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Type FJ4000D engine control box (cabinet) service and maintenance manual V1.1

catalogue

1. Product overview

Type FJ4000D engine control box (cabinet) (hereinafter referred to as engine control box) is an automatic engine electronic measurement and control system composed of GEC16W-D monitoring display module and GEC8000-K1 safety protection module. GEC16W-D monitoring display module adopts large screen LCD display; CAN communication interface can accurately display parameters such as engine speed, oil pressure, water temperature and oil temperature, detect battery voltage and engine accumulated running time, and monitor and display the above measured parameters in real time. When the control box detects an alarm signal, the control box automatically emits sound and optical alarm signal; when the fault stop signal is detected (such as overspeed stop), the control box automatically output the shutdown control signal to control the engine shutdown. Through the control box system, the engine can start automatically and stop automatically.

The design of this product meets the requirements of China Classification Society CCS specification. The technical performance and quality requirements of this product comply with the International Electrotechnical Commission IEC standards.

2. Product characteristics

The control system of type FJ4000D engine control box is composed of GEC16W-D monitoring display module and GEC8000-K1 safety protection module, which has the characteristics of good reliability, good stability, high measurement accuracy, small volume, and convenient installation and maintenance in similar products. It can be used for ships and land power stations and other engines, and is a more advanced electromechanical integration electronic instrument system.

3. Main technical indicators

(A) Product use environment requirements

ambient air temperature

Marine environment: + 5℃ ~ + 55℃, and can withstand the high temperature of 2h; non-Marine environment: -25℃ ~ + 55℃.

(B) Relative air humidity

With temperature less than or equal to 45℃, the relative humidity is 90 ± 3%; with temperature greater than 45℃, the relative humidity is 60 ± 3%.

(c) vibrate

The control box can operate normally under the vibration conditions described in Table 3.1.3. If the resonance occurs in the following frequency range, appropriate measures should be taken to suppress the vibration which exceeds the following specified value.

Table 3.1.3:

installation site	Vibration parameters	
General premises	2.0 vs. 13.2 Hz amplitude ± 1mm	Acceleration from 13.2 to 100 Hz ± 0.7g
On the engine	From 2.0 to 25 Hz, the amplitude was ± 1.6mm	From 25 to 100 Hz, the acceleration was ± 4g

(D) Tilting and sway

The control box shall be capable of leaning and rocking 22.5 ° (cycle 10s) and 9.8m / s in the vertical direction^{2}Work normally at the time.

(E) The control box can work reliably for a long time in the environment with salt spray, oil mist, mold and dust.

3.2 Power supply

The control box can work normally when the voltage deviates from the rated value of-25% - - + 30%.

3.3 Compliance with the relevant requirements of electromagnetic compatibility 3.4 Measurement range and accuracy

3.4.1, the rotational speed sensor

Display range: 0-9999 r/min; measurement accuracy: ± 2 r/min;

Signal type: magnetoresistance type pulse signal;

Operating temperature range: 40~ + 100℃ 3.4.2, oil pressure sensor

Display range: 0-1.0Mpa;

Measuring accuracy: ± 0.02 Mpa; signal type: 0.5V-4.5V

Operating temperature range: 40~ + 100℃

3.4.3, the temperature sensor

Display range: 0-150℃;

Measuring accuracy: ± 2.5℃; Signal type: NTC

Operating temperature range: 40~ + 100℃

3.4.4 Voltage detection and display range of working

power supply or standby

power supply: 8-36V;

Measurement

accuracy: ± 0.4V;

signal type: DC

voltage

4. Description of the control box

4.1 Description of the indicator light on the panel

Power supply indication: the control box power supply, the indicator light is on.

Comprehensive alarm: when any fault alarm occurs, the indicator light is on.

Automatic: When the <remote / side / automatic> switch is placed in the <automatic> position.

Note: When the unit is an emergency unit, select the automatic state, the unit protection function is automatically more controlled, and the "automatic more control" is displayed on the LCD screen.

Remote control: When the <remote / side / automatic> switch is placed in the <remote> position, the indicator light is on. Oil-water heating: When the oil heater is in operation state, the water indicator is on.

4.2 Description of the push-button switch of the control box panel

Power switch: control the on and off of the power supply in the control box.

Remote / Manual / automatic: Select switch for remote and Manual and Automatic control modes.

Heating switch: the engine oil-water heater control switch. In normal circumstances, the transfer switch should be in the "off" position; when the oil-water heater is required to work, put the transfer switch in the "on" position and the oil-water heating indicator is on.

Emergency stop: use during engine emergency stop. This button has self-locking function, press the engine to stop; after the engine stops, the <emergency stop> button must be reset before starting again. Manual or automatic, the button works.

Idle / Rating: used to control the conversion of engine speed between idle and rated. Standby start: This button can be activated activated when the GEC16W-D module fails.

5. Operation instructions for startup and shutdown

5.1 Operation instructions for automatic startup and shutdown

The <remote / manual / automatic> transfer switch is placed in the <automatic> position, and the automatic status indicator light is on, indicating that the engine is in the automatic control mode.

5.1.1 Automatic start-on sequence

1) When the control box receives the start trigger signal (passive normally open contact, closed work), that is, when the terminal "1,2" (passive contact) is closed, the delay 2S (the time can be set) automatically sends out the start signal;

2) Start the starting time at the same time as the starting output. If the engine does not start successfully in the "starting time", the starting

relay stops the output and enters the "start interval time" to wait for the second automatic start;

3) If the engine does not start successfully for 3 times, display the start failure alarm, and issue sound and light alarm at the same time;

5.1.2 Automatic shutdown sequence:

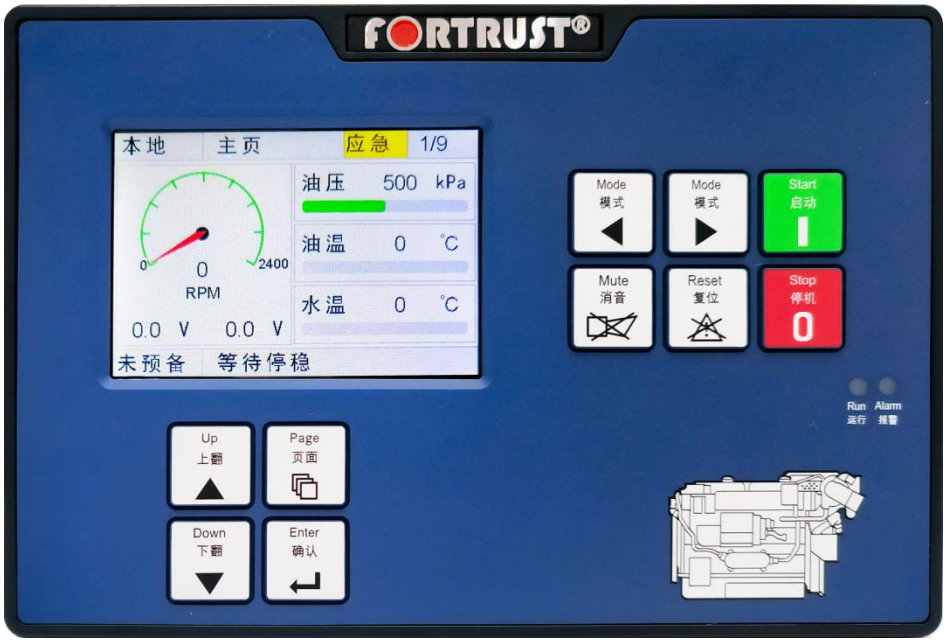
1) During the normal operation of the engine, then, when the terminals "1 and 2" (passive contact) are disconnected, enter the "stop delay" and send the switch signal; the default is 120S (can be set by parameter setting page) to facilitate the heat dissipation of the engine;

2) After the "stop delay", the stop signal will be automatically sent; after the stop signal is continuously sent 20S (the time can be set), the stop output will be automatically cancelled and determine whether the engine has stopped. If the engine has stopped, enter the next start preparation; if the engine does not stopped, issue the alarm of stop failure.

5.2 Operation instructions for manual startup and shutdown

The <remote / manual / automatic> transfer switch is in the <Manual> position and the engine is in manual control mode.

5.2.1 Manual startup



In the "manual" mode, press the <start> button on the control module, start the engine, and after the start successfully, can 

Increase the engine speed to the rated state by passing the idle / rated switch on the panel;

During the engine operation, high water temperature, low oil, overspeed, abnormal voltage and other conditions, the control box can have Effective and quick protection for the shutdown.

5.2.2 Manual shutdown

In Manual mode, pressing the <Stop> button on the control module stops the running engine. 

5.3 Operation instructions for remote control startup and shutdown

The <remote / manual / automatic> transfer switch is in the <remote> position and the engine is in remote control manual control mode.

5.3.1 Remote control and manual boot

In the "Remote control" mode, press the <start> button on the remote control module to start the engine; 

When high water temperature, low oil pressure, overspeed and abnormal voltage occur during engine operation, the control box can effectively protect and stop the engine quickly.

5.3.2 Manual shutdown by remote control

In Remote Control mode, pressing the <Downtime> key on the control module stops the running engine.

Regardless of the remote control, manual, automatic status, in an emergency, pressing the <emergency stop> button, can stop the engine.

6, GEC16W-D, the function description of the main control module

6.1 GEC16W-D, monitoring display module operation said

1) 

Up and down page turning button: switch the displayed content (engine parameters, etc.) in the main interface, and select the parameters

Select the parameter number when selecting the interface, and set the number when editing the parameter interface.

2) Page turning button: switch to the parameter selection setting interface when the main interface, return to the main interface when the parameter selection setting page, and return to the parameter selection setting page when the parameter state is modified.

3) Confirm button: in the parameter selection setting page to enter the corresponding sub-menu, press this button to complete the write function after the parameter modification state.

4) Self-test button: When the engine stops, press one of the above two buttons, and the system will enter the self-test program. The self-test program will display the engine parameters pre-set by the user, such as the number of flywheel teeth, rated speed, overspeed alarm value, etc. After the self-test, the system will automatically return to the initial state.

5) 

Start and stop button: in manual mode, control the start and stop of the engine through these two buttons

machine.

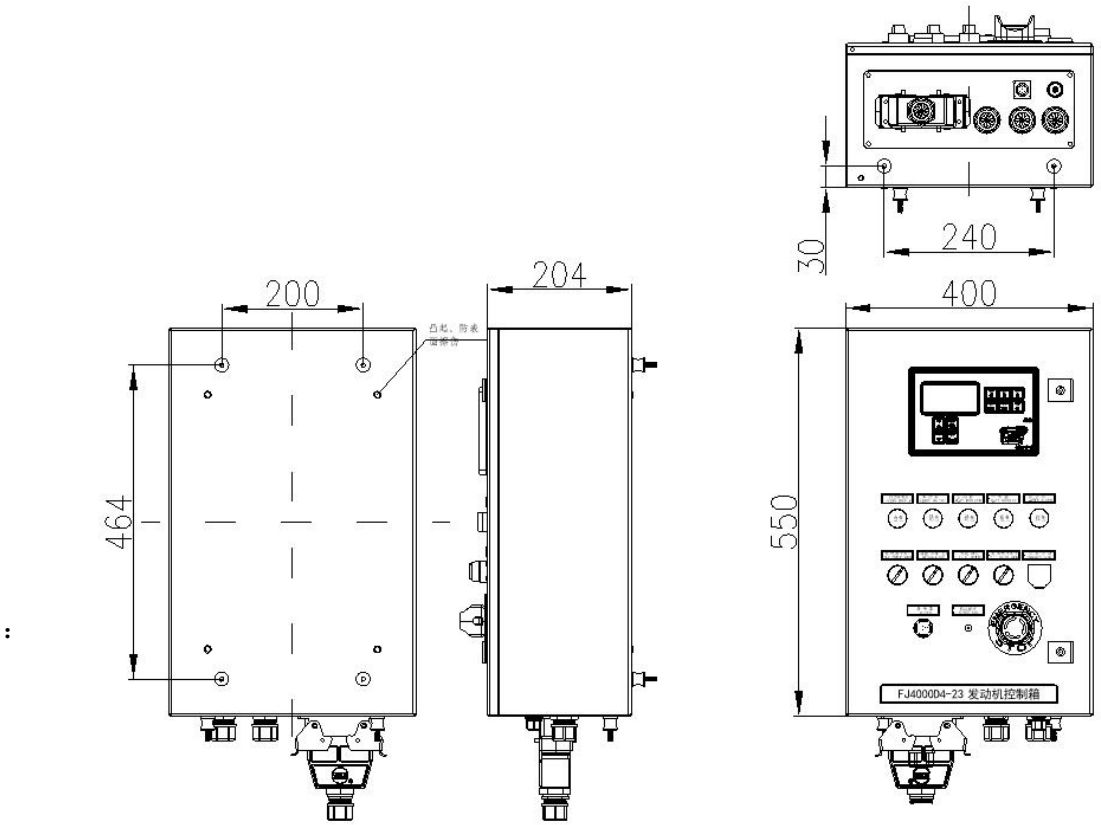
6) Silencing button: when the sound alarm signal is used, press the button "sound elimination>" button to eliminate the sound signal output, and the corresponding alarm light is indicated by flashing and flattening light.

7) Reset button: When the engine alarm is stopped, this button must be pressed and the control box is reset before starting the engine again.

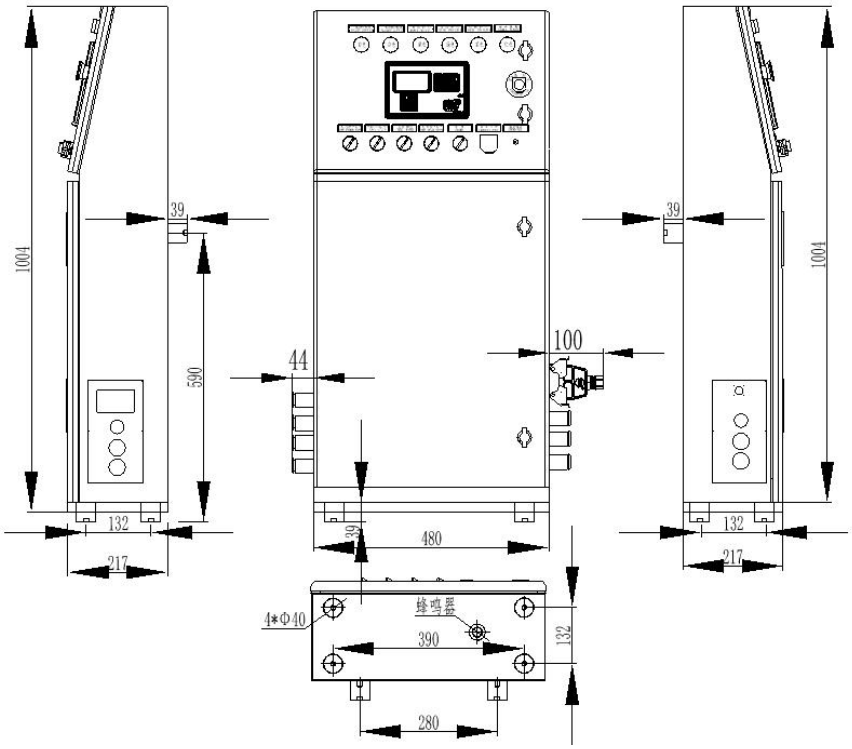
7. Installation and external wiring of the box body

7.1 The control box is equipped with shock absorber, and the installation position should be selected in a place with small vibration to avoid direct heat transfer or close heat radiation from the exhaust system. Therefore, strong impact and high voltage shock to the box should be avoided during the installation process.

7.1.1 Wall hanging drawing:

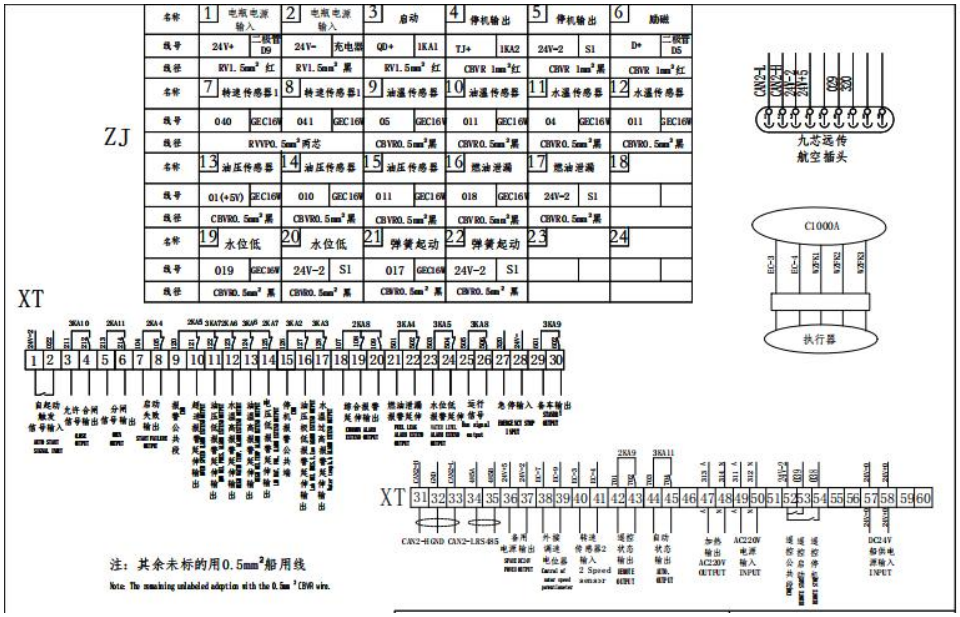


7.1.2 Vertical shape drawing:



7. 2 When the control box is connected to the power supply, pay attention to the positive and negative poles to avoid the reverse polarity.

7. 3 Other external wiring is shown below:



8. Precautions

1) Before starting the engine, open the power supply of the control box and check the abnormal parameters before starting the engine.

2) When the engine is running normally, do not press the <reset>, start>, stop> and other buttons.

3) Often check whether the joints of the sensor and control box are eroded by oil and water and fall loose.

4) The signal cable should be wired separately from the power cable to avoid electromagnetic interference, and do not touch the high temperature parts such as the exhaust pipe.

5) When replacing the sensor, it must be noted that the positioning hole on the connector must be aligned, otherwise the connector and the sensor will be damaged.

6) When the external power supply is used to charge the battery, the power supply of the control box must be closed first, and the switch is over, then the power supply of the control box is opened when charging normally.

7) The control box cannot be directly powered by the charging generator.

9. Common troubleshooting methods

Common faults	failure cause	Exclusion method
The power light is not on when starting up	1, power supply circuit or polarity reverse 2. Fuse broken	1. Check the line and connect it correctly 2. Change the fuse
The oil pressure is abnormal and the pressure remains 0.000 or 1. ×××	1. Oil blocked 2. Loose connection 3. Oil pressure sensor is damaged	1. Clean up the oil road 2, check the line, and repeat the line 3. Replace the oil pressure sensor
The temperature is abnormal	1. Loose connection 2. The sensor is damaged	1, check the line and repeat the line 2. Change the sensor
The start is not normal	1. The starting motor can not work normally 2, the battery line oxidation, loose 3. The battery voltage is too low	1. Check the starting motor 2. Check the battery connection 3, the battery charging
The speed indication is abnormal and the speed stays at 0000	1. Loose connection 2. The speed sensor is damaged	1. Check the connection 2. Change the rotational speed sensor

After the above treatment, if the fault still cannot be eliminated, please find a professional personnel for maintenance.

10., The Warranty Period

Under the condition of normal storage, use and maintenance of the control box, the warranty period is: one year for shipment or 18 months from the date of delivery, and one year for the non-Marine control box from the date of delivery.

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