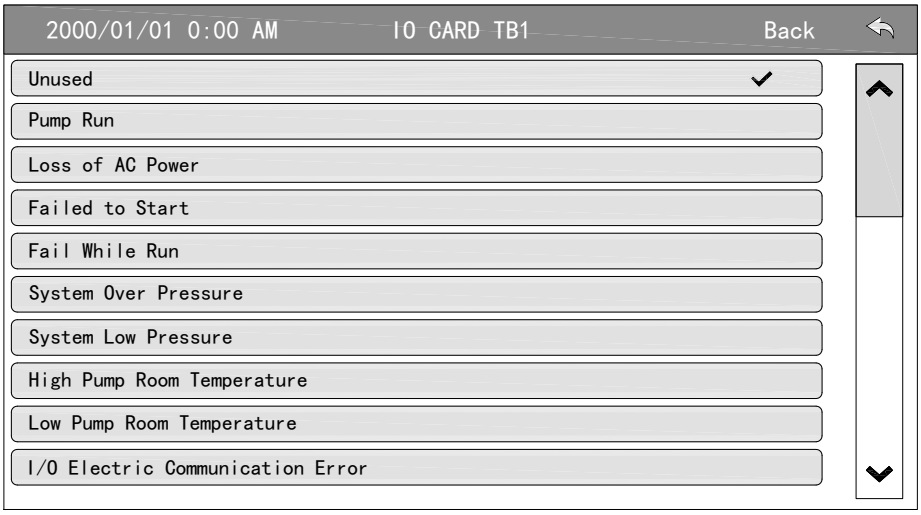
On this page, variables such as signal endpoint, unit type, unit, minimum and maximum pressure values have been set.For pressure sensor PT1, it is necessary to set a calibration point with high and low values in order to calibrate the sensor.

Output



This page is used to select the logic of the activation signal output on the IO board and test these outputs.
-controller fault (TB1)
-engine run (TB2)
-HOA In manual or closed position (TB3)
-engine fault (TB4)
-Pump room fault (TB5)
-programmable output (TB6)

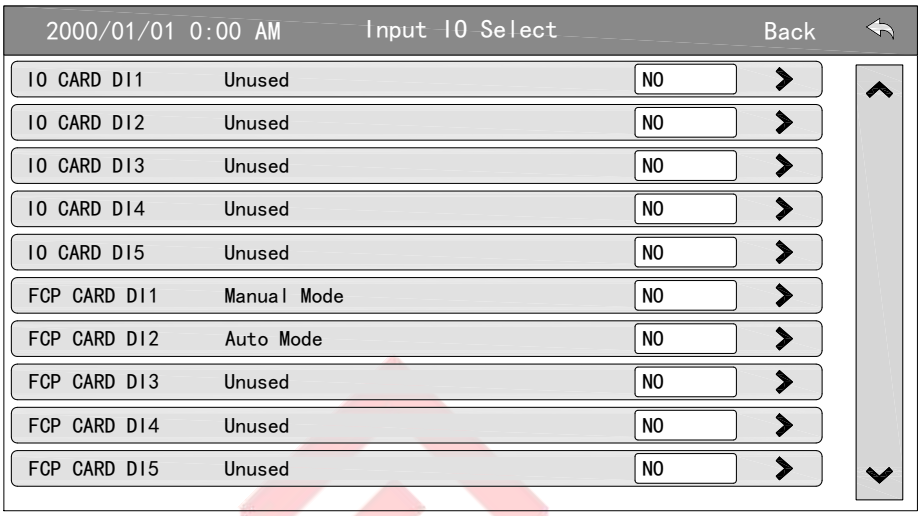
Pressing one of the outputs will take you to this page:



Click on a tab on this page, and a dialog box will pop up. Click OK to set the

corresponding output port.
If the status or alarm corresponding to the tab appears, the corresponding relay on the IO board will close.

Input

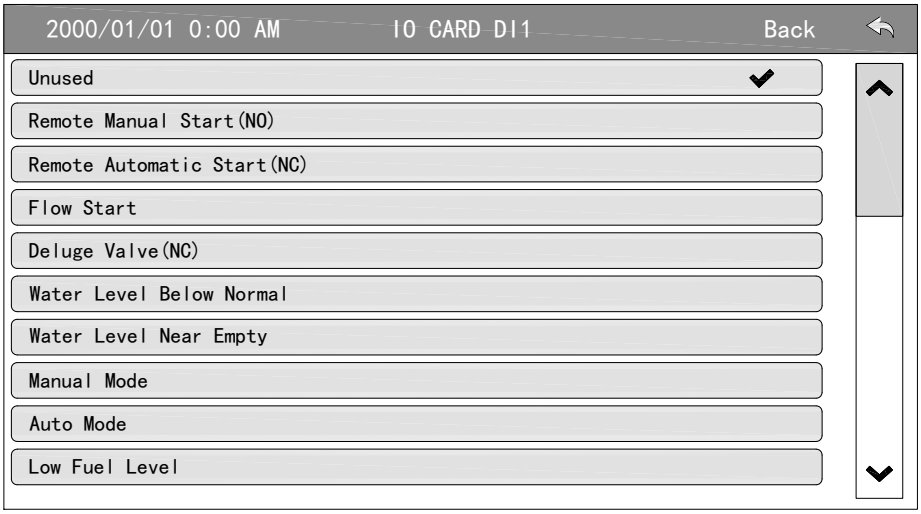


When NO(normal open) is selected,Signal line disconnection is invalid, closure is valid.
When NO(normal close) is selected,Signal line closure is valid, disconnection is invalid.

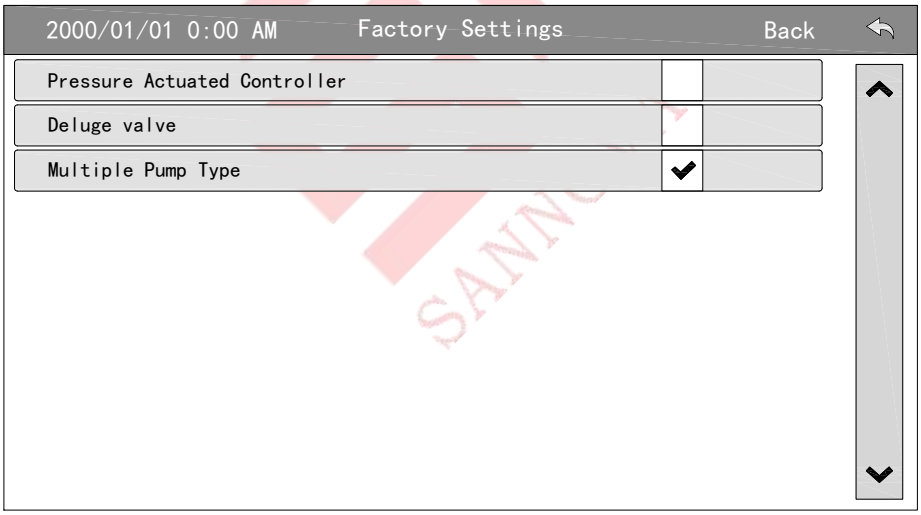
Select from this page, where FCP CARD1 and FCP CARD3 correspond to automatic mode and manual mode,
Please refer to the IO motherboard electrical diagram for details.

The following are the optional input port functions:

The NO、NC in parentheses is the recommended mode, which ultimately depends on the user.



Factory settings



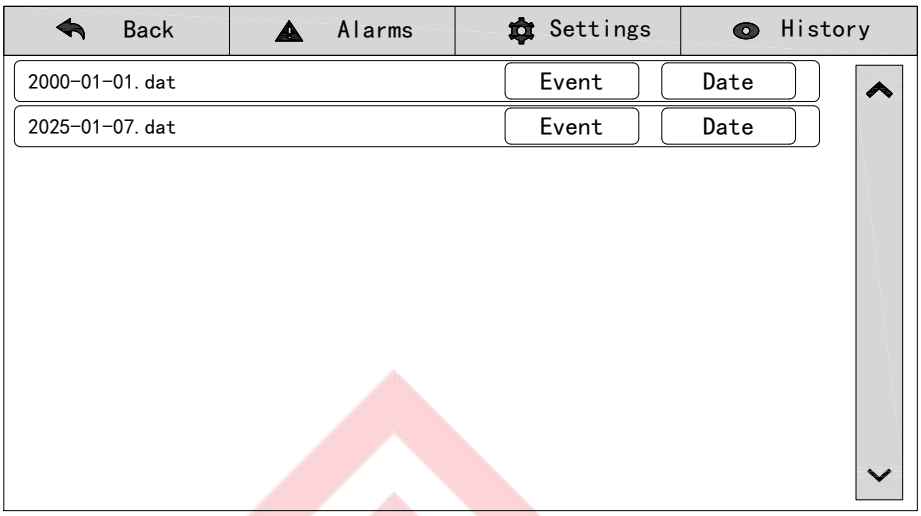
Pressure Actuated Controller： Enable the automatic controller to start after the pressure drops.

Deluge valve： After selecting the rain shower valve for a certain input port, this box needs to be checked.

Multiple： Default selection.

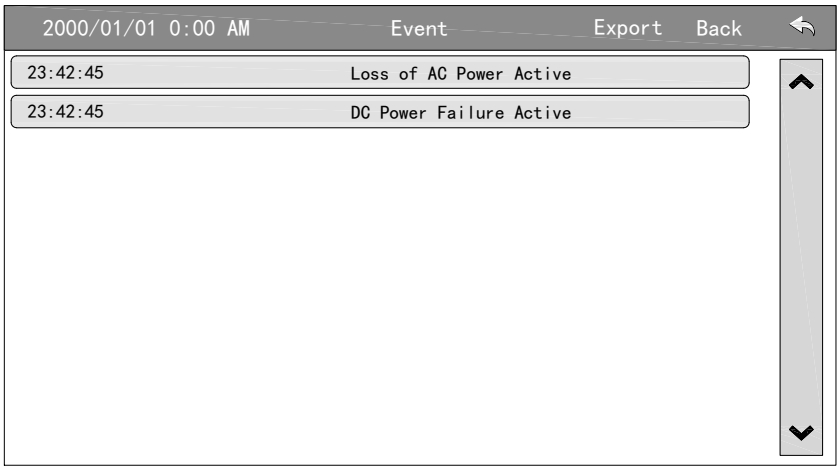
History

History(menu)



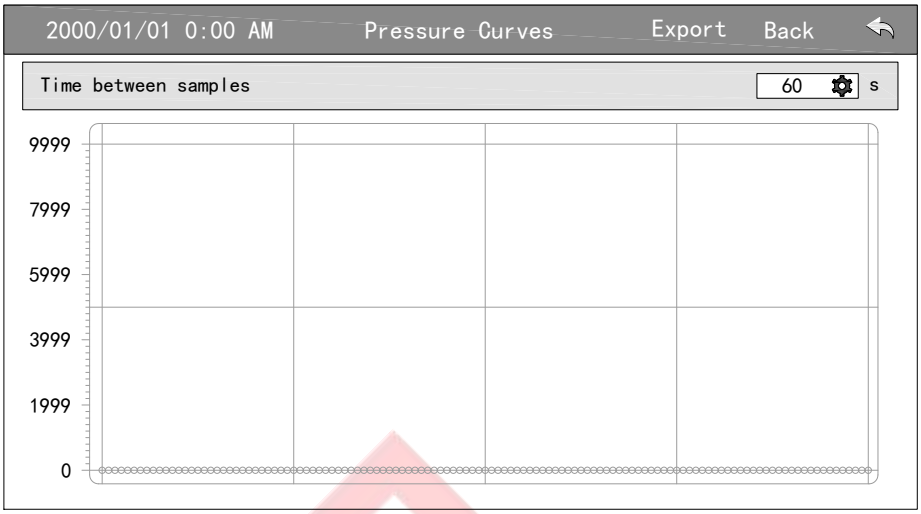
Event

Click this button to enter the 'Event Page',It will display the events in the log of the current day.Each event log contains the date and event of occurrence, as well as a brief description of the event.



pressure curve

Click the "Data" button to enter the corresponding "Pressure Curve" page, which will display



Click the export button to export the corresponding logs or curves for the day. You need to insert a USB drive into the USB port on the side of the panel, and a dialog box (File open fail) will appear.

Update

Please refer to the FPDV1 Manual CH manual for details on updating programs and exporting logs through a USB drive.