DC5x-4G GENSET CONTROLLER
USER MANUAL

DC50x-4G

DC52x-4G

Software Version

No.	Version	Date	Note
1	V1.0	2022-07-05	Original release.
2			

Chongqing Mebay Technology Co.,Ltd
Add: No6-2,Building 4, Gangan Rd, Jiangbei District, Chongqing.
Tel：+86-23-6869 3061
Fax：+86-23-6765 8207
Web：http://www.mebay.cn
http://www.cqmb.cn
E_mail：sales@mebay.cn

Symbol Description

Symbol	Description
 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. 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.

CATALOGUE

1. Summary

This series controller is specialized for Diesel / Gasoline / Gas Genset Start, Stop, Parameters monitoring, faults-checking as well as data setting. At the same time, it has 4G cloud control function, GPS positioning function, WEB and APP can remote control and remote upgrade function;

3.5 inch 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. Besides, LCD screen can display various faults in the same time that the genset will be stopped once it can't work smoothly.

There are Chinese/English interface options, more language can be set according to user's request. All the parameters can be configured through the front face buttons or use programmable interface by RS485 or USB to adjust via PC. It can be widely applied for all kinds of auto control system of gensets.

2. Main Features

There are six Models under DC5x-4G series.

DC50D-4G: Used for single machine automation. Start/Stop through remote start signal.The built-in 4G communication module can be connected to the GSCLOUD cloud control platform, and the 4G communication is the Chinese version.

DC52D-4G: Based on DC50D-4G,Added the mains monitoring and AMF (Mains/Generator automatic switching control), especially suitable for the automation system composed by mains and genset.

DC50C-4G: Based on DC50D-4G, added to CAN communication port, and adapt to more than 40 kinds of engines.

DC52C-4G: Based on DC52D-4G, added to CAN communication port, and adapt to more than 40 kinds of engines.

DC50CR-G4G: Used for single machine automation. Start/Stop through remote start signal.Built-in 4G communication module, can be connected to GSCLOUD cloud control platform, standard CAN communication and RS485 communication port, 4G communication is the global version.

DC52CR-G4G: Based on DC50CR-G4G，Added the mains monitoring and AMF (Mains/Generator automatic switching control), especially suitable for the automation system composed by mains and genset.

- ◆ Dual core 32bit high performance single chip microcomputer.
- ◆ 3.5 inch 240 * 128 high-resolution LCD screen, Available in 6 languages, user's language set if necessary.
- ◆ Indicator and number display through UI surface.
- ◆ Acrylic material is adapted to protect the screen.
- ◆ Silicone panels;
- ◆ USB Port: parameters can be set even without power through USD port to monitor in real time.
- ◆ With RS485 communication port, can achieve "Three Remote" functions via MODBUS protocol.

- ◆ Standard CAN communication port, built-in J1939 protocol, has matched more than 40 kinds of engines;(Only for DC5xC-4G\DC5xCR-G4G)
- ◆ The module comes with GPS positioning and base station positioning functions, which can realize real-time positioning of the unit;
- ◆ When the generator set alarms, the data can be uploaded to the server immediately;
- ◆ Various kinds of parameters display.
- ◆ Input/output function, status can be shown directly.
- ◆ Real time clock inside: preset time operate and auto maintenance is available. Genset working plan can be set as per week or month.
- ◆ Maintenance countdown function, can set maintenance time or date.
- ◆ The black box function can save the relevant parameters of the unit when the fault alarm occurs in real time, and it is convenient to find the cause of the fault.
- ◆ Totally 6relay's output, among which 4 relay output can be self-configurable, each relay can be set as max 20 functions, besides, there are 3 groups as non-contact terminals.
- ◆ With 5 switches input, up to 20 functions optional;
- ◆ 3 sensor simulation input connectors, the oil pressure sensor is compatible with voltage signal input, and various display units can be configured.
- ◆ Battery charging control function,which can protect the battery according to battery voltage status.
- ◆ Sensor can be self-defined by front face button or PC software.
- ◆ Adapt to 3P4W,1P2W,2P3W(120V/240V,50/60HZ)
- ◆ Various of crank conditions (RPM, Frequency, Oil Pressure) can be chosen.
- ◆ Control Protection: Auto Start/Stop of genset, load transfer (ATS control) and perfect failure display and protection.
- ◆ Standard water-proof rubber gasket. The waterproof can reach IP54
- ◆ Module design: All the connections are adapted with European connectors so that installation, connection, repair and replacement can be more easily.

3. Parameters Display

- ◆ Engine RPM
- ◆ Engine oil pressure
- ◆ Engine temperature
- ◆ Engine fuel level
- ◆ Engine battery voltage
- ◆ Charging voltage
- ◆ CAN related parameters(Only for DC5xC-4G\DC5xCR-G4G)
- ◆ DTU related parameters (displayed in the status bar)
- ◆ Mains Frequency (Only for DC52D-4G，DC52C-4G，DC52CR-G4G)
- ◆ Mains phase voltage L-N (Only for DC52D-4G，DC52C-4G，DC52CR-G4G)
- ◆ Mains phase voltage L-L Only for DC52D-4G，DC52C-4G，DC52CR-G4G)
- ◆ Generator 3 Phase voltage L-N
- ◆ Generator 3 Phase voltage L-L
- ◆ Generator 3 phase current A
- ◆ Generator Frequency Hz

- Generator Power Factor COS φ
- Generator active power KW
- Generator apparent power KVA
- Generator reactive power KVar
- Real-time load rate %
- Current load rate %
- Average loading rate %
- Current consumption KWH
- Total consumption KWH
- Total Crank times
- Cumulative power on time of controller
- Current running time
- Total running time
- Maintenance notice
- Switches input status display
- Output status display of relays
- Current date and time;

4. Protection

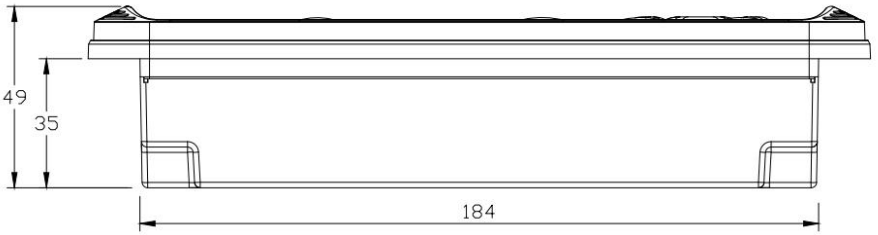
- Over speed
- Under speed
- Low oil pressure
- High temperature
- Low fuel level
- External emergency alarm
- D+ open
- RPM Lost
- Sensor Open
- Over Frequency
- Under Frequency
- Over voltage
- Under voltage
- Over current
- Non-balance of current
- Over power
- Maintenance expire
- Low water level alarm
- Emergency Stop
- Crank failure
- Battery over voltage
- Battery under voltage
- The charger fails to charge
- Charger charging failure
- Stop Failure
- ECU alarm failure
- ECU communication Failure

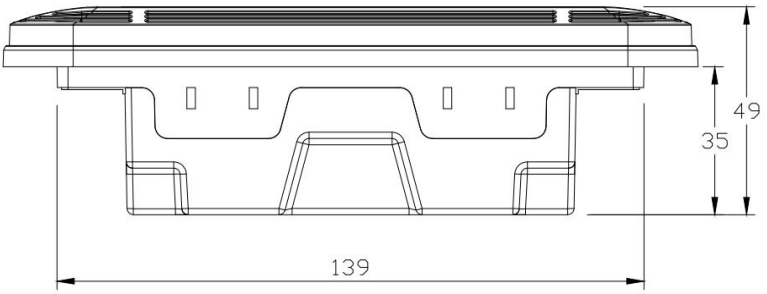
5. Parameters

Options	Parameters
Working voltage	DC8V----36V Continuous
Power consumption	Standby：24V：MAX 2W
	Working：24V：MAX5W
AC Voltage Input	1P2W 30VAC-360VAC (ph-N)
	2P3W 30VAC-360VAC (ph-N)
	3P4W 30VAC-360VAC (ph-N)
Rotate speed sensor Frequency	50-10000Hz
MAX Accumulating Time	99999.9Hours（Min Store time:6min）
Fuel Relay Output	Max 16Amp DC+VE Supply voltage
Start Relay Output	Max 16Amp DC+VE Supply voltage
Programmable Relay output 1	Max 16Amp DC+VE Supply voltage
Programmable Relay output 2	Max 16Amp DC+VE Supply voltage
Programmable Relay output 3	5AMP Non-contact normal open output
Programmable Relay output 4	5AMP Non-contact normal open output
Excitation output	DC+VE supply voltage
GPRS	SMA port
GPS	SMA port
DC5xCR-G4G supports frequency bands	**LTE-FDD:** B1/ B2/ B3/ B4/ B5/ B7/ B8/ B12/ B13/ B18/ B19/ B20/ B25/ B26/ B28 **LTE-TDD:** B38/ B39/ B40/ B41 **WCDMA:** B1/ B2/ B4/ B5/ B6/ B8/ B19 **GSM:** B2/ B3/ B5/ B8
DC5xD-4G\DC5xC-4G supports frequency bands	**LTE-FDD:** B1/ B3/ B5/ B8 **LTE-TDD:** B34/ B38/ B39/ B40/ B41
SIM card	Nano SIM
Switch value input	Available if connecting with Battery -
Working condition	-25-65℃
Storage condition	-40-85℃
Protection Level	IP54：when waterproof rubber gasket is added between controller and its panel
Insulation strength	Apply AC2.2kV 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	186mm*142mm
Weight	0.9Kg

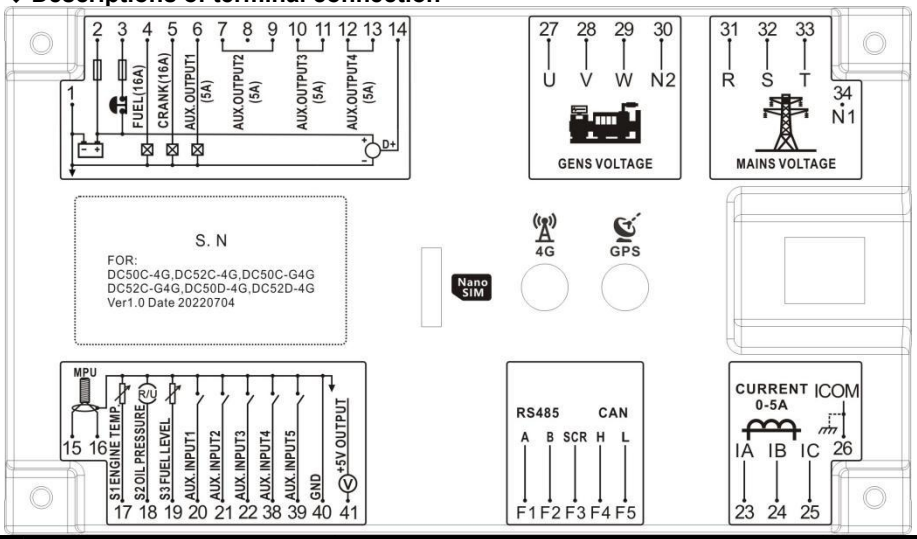
6. Overall Dimension and Wiring Diagram

◆ **Overall Dimension:**





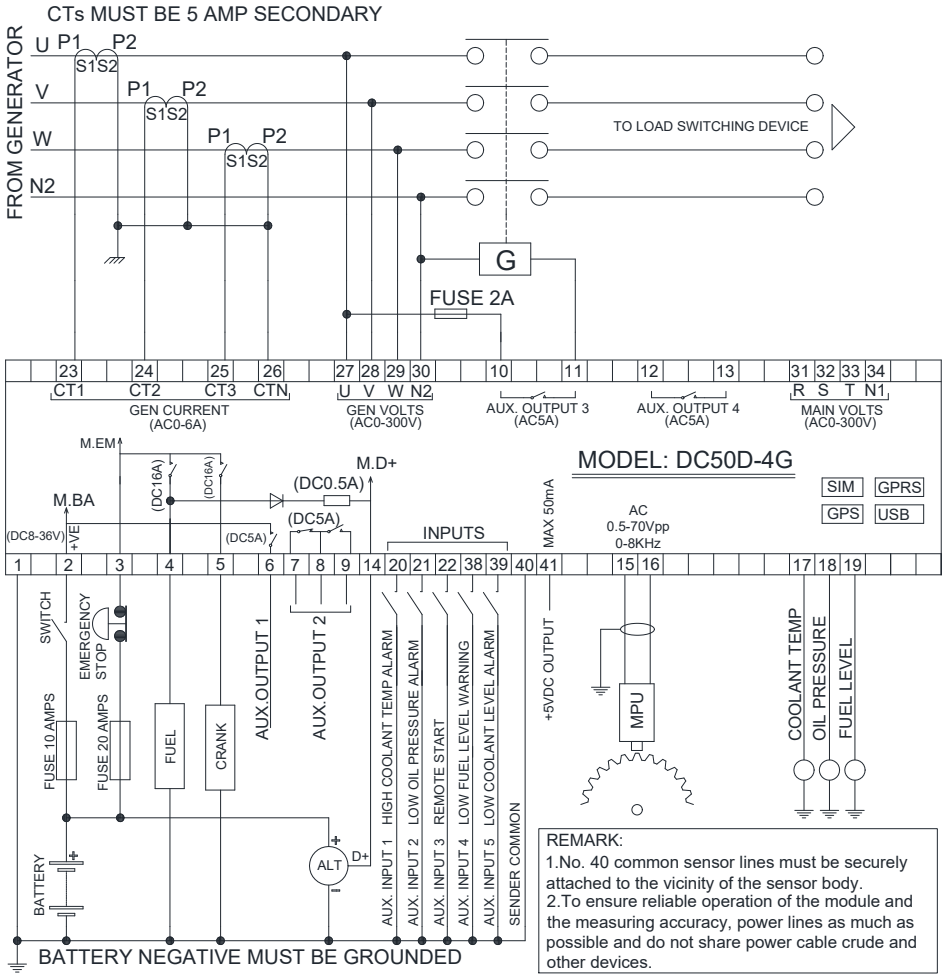
◆ **Descriptions of terminal connection**



No.	Function	Description	Cable cross sectional area
1	Battery Negative Input B-	Controller power supply input B-.	2.5mm²
2	Battery Negative Input B+	Controller power supply input B+.	2.5mm²
3	Emergency Stop Input	B+ voltage input is active, and connected to emergency stop normal closed button.	2.5mm²
4	Fuel Output	+VE output, Max 16Amp	1.5mm²
5	Crank Output	+VE output, Max 16Amp.	1.5mm²
6	Aux. Ouput 1	+VE output, Max 5Amp.	1.5mm²
7	Aux. Ouput 2 Normal close	Passive Output, Max 5Amp.	1.5mm²
8	Aux. Ouput 2 Common		1.5mm²
9	Aux. Ouput 2 Normal open		1.5mm²
10	Aux.Output 3	Passive normally open output, Max 5Amp.	1.5mm²
11	Aux.Output 3		1.5mm²
12	Aux.Output 4	Passive normally open output, Max 5Amp.	1.5mm²
13	Aux.Output 4		1.5mm²
14	Charging excitation output	+VE output, Max 0.9Amp.	1.0mm²
15	Speed sensor -	Use a shielded wire to connect the speed	1.0mm²

16	Speed sensor +	sensor.	1.0mm²
17	Temperature Sensor	Connect sensor input. Oil pressure sensor compatible with resistance/voltage sensors;	1.0mm²
18	Oil pressure sensor		1.0mm²
19	Fuel level sensor		1.0mm²
20	Aux. Input 1	The grounding is valid according to the function selection switch input.	1.0mm²
21	Aux. Input 2		1.0mm²
22	Aux. Input 3		1.0mm²
23	Load CT Secondary L1	Current Transformer Secondary Rated 5A.	1.5mm²
24	Load CT Secondary L2		1.5mm²
25	Load CT Secondary L3		1.5mm²
26	Load CT Secondary ICOM	Connect to the common.	1.5mm²
27	Generator Voltage U	Connected to the power generation output R phase.	1.0mm²
28	Generator Voltage V	Connected to the power generation output S phase.	1.0mm²
29	Generator Voltage W	Connected to the power generation output T phase.	1.0mm²
30	Generator Voltage N2	Connected to the power generation output N phase.	1.0mm²
31	Mains Voltage R	Connected to the mains U phase.	1.0mm²
32	Mains Voltage S	Connected to the mains V phase.	1.0mm²
33	Mains Voltage T	Connected to the mains W phase.	1.0mm²
34	Mains Voltage N1	Connected to the mains N phase.	1.0mm²
38	Aux. Input 4	The grounding is valid according to the function selection switch input.	1.0mm²
39	Aux. Input 5		1.0mm²
40	Sensor common GND	Connect the battery negative or outer.	1.0mm²
41	+5V Output	Connect the power supply of the oil pressure sensor with the output voltage signal, with a maximum of 50mA.	1.0mm²
F1	RS485_A	A 120 Ω shielded wire and good grounding are recommended.	1.0mm²
F2	RS485_B		1.0mm²
F3	COM_SCR		1.0mm²
F4	CAN H		1.0mm²
F5	CAN L		1.0mm²

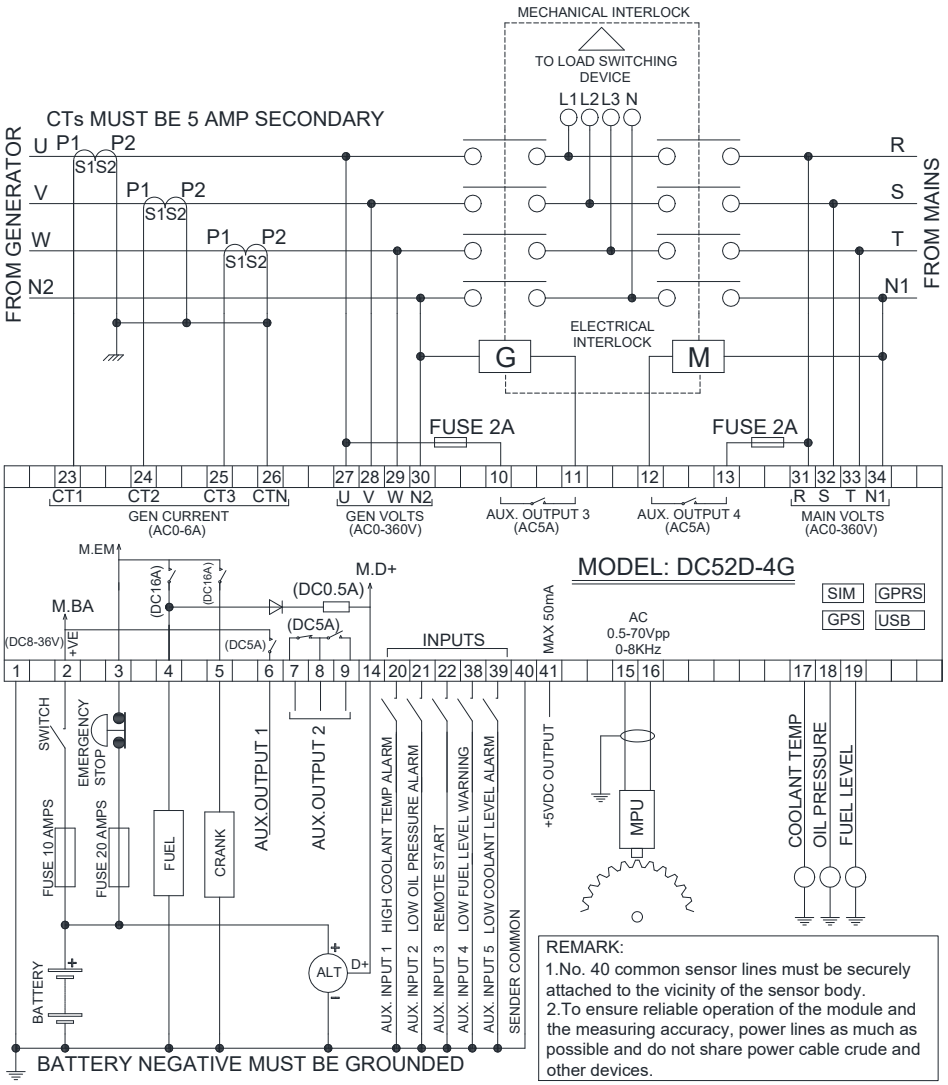
◆ DC50D-4G 3-phase 4-wire Typical Wiring Diagram



Note: Please don't move battery during running status or it may cause the controller broken!

WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

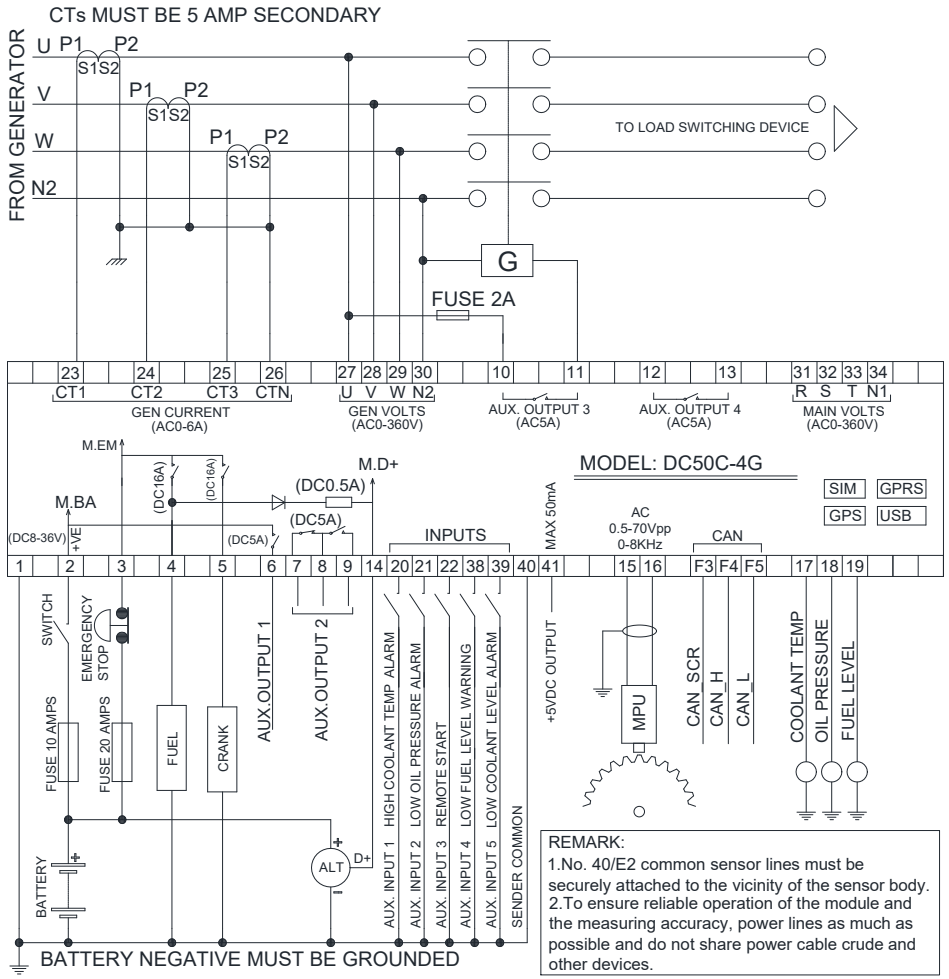
◆ DC52D-4G 3-phase 4-wire Typical Wiring Diagram



Note: Please don't move battery during running status or it may cause the controller broken!

WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

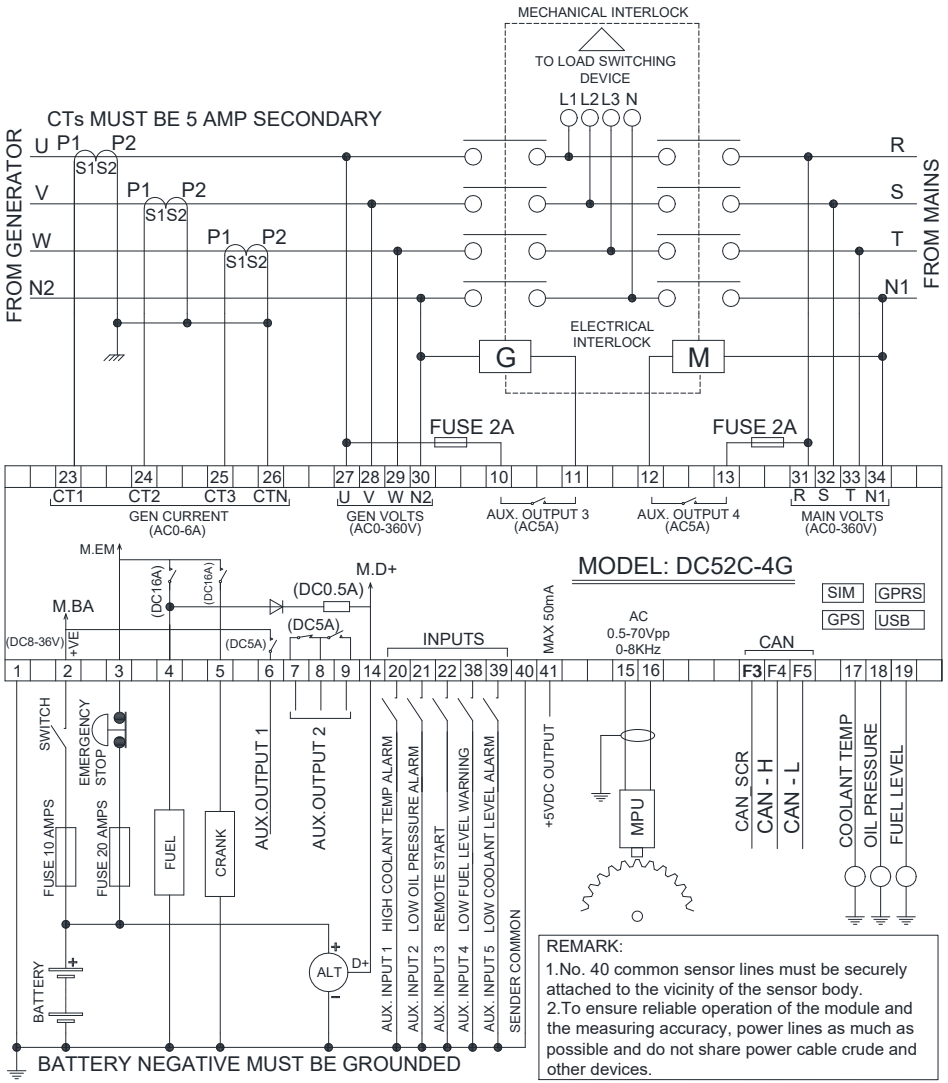
◆ DC50C-4G 3-phase 4-wire Typical Wiring Diagram



Note: Please don't move battery during running status or it may cause the controller broken!

WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

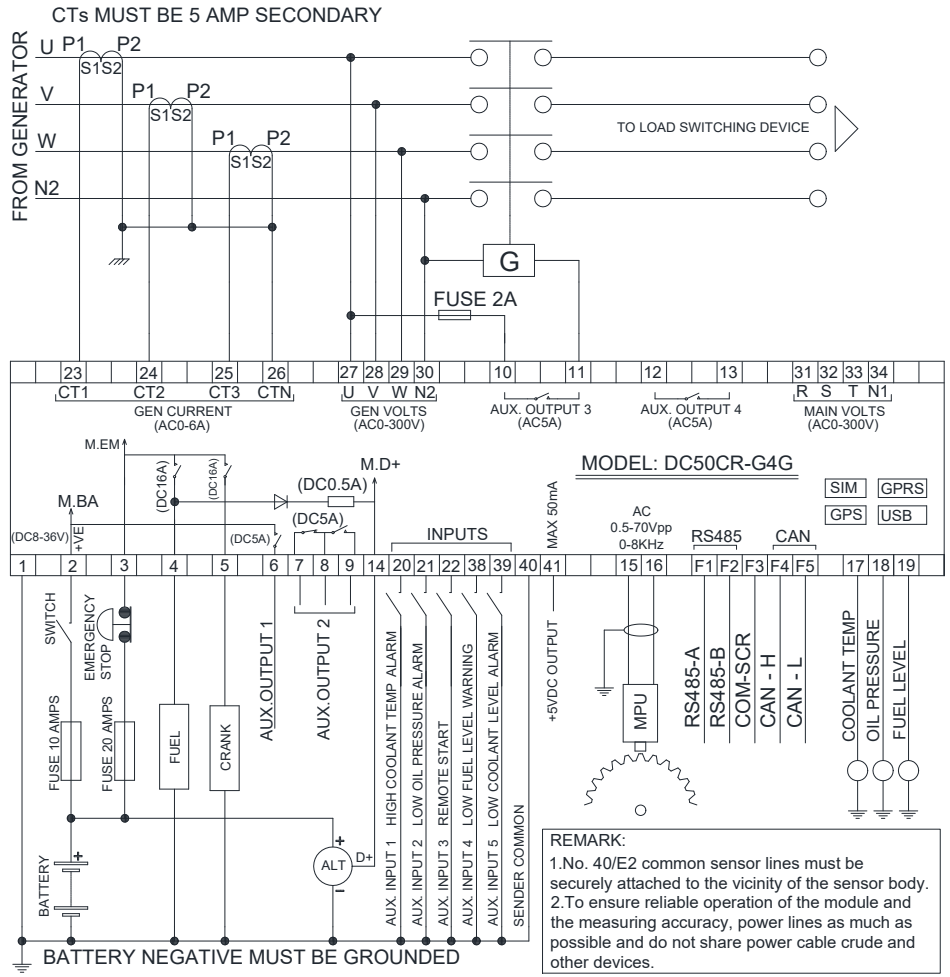
◆ DC52C-4G 3-phase 4-wire Typical Wiring Diagram



Note: Please don't move during running status or it may cause the controller broken!

WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

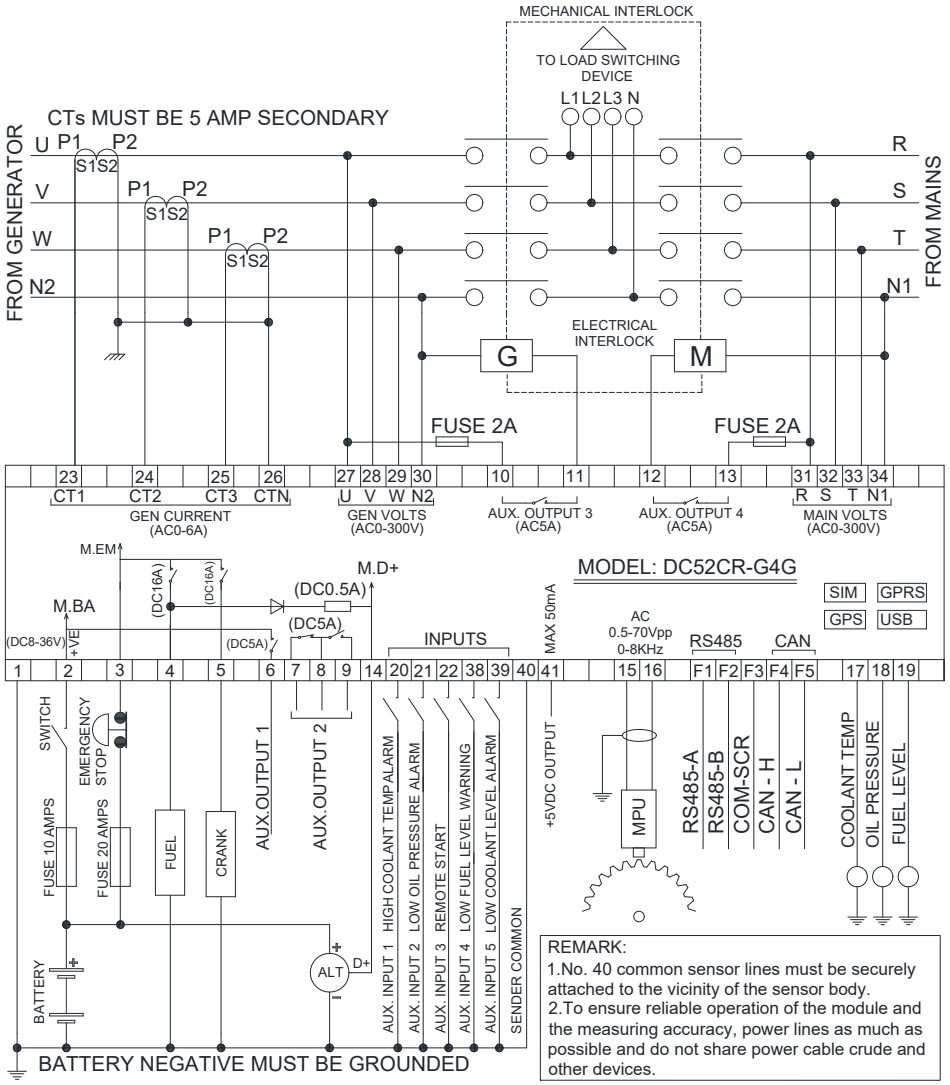
◆ DC50CR-G4G 3-phase 4-wire Typical Wiring Diagram



Note: Please don't move during running status or it may cause the controller broken!

WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

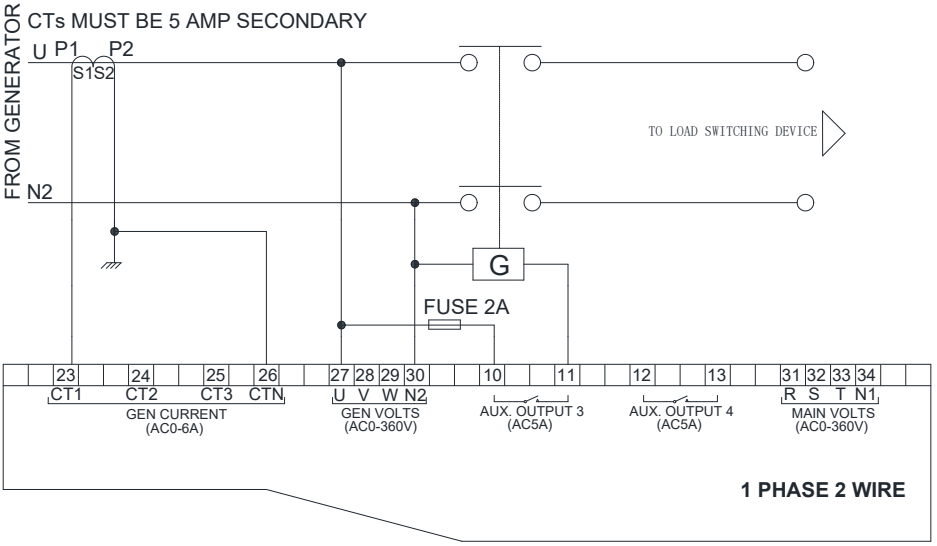
◆ DC52CR-G4G 3-phase 4-wire Typical Wiring Diagram



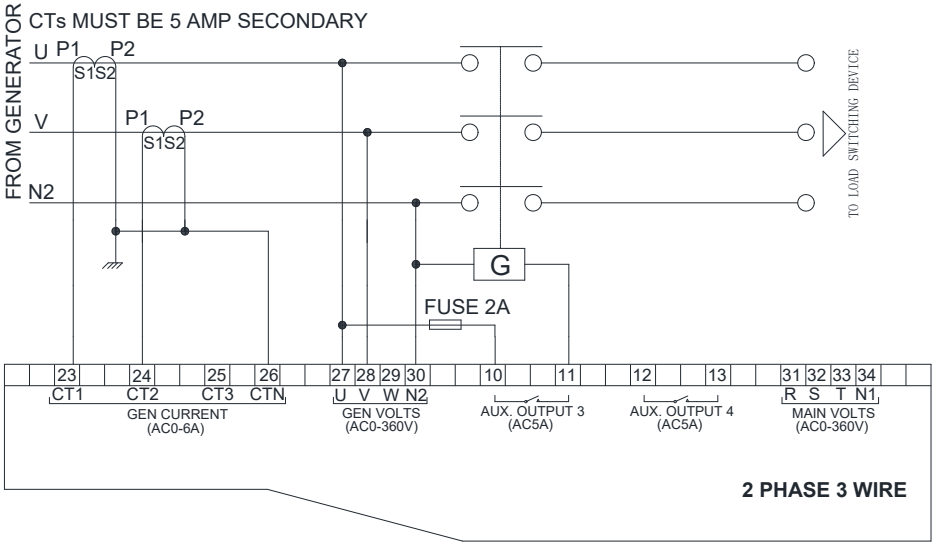
Note: Please don't move during running status or it may cause the controller broken!

WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

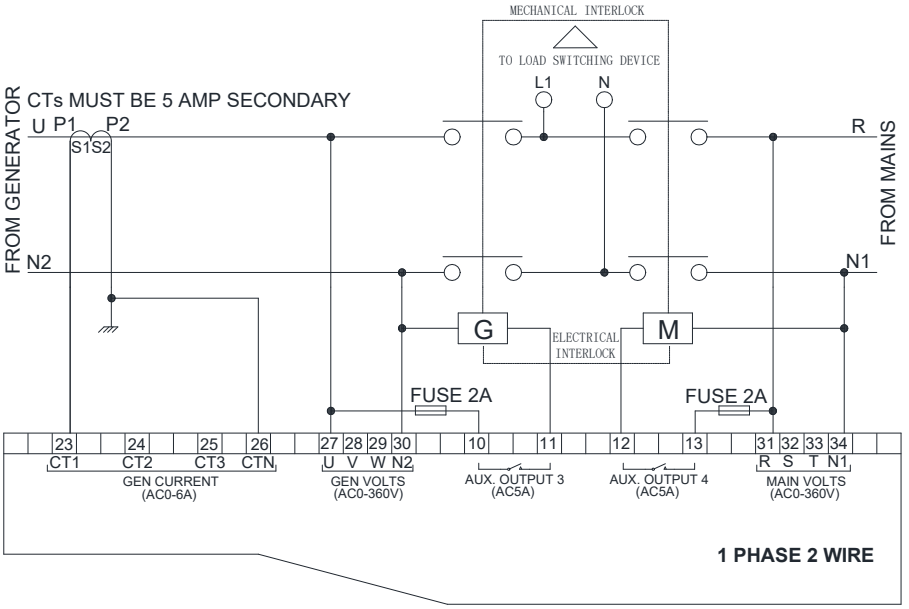
◆ Auto start 1-phase 2-wire Typical Wiring Diagram



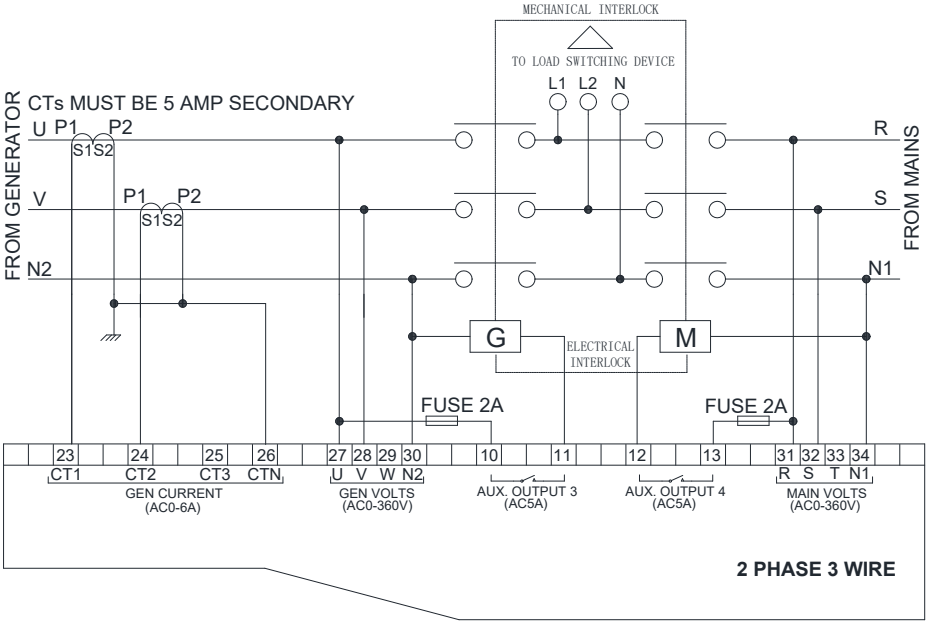
◆ Auto start 2-phase 3-wire Typical Wiring Diagram



◆ AMF 1-phase 2-wire Typical Wiring Diagram



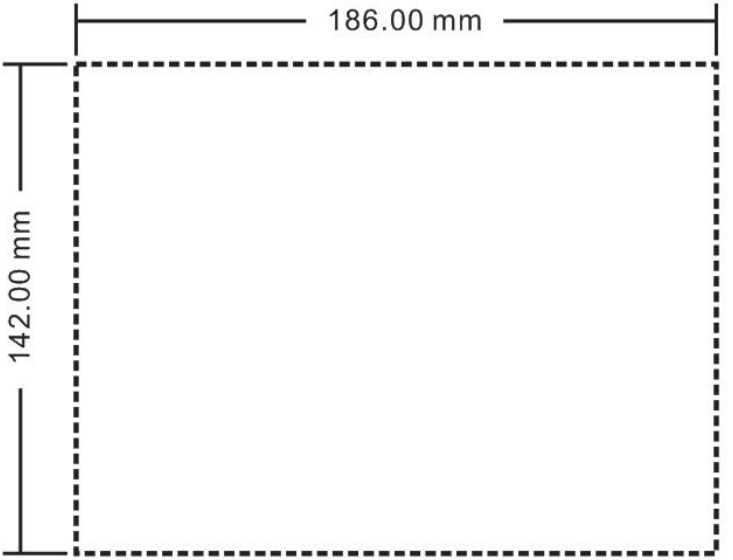
◆ AMF 2-phase 3-wire Typical Wiring Diagram



7. 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: W220mm*H160mm.



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

◆ GPRS port ： Connect the GPRS antenna to the GPRS/ 4G port. Antenna parameters:50 Ω/ SMA female seat.

◆ GPS port： When using GPS positioning function, GPS antenna is connected to DTU module, antenna port: 50 Ω / SMA master, active antenna.

Note: GPS antenna needs to be placed outside the open, otherwise the position information is inaccurate or can not get the position information.The GPRS antenna and the GPS antenna cannot be reversed.

◆ SIM card installation：

The SIM card is inserted and the DTU will be connected to the server through the wireless mobile network. Standard Nano SIM card (25 mm to 15 mm in size).

◆Battery Voltage Input

DC5x-4G controller is suitable for 8-36V DC battery voltage. Battery negative must be reliably connected to the enclosure of the engine. The controller power supply B+ and B- must be connected to battery positive and negative, and the wire size must not be less than 2.5mm^2.

NOTE:

In case of floating charger connect charger output to battery positive and negative

directly, then, connect battery positive and negative poles to controller positive and negative power supply.

◆Output and relay expansion

Note: All outputs of the controller are relay contacts. The maximum current capacity is described in the "Parameters" in this manual. Please use it in the relay current capacity. If an extended relay is needed, add a continuous current diode (when the extended relay coil is DC) or a resistance-capacitance loop (when the extended relay coil is AC) to both ends of the coil to prevent interference with the controller or other equipment.

◆ AC current input

Current transformer with rated secondary current 5A must be externally connected to the controller current input.

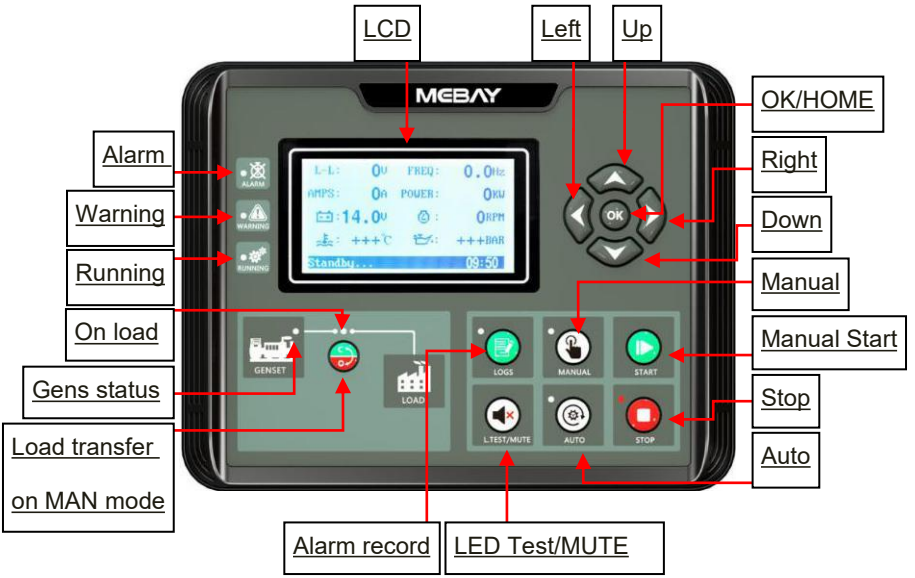
WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

◆Withstanding voltage test

If withstanding voltage test is conducted after the controller has already been installed onto the control panel, please unplug all controller terminal connections in order to prevent high voltage from damaging it.

8. Panel and display

◆ DC50x-4G Panel Instructions



◆ **DC52x-4G Panel Instructions**

◆ **Key Function Description**

KEYS	NAME	Main Function
	Stop Reset Revert	◆ Can stop generator under manual/auto mode; ◆ Can reset shutdown alarm ◆ During stop procession, pressing this key again can stop generator immediately. ◆ Pressing this key can cancel the setting and back to upper class under edition. ◆ Under the setting mode with checking data, the data can be saved and system will exit after pressing.
	Start	◆ Start the genset under manual mode. ◆ Pressing this key can start the genset under manual testing mode. ◆ In the stop gear, press this key, the oil valve and ECU power supply will output;(Only for DC5xC-4G\DC5xCR-G4G)
	Manual	◆ Pressing this key will set the module into manual mode.
	Auto	◆ Pressing this key will set the module into auto mode.
	Test	◆ Pressing this key to come into manual testing mode. ◆ 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.

	LED Test/ Warning clear	◆ Test if all LED lights are ok, pressing this key to test if all lighted, all off when loosen it. ◆ Under warning, pressing this key can clear warning and controller will re-check warning. ◆ Under alarm, pressing this key can clear the buzzer call. ◆ Pressing this key in 3 seconds can clear the buzzer call, pressing it again in 3 seconds can recover the buzzer call.
	Gens/ Mains Close/On	◆ Under manual mode, pressing this key can transfer load to genset/mains.
	Left	◆ Under display mode, pressing this key to turn left page. ◆ Under edition mode, pressing this key to move the digit.
	Right	◆ Under display mode, pressing this key to turn right page. ◆ Under edition mode, pressing this key to move the digit.
	Up	◆ Under display mode, parts of the page can move up. ◆ Under edition mode, pressing this key to move the digit or increase the numbers. ◆ Under records mode, pressing this key to move the digit.
	Down	◆ Under display mode, parts of the page can move down. ◆ Under edition mode, pressing this key to move the digit or decrease the numbers. ◆ Under records mode, pressing this key to move the digit.
	OK UI Change	◆ Confirm the change under edition mode. ◆ Page exited under records checking mode. ◆ Black UI and white UI can be switched when Pressing. ◆ In standby state, press for 3 seconds to enter the parameter setting mode.
	Setting mode	◆ Pressing OK and STOP simultaneously to come into setting mode
	Alarm Records checking	◆ Pressing STOP and RIGHT to check the records and any buttons pressed to exit from the page.

◆ **Engine flywheel teeth automatic adjustment**

1) Crank disconnect must be set to include both "speed" and "frequency" options.

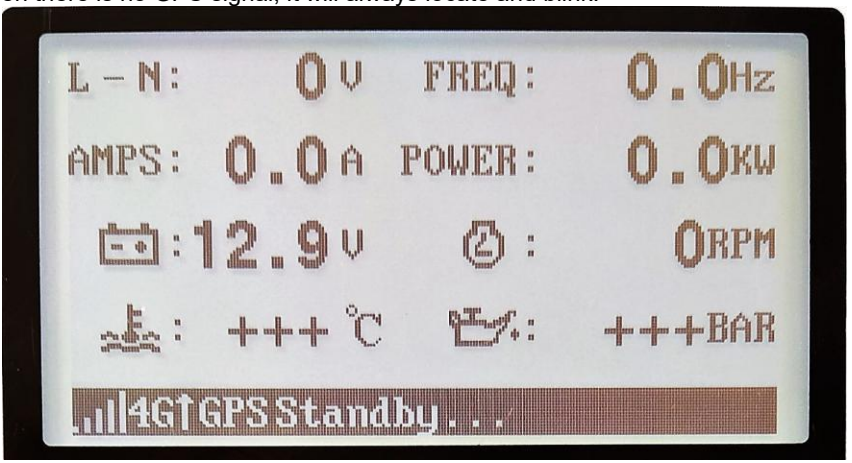
2) When the generator frequency and engine speed are not zero, press and for more than 0.5 seconds, the controller will automatically calculate and save the number of flywheel teeth according to the generation frequency and generator poles.

3) After calculating and saving the number of flywheel teeth successfully, the controller shows: " **Flywheel xxx teeth, saved successfully!**"

◆ **4G network and GPRS signal view**

4G network and GPRS status can be viewed in the status bar at the bottom left corner of the screen. The network type does not display X. If there is a network, it will display 2/3/4G according to the network type. It will display ↑ when network data is

uploaded and ↓ when downloading. GPS positioning is successfully displayed. GPS, when there is no GPS signal, it will always locate and blink.



◆ **Alarm records checking**

DC5x-4G controller can save 100 groups of alarm records which contains time, gens parameter, engine parameter and so on.How to check the alarm records:

1) Enter alarm record page: In the standby state, press and simultaneously to come into alarm records page;
2) Press to turn upper digit and press to turn lower digit in order to choose the record you need. Press OK 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;

◆ **View controller system log**

DC5x-4G series generator set controller can save 5000 system logs, including operation time, generator set startup, key operation, parameter modification, controller power on and other records.

The steps to view the system log are as follows:

1) Press the key OK for more than 3 seconds.Or press the stop key without releasing, press the OK key OK again, and then release all the keys to enter the setting menu page;
2) In the setting menu page, select "**System logs**" and press the OK key OK to enter the password input page;
3) Enter the controller parameter setting password, and the default factory password is "**07623**"; after entering the password, press the OK key OK once to enter the system log page;

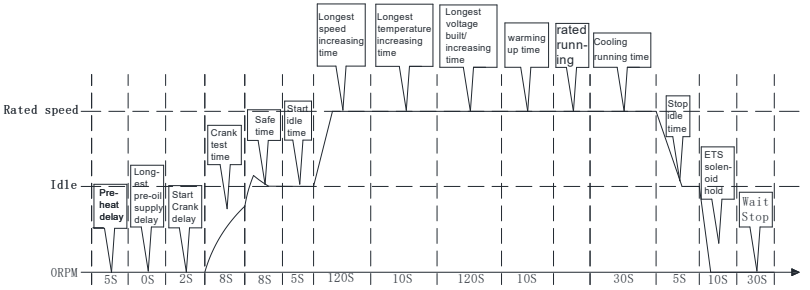
4) In the system log page, press the up key and down key to browse the operation log, and the latest operation is recorded in the front; press the STOP key to exit the system log page.

9. 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:



Emergency start mode:

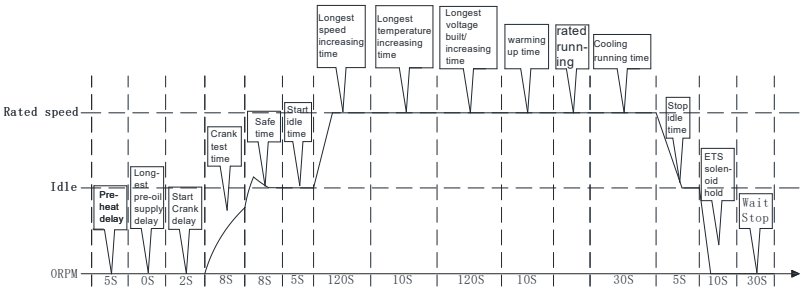
In manual mode, pressing the ""button and the "" button at the same time can force the generator to start. At this time, the controller will no longer automatically judge the successful start condition, and the operator will judge the separation of the starter by himself. The operator observes that the unit has started successfully. After releasing the "" button, the starter motor will be disconnected immediately, and the controller will enter the "safety protection delay" state.

Manual Start Mode

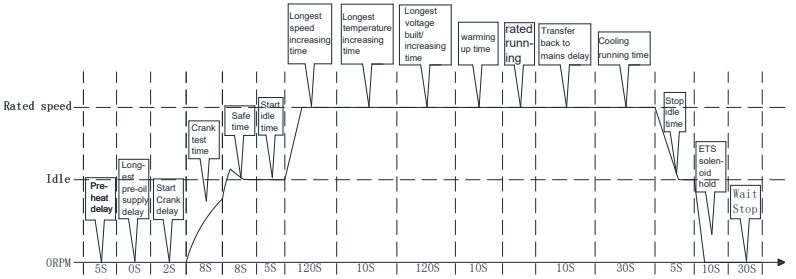
press and make sure it is in the stop position before starting.

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:

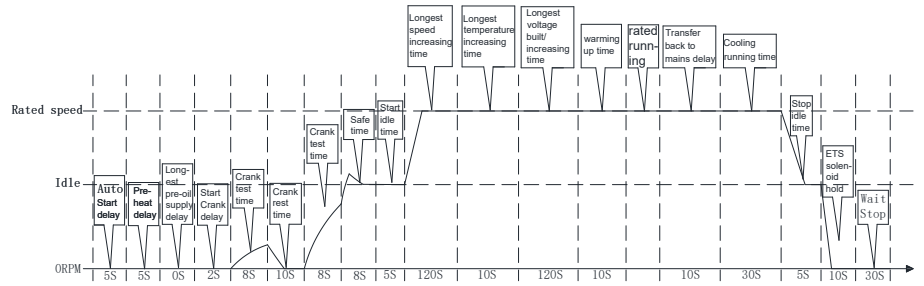


Automatic starting mode:

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.

10. 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 switch 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 Switch** " on the current fault screen.

High temperature sensor warning
When the controller parameter "**Action if high temperature**" is set to "**Warning**" and the programmable input port "**High temperature disabled**" switch is valid,and the controller detects that the coolant 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 coolant temperature warning is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**High WT sensor**" on the current fault screen.

High temperature switch warning
When the controller parameter "**Action if high temperature**" is set to "**Warning**" and the programmable input port "**High temperature disabled**" switch is valid,and the controller detects that the coolant 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 coolant temperature warning is reported. "**WARNING**" lights will light up, Generators will not stop, displays "**High WT sensor**" 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 "**OP sensor open**" on the current fault screen.

Coolant 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 "**WT sensor open**" on the current fault screen.

Over battery voltage warning
When the controller detects that the battery voltage is higher 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 voltage**" on the current fault screen.

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

Maintenance expiration warning
When the controller parameter "**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. "**WARNING**" lights on, without stopping the engine, and displays "**Maintain end**" on the LCD 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.

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.

◆ 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**

 Warning: After the Shutdown Alarm occurs, the system will be locked immediately and the generator set will be stopped. Only after troubleshooting, press  key to clear the alarm, can it be re-operated.

 Notes：When the shutdown alarm failure occurs, the "**ALARM**" lights will light up and the generator unit automatically stops.

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 returned to normal, the alarm of over speed is reported. "**ALARM**" lights flicker, 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 returned to normal, the alarm of under speed is reported. "**ALARM**" lights flicker, 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 flicker, Generator stops running, and displays "**Low OP 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 "general alarm delay" programmable input port "low oil pressure alarm input" switch is valid. Then the alarm, the public alarm light "ALARM" light is always on, stop the unit operation, and display **"Low OP switch"** on the current fault screen.

High temperature sensor alarm

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

High Temperature Switch Alarm

When the controller detects that the High temperature alarm switch input is valid to the ground, then start alarm delay and the duration (Normal alarm delay) have not returned to normal, the alarm of High Temperature Switch is reported. "**ALARM**" lights flicker, Generator stops running, and displays "**High Temp 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-A**" 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-D**" 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 "**OP sensor open**" on the current fault screen.

Temperature sensor disconnected alarm
When the controller parameter "**Action if temperature sensor disconnected**" is set to "**alarm**", When the 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 temperature sensor disconnected alarm is reported. "**ALARM**" lights will light up, Generator stops running, displays "**Temp 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 "**FL sensor 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.

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.

Non-balance current ratio alarm
When the controller is 2 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.

Maintenance Expiration Alarm
When the action after the primary maintenance expired set as “alarm”, When the countdown to maintenance is detected as "0", Then start warning delay and the duration (Normal alarm delay) have not returned to normal, the warning of Maintenance expiration is reported. "**ALARM**" lights on, Generator stops running, and displays "**Maintain end**" on the current fault 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 coolant 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 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 **" Stop fail-OP-D".**

11. Parameters setting

◆ Enter the edition page

Please set the parameters according to below steps:

1) The setting mode can be actived after pressing STOP and OK simultaneously, under the status of standby without any alarm. The default password is "***07623***".

2) 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 OK 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.

3) Press ▲ to turn the digit into upper position, press ▼ to turn the digit into lower position, press OK to get into parameters setting page.

4) Press ▲ to shift up the parameters, press ▼ to shift down the parameters, press OK to get into parameter changing page.

5) 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 OK once done. If the parameters setting is in the valid setting range,then it can be saved, if not, it can not be saved.

6) Press OK and STOP to save the parameters and exit from edition page.

7) Press STOP 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 setting

1) Basic setting

No	Parameter	Range ***(default)***	Notes
0	Language/语言	*0-English* 1-***简体中文*** 2-繁体中文 3-Русский 4-Espanol 5-Türk dili	Language option.

		6-Français	
1	Gens poles	2/4/6/8***(4)***	When the flywheel teeth is 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 ***3 phase 4 wire***	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***(500A/5A)***	Used for setting genset CT primary current, secondary rated current 5A.
4	Rated frequency	40.0-80.0Hz***(50.0Hz)***	Setting generator rated frequency to calculate the alarm value.
5	Rated phase voltage	30-30000V***(230V)***	Setting generator phase voltage to calculate the alarm value.
6	Rated phase current	5-6000A***(500A)***	Setting generator phase current to calculate the alarm value.
7	Rated total power	5-2000Kw***(276Kw)***	Set total power of generator to calculate the average loading rate and alarm value.
8	Rated battery voltage	8.0-36.0V***(24.0V)***	Calculate the alarm value.
9	Rated RPM	500-4500RPM***(1500)***	Calculate the alarm value.
10	Flywheel teeth	0-300***(0)***	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: VDO 0-10Bar*** 6: MEBAY-003B 7: SGH 8: SGD 9: SGX 10: CURTIS 11:DATCON 10Bar 12: VOLVO-EC 13: 3015237 14: WEICHAI 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: VDO 40-120℃*** 3: MEBAY-001B 4: SGH 5: SGD	Choose the usual temperature sensor, if the sensor users choose is not the 11 types, it can be User-defined.

		6: SGX 7: CURTIS 8: DATCON 9: VOLVO-EC 10: 3015238 11:PT100 12: MEBAY-Mier 13: WEICHAI 40-120℃ 14: GENCON 40-120℃	
13	Fuel level sensor	***0: Disable*** 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	If the sensor users choose is not the 3 types, it can be User-defined.
14	Action if RPM lost	***Warning***/Alarm and stop	The flywheel teeth is not 0 to detect this fault.
15	Action if low oil pressure	Warning ***Alarm and stop***	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 ***Alarm and stop*** Alarm and stop after unload	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. 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.
17	Oil pressure sensor open	Disable ***Warning*** Alarm and stop	Action if oil temperature sensor disconnected.
18	Temperature sensor open	Disable ***Warning*** Alarm and stop	
19	Fuel Level sensor open	Disable ***Warning*** Alarm and stop	Action if Fuel level sensor disconnected.
20	Pressure/Temperature unit	℃/KPA ***℃/BAR*** ℃/PSI ℉/KPA ℉/BAR ℉/PSI	Unit display.
21	Gens volt. Primary(PT)	30-30000V***(100V)***	Voltage transformer primary voltage.
22	Gens volt. Secondary(PT)	30-30000V***(100V)***	Voltage transformer secondary voltage.
23	Mains volt. Primary(PT)	30-30000V***(100V)***	Voltage transformer primary voltage.
24	Mans volt. Secondary(PT)	30-30000V***(100V)***	Voltage transformer secondary voltage.

2)Basic Setting 2

NO	Parameter	Range***(defaults)***	Notes
1	Primary Modes	***STOP*** Manual Auto Auto save	The primary modes on power, easy for user operation. Note: auto record function can not record the mode with load.
2	Manual crank times	1-30 ***(1 time)***	Crank times under manual mode and test mode.
3	Auto start crank times	1-30 ***(3 times)***	Crank times under auto mode.
4	E.T.S. hold times	1-10***(2 times)***	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 disconnet	RPM Hz	1.If there is no oil pressure sensor, please don't choose it.

		Oil pressure(delay) ***RPM/Frequency*** RPM/Oil Pressure Frequency/Oil Pressure RPM/Frequency/Oil press.	2.Oil pressure switch input is not the crank condition 3.Please check if the running status, stop condition are according with crank condition. 4.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%***(28%)***	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***(200kpa)***	When the engine oil pressure is over the condition value, then system regards it as crank success, motor escaped.
8	RPM disconnect	0-200%***(24%)***	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***(200kpa)***	When the oil pressure is over the condition value, then pre-oil supply is stopped.
10	RPM-up stop	0-200%***(90%)***	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℃***(68℃)***	When the temperature is over the preset value, then temperature-up procession is stopped in time.
12	Voltage-up stop	0-200%***(85%)***	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%***(25%)***	When the fuel level is lower than preset value and remains 10S, fuel pump opened signal output
14	Fuel pump close	0-100%***(80%)***	When the fuel level is higher than preset value and remains 1S, fuel pump closed signal output.
15	Maintenance countdown	0-5000h***(5000h)***	When it is set as 5000, then this function is disabled.
16	Maintenance date	***2000/01/01***-2099/12/31	When it is set as 2000/01/01, this function is disabled.
17	Maintenance expire	***Warning*** /Alarm and stop	The action after the primary maintenance expired.
18	User password	00000-65535***(07623)***	Change the password.
19	Battery charging start	8.0-30.0***(25.6V)***	When the battery voltage is lower than start value and remains 10s under non-running status, then the relay is opened. When it is
20	Battery charging	10.0-36.0***(27.8V)***	

	stop		higher than the close value and remains 10s, relay is closed. Once coming into running mode, there is no output.
21	ATS in manual mode	***Disable***/Enable	When it is set to enabled, when the generator set meets the closing conditions, it will be loaded automatically.

3)Delay time setting

NO	Parameter	Range***(default)***	Notes
1	Start delay	0-6500.0s***(5.0s)***	The time during the genset starts after the mains failure or remote signal is valid.
2	Preheat time	0-6500.0s***(0.0s)***	The time needed to be preheat before the starter on power.
3	Longest pre-oil supply	0-180.0s***(0.0s)***	Under pre-oil supply, if the oil pressure is higher than setting value, then pre-oil supply stopped.
4	Cranking time	3.0-60.0s***(8.0s)***	The time when the starter is on power.
5	Crank rest time	3.0-60.0s ***(10.0s)***	If crank failure, the waiting time before the second test time.
6	Oil pressure delay	0-20.0s***(0.0s)***	When the crank condition contains oil pressure, if the oil pressure is higher than the preset value and continue for few seconds, then it is regarded as crank success.
7	Safety delay	1.0-60.0s***(8.0s)***	Low oil pressure, high temperature, under speed, under frequency, under voltage, charge failure are all invalid during this time except for emergency stop ,over speed, over freq.
8	Start idle time	0-3600.0s***(5.0s)***	Idle running time when crank successfully.
9	Longest RPM-up time	0-3600.0s ***(120.0s)***	The longest speed-up time,during which time the system will exit once speed increased successfully .
10	Longest Temp.-up time	0-3600.0s***(0.0s)***	The longest warming-up time,during which time the system will exit once temperature increased successfully .
11	Longest Volt.-up time	0-3600.0s ***(120.0s)***	The longest voltage-up time,during which time the system will exit once voltage increased successfully .
12	Warming-up time	0-3600.0s ***(10.0s)***	The time needed for loading.
13	Back to Mains time	0-3600.0s ***(10.0s)***	To avoid the switch actions if the mains unstable.If the remote start signal is invalid (At the same time will check if the mains normal), 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 ***(5.0s)***	There shall be loading delay from Mains to Gens if the remote start signal valid or Mains abnormal under Cooling time.
15	Cooling time	0-3600.0s ***(30.0s)***	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***(5.0s)***	Idle-speed running time.
17	E.T.S. hold time	0-600.0s***(10.0s)***	Stop solenoid on power time.
18	Fail to stop	5-180.0s***(30.0s)***	If the RPM is 0 during the stop failure time, then the stop failure time is no needed.
19	Emergency delay	0-10.0s ***(1.5s)***	Over speed and over frequency alarm delay.
20	Normal alarm delay	2.0-20.0s ***(5.0s)***	The alarm delay except for over speed and over frequency
21	Normal warning delay	1.0-20.0s***(2.0s)***	The warning delay.
22	AC Voltage abnormal delay	2.0-20.0s***(10.0s)***	Over / under voltage delay.
23	Current inverse time	0.1-36.0***(36.0)***	This option will not take effect until the **[27-Over phase current delay]** is set to **0**. The overcurrent delay is inverse time, and the formula is **T=t/((IA/IT) -1)^2.**
24	Power inverse time	0.1-36.0***(36.0)***	This option will not take effect until the **[28-Over total power delay]** is set to **0**. The over power delay is inverse time, and the formula is **T=t/((IA/IT) -1)^2.**
25	Transfer switch delay	0-3600.0s***(1.0s)***	The time from Mains to Gens.
26	Load / unload pulse width	1.0-10.0s ***(5.0s)***	Mains and Gens loading and unloading pulse width, when it is 10s, it is regarded as continuous output.
27	Over phase current delay	0-3600.0s***(30s)***	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	0-3600.0s***(30s)***	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.
29	Fuel output delay	0-60.0s***(2.0s)***	The output time of fuel valve relay before crank.
30	Pulse speed up delay	0.1-60.0s ***(0.2s)***	The interval time of the pulse speed up relay change.
31	Pulse speed down delay	0.1-60.0s ***(0.2s)***	The interval time of the pulse speed down relay change.

4)Engine Alarm setting

NO	Parameter	Range ***(defaults)***	Notes
1	Over speed alarm	0-200% ***(114%)***	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% ***(80%)***	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 ***(103kpa)***	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℃ ***(98℃)***	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% ***(20%)***	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% ***(0%)***	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 warn	0-200% ***(135%)***	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 warn	0-200% ***(67%)***	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	Engine charger warning	1.0-30.0V ***(30.0V)***	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%***(114%)***	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 warning	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	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 Amps ratio	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 warn delay), then non-balance current ratio warns.If the value is set as 100, then the warning 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.
8	Over current recovery hysteresis width	0-500A ***(0A)***	When the generator has over current, it will enter the over current alarm delay; The over current alarm delay can be exited only when the current is less than the over current alarm value minus this value.
9	Over power recovery hysteresis width	0-500KW ***(0KW)***	When the generator has over power, it enters the over power alarm delay. The over power alarm delay can be exited only when the current power is less than the over power alarm value minus this value.

6)Output/input setting

No	Parameters	Range***(defaults)***	Notes
1	AUX.OUTPUT 1	0-25 ***(17. E.S.T. hold)***	**Set the default value (please refer to the AUX. Output function table)**
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)***	

AUX. Output function table

0. Disable.
1. Public warning output: when there is any warning output.
2. Public alarm output: when there is any alarm output, alarm locks till revert back.

3. Audio alarm: when there is any alarm output, the Audio controls.
4. Shades control: there is output once genset starts and stop till stable.
5. Preheat mode 1: preheat before start.
6. Pre-oil supply control: Under pre-oil supply, if the oil pressure is higher than setting value or pre-oil supply time ends, then pre-oil supply stopped.
7. Fuel output: output once gens starts and off till stable.
8. Crank output: output once cranking, no output in other mode.
9. Genset running: output under running, off once RPM is lower than cranking RPM. The crank success condition can be set.
10. Idle speed control 1: used for speed controller, there is output under idle but no output under high speed.
11.Speed-up control: during the procession of speed increasing, the output time is the Longest RPM-up time.
12. High speed control: there is output when coming into high speed warming up, but off after cooling down.
13. Excitation output: there is output during cranking procession and there is 2s output if there is no frequency under high speed status.
14. Gens load: continuous or pulse type according to time setting.
15. Gens unload: continuous or pulse type according to time setting.
16. Speed-down control: the output time is shutdown idle delay during shutdown idle or shutdown on power procession.
17. E.S.T. hold: shutdown output, it is used for gens with stop solenoid. when the setting value of shutdown delay is over, then it is off.
18. System in stop: there is output under stop mode.
19. System in manual: there is output under manual mode.
20. System in auto: there is output under auto mode.
21. Fuel pump output: 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.
22. Battery charging control: there is output if the voltage is lower than the preset value under standby status and shutdown after start and in running status.
23. Mains load: continuous or pulse type according to time setting. (Only for DC52D-4G, DC52C-4G, DC52CR-G4G)
24. Mains unload: continuous or pulse type according to time setting. (Only for DC52D-4G, DC52C-4G, DC52CR-G4G)
25. Idle speed control 2: used for speed controller, there is output under idle but no output under high speed.
26. Rated running: there is output under rated running.
27. ECU power: apply to electrical ECU engine, used for control ECU power.
28. ECU stop: apply to electrical ECU engine, used for control ECU shutdown.
29. ECU warning: there is a warn signal from ECU.
30. ECU alarm: there is an alarm signal from ECU.
31. ECU communication failure: Cannot communicate with ECU.
32. Pulse speed up output: the pulse shall be sent out in the interval of “Pulse speed up delay” under speed –up.
33. Pulse speed down output： the pulse shall be sent out in the interval of “Pulse speed down delay” under stop idle speed.
34. Public unload: Public unload of Gens and Mains.
35. Preheat mode 2: Preheat stops after successful start.
36. Preheat mode 3: Preheat stops after safety delay.
37. Preheat mode 4: Preheat stops after Temp.-up time.

38. Preheat mode 5: Preheat stops after Temp.-up time,no preheat start the motor;

5	AUX.INPUT 1	0-40 ***(1. Low oil pressure alarm switch)***	**Set the default value (please refer to the AUX. input function table)** **Set the state when the AUX. input is valid.**
6	AUX.INPUT 1 valid	***0-Normal close*** 1-Normal open	
7	AUX.INPUT 2	0-40 ***(2. High temperature alarm switch)***	
8	AUX.INPUT 2 valid	***0-Normal close*** 1-Normal open	
9	AUX.INPUT 3	0-40 ***(18. Remote start with load)***	
10	AUX.INPUT 3 valid	***0-Normal close*** 1-Normal open	
11	AUX.INPUT 4	0-40 ***(5. Low fuel level warning input)***	
12	AUX.INPUT 4 valid	***0-Normal close*** 1-Normal open	
13	AUX.INPUT 5	0-40 ***(3. Low water level warning switch)***	
14	AUX.INPUT 5 valid	***0-Normal close*** 1-Normal open	

AUX. input function table

0. Disable.
1. Low oil pressure alarm switch.
2. High temperature alarm switch.
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.
13. Mains un/loading input: connect to auxiliary point of mains loading switch.(Only for DC52D-4G, DC52C-4G, DC52CR-G4G)
14. Shades status input.
15. Auto start disabled: gens will not start if there is signal input whatever mains normal or not.
16. Auto stop disabled: gens will not stop if there is signal input whatever mains normal or not.
17. Stop by radiator if high temperature: 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.
18. Remote start (with load): the gens comes into start procession if this signal is valid and under auto mode.
19. Soundproof alarm: audio alarm output is disabled if there is signal output.
20. Front face button disabled: any button except for page button is disabled if there is signal output.
21. Meter mode: all output are disabled, alarm and warns are invalid. any button except for page button is disabled.
22. Remote control mode: 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.
23. Remote Control Inhibited
24. Access Alarm Input
25. Fire Alarm Input
26. Remote start(without load): the gens comes into start procession(without load) if this signal is valid and under auto mode.

27. Simulate STOP;
28. Simulate MANUAL;
29. Simulate AUTO;
30. Simulate START;
31. Simulation GENS CLOSE/ON;
32. Simulation MAINS CLOSE/ON;
33. – 40. Reserved.

7)Working plan and maintenance setting

NO	Parameter	Range***(defaults)***	Notes
1	Working plan format	***Disable*** 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	From 1st to 31st ***Default: the first day***	The date chosen for every month.
3	Maintenance week	Monday to Sunday ***Default: Sunday***	The date chosen for every week.
4	Maintenance with load or not	***Disabled***/with load	To choose if the genset starts with load or not.
5	Maintenance start time	00:00-23:59***(00:00)***	Maintenance start time setting.
6	Maintenance run time	1-120m***(5m)***	Maintenance running time setting.

8)Mains protection(Only for DC52D-4G, DC52C-4G, DC52CR-G4G)

No	Parameter	Range***(defaults)***	Notes
1	Phase	Disable 1 Phase 2 Wire 2 Phase 3 Wire 3 Phase 3 Wire ***3 Phase 4 Wire***	Select the mains input specification; If you choose to disable, the mains-related parameters will not be detected and displayed.
2	Mains under volt	55-330V***(184V)***	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***(207V)***	
4	Mains over volt	55-330V***(276V)***	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.
5	Revert over volt	55-330V***(253V)***	

6	Mains normal delay	0.0-3600.0S ***(10.0S)***	The time from abnormal to normal, which is used for ATS transfer.
7	Mains abnormal delay	0.0-3600.0S ***(5.0S)***	

DTU Related settings(Host PC settings only)

No	Parameter	Range***(defaults)***	Notes
1	GPS functional enable	0-1***(1)***	0:manual input ； 1:GPS module acquisition position
2	Set Longitude	-180°-180°***(0.00000)***	Manual entry of communication module GPS location, altitude
3	Set latitude	-90°-90°***(0.00000)***	
4	above sea level	-9999.9-9999.9m ***(100.0m)***	
5	APN		**40 characters**
6	GPRS user name		**40 characters**
7	GPRS password		**40 characters**
8	Running data upload interval	10-170S***(10)***	The interval between uploading data to the server while the generator is running.
9	Standby data upload interval	90-170S***(90)***	The interval between uploading data to the server while the generator is standby.

9)LCD setting

No	Parameter	Range***(defaults)***	Notes
1	Start screen display	0-20.0s***(5.0s)***	Start screen display time,0: No-display.
2	Saving mode	5.0-6000.0s ***(600.0s)***	LCD light will be closed automatically without any button pressed after delay.If setting as 200.0s, back light always lighted.
3	Homing display	5.0-600.0s ***(600.0s)***	The time when the page reverts back to the home page .If setting as 600.0s:disabled.
4	Standby display LOGO	5.0-6000.0 ***(6000.0s)***	Start screen will be opened without any button pressed after delay.If setting as 6000.0s: disabled.
5	LCD contrast	50-128***(82)***	Set the LCD display contrast.
6	ECU page	Disable/***Enable***	Set whether the ECU page is displayed.

a) RS485/CAN PORT

No	Parameter	Range***(default)***	Notes
1	RS485 Controller address	1-255***(16)***	The IP built by controller and PC.
2	RS485 baud rate	0-4800 1-9600 ***2-19200*** 3-38400 4-57600 5-115200	RS485 communication baud rate.
3	CAN failure	Disable Warn	ECU communication failure.

		Alarm and Stop	
4	CAN Protocol	***0- Disabled*** 1: J1939 2: Cummins ISB 3: Cummins-CM850 4: Cummins QSX15-CM570 5: Cummins-CM850-PCC13X 6: Cummins-DCEC-QSZ13 7: Cummins-CCEC-QSN 8: Perkins 9: Perkins-1100 10: Volvo 11: Volvo-EMS2 12: Volvo-EMS2b 13: Volvo-EDC4 14: Scania 15: Scania-kw2000 16: Scania-kw2k-coo 17: John Deere 18: mtu-ADEC 19: mtu-ADEC-SAM 20: mtu-ADEC-303 21: mtu-ADEC-304 22: BOSCH 23: GTSC1 24: MTSC1 25: YUCHAI-YCECU 26: Y&C ENGINE-YC6K 27: WEICHAI-WISE15 28: CHANGCHAI-ECU15 29: YUCHAI-LMB 30: MAN 31: J1939-C 32: SDEC-H/D 33: SDEC-E 34: YTO 35: DEUTZ EMR2-2001 36: DEUTZ EMR2-2012 37: DEUTZ EMR3 38: DEUTZ EMR4 39. ECU15 40. CM2150	CAN protocol Option: the Engine parameters like RPM, oil pressure, water temperature are all from ECU data after choosing the relative protocol.
5	ECU warning	Disable/***Enable***	ECU warnings enable.
6	ECU alarm	Disable/***Enable***	ECU alarms enable.
7	Mask SPN	0-12	Up to 12 sets of alarm codes can be input, and the controller will not respond to the input alarm codes.
8	Rated idle speed	500-4500rpm ***(750rpm)***	ECU idle speed value.
9	Slow rise time	0-120.0S***(5.0S)***	The time of ECU from idling to high

			speed.
10	ECU speed control address	0-255***(3)***	The TSC1 message ID address sent by the controller to the ECU, and the communication protocol must be 31: J1939-C.
11	CAN communication rate	0: 125kbps ***1: 250kbps*** 2: 500kbps	CAN communication rate

b) Working plan

No	Parameter	Range***(default)***	Notes
1	Working plan	***Disable*** Enable 1:remote start Enable 2:mains failure Enable 3:the above 1 or 2 Enable 4:running always	Working plan must be under auto mode.During the working time, the genset start if the conditions reached and shall stop if the conditions not reached. The genset shall not start when out of the working time wheather the conditions reached or not.
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***(defaults)***	Notes
1	Date	2000/01/01-2099/12/31	Permanent calendar inside, please correct the time timely.
2	Current time	00:00-23:59	

d) Self-define curve

NO	Parameter	Notes
1	Oil pressure Ohm curve	***Sensor curve can be User-defined by panel buttons, resistance and according value should be input, MAX 15 groups, MIN 2 groups.*** ***Rule: resistance should be input from small to large.***
2	Oil pressure DC curve	
3	Temperature Ohm curve	
4	Fuel Level Ohm Curve	

12. 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	Check the emergency stop button. Check that the voltage of the controller's 3 feet to the ground should be the battery voltage.

	Check the controller connection.
Low oil pressure alarm	Check oil pressure sensor and its wiring. Check the oil pressure sensor type and controller settings must be consistent. Check whether the low oil pressure sensor is normal.
High temperature alarm	Check temperature sensor and its wiring. Check the temperature sensor type and controller settings must be consistent. Check whether the temperature sensor is normal.
Shutdown Alarm in running	Check related switch and its connections according to the information on LCD. Check programmable inputs.
Fail to start	Check fuel return circuit and wiring. Check start battery. Consult engine manual.
Starter motor does not respond	Check the wiring to the starter. Check start battery.
Unit operation but ATS does not switch	Check the ATS. Check the cable between the controller and the ATS.
USB communication is abnormal	Check the USB connection. Check whether the USB port of the computer is normal. Check whether the USB driver is installed.
RS485 cannot communicate normally	Check the connection. Check if the communication ID number setting is correct. Check if the A and B lines of RS485 are reversed. Check if the RS485 communication line driver is installed or not. Check if the communication port of the PC is damaged. Add a 120 Ω resistor between the AB of the controller RS485.
ECU warning or stop	Get information from LCD of alarm page; If there is detailed alarm, check engine according to description. If not, please refer to engine manual according to SPN alarm code.