

# HM500 DISPLAY PANEL OF GENERATOR CONTROLLER USER MANUAL V1.1



## Version

No.	Version	Date	Note
1	V1.0	2020-07-1	Original release.
2	V1.1	2020-12-22	Update AUX option description



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## Symbol Description

<b>Symbol</b>	<b>Description</b>
 Note	Remind operators to operate correctly, otherwise it may cause the equipment not to work correctly.
 Be care	It is indicated that potential hazards can damage equipment without proper precautions.
 Warning	It is indicated if appropriate preventive measures are not taken, potentially dangerous situations may result in death, serious personal injury or significant property losses.

**Warning**

1. The installation of this equipment must be carried out by professionals.
2. When installing and operating the controller, please read the entire instruction manual first.
3. Any maintenance and commissioning of the equipment must be familiar with all the equipment.
4. t, safety standards and precautions in advance, otherwise it may cause personal injury or damage to related equipment.
5. The engine must have an overspeed protection device independent of the controller system to avoid casualties or other damage caused by engine out of control.
6. After the installation of the controller is completed, please verify that all protection functions are valid.

**Be Care**

1. Please keep the good connection of the power supply of the controller. Do not share the connection lines of the positive and negative electrodes of the battery with the floating charger.
2. During the operation of the engine, do not disconnect the battery, otherwise it may cause damage to the controller.

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### Notes:

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## 1. Summary

This display panel controller is specially designed for the display of FM700 series products, and has the functions of starting, stopping, parameter monitoring, fault monitoring and parameter setting.

3.5inch LCD screen display with brand new UI design is adapted in this controller that the relative failures can be displayed directly. All the parameters can be displayed by simulated indicators and words.

## 2. Main Features

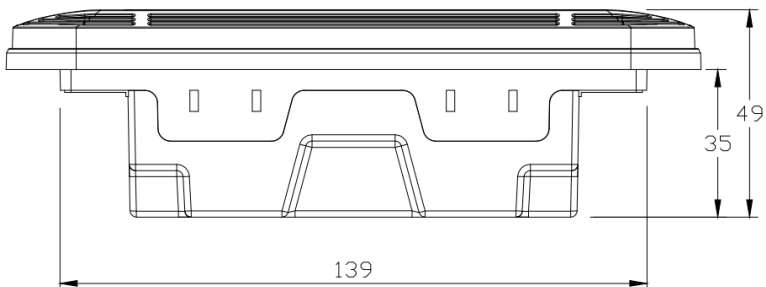
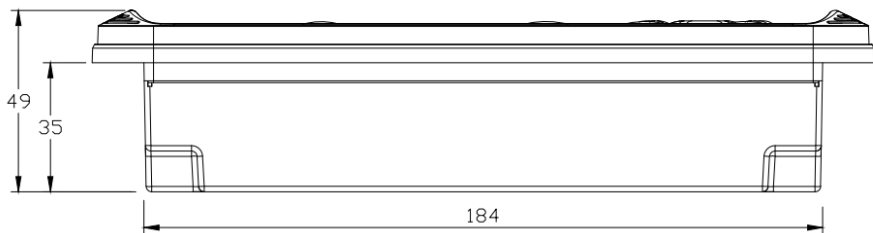
- ◆ Mainly used with FM7000 series products, and can be split and replaced.
- ◆ Dual core 32bit high performance single chip microcomputer.
- ◆ 3.5 inch 240 \* 128 high-resolution LCD screen, comes with Chinese and English switchable, various languages can be customized according to customer needs, removable installation.
- ◆ Indicator and number display through UI surface.
- ◆ Acrylic material is adapted to protect the screen.
- ◆ Silicone panels;

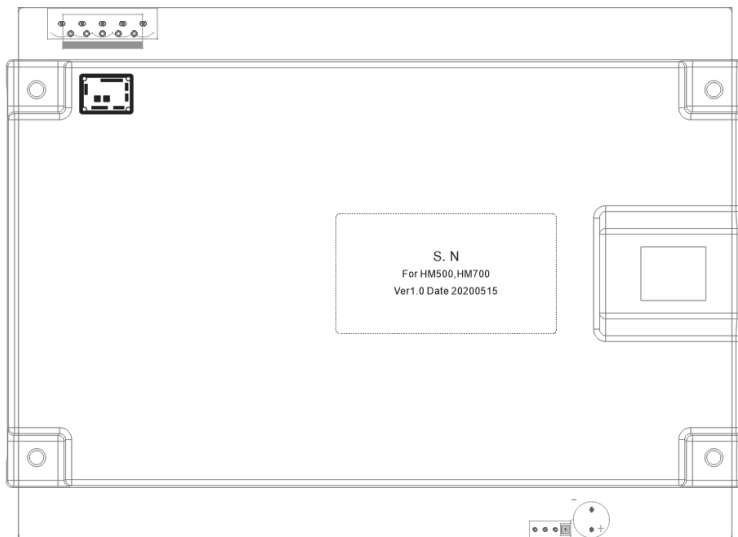
## 3. Parameters

Options	Parameters
Working voltage	FM7000 Motherboard power supply
Power consumption	Working: 5V: MAX 0.5W
Working condition	-25-70°C
Storage condition	-40-80°C
Protection Level	IP54: when waterproof rubber gasket is added between controller and its panel
Insulation strength	Apply AC1.5kV voltage between high voltage terminal and low voltage terminal; The leakage current is not more than 3mA within 1min.
Overall dimension	210mm*160mm*50mm
Panel cutout	W186mm*H142mm.
Weight	0.2Kg


**4. Overall Dimension and Wiring Diagram**

◆ Overall Dimension:



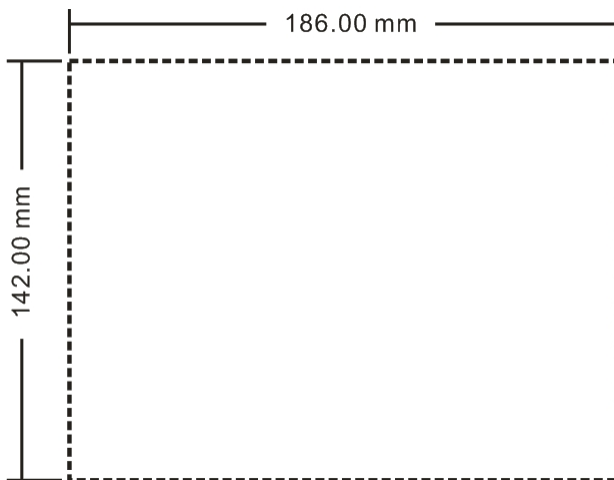


#### ◆ HM500 Descriptions of terminal connection

No.	Function	Description
	5-position terminal	Connect to the main control board.

#### 5. Installation instruction

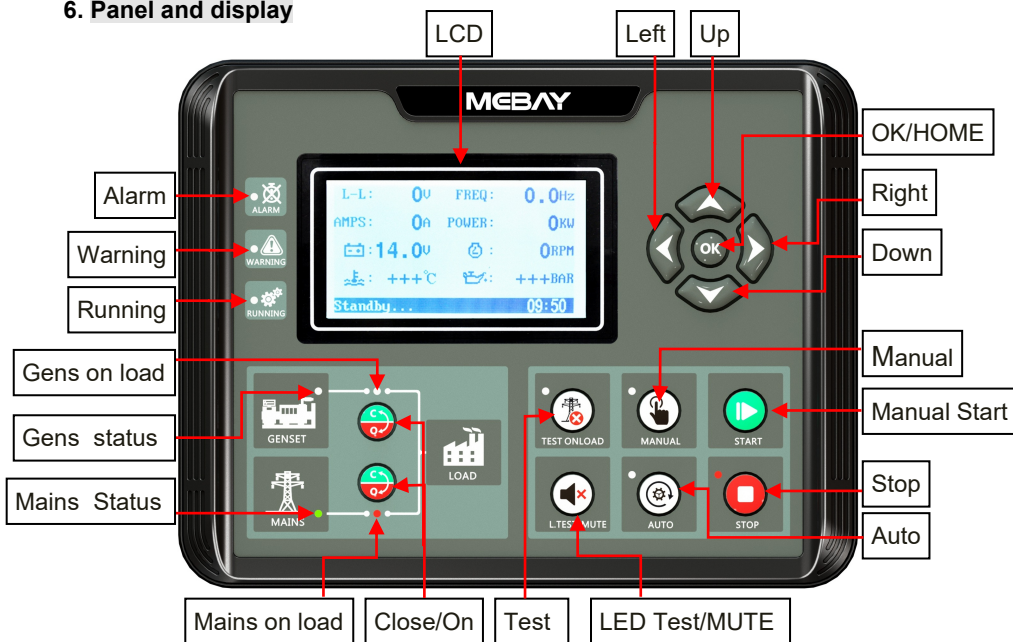
- ◆ The controller is fixed by four special fixing members and screws, and the screws of the metal fasteners cannot be too tight.
- ◆ Panel Cutout: W186mm\*H142mm.



**Note:** If the controller is installed directly in the genset shell or other fluctuated equipment, the rubber pad must be installed.



## 6. Panel and display



## 7. Control and operation instruction

### ◆ Key Function Description


KEYS	NAME	Main Function
	Stop Reset Revert	<ul style="list-style-type: none"> <li>◆ Can stop generator under manual/auto mode;</li> <li>◆ Can reset shutdown alarm</li> <li>◆ During stop procession, pressing this key again can stop generator immediately.</li> <li>◆ Pressing this key can cancel the setting and back to upper class under edition.</li> <li>◆ Under the setting mode with checking data, the data can be saved and system will exit after pressing.</li> <li>◆ In the standby state, press for 3 seconds to enter the historical alarm recording interface.</li> </ul>
	Start	<ul style="list-style-type: none"> <li>◆ Start the genset under manual mode.</li> <li>◆ Pressing this key can start the genset under manual testing mode.</li> </ul>
	Manual	<ul style="list-style-type: none"> <li>◆ Pressing this key will set the module into manual mode.</li> </ul>
	Auto	<ul style="list-style-type: none"> <li>◆ Pressing this key will set the module into auto mode.</li> </ul>
	TEST	<ul style="list-style-type: none"> <li>◆ Pressing this key to come into manual testing mode.</li> <li>◆ Under testing mode, pressing MANUAL can start the genset and transfer to normal loading after running which is to test if the auto start is in normal status.</li> </ul>



	LED Test/ Warning clear	<ul style="list-style-type: none"> <li>◆ Test if all LED lights are ok, pressing this key to test if all lighted, all off when loosen it.</li> <li>◆ Under warning, pressing this key can clear warning and controller will re-check warning.</li> <li>◆ Under alarm, pressing this key can clear the buzzer call.</li> <li>◆ Pressing this key in 3 seconds can clear the buzzer call, pressing it again in 3 seconds can recover the buzzer call.</li> </ul>
	Gens/ Mains Close/On	<ul style="list-style-type: none"> <li>◆ Under manual mode, pressing this key can transfer load to genset/mains.</li> </ul>
	Left	<ul style="list-style-type: none"> <li>◆ Under display mode, pressing this key to turn left page.</li> <li>◆ Under edition mode, pressing this key to move the digit.</li> </ul>
	Right	<ul style="list-style-type: none"> <li>◆ Under display mode, pressing this key to turn right page.</li> <li>◆ Under edition mode, pressing this key to move the digit.</li> </ul>
	Up	<ul style="list-style-type: none"> <li>◆ Under display mode, parts of the page can move up.</li> <li>◆ Under edition mode, pressing this key to move the digit or increase the numbers.</li> <li>◆ Under records mode, pressing this key to move the digit.</li> </ul>
	Down	<ul style="list-style-type: none"> <li>◆ Under display mode, parts of the page can move down.</li> <li>◆ Under edition mode, pressing this key to move the digit or decrease the numbers.</li> <li>◆ Under records mode, pressing this key to move the digit.</li> </ul>
	OK	<ul style="list-style-type: none"> <li>◆ Confirm the change under edition mode.</li> <li>◆ Page exited under records checking mode.</li> <li>◆ In the display mode, press to return to the display homepage;</li> <li>◆ In standby state, press for 3 seconds to enter the parameter setting mode.</li> </ul>
	Setting mode	<ul style="list-style-type: none"> <li>◆ Pressing OK and STOP simultaneously to come into setting mode</li> </ul>
	Alarm Records checking	<ul style="list-style-type: none"> <li>◆ Pressing STOP and RIGHT to check the records and any buttons pressed to exit from the page.</li> </ul>


### ◆ Alarm records checking




HM500 controller can save 14 group of alarm records which contains the alarm record data includes detailed data such as alarm time, generator parameters, engine parameters, etc.


### ◆ How to check the alarm records:

1) Enter alarm record page: In the standby state, press and hold the  for more than 3 seconds to enter the historical alarm recording interface;

2) Press  to turn upper digit and press  to turn lower digit in order to


choose the record you need. Press  to confirm the record and come into history records checking page.




3) Press  to turn lower records under records checking page. Press  to turn upper records and press  to revert back to alarm history records page.

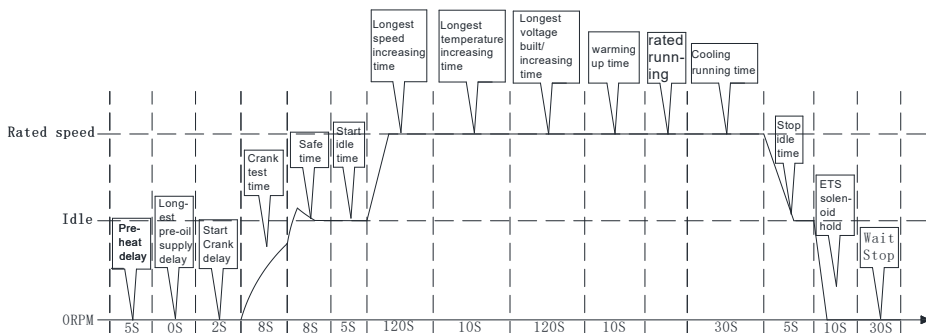
4) Exit from records page: In the history records page and checking page, press  to exit.

**8. Control and operation instruction**


**◆ Manual test mode:**




press  and make sure it is in the stop position before starting.

Press "" and the test file indicator is on. At this time, it is detected whether the connection of each sensor is normal. If the sensor is open, the sensor opens an alarm. If it is normal, the unit start process is executed in the following sequence after pressing the "". automatically switch to Generator provide the power when the unit is running normally. Press "". The controller performs the parking process at the following timing:

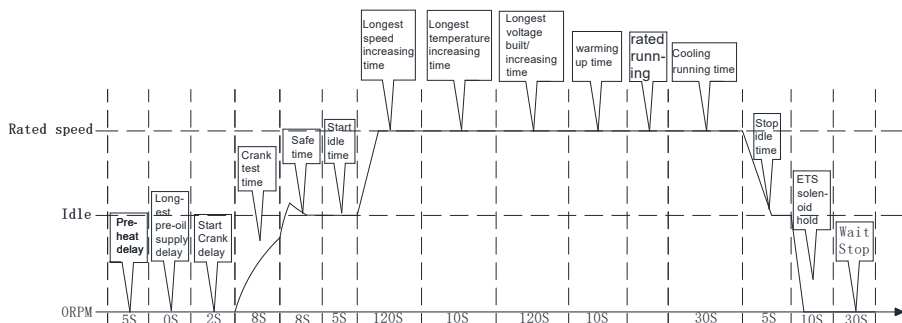


**◆ Manual Start Mode**

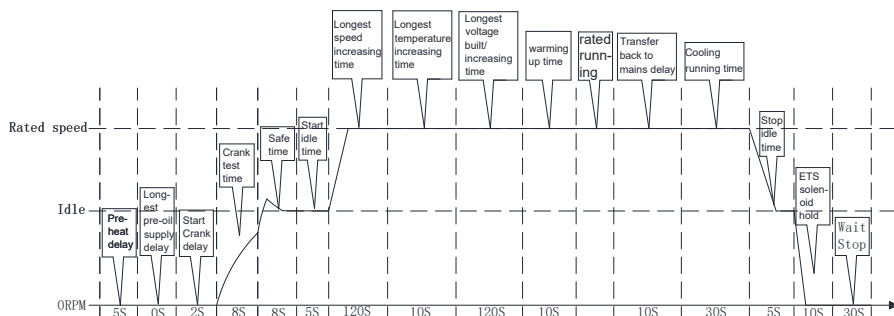
press  and make sure it is in the stop position before starting.

Press "" and the test file indicator is on. At this time, it is detected whether the connection of each sensor is normal. If the sensor is open, the sensor opens an alarm. If it is normal, the unit start process is executed in the following sequence after pressing the "". automatically switch to Generator provide the power when the unit is running normally. Press "". The controller performs the parking process at the following timing:


Manual start and stop process:




After the manual start is successful, pressing the "automatic key" can be converted into an automatic file. The specific working time is as follows:

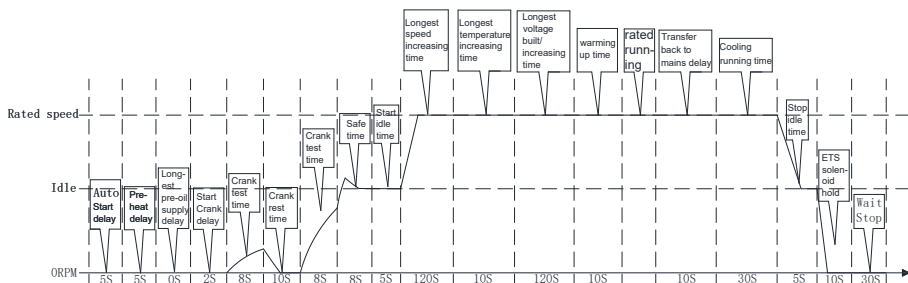


### Automatic starting mode:

press  and make sure it is in the stop position before starting.

Press  and the test file indicator is on. At this time, it is detected whether the connection of each sensor is normal. If the sensor is open, the sensor opens an alarm. If it is normal, wait for the remote start signal to be valid (detected the remote starting signal is valid or the mains provide the power is invalid). The unit will perform the starting process in the following sequence. When the unit enters the normal rated operation, it will automatically switch to the generator provide the power. The controller will detect the remote start signal and the mains status in real time. When the remote start signal fails and the mains provide the power returns to normal, the shutdown process after the "loop time delay" is performed.

Auto start and stop process:



## Notices in Starting Process



Note 1: During the Cranking time, the controller automatically detects the speed signal, frequency signal and oil pressure value or the charging voltage (according to the parameter setting) to reach the judgment condition of successful start, then the judgment is that the start is successful and the motor relay is closed.



Note 2: Within the safety delay, only respond to emergency stop, immediate stop, over speed, over frequency, over voltage, ECU communication Failure, shutter open abnormal, other alarms are not responded to.



Note 3: No response to alarm and warning of under speed, low frequency, under voltage, over current, over power, non-balance of current, external instant unloading shutdown, during start idle time.



Note 4: No response to low frequency, under voltage, over current non-balance of current, external instant unloading shutdown and over power is required when entering the RPM-up time.



Note 5: No response to low frequency, under voltage, over current non-balance of current, external instant unloading shutdown and over power is required when entering the temperature-up time.



Note 6: No response to low frequency, under voltage, over current non-balance of current, external instant unloading shutdown and over power is required when entering the Voltage-up time.



Note 7: No response to low frequency, under voltage, over current non-balance of current, external instant unloading shutdown and over power is required when entering the Warming-up time.



Note 8: After entering rated operation, the Gens load relay output.



Note 9: In the process of shutdown, if the remote starting signal is restored to be valid within the "Cooling time", the rated operation will be entered again.



Note 10: If the stop key is pressed again during idle time, the idle time will be canceled and the stop operation will be executed directly.

## 9. Warnings and Shutdown Alarms

### ◆ Warnings



Notes: Warning is a non-serious failure state, which will not harm the gensets system for the time being. It only reminds operators to pay attention to the situation that does not meet the requirements and solve it in time to ensure the continuous operation of the system. When the warning occurs, the gensets does not stop. Once the fault is removed, the warning is automatically canceled.

### Low Oil Pressure Sensor Warning

When the controller parameter "**Action if low oil pressure**" is set to "**Warning**" and the programmable input port "**Low oil pressure shutdown disabled**" switch is valid, and the controller detects that the engine Oil Pressure is lower than "**Low oil pressure warning**", Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of low Oil Pressure is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**Low OP sensor**" on the current fault screen.

### Low oil Pressure switch warning

When the controller detects that the programmable input "**Low oil Pressure warning input**" switch is active, it starts warning delay and lasts for Normal alarm delay. When the "**Low oil Pressure warning input**" switch is enabled, the engine low oil level switch warning is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**Low oil pressure switch**" on the current fault screen.

### High temperature sensor warning

When the controller parameter "**Action if high water temperature**" is set to "**Warning**" and the programmable input port "**High water temperature disabled**" switch is valid, and the controller detects that the coolant temperature value is higher than the "**High coolant temperature warning**", Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of High coolant temperature warning is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**High temperature sensor**" on the current fault screen.

### High temperature switch warning

When the controller parameter "**Action if high water temperature**" is set to "**Warning**" and the programmable input port "**High temperature shutdown disabled**" switch is valid, and the controller detects that the oil temperature value is higher than the "**High temperature warning**", Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of High oil temperature warning is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**High temperature switch**" on the current fault screen.

### Low fuel level sensor warning

When the controller detects that the fuel level value is lower than the "**Low fuel level warning**", Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of Low fuel level warning is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**Low fuel level-A**" on the current fault screen.

### Low fuel level switch warning

When the controller detects that the programmable input **"Low fuel level warning input"** switch is active, it starts warning delay and lasts for Normal alarm delay. When the **"Low fuel level warning input"** switch is enabled, the engine low fuel level switch warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Low fuel level-D"** on the current fault screen.

### External instant warning

When the controller detects that the programmable input **"External instant warning input"** switch is active, it starts warning delay and lasts for Normal alarm delay. When the **"External instant warning input"** switch is enabled, the warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Instant warn"** on the current fault screen.

### Speed signal lost warning

When the controller parameter **"Action if RPM lost"** is set to **"warning"**, the detected speed value is 0, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of speed signal lost warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Lose speed"** on the current fault screen.

### Oil pressure sensor disconnected warning

When the controller parameter **"Action if low oil pressure sensor disconnected"** is set to **"warning"**, When the oil pressure sensor is detected to be disconnected, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of Oil pressure sensor disconnected warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **" Oil pressure sensor open"** on the current fault screen.

### Temperature sensor disconnected warning

When the controller parameter **"Action if water temperature sensor disconnected"** is set to **"warning"**, When the coolant temperature sensor is detected to be disconnected, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of coolant temperature sensor disconnected warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Temperature sensor open "** on the current fault screen.

### Fuel Level sensor disconnected warning

When the controller parameter **"Action if fuel Level sensor disconnected "** is set to **"warning"**, When the fuel Level sensor is detected to be disconnected, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of fuel Level sensor disconnected warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Fuel Level sensor open"** on the current fault screen.

### Maintenance expiration warning

When the controller parameter **"Primary maintenance expire"** is set to **"warning"**, when the primary countdown to maintenance is detected as "0" or primary maintenance date less than current date, then start warning delay and the duration (normal alarm delay), the warning of maintenance expiration is reported. **"ALARM"** lights on, without stopping the engine, and displays **" maintain end"** on the LCD

screen.

### **ECU faults warning**

When the controller detects the warning information of ECU, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of ECU faults warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"ECU faults warn"** on the current fault screen.

### **ECU Communication Failure Warning**

When the controller parameter **"CAN failure"** is set to **"warning"**, and controller does not receive any message sent by ECU. It started to delay and lasted for some time (Normal alarm delay) but still did not receive the message from ECU, the warning of ECU faults warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"ECU comm. fail"** on the current fault screen.

### **Low coolant level switch warning**

When the controller detects that the programmable input **"Low water level warning"** switch is active, it starts warning delay and lasts for Normal alarm delay. When the **"Low water level warning"** switch is enabled, the engine low coolant level switch warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Low water level"** on the current fault screen.

### **Over battery voltage warning**

When the controller detects that the battery voltage is over than the **"Over battery voltage warning"**, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of over battery voltage warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Over BATT volt"** on the current fault screen.

### **Under battery voltage warning**

When the controller detects that the battery voltage is lower than the **"Under battery voltage warning"**, Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of Under battery voltage warning is reported. **"WARNING"** lights will light up, Generators will not stop, displays **"Under BATT volt"** on the current fault screen.

### **Charging failure warning**

When the gap between D+ and B+ is over than this value, and there is charging failure but still high (normal warning delay), then charge failure warns. **"WARNING"** lights will light up, Generators will not stop, displays **"Charger fault"** on the current fault screen. Once the gap is lower than the value, warns clear.

### **◆ Starting fault**

#### **Fail to Start**

If the number of cranks exceeds the predetermined number of cranks, the failure of start-up will be reported if the start-up of the generating unit is still unsuccessful. **"ALARM"** lights on, without stopping the engine, and displays **"Crank failure"** on the current fault screen.



## ◆ Shutdown Alarms

### Communication failure

When the controller detects that the display panel communication with FM7000 is disconnected, the alarm delay starts and the communication failure with the display panel continues for 20S, and then reports the failure of the main control board communication failure, and the general alarm light "**ALARM**" indicator flashes continuously, The device stops running and displays "**Alarm: Communication failure**" on the current fault screen.

### Over Speed Alarm

When the controller detects that the engine speed is higher than "**Over speed alarm**", Then start alarm delay and the duration (Emergency delay) have not lower than "**Over speed revert**", the alarm of over speed is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**Over speed**" on the current fault screen.

### Under Speed Alarm

When the controller detects that the engine speed is under than "**Under speed alarm**", Then start alarm delay and the duration (Normal alarm delay) have not higher than "**Under speed revert**", the alarm of under speed is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**Under speed**" on the current fault screen.

### Low Oil Pressure Sensor Alarm

When the controller detects that the engine Oil Pressure is lower than "**Low oil pressure alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of low Oil Pressure is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**Low Oil Pressure sensor**" on the current fault screen.

### Low oil pressure switch alarm

When the controller detects that the programmable input port "**Low oil pressure alarm input**" switch is active. Start low oil pressure switch alarm delay, for a period of time "Normal alarm delay" programmable input port "**low oil pressure alarm input**" switch is valid. Then the alarm, the public alarm light "**ALARM**" lights will light up, stop the unit operation, and display "**Low oil pressure switch**" on the current fault screen.

### High temperature sensor alarm

When the controller detects that the coolant temperature value is higher than the "**High coolant temperature alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of High coolant temperature alarm is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**High temperature sensor**" on the current fault screen.

### High temperature switch alarm

When the controller detects that the programmable input port "**High temperature alarm switch**" switch is active. Start low oil pressure switch alarm delay, for a period of time "Normal alarm delay" programmable input port "**High temperature alarm switch**" is valid. Then the alarm, the public alarm light "**ALARM**" lights will light up, stop the unit operation, and display "**High temperature switch**" on the current fault screen.

### Low fuel level sensor alarm

When the controller detects that the fuel level value is lower than the "**Low fuel level alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of Low fuel level alarm is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**Low fuel level sensor**" on the current fault screen.

### Low fuel level switch alarm

When the controller detects that the programmable input "**Low fuel level alarm input**" switch is active, it starts alarm delay and lasts for Normal alarm delay. When the "**Low fuel level alarm input**" switch is enabled, the engine low fuel level switch alarm is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**Low fuel level switch**" on the current fault screen.

### External instant alarm

When the controller detects that the "**External instant alarm input**" switch of the programmable input port is valid, the external instant trip is started and the shutdown alarm delay is delayed for a period of time "**Normal alarm delay**" programmable input port "**External instant alarm input**" switch When it is valid, it will alarm, the public alarm light "**ALARM**" lights will light up, Generator stops running, and display "**Instant parking**" on the current fault screen.

### Speed signal lost alarm

When the controller parameter "**Action if RPM lost**" is set to "**alarm**", the detected speed value is 0, Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of speed signal lost warning is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Lose speed**" on the current fault screen.

### Oil pressure sensor disconnected alarm

When the controller parameter "**Action if low oil pressure sensor disconnected**" is set to "**alarm**", When the oil pressure sensor is detected to be disconnected, Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of Oil pressure sensor disconnected alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Oil pressure sensor open**" on the current fault screen.

### Temperature sensor disconnected alarm

When the controller parameter "**Action if water temperature sensor disconnected**" is set to "**alarm**", When the coolant temperature sensor is detected to be disconnected, Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of coolant temperature sensor disconnected alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "

**Temperature sensor open**" on the current fault screen.

### **Fuel Level sensor disconnected alarm**

When the controller parameter "**Action if fuel Level sensor disconnected**" is set to "**alarm**", When the fuel Level sensor is detected to be disconnected, Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of fuel Level sensor disconnected alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Fuel Level open**" on the current fault screen.

### **Over frequency alarm**

When the controller detects that the generator frequency is higher than "**Over frequency alarm**", Then start alarm delay and the duration (Emergency delay) have not returned to normal, the alarm of over frequency is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Over frequency**" on the current fault screen.

### **Under frequency alarm**

When the controller detects that the generator frequency is lower than "**Under frequency alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of under frequency is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Under frequency**" on the current fault screen

### **Over voltage alarm**

When the controller detects that the generator voltage is higher than "**Over voltage alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of over voltage is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Over voltage**" on the current fault screen.

### **Under voltage alarm**

When the controller detects that the generator voltage is lower than "**Under voltage alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of under voltage is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Under voltage**" on the current fault screen.

### **Over current alarm**

When the controller detects that the generator phase current is higher than "**Phase current over-load alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of over current is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Over current**" on the current fault screen.

### **Non-balance current ratio alarm**

When the controller is t2 phase 3 wire or 3 phase 4 wire, the controller detects that the unbalance degree of the three-phase or two-phase current of the generator is higher than the "**Non-balance current ratio alarm**". Then start alarm delay and the

duration (Normal alarm delay) have not returned to normal, the alarm of Non-balance current ratio is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Unbalance of AMP**" on the current fault screen.

### **Over power alarm**

When the controller detects that the generator power is higher than "**Over total power alarm**", Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of over power is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Over power**" on the current fault screen.

### **Generator loading failure**

When the controller parameter "**Gens breaker checking**" is set to "**alarm**", When the ATS switch is switched, it is detected that the programmable input switch of "**Gens un/loading input**" is invalid. Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of generator loading failure is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Gens onload fail**" on the current fault screen.

### **Maintenance expiration alarm**

When the controller parameter "**Primary maintenance expire**" is set to "**alarm**", when the primary countdown to maintenance is detected as "0" or primary maintenance date less than current date, then start alarm delay and the duration (normal alarm delay), the alarm of maintenance expiration is reported. "**ALARM**" lights on, without stopping the engine, and displays "**Maintain end**" on the LCD screen.

### **ECU faults alarm**

When the controller detects the alarm information of ECU, Then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of ECU faults alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**ECU faults warn**" on the current fault screen.

### **ECU communication failure alarm**

When the controller parameter "**CAN failure**" is set to "**alarm**", and controller does not receive any message sent by ECU. It started to delay and lasted for some time (Normal alarm delay) but still did not receive the message from ECU, the alarm of ECU faults alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**ECU comm. fail**" on the current fault screen.

### **Low water level switch alarm**

When the controller detects that the programmable input "**Low water level alarm**" switch is active, it starts alarm delay and lasts for Normal alarm delay. When the "**Low water level alarm**" switch is enabled, the engine low coolant level switch alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Low water level**" on the current fault screen.

### **Louver opening exception alarm**

When the controller detects that the programmable input "**Louver status input**" switch is active, it starts alarm delay and lasts for Normal alarm delay. When the

"**Louver status input**" switch is enabled, the Louver status input alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Louver abnormal**" on the current fault screen.

### Emergency stop alarm

When the controller detects that the input voltage of PIN 3 is less than 2V, then start alarm delay and the duration (Emergency delay) have not returned to normal, the alarm of Emergency Stop is reported. "**ALARM**" lights will light up, Generator stops running, and displays "**Emergency stop**" on the current fault screen.

### Stop failure with speed alarm

When the controller detects that the speed is not "0" after the execution of the shutdown, the alarm of stop failure is reported. "**ALARM**" lights will light up and displays "**Stop fail-RPM**" on the current fault screen.

### Stop failure with frequency alarm

When the controller detects that the frequency is not "0" after the execution of the shutdown, the alarm of stop failure is reported. "**ALARM**" lights will light up and displays "**Stop fail-Hz**" on the current fault screen.

### Stop failure with pressure alarm

When the controller detects that the Oil **Pressure** is not "0" after the execution of the shutdown, the alarm of stop failure is reported. "**ALARM**" lights will light up and displays "**Stop fail-OP-A**" on the current fault screen.





### Stop failure with oil pressure switch


When the controller detects that the oil pressure switch has not returned after the stop, it will alarm, the public alarm light "**ALARM**" lights will light up, and the current fault screen displays "**Alarm: Stop fail-OP-D**".

## 10. Parameters setting


### ◆ Enter the edition page

Please set the parameters according to below steps:

1) In the stop mode, Press and hold the  button for more than 3 seconds, or the  button, press the  button, and then release the  button to enter the setting menu interface;

2) Select the detailed parameter settings of the controller and press the  key to enter the password interface;

3) The default factory password of the controller is "07623";

4) Press  and add number 1, press  to reduce number 1, press  to turn the digit into right, press  to turn the digit into left, press  once done. Then system comes into menu after confirmation of password setting. The screen will

display error if password is wrong. The correct password should be put after pressing any button.

5) Press to turn the digit into upper position, press to turn the digit into lower position, press to get into parameters setting page.

6) Press to shift up the parameters, press to shift down the parameters, press to get into parameter changing page.

7) Press to add number 1, press to reduce number 1, press to turn the digit into right and press to turn the digit into left, press once done. If the parameters setting is in the valid setting range, then it can be saved, if not, it can't be saved.

8) Press and to save the parameters and exit from edition page.

9) Press to revert back to last class if in any setting position.

Revert back to default: put password "97011" when coming into parameters setting, then all the parameters can be set as defaults.

Note: the data can't be saved if the user didn't press OK and STOP to confirm the setting.

#### ◆ Parameter list.

##### 1) Basic setting

No	Parameter	Range (default)	Notes
0	Language	0-English 1-简体中文 2-繁体中文 3-español 4-русский 5-TURK DILI	Language option.
1	Gens poles	2/4/6/8(4)	When the flywheel teeth are set as 0, the RPM will be resulted by frequency. Pole 2: 50Hz---3000RPM. Pole 4: 50Hz---1500RPM. Pole 6: 50Hz---1000RPM. Pole 8: 50Hz---750RPM
2	Gens AC system	Disable 1 phase 2 wire 2 phase 3 wire 3 phase 3 wire <b>3 phase 4 wire</b>	Gens phases: No gens parameters can be displayed if setting as disable, which is applied to water pump genset.
3	CT rate	5-6000A/5A <b>(500A/5A)</b>	Used for setting genset CT primary current, secondary rated current 5A.

4	Rated frequency	40.0-80.0Hz <b>(50.0Hz)</b>	Setting generator rated frequency to choose the meter range and calculate the alarm value.
5	Rated phase voltage	80-360V <b>(230V)</b>	Setting generator phase voltage to choose the meter range and calculate the alarm value.
6	Rated phase current	5-6000A <b>(500A)</b>	Setting generator phase current to choose the meter range and calculate the alarm value.
7	Rated total power	5-2000Kw <b>(276Kw)</b>	Set total power of generator to choose the meter range and calculate the average loading rate and alarm value.
8	Rated battery voltage	8.0-36.0V <b>(24.0V)</b>	Choose the meter range and calculate the alarm value.
9	Rated RPM	500-4500RPM <b>(1500)</b>	Choose the meter range and calculate the alarm value.
10	Flywheel teeth	0-300 <b>(0)</b>	If the setting is 0, (RPM sensor Disabled), then RPM is resulted by Hz.
11	Oil pressure sensor	0: Disable 1: User defined-Resistance 2: User defined-Voltage 3: Volt In 1MPa-0-5V 4: Volt In 1MPa-0.5-4.5V 5: <b>VDO 0-10Bar</b> 6: MEBAY-003B 7: SGH 8: SGD 9: SGX 10: CURTIS 11: DATCON 10Bar 12: VOLVO-EC 13: 3015237 14: WEICHA1 0-0.6MPa 15: GENCON 0-10Bar	Choose the usual oil pressure sensor, if the sensor users choose is not the 9 types, it can be User-defined.
12	Temperature sensor	0: Disable 1: User-defined 2: <b>VDO 40-120 °C</b> 3: MEBAY-001B 4: SGH 5: SGD 6: SGX 7: CURTIS 8: DATCON 9: VOLVO-EC 10: 3015238 11: PT100 12: MEBAY-Mier 13: WEICHA1 40-120°C 14: GENCON 40-120°C	Choose the usual temperature sensor, if the sensor users choose is not the 11 types, it can be User-defined.
13	Fuel level	<b>0: Disable</b>	If the sensor users choose is not the 3

	sensor	1: User-defined 2: 0-100Ω 3: 100-0Ω 4: 0-107Ω 5: 107-0Ω 6: 0-180Ω 7: 180-0Ω 8: 180-10Ω 9: 10-180Ω 10: 120-10Ω 11: 10-120Ω 12: 90-0Ω 13: 0-90Ω 14: 0-30Ω 15: 73-10Ω 16: 240-33Ω 17: 33-100Ω 18: 0-200Ω 19: 200-0Ω	types, it can be User-defined.
14	Action if RPM lost	<b>Warning</b> Alarm and stop	The flywheel teeth is not 0 to detect this fault.
15	Action if low oil pressure	Warning <b>Alarm and stop</b>	If setting as warning, the programmable input should be set as Low oil pressure stop disabled and input is valid. When the oil pressure value is lower than the preset value or low oil pressure alarm input signal is valid, then controller only display warning but not stop.
16	Action if high temperature	Warning <b>Alarm and stop</b> Alarm and stop after unloading	Alarm and stop: when the temperature is higher than preset value or high temperature signal is valid, then controller will alarm and stop after normal faults delay.
17	Action if oil pressure sensor disconnected	Disable <b>Warning</b> Alarm and stop	If setting as warning: the programmable input should be set as high temperature stop disabled and input is valid. When the temperature value is higher than the preset value or high temperature alarm input signal is valid, then controller only display warning but not stop. If setting as alarm and stop after unloading: the programmable input should be set as high temperature stop and input is valid. When the temperature value is higher than the preset value or high temperature alarm input signal is valid, then controller shall start the unloading procession and stop with alarm.
18	Action if temperature sensor disconnected	Disable <b>Warning</b> Alarm and stop	Action if oil temperature sensor disconnected.



19	Action if fuel Level sensor disconnected	Disable <b>Warning</b> Alarm and stop	Action if Fuel level sensor disconnected.
20	Pressure/Temperature unit	°C/KPA °C/ <b>BAR</b> °C/PSI °F/KPA °F/ <b>BAR</b> °F/PSI	Unit display.

## 2)Basic Setting 2

No	Parameter	Range(defaults)	Notes
1	Primary Modes	<b>STOP</b> Manual Auto Auto save	The primary modes on power, easy for user operation. Note: auto record function can't record the mode with load.
2	Manual crank times	1-30 ( <b>1 time</b> )	Crank times under mode and test mode.
3	Auto start crank times	1-30 ( <b>3 times</b> )	Crank times under auto mode.
4	E.T.S. hold times	1-10( <b>2 times</b> )	The max E.T.S. hold on power shall be canceled once stop success under auto mode. the output interval time is " Fail to stop ".
5	Crank disconnect	RPM Hz Oil pressure(delay) D+ <b>RPM/Frequency</b> RPM/Oil Pressure RPM/ D+ Frequency/Oil Pressure Frequency / D+ Oil pressure/ D+ RPM/Frequency/Oil press. Frequency/oil Press/D+ Oil pressure/D+/RPM D+/Frequency/RPM RPM/Freq./Oil Press/D+	1.If there is no oil pressure sensor, please don't choose the type. 2.If there is no oil pressure sensor (only with low oil pressure switch), RPM, voltage, the user can choose Charge D+ as the crank condition, please choose oil pressure + Charge D+ as conditions in order to keep the engine running safely. Oil pressure switch input is not the crank condition Please check if the running status, stop condition are according with crank condition. Means either of the conditions can be acceptable as crank condition. But all of them should be meet together to regard as stop condition.
6	Frequency disconnect	0-200% ( <b>28%</b> )	Rated frequency multiplying by this value is regarded as crank success condition. When the gens frequency is over the condition value, then system regards it as crank success.
7	Oil pressure disconnect	0-400kpa( <b>200kpa</b> )	When the engine oil pressure is over the condition value, then system regards

			it as crank success, motor escaped.
8	RPM disconnect	0-200% <b>(24%)</b>	Rated RPM multiplying by this value is regarded as crank success condition. When the RPM is over the condition value, then system regards it as crank success, motor escaped.
9	OP pre-supply stop	50-600kpa <b>(200kpa)</b>	When the oil pressure is over the condition value, then pre-oil supply is stopped.
10	RPM-up stop	0-200% <b>(90%)</b>	Rated RPM multiplying by this value is regarded as speed-up stop value. When the RPM is over this value, then the RPM-Up procession is stopped in time.
11	Temperature-up stop	20-200℃ <b>(68℃)</b>	When the water temperature is over the preset value, then temperature-up procession is stopped in time.
12	Voltage-up stop	0-200% <b>(85%)</b>	Rated voltage multiplying by this value is regarded as voltage-up stop value. When the voltage is over this value, then the voltage-Up procession is stopped in time.
13	Fuel pump open	0-100% <b>(25%)</b>	When the fuel level is lower than preset value and remains 10S, fuel pump opened signal output
14	Fuel pump close	0-100% <b>(80%)</b>	When the fuel level is higher than preset value and remains 1S, fuel pump closed signal output.
15	Primary Maintenance countdown	0-5000h <b>(5000h)</b>	When it is set as 5000, then this function is disabled.
16	Maintenance date	<b>2000/01/01-2099/12/31</b>	When it is set as 2000/01/01, this function is disabled.
17	Maintenance expire	<b>Warning Alarm and stop</b>	The action after the primary maintenance expired.
18	User password	00000-65535 <b>(07623)</b>	Change the password.
19	Battery charging start	8.0-30.0 <b>(25.6V)</b>	When the battery voltage is lower than start value and remains 10s under non-running status, then the relay is opened. When it is higher than the close value and remains 10s, relay is closed. Once coming into running mode, there is no output.
20	Battery charging stop	10.0-36.0 <b>(27.8V)</b>	

### 3)Delay time setting

No	Parameter	Range( <b>default</b> )	Notes
1	Start delay	0-65000s <b>(5s)</b>	The time during the genset starts after the mains failure or remote signal is valid.
2	Preheat time	0-6500.0s <b>(0.0s)</b>	The time needed to be preheated before the starter on power.
3	Longest pre-oil	0-180.0s <b>(0.0s)</b>	Under pre-oil supply, if the oil pressure is higher

	supply		than setting value, then pre-oil supply stopped.
4	Cranking time	3.0-60.0s <b>(8.0s)</b>	The time when the starter is on power.
5	Crank rest time	3.0-60.0s <b>(10.0s)</b>	If crank failure, the waiting time before the second test time.
6	Oil pressure delay	0-20.0s <b>(0.0s)</b>	When the crank condition contains oil pressure, if the oil pressure is higher than the presets value and continue for few seconds, then it is regarded as crank success.
7	Safety delay	1.0-60.0s <b>(8.0s)</b>	Low oil pressure, high water temperature, under speed, under frequency, under voltage, charge failure are all invalid during this time except for emergency stop and over speed.
8	Start idle time	0-3600.0s <b>(5.0s)</b>	Idle running time when crank successfully.
9	Longest RPM-up time	0-3600.0s <b>(120.0s)</b>	The longest speed-up time, during which time the system will exit once speed increased successfully.
10	Longest Temp.-up time	0-3600.0s <b>(0.0s)</b>	The longest warming-up time, during which time the system will exit once temperature increased successfully.
11	Longest Volt. -up time	0-3600.0s <b>(120.0s)</b>	The longest voltage-up time, during which time the system will exit once voltage increased successfully.
12	Warming-up time	0-3600.0s <b>(10.0s)</b>	The time needed for loading.
13	Back to Mains time	0-3600.0s <b>(5.0s)</b>	To avoid the switch actions if the mains unstable. If the remote start signal is invalid , genset will not switch immediately, after the delay time, it will transfer to mains. during the delay, if the remote start signal is valid, then genset will come into rated running.
14	Back to Gens time	0-3600.0s <b>(5.0s)</b>	There shall be loading delay from Mains to Gens if the remote start signals valid or Mains abnormal under Cooling time.
15	Cooling time	0-3600.0s <b>(30.0s)</b>	After unloading, the time of cooling down by radiator before stop. during the delay, if the remote start signal is valid, then genset will come into rated running.
16	Stop idle time	0-3600.0s <b>(5.0s)</b>	Idle-speed running time.
17	E.T.S. hold time	0-600.0s <b>(10.0s)</b>	Stop solenoid on power time.
18	Fail to stop	5-180.0s <b>(30.0s)</b>	If the RPM is 0 during the stop failure time, then the stop failure time is no needed.
19	Emergency delay	0-10.0s <b>(1.5s)</b>	Emergency and over frequency alarm delay.
20	Normal alarm delay	2.0-20.0s <b>(5.0s)</b>	The alarm delay except for emergency stop and over frequency
21	Normal warning delay	1.0-20.0s <b>(2.0s)</b>	The warning delay.
22	AC Voltage abnormal delay	2.0-20.0s <b>(10.0s)</b>	Over / under voltage delay.
23	Over current	0.1-36.0 <b>(36.0)</b>	This option will not take effect until the <b>[23-Over</b>

	<b>【inverse time】</b>		<b>phase current delay</b> is set to <b>0</b> . The over current delay is inverse time, and the formula is $T=t/((IA/IT) - 1)^2$ .
24	Over power <b>【inverse time】</b>	0.1-36.0 <b>(36.0)</b>	This option will not take effect until the <b>[24-Over total power delay]</b> is set to <b>0</b> . The over power delay is inverse time, and the formula is $T=t/((IA/IT) - 1)^2$ .
25	Transfer switch delay	0-3600.0s <b>(1.0s)</b>	The time from Mains to Gens.
26	Load / unload pulse width	1.0-10.0s <b>(5.0s)</b>	Mains and Gens loading and unloading pulse width, when it is 10s, it is regarded as continuous output.
27	Over phase current delay	<b>0-3600.0s (30s)</b>	When this parameter is set to 0, the over current delay is the inverse time; if not, the over current delay is the time set for this parameter.
28	Over total power delay	<b>0-3600.0s (30s)</b>	When this parameter is set to 0, the over power delay is the inverse time; if not, the over current delay is the time set for this parameter.

#### 4) Engine Alarm setting

No	Parameter	Range (defaults)	Notes
1	Over speed alarm	0-200% <b>(114%)</b>	Rated RPM multiplying by this value is regarded as over speed alarm value. When the RPM is higher than the alarm value and comes into over speed delay but still higher (emergency faults delay), then over speed alarms. if the value is set as 200, then the over speed alarm is disabled.
2	Under speed alarm	0-200% <b>(80%)</b>	Rated RPM multiplying by this value is regarded as under speed alarm value. When the RPM is lower than the alarm value and comes into under speed delay but still lower (normal faults delay), then under speed alarms. if the value is set as 0, then the under speed alarm is disabled.
3	Low oil pressure alarm	0-999kpa <b>(103kpa)</b>	When the oil pressure is lower than the alarm value and comes into low oil pressure delay but still lower (normal faults delay), then low oil pressure alarms. if the value is set as 0, then the under speed alarm is disabled.
4	High temperature alarm	20-200℃ <b>(98 ℃)</b>	When the temperature is higher than the alarm value and comes into high temperature delay but still higher (normal faults delay), then high temperature alarms. If the value is set as 200, then the high temperature alarm is disabled.
5	Low fuel level warning	0-100% <b>(20%)</b>	When the fuel level is lower than the value and comes into low fuel level warning delay but still lower (normal warning delay), then low fuel level warns. If it is higher than the value then warning clears. If the value is set as 0, then the low fuel level warning is disabled.
6	Low fuel level alarm	0-100% <b>(0%)</b>	When the fuel level is lower than the alarm value and comes into low fuel level delay but still lower (normal

			faults delay), then low fuel level alarms. if the value is set as 0, then the under speed alarm is disabled.
7	Over battery voltage warning	0-200% <b>(135%)</b>	Rated battery voltage multiplying by this value is regarded as over battery voltage warning value. When the battery input is higher than the warning value and comes into over battery voltage delay but still higher (normal faults delay), then over battery voltage warns. if the value is set as 200, then the over battery voltage is disabled.
8	Under battery voltage warning	0-200% <b>(67%)</b>	Rated battery voltage multiplying by this value is regarded as under battery voltage warn value. When the battery input is lower than the warning value and comes into under battery voltage delay but still lower (normal faults delay), then under battery voltage warns. if the value is set as 0, then the under battery voltage is disabled.
9	Charger warning	1.0-30.0V <b>(30.0V)</b>	When the gap between D+ and B+ is over than this value, and there is charging failure but still high (normal warning delay), then charge failure warns. Once the gap is lower than the value, warns clear. If the value is set as 300, then the charge failure is disabled.

### 5)Generator alarm parameters

No	Parameter	Range(defaults)	Notes
1	Over freq alarm	0-200% <b>(114%)</b>	Rated frequency multiplying by this value is regarded as under over frequency alarm value. When the Freq is higher than the value and comes into over freq delay but still higher (emergency faults delay), then over frequency alarms, If the value is set as 200, then the alarm is disabled.
2	Under freq alarm	0-200% (80%)	Rated frequency multiplying by this value is regarded as under frequency alarm value. When the Freq is lower than the value and comes into under freq delay but still lower (normal faults delay), then under frequency alarms, If the value is set as 0, then the alarm is disabled.
3	Over voltage alarm	0-200% (120%)	Rated voltage multiplying by this value is regarded as over voltage alarm value. When the voltage is higher than the value and comes into over voltage delay but still higher (normal faults delay), then over voltage alarms, If the value is set as 200, then the alarm is disabled.
4	Under voltage alarm	0-200% (80%)	Rated voltage multiplying by this value is regarded as under voltage alarm value. When the voltage is lower than the value and comes into under voltage delay but still lower (normal faults delay), then under voltage alarms, If the value is set as 0, then the alarm is disabled.
5	Phase current over-load alarm	0-200% (100%)	Rated current multiplying by this value is regarded as over current alarm value. When the current is

			higher than the value and comes into over current delay but still higher (over current faults delay), then over current alarms, If the value is set as 200, then the alarm is disabled.
6	Non-balance current ratio alarm	10-100% (100%)	It is valid for 2P3W or 3P4W. When the non-balance current ratio is higher than the value and comes into delay but still higher (normal faults delay), then non-balance current ratio warns, If the value is set as 100, then the alarm is disabled.
7	Over total power alarm	0-200% (100%)	Rated power multiplying by this value is regarded as over power alarm value. When the loading power is higher than the value and comes into delay but still higher (power faults delay), then over power alarms, If the value is set as 200, then the alarm is disabled.

### 6) Output/input setting

No	Parameters	Range(defaults)	Notes
1	AUX.OUTPUT 1	0-25 (17. E.S.T. hold)	<b>0. Disable.</b> <b>1. Public warning output:</b> when there is any warning output. <b>2. Public alarm output:</b> when there is any alarm output, alarm locks till revert back. <b>3. Audio alarm:</b> when there is any alarm output, the Audio controls. <b>4. Shades control:</b> there is output once genset starts and stop till stable. <b>5. Preheat mode 1:</b> preheat before start. <b>6. Pre-oil supply control:</b> Under pre-oil supply, if the oil pressure is higher than setting value or pre-oil supply time ends, then pre-oil supply stopped. <b>7. Fuel output:</b> output once gens starts and off till stable. <b>8. Crank output:</b> output once cranking, no output in other mode. <b>9. Genset running:</b> output under running, off once RPM is lower than cranking RPM. The crank success condition can be set. <b>10. Idle speed control 1:</b> used for speed controller, there is output under idle but no output under high speed. <b>11. Speed-up control:</b> during the procession of speed increasing, the output time is the Longest RPM-up time. <b>12. High speed control:</b> there is output when coming into high speed warming up, but off after cooling down. <b>13. Excitation output:</b> there is output during cranking procession and there is 2s output
2	AUX.OUTPUT 2	0-25 (10. Idle speed control 1)	
3	AUX.OUTPUT 3	0-25 (14. Gens load)	
4	AUX.OUTPUT 4	0-25 (23. Mains load)	

			<p>if there is no frequency under high speed status.</p> <p><b>14. Gens load:</b> continuous or pulse type according to time setting.</p> <p><b>15. Gens unload:</b> continuous or pulse type according to time setting.</p> <p><b>16. Speed-down control:</b> the output time is shutdown idle delay during shutdown idle or shutdown on power procession.</p> <p><b>17. E.S.T. hold:</b> shutdown output, it is used for gens with stop solenoid. when the setting value of shutdown delay is over, then it is off.</p> <p><b>18. System in stop:</b> there is output under stop mode.</p> <p><b>19. System in manual:</b> there is output under manual mode.</p> <p><b>20. System in auto:</b> there is output under auto mode.</p> <p><b>21. Fuel pump output:</b> there is output if the oil capacity is lower than start condition for 10s and shutdown if it is higher than the shutdown condition for 1s.</p> <p><b>22. Battery charging control:</b> there is output if the voltage is lower than the preset value under standby status and shutdown after start and in running status.</p> <p><b>23. Mains load:</b> continuous or pulse type according to time setting.</p> <p><b>24. Mains unload:</b> continuous or pulse type according to time setting.</p> <p><b>25. Idle speed control 2:</b> used for speed controller, there is output under idle but no output under high speed.</p>
5	AUX.INPUT 1	0-40 (1. Low oil pressure alarm switch)	0. Disable.
7	AUX.INPUT 2	0-40 (2. High temperature alarm switch)	1. Low oil pressure alarm switch.
9	AUX.INPUT 3	0-40 (18. Remote start with load)	2. High temperature alarm switch.
11	AUX.INPUT 4	0-40 (5. Low fuel level warning input)	3. Low water level warning switch.
13	AUX.INPUT 5	0-40 (3. Low water level warning switch)	4. Low water level alarm switch.
			5. Low fuel level warning input.
			6. Low fuel level alarm input.
			7. Charging failure warning: output when charging failure.
			8. Low oil pressure shutdown disabled: valid if there is signal input.
			9. High temperature shutdown disabled: valid if there is signal input.
			10. External instant warning input.
			11. External instant alarm input.
			12. Gens un/loading input: connect to the gens loading switch auxiliary point.

			<p>13. <b>Mains un/loading input:</b> connect to auxiliary point of mains loading switch.</p> <p>14. <b>Shades status input.</b></p> <p>15. <b>Auto start disabled:</b> gens will not start if there is signal input whatever mains normal or not.</p> <p>16. <b>Auto stop disabled:</b> gens will not stop if there is signal input whatever mains normal or not.</p> <p>17. <b>Stop by radiator if high temperature:</b> The controller will shutdown the gens after high speed cooling down delay when temperature is too high if this signal is valid and gens under normal running the controller will shutdown the gens directly if the signal is not valid.</p> <p>18. <b>Remote start (with load):</b> the gens comes into start procession if this signal is valid and under auto mode.</p> <p>19. <b>Soundproof alarm:</b> audio alarm output is disabled if there is signal output.</p> <p>20. <b>Front face button disabled:</b> any button except for page button is disabled if there is signal output.</p> <p>21. <b>Meter mode:</b> all output are disabled, alarm and warns are invalid. any button except for page button is disabled.</p> <p>22. <b>Remote control mode:</b> any button except for page button is disabled if the input is valid, LCD will display remote mode. remote control module can start/stop and monitor parameters through front face buttons.</p> <p>23.– 40. Reserved.</p>
6	AUX.INPUT 1 valid	0- Normal close 1- Normal open	The status of switch value input valid.
8	AUX.INPUT 2 valid	0- Normal close 1- Normal open	
10	AUX.INPUT 3 valid	0- Normal close 1- Normal open	
12	AUX.INPUT 4 valid	0- Normal close 1- Normal open	
14	AUX.INPUT 5 valid	0- Normal close 1- Normal open	

### 7) Working plan and maintenance setting

No	Parameter	Range(defaults)	Notes
1	Working plan format	<b>Disable</b> Every month Every week	This mode must be under auto mode. Working plan is disabled once setting as disable.



			The working plan will be executed according the chosen date when setting as every month. The working plan will be executed according the chosen date when setting as every week.
2	Maintenance date per month	From 1 <sup>st</sup> to 31 <sup>st</sup> <b>Default: the first day</b>	The date chosen for every month.
3	Maintenance date per week	Monday to Sunday <b>Default: Sunday</b>	The date chosen for every week.
4	Maintenance with load or not	<b>Disabled</b> /with load	To choose if the genset starts with load or not.
5	Maintenance start time	00:00-23:59( <b>00:00</b> )	Maintenance start time setting.
6	Maintenance running time	1-120m( <b>5m</b> )	Maintenance running time setting.

### 8)Mains protection

No	Parameter	Range(defaults)	Notes
1	Phase	Disable 1 Phase 2 Wire 2 Phase 3 Wire 3 Phase 3 Wire <b>3 Phase 4 Wire</b>	Choose the input, there is no display if setting as disable.
2	Mains under volt	55-330V( <b>184V</b> )	When the mains voltage is lower than the "low voltage crank threshold" and comes into mains low voltage delay (normal failure delay) but still lower, then mains becomes invalid. If the voltage become higher than "low voltage revert threshold" during normal failure delay time, then it will not alarm.
3	Revert under volt	55-330V( <b>207V</b> )	
4	Mains over volt	55-330V( <b>276V</b> )	
5	Revert over volt	55-330V( <b>253V</b> )	When the mains voltage is higher than the "high voltage crank threshold" and comes into mains high voltage delay (normal failure delay) but still higher, then mains becomes invalid. If the voltage become lower than "low voltage revert threshold" during normal failure delay time, then it will not alarm.
6	Mains normal delay	0.0-3600.0S( <b>10.0s</b> )	The time from abnormal to normal, which is used for ATS transfer.
7	Mains abnormal delay	0.0-3600.0S( <b>5.0s</b> )	

### 9)LCD setting

No	Parameter	Range(defaults)	Notes
1	Start screen display time	0-20.0s ( <b>5.0s</b> )	Start screen display time,0: No-display.
2	Saving mode	5.0-6000.0s ( <b>600.0s</b> )	LCD light will be closed automatically without any button pressed after delay. If setting as 6000.0s, back light always lighted.
3	Homing display	5.0-600.0s ( <b>600.0s</b> )	The time when the page reverts back to the home page. If setting as 600.0s: disabled.
4	LOGO delay display	5.0-6000.0	Start screen will be opened without any

under standby	<b>(6000.0s)</b>	button pressed after delay. If setting as 6000.0s: disabled.
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**a) USB/485 PORT**

No	Parameter	Range( <b>default</b> )	Notes
1	Controller ID	1-255( <b>16</b> )	The IP built by controller and PC.
2	RS485 baud rate	0-4800 1-9600 <b>2-19200</b> 3-38400 4-57600 5-115200	RS485 communication baud rate.
3	CRC setting	CRC: L_H <b>CRC: H_L</b>	RS485 communication CRC correction high and low bits

**b) working plan**

No	Parameter	Range( <b>default</b> )	Notes
1	Working plan	<b>Disable</b> Enable 1: remote start Enable 2: mains failure Enable 3: the above 1 or 2 Enable4: running always	Working plan start condition.
2	Start time	00:00-23:59	The start time allowed.
3	End time	00:00-23:59	The end time allowed (the next day is valid).
4	Dates	1-31	Multiple choices according to the reality. The longest running time is 24 hours.

**c) Data/time setting**

No	Parameter	Range( <b>defaults</b> )	Notes
1	Date/Time	2016/01/01-2099/12/31	Internal calendar, please calibrate regularly.
2	Current time	00:00:00-23:59:59	

**d) Self-define curve**

NO	Parameter	Notes
1	Self-define oil pressure resistance curve	<b>Sensor curve can be User-defined by panel buttons, resistance and according value should be input, MAX 15 groups, MIN 2 groups.</b>
2	Self-define oil pressure voltage curve	
3	Self-define water temperature curve	
4	Self-define fuel level curve	<b>Rule: resistance should be input from small to large.</b>

**11. Fault finding**

Symptoms	Possible Solutions
Controller no response with power	Check DC voltage. Check DC fuse. Check if the terminal 1 and 2 is with battery voltage.
Genset shutdown	Check the water/cylinder temperature is too high or not. Check the genset AC voltage. Check DC fuse.

Genset Emergency Stop	<p>Check the emergency stop button.</p> <p>Check that the voltage of the controller's 3 feet to the ground should be the battery voltage.</p> <p>Check the controller connection.</p>
Low oil pressure alarm	<p>Check oil pressure sensor and its wiring.</p> <p>Check the oil pressure sensor type and controller settings must be consistent.</p> <p>Check whether the low oil pressure sensor is normal.</p>
High temperature alarm	<p>Check temperature sensor and its wiring.</p> <p>Check the temperature sensor type and controller settings must be consistent.</p> <p>Check whether the temperature sensor is normal.</p>
Shutdown Alarm in running	<p>Check related switch and its connections according to the information on LCD.</p> <p>Check programmable inputs.</p>
Fail to start	<p>Check fuel return circuit and wiring.</p> <p>Check start battery.</p> <p>Consult engine manual.</p>
Starter motor does not respond	<p>Check the wiring to the starter.</p> <p>Check start battery.</p>
Unit operation but ATS does not switch	<p>Check the ATS.</p> <p>Check the cable between the controller and the ATS.</p>
USB communication is abnormal	<p>Check the USB connection.</p> <p>Check whether the USB port of the computer is normal.</p> <p>Check whether the USB driver is installed.</p>
RS485 cannot communicate normally	<p>Check the connection.</p> <p>Check if the communication ID number setting is correct.</p> <p>Check if the A and B lines of RS485 are reversed.</p> <p>Check if the RS485 communication line driver is installed or not.</p> <p>Check if the communication port of the PC is damaged.</p> <p>Add a 120 <math>\Omega</math> resistor between the AB of the controller RS485.</p>