DC5xD MK3
GENSET CONTROLLER
USER MANUAL

DC50D MK3



DC52D MK3



Software Version

No.	Version	Date	Note
1	V1.0	2020-08-01	Original release.
2	V1.1	2021-02-04	Unify the description of input and output ports.
3	V1.2	2021-06-25	Fixed a known bug.
4	V1.3	2022-02-16	Add the system log function, increase the number of alarm records, add the recovery hysteresis width of over-current and over-power alarm, and add the remote start without load function for the switching value input.The relay output increases ”Public unload”.Add Emergency start function.
5	V1.4	2022-08-01	Add display language: Français.
6	V1.5	2022-09-01	DC50D adds mains power detection function. Add the function of voltage transformer. Correct the AC voltage input range.
7	V1.6	2023-04-18	Add languages: Português, Românesc, Polski.
8	V1.7	2023-10-18	Add languages: German, Korean, Vietnamese, Arabic, Bahasa Indonesia.
9	V1.8	2024-04-10	Add: Run Record, Alternate Parameters, Persian - فارسی and other functions to optimise parameter settings.
10	V1.9	2024-07-10	Add display language: Українa.
11	V2.0	2024-10-08	Add fuel level voltage profile, AUX.output and other functions;
12	V2.1	2025-03-11	Add display language: Bengali; Lietuvių kalba
13	V2.2	2026-01-22	Optimisation of fuel pump control, heating control, and cooling control; addition of languages; other functional enhancements.

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Controller models to which this manual applies:
DC50D MK3
DC52D MK3
DC50DR MK3
DC52DR MK3

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. t, safety standards and precautions in advance, otherwise it may cause personal injury or damage to related equipment.
5. The engine must have an over-speed 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

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Notes:
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1. Summary

This series controller is specialized for Diesel / Gasoline / Gas Genset Start, Stop, Parameters monitoring, faults-checking as well as data setting.

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 four Models under DC5xD MK3 series.

DC50D MK3: used for single machine automation. Start/Stop through remote start signal.

DC52D MK3: Based on DC50D MK3, it adds Mains monitoring and AMF (Mains/Generator automatic switching control), especially suitable for the automation system composed by mains and genset.

DC50DR MK3: Based on DC50D MK3, it adds RS485 port.

DC52DR MK3: Based on DC52D MK3, it adds RS485 port.

- ◆ 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 USB port to monitor in real time.
- ◆ With RS485 communication port, can achieve "Three Remote" functions via MODBUS protocol.
- ◆ 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.
- ◆ With event recording function, it can save 100 groups of alarm records, including relevant parameters of the unit in case of fault alarm; 5000 system logs can be saved to find the cause of failure;
- ◆ 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 IP65.
- 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
- Mains Frequency (only for DC52D MK3)
- Mains phase voltage L-N (only for DC52D MK3)
- Mains phase voltage L-L (only for DC52D MK3)
- 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
- Load 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
- 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
- Phase Sequence Wrong alarm

5. Parameters

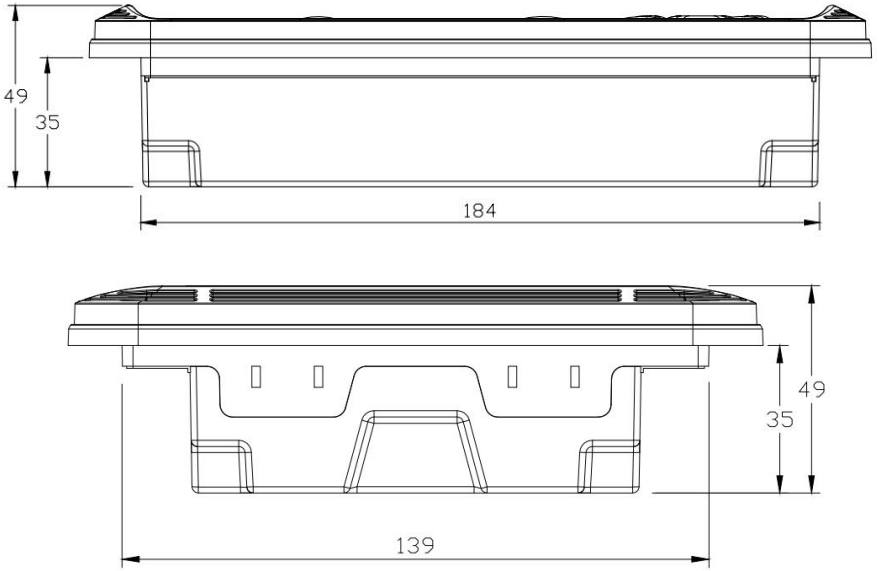
Options	Parameters
Working voltage	DC8V----36V Continuous
Power consumption	Standby：24V：MAX 1.5W
	Working：24V：MAX5W
AC Voltage Input	1P2W 30VAC-360VAC (ph-N)
	2P3W 30VAC-360VAC (ph-N)
	3P4W 30VAC-360VAC (ph-N)
Rotate speed sensor Frequency	50-10000Hz
MAX Accumulating Time	99999.9Hours (Min Store time: 0.01H)
Fuel Relay Output	Max 16Amp DC+VE Supply voltage
Start Relay Output	Max 16Amp DC+VE Supply voltage
AUX. OUTPUT 1	Max 5Amp DC+VE Supply voltage
AUX. OUTPUT 2	Max 5Amp Non-contact normal open or normal close output

AUX. OUTPUT 3	5AMP Non-contact normal open output
AUX. OUTPUT 4	5AMP Non-contact normal open output
Excitation output	DC+VE supply voltage
Switch value input	Available if connecting with Battery -
Working condition	-25-65℃
Storage condition	-40-85℃
Protection Level	IP65：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	1Kg

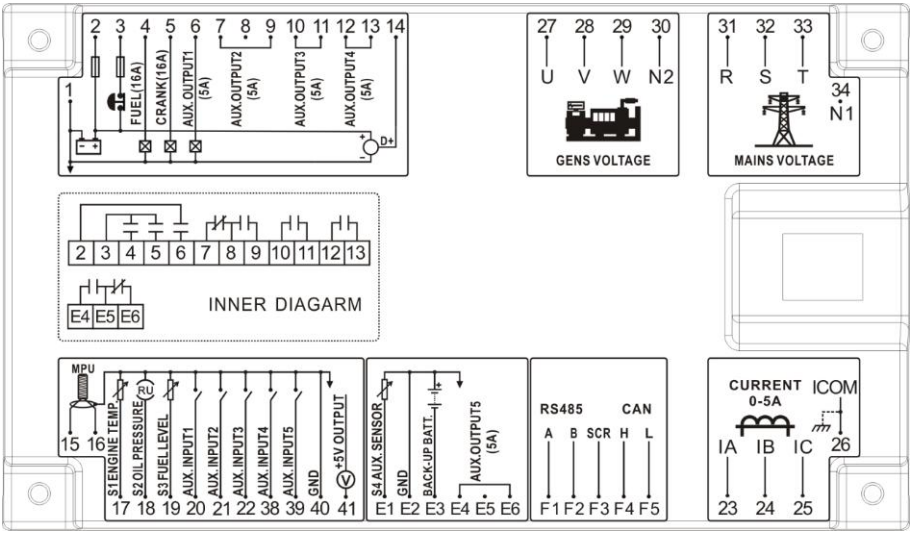
6. Overall Dimension and Wiring Diagram

◆ **Overall Dimension:**





◆ **Descriptions of terminal connection**

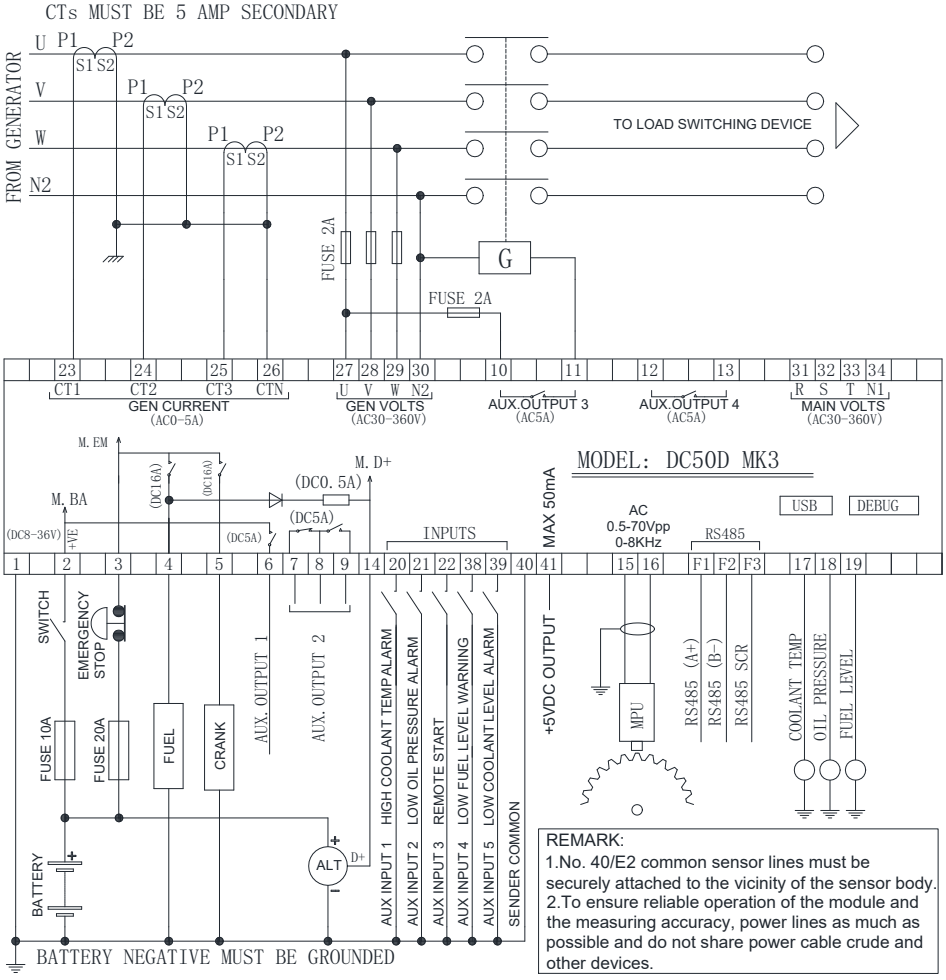


No.	Function	Description	Cable cross sectional area
1	Battery Negative Input B-	Controller power supply input B-.	2.5mm^2
2	Battery Positive Input B+	Controller power supply input B+.	2.5mm^2
3	Emergency Stop Input	B+ voltage input is active, and connected to emergency stop normal closed button.	2.5mm^2
4	Fuel Output	+VE output, Max 16Amp	1.5mm^2

5	Crank Output	+VE output, Max 16Amp.	1.5mm²
6	Aux. Output 1	+VE output, Max 5Amp.	1.5mm²
7	Aux. Output 2 Normal close	Passive Output, Max 5Amp.	1.5mm²
8	Aux. Output 2 Common		1.5mm²
9	Aux. Output 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 sensor.	1.0mm²
16	Speed sensor +		1.0mm²
17	Temperature Sensor	Connect sensor input.	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 B	A 120 Ω shielded wire and good grounding are recommended.	1.0mm²
F2	RS485 A		1.0mm²
F3	RS485 SCR		1.0mm²

◆ DC50D MK3 3-phase 4-wire Typical Wiring Diagram

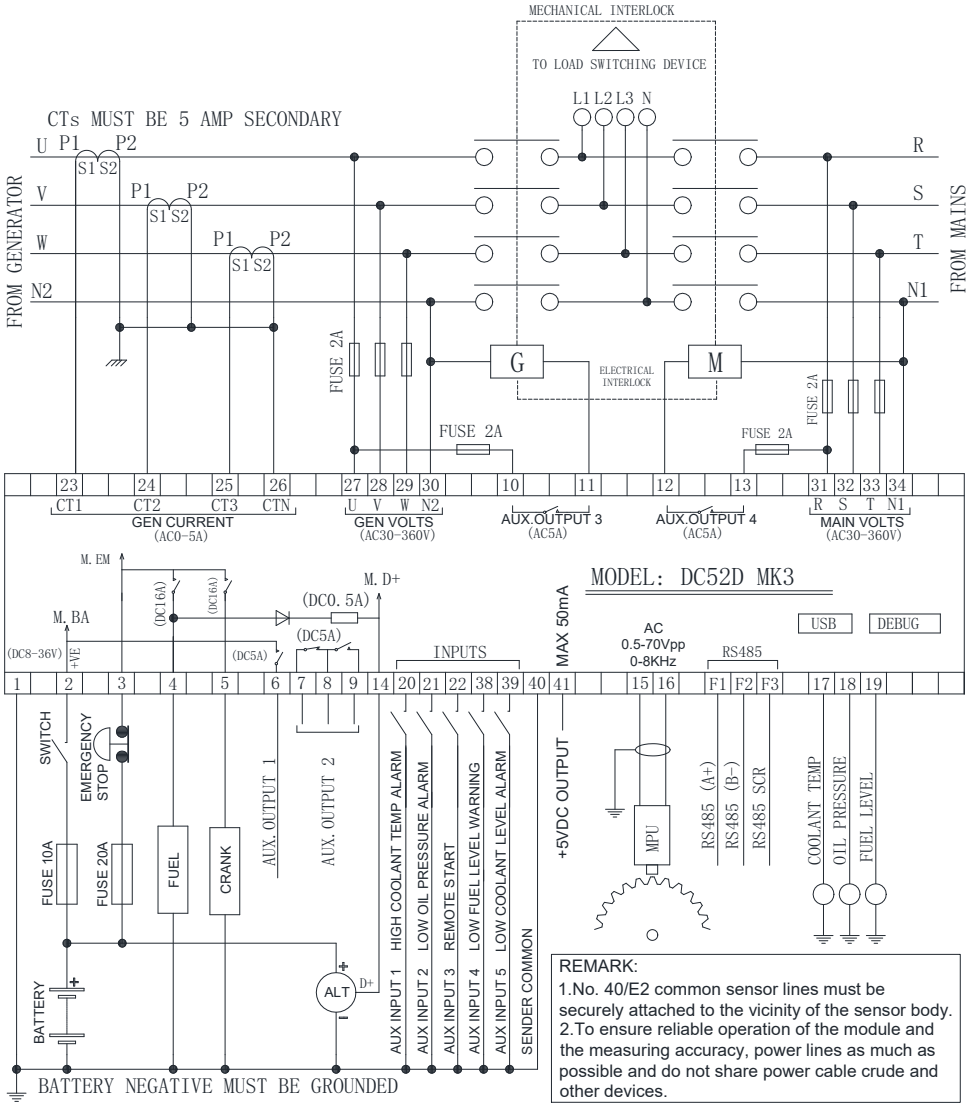


REMARK:
1.No. 40/E2 common sensor lines must be securely attached to the vicinity of the sensor body.
2.To ensure reliable operation of the module and the measuring accuracy, power lines as much as possible and do not share power cable crude and other devices.

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.

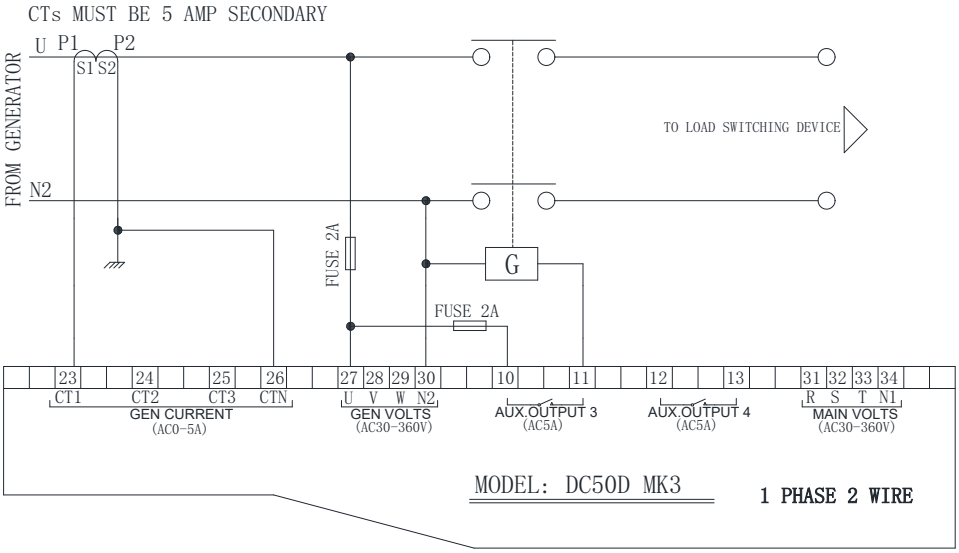
◆ DC52D MK3 3-phase 4-wire Typical Wiring Diagram



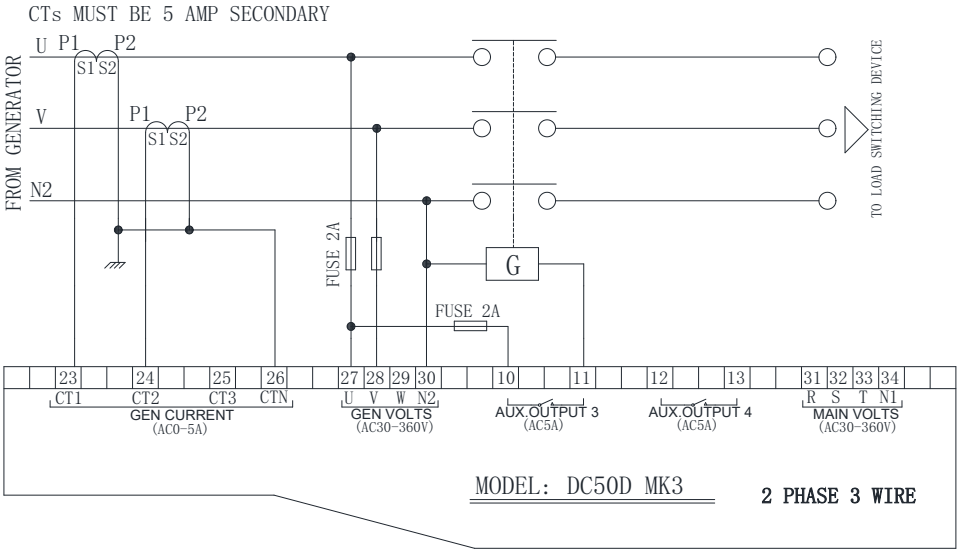
Note: Please don't move during running status or it may cause the controller broken!

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.

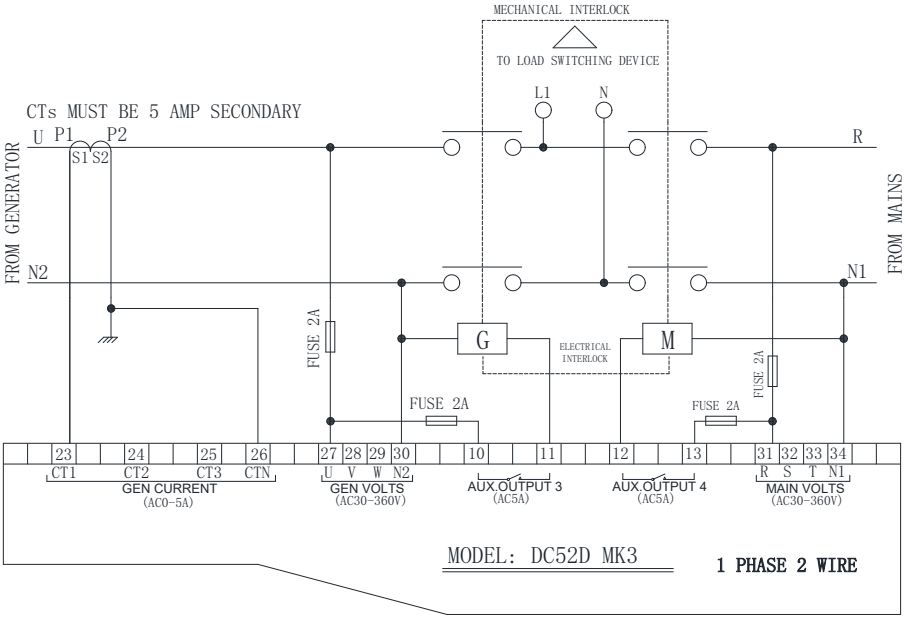
◆ DC50D MK3 1-phase 2-wire Typical Wiring Diagram



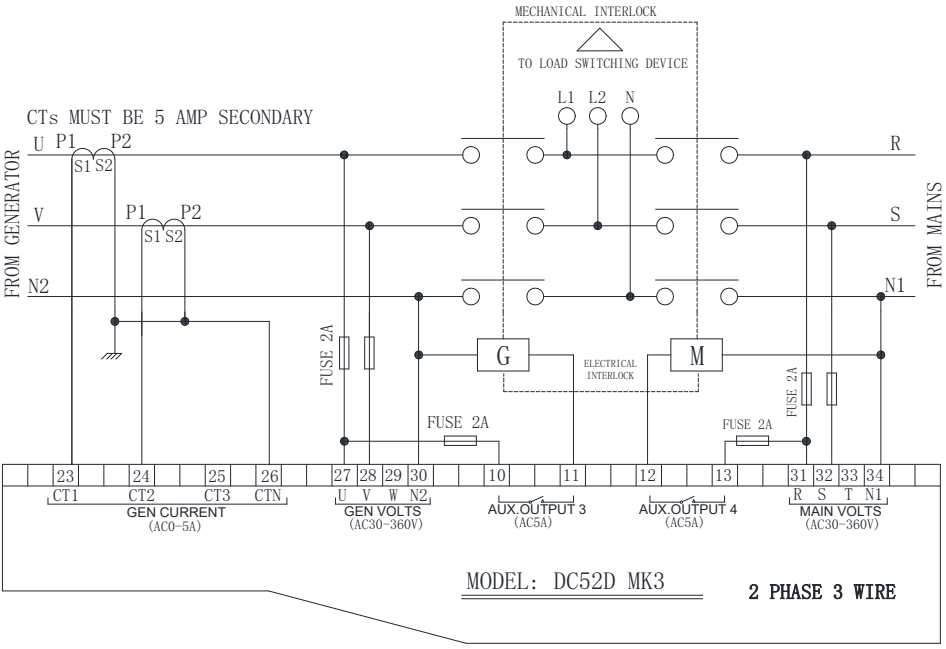
◆ DC50D MK3 2-phase 3-wire Typical Wiring Diagram



◆ DC52D MK3 1-phase 2-wire Typical Wiring Diagram



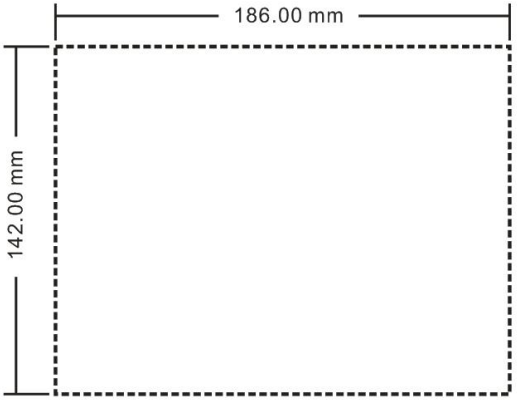
◆ DC50D MK3 2-phase 3-wire Typical Wiring Diagram



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.

◆Battery Voltage Input

DC5xD MK3 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.

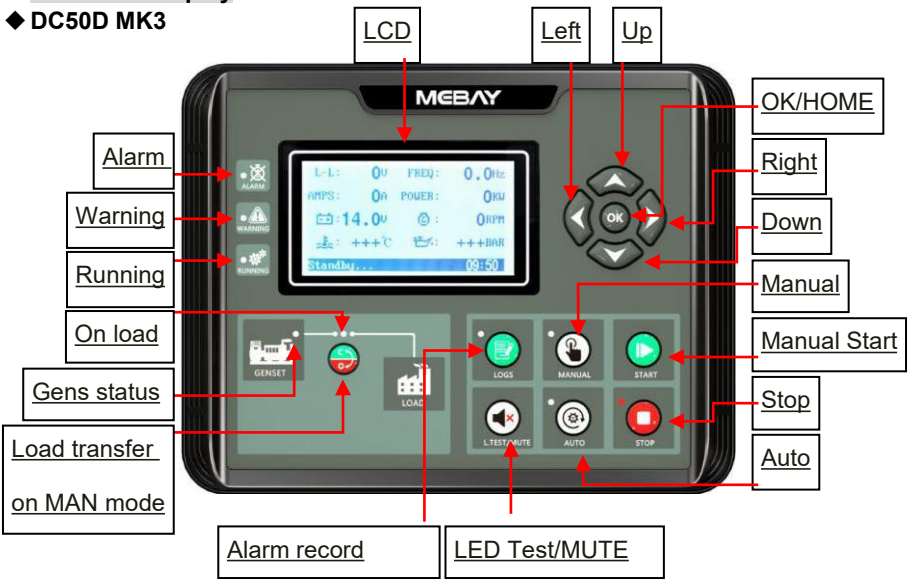
WARNING: When generator is on-load, C. T. secondary must not be open circuit, Otherwise, the high voltage generated will pose a danger to personal safety.

◆Withstanding voltage test

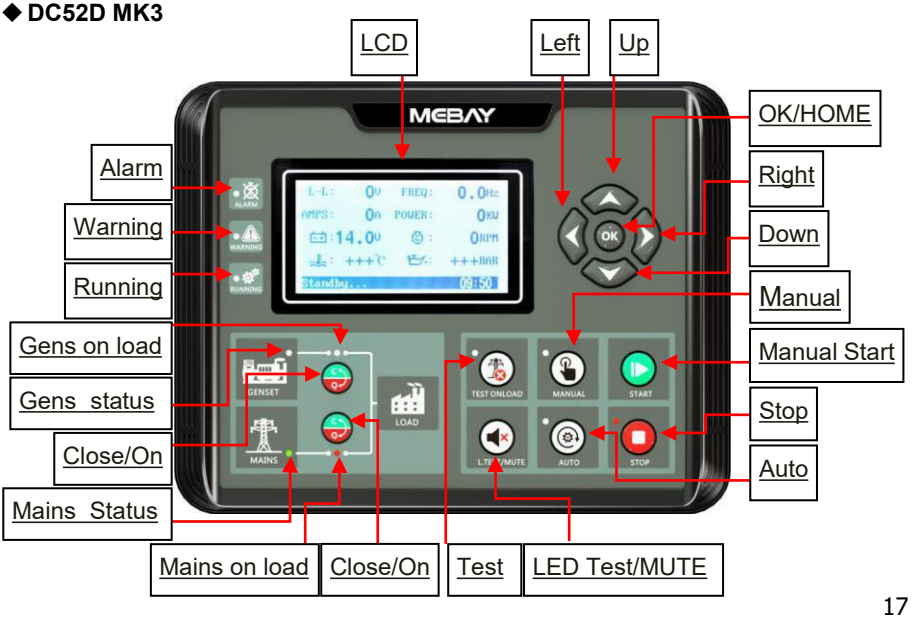
If withstanding voltage test is conducted after the controller has already been installed onto the control panel, please unplug all controller terminal connections in order to prevent high voltage from damaging it.

8. Panel and display

◆ DC50D MK3

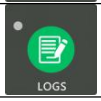


◆ DC52D MK3



9. Control and operation instruction

◆ Key Function Description

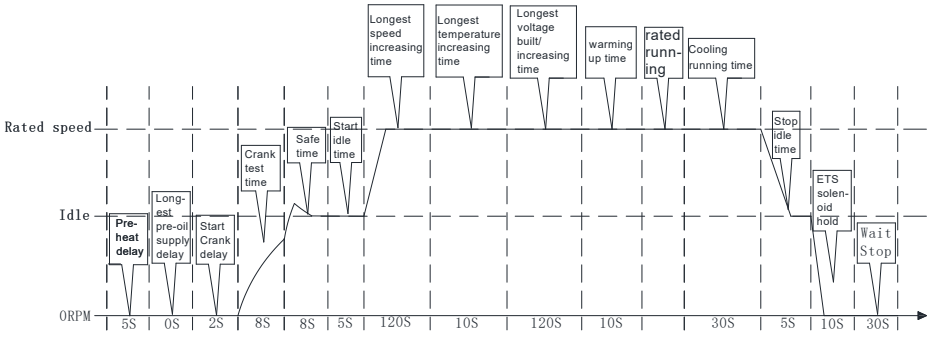
KEYS	NAME	Main Function
	Stop Reset Revert	◆ Can stop generator under manual/auto mode; ◆ Can reset shutdown alarm ◆ During stop procession, pressing this key again can stop generator immediately. ◆ Pressing this key can cancel the setting and back to upper class under edition. ◆ Under the setting mode with checking data, the data can be saved and system will exit after pressing. ◆ During the stop sequence, pressing the stop key will bypass the delay associated with the current process (excluding E.T.S. hold time and Fail to stop).
	Start	◆ Start the genset under manual mode. ◆ Pressing this key can start the genset under manual testing mode. ◆ Idle runtime process, press the start button again, then the idle runtime process will be jumped out. ◆ Pressing the start key during the start-up sequence will bypass the relevant delays for the current sequence (excluding Cranking time/Longest Volt.-up time/Longest RPM-up time).
	Manual	◆ Pressing this key will set the module into manual mode.
	Auto	◆ Pressing this key will set the module into auto mode.
	DC50D MK3 Records	◆ Pressing this key to check the alarm records under stop mode.
	DC52D MK3 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	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. ◆Press for 3 seconds to enter the parameter setting mode.
OK +	Setting mode	◆Pressing OK and STOP simultaneously to come into setting mode
+	DC52D MK3 Alarm Records checking	◆Pressing STOP and RIGHT to check the records and any buttons pressed to exit from the page.

◆ Manual test mode: (only DC52D MK3 has this function)

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:

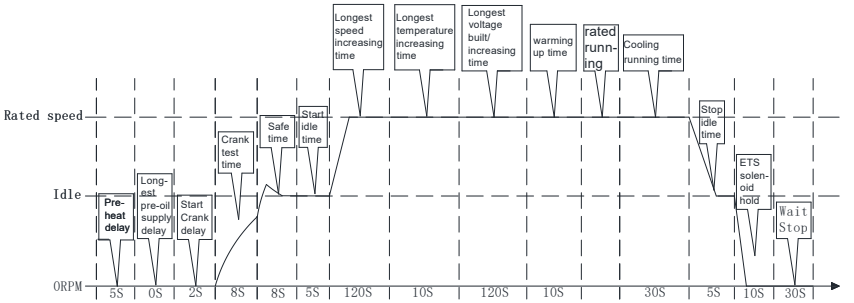


◆ Manual Start Mode

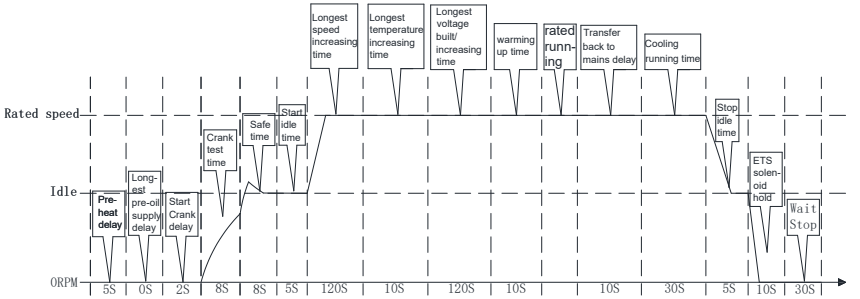
press  and make sure it is in the stop position before starting.

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:



◆ Emergency Start

In the manual mode, press the "manual"  button and the "start"  button at the same time to start the generator set in case of emergency.

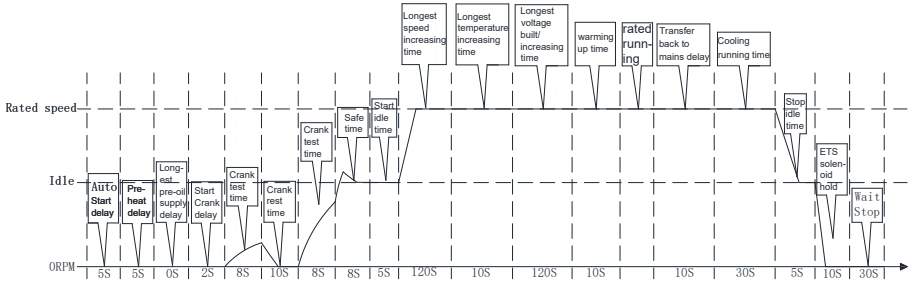
At this time, the controller does not judge whether the engine has been started successfully according to the successful starting conditions. The disengagement of the starter must be controlled by the operator. When the operator observes that the unit has been started successfully, release the key, the starter stops output, and the controller enters the safety delay.

◆ **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 (DC52D MK3 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 (DC52D MK3 is available). 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 (DC52D MK3 is available).

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, 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.

◆ **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!**"

10. Setting Menu instructions

The steps to enter the **Menu** setting are as follows:

1) Press the key OK for more than 3 seconds.Or press the stop key without releasing, press the OK key again, and then release all the keys to enter the setting menu page; The menu contents are as follows:

◆ **Fast Set Parameters:** This menu is for commonly used setup options and does not require a password to enter, making it easy for users to debug the unit.

◆ **Set Parameters: please refer to "Parameter".**

◆ **Language/语言: please refer to "Language".**

◆ **Information: Can view the product model, release date and other information.**

◆ **System log**

DC5xD MK3 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 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 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 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.

◆ **Operational Records**

DC5xD MK3 controller can save 5000 system operation records, including power-on time, date, cumulative time, starting mode (manual, automatic, unknown,), running time, stopping mode (manual, automatic, alarm stop, unknown), and writing running time and mode at intervals.

The steps to view the system log are as follows:

2) Press the key OK for more than 3 seconds.Or press the stop key without releasing, press the OK key again, and then release all the keys to enter the setting menu page;

3) In the setting menu page, select "**System Operational Records**" and press the OK key once to enter the System Operational Records page;

4) In the System Operational Record 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 Operational Records page.

◆ **Alarm Records**

DC5XD MK3 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:

a) DC50D MK3: under stop mode, press to come into alarm records page;

b) DC52D MK3: 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 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;

◆ **Maintenance Reset**

The controllers are equipped with a quick reset maintenance countdown function, which is operated as follows:

1) Press the key OK for more than 3 seconds to enter the setting menu interface.

2) In the setting menu interface, press key to move down, select "Maintenance Countdown Reset", and input "Maintenance Countdown Reset Password".

3) In the pop-up dialogue box, select "Yes", the controller will reset the maintenance countdown to the set value.

4) After the maintenance countdown is reset successfully, the controller will exit the setting interface automatically.

Note: The maintenance countdown password cannot be set as the same as the parameter setting password!

11. 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.

Note: When a warning fault occurs, the warning indicator **"WARNING"** is always on, and the current fault interface displays the warning description, Generators will not stop.

Code	Display name	Description
A7	Low oil pressure sensor	When the controller parameter "**Low Oil Pressure** Sensor Alarm Action" is set to **"Warning"**, detected sensor less than the "Warning Threshold", after the warning delay, it will report the "**Low oil pressure sensor**" warning.
A8	High WT sensor	When the controller parameter "**High water temperature** Sensor Alarm Action" is set to "**Warning**", detected sensor higher than the "Warning Threshold", after the warning delay, it will report the **"High WT sensor"** warning.
A11	Low fuel level sensor	When the controller parameter "Low fuel level Sensor Alarm Action" is set to "Warning", detected sensor less than the "Warning Threshold", after the warning delay, it will report the "**Low fuel level sensor**" warning.

A12	Low fuel level switch	When the controller detects that the AUX. Input "**Low fuel level warning input"** switch is active, after the warning delay, it will report the "**Low fuel level switch**" warning.
A13	Under battery voltage	When the controller detects that the battery voltage is lower than the "**Under battery voltage warning"**, after the warning delay, it will report the "**Under battery voltage**" warning.
A19	High WT switch	When the controller detects that the AUX. Input "**High water temperature warning"** switch is active, after the warning delay, it will report the **"High WT switch"**.
A26	Instant warning switch	When the controller detects that the AUX. Input "**External instant warning input"** switch is active, after the warning delay, it will report the **"Instant warning switch"**.
A28	RPM Signal lost	When the controller parameter "**Action if RPM lost**" is set to "**warning**", the detected speed value is 0, after the warning delay, it will report the "**RPM Signal lost**" warning.
A29	Oil Pressure sensor open	When the controller parameter "**Action if oil pressure sensor disconnected**" is set to "**warning**", When the oil pressure sensor is detected to be disconnected, it will report the **"Oil Pressure sensor open"**
A30	WT sensor open	When the controller parameter "**Action if water temperature sensor disconnected**" is set to "**warning**", When the water temperature sensor is detected to be disconnected, it will report the **"WT sensor open"**
A34	Fuel level sensor open	When the controller parameter "**Action if Fuel level sensor disconnected**" is set to "**warning**", When the fuel level sensor is detected to be disconnected, it will report the **"Fuel level sensor open"**
A 35	Over power	When the controller parameter **"Over power action"** is set to **"Warning"**, the controller detects that the generator power is higher than "**Over total power warning**", after the warning delay, it will report the "**Over power**" warning.
A 37	Phase Sequence Wrong	When the controller parameter "**Phase Sequence Wrong**" is set to **"warning"**, detects that the generator "**Phase Sequence Wrong**" , it will report the **"Phase Sequence Wrong"** warning.
A 38	Gens close fail	When the controller gens close output, controller does not detect the " **Gens close signal**" within the warning time, it will report the **"Gens close fail"** warning.
A 39	Gens open fail	When **"Action if gens open fail "** is set to **"warning"** the controller gens open output, controller does not detect the " **Gens open signal**" with in the warning

		time, it will report the **"Gens open fail"** warning.
A 40	Mains close fail	When the controller mains close output, controller does not detect the " **Mains close signal**" within the warning time, it will report the **"Mains close fail"** warning.
A 41	Mains open fail	When **"Action if mains open fail "** is set to **"warning"** the controller mains open output, controller does not detect the " **Mains open signal**" within the warning time, it will report the **"Mains open fail"** warning.
A 44	ECU Warn	When the controller detects a warning message from the ECU, after the warning delay, an ECU warning is reported (The corresponding ECU warning code displayed).
A 45	ECU Comms. fail	When the controller parameter "**ECU failure**" Action is set to "**warning**", and no message is received from the ECU within a fixed period of time, it will report **"ECU Comms.fail"** warning.
A 46	Low water level switch	When the controller detects that the AUX. Input "**Low water level warning"** switch is active, after the warning delay, it will report the **"Low water level switch"** warning.
A 47	Over battery voltage	When the controller detects that the battery voltage is over than the "**Over battery voltage warning"**, after the warning delay, it will report the "**Over battery voltage**" warning.
A 48	Charger fault	When the controller detects that the voltage difference between D+ and B+ is greater than the **" Charger warning voltage difference",** after the warning delay, it will report " **charger fault**" warning.
A 49	Battery charger fault	When the controller detects that the AUX. Input "**Charging failure warning"** switch is active, after the warning delay, it will report **"Battery charger fault"** warning.
A 50	Low OP switch	When the controller detects that the AUX. Input "**Low oil pressure warning"** switch is active, after the warning delay, it will report the **"Low OP switch"** warning.
A 51	Over current	When the controller parameter "**Action in case of over current"** is set to **"Warning"**, the controller detects that the generator current is higher than **"Phase current over-load warning"**, after the warning delay, it will report the "**over current**" warning.
A 52	Maintain end	When the controller parameter **"Maintenance expire"** is set to **"warning"**, when the countdown to maintenance is detected as "0" or maintenance date less than current date, it will report the "**Maintain end**" warning.
A 68	Fuel filling system	When the controller **"Fuel Pump Output "** is active, if

	fault	no increase in fuel level is detected during the "Fuel Pump Filling detection time ", it will report the **"Fuel filling system fault"** warning.

◆ **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.

Code	Display name	Description
E0	Emergency stop	When the controller detects that the input voltage of PIN 3 is less than 2V, then start alarm delay and the duration (0.5s) have not returned to normal, it will report the **"Emergency stop "** alarm.
E1	Over speed	When the controller detects that the engine speed is higher than "**Over speed alarm**", after the alarm delay, it will report the **"Over speed "** alarm.
E2	Under speed	When the controller detects that the engine speed is under than "**Under speed alarm**", after the alarm delay, it will report the **"Under speed "** alarm, after the alarm delay, it will report the **"Under speed "** alarm.
E3	Over frequency	When the controller detects that the generator frequency is higher than "**Over frequency alarm**", after the alarm delay, it will report the **"Over frequency"** alarm.
E4	Under frequency	When the controller detects that the generator frequency is lower than "**Under frequency alarm**", after the alarm delay, it will report the **"Under frequency"** alarm.
E5	Over voltage	When the controller detects that the generator voltage is higher than "**Over voltage alarm**", after the alarm delay, it will report the **"Over voltage"** alarm.
E6	Under voltage	When the controller detects that the generator voltage is lower than "**Under voltage alarm**", after the alarm delay, it will report the **"Under voltage"** alarm.
E8	Low oil pressure sensor	When the controller parameter **"Low Oil Pressure Sensor Alarm Action"** is set to **"Alarm and stop"**, detected sensor less than the **"Alarm Threshold"**, after the alarm delay, it will report the "**Low oil pressure sensor**"alarm.

E9	Low oil pressure switch	When the controller detects that the AUX. Input **"Low oil pressure alarm"** switch is active, after the alarm delay, it will report the **"Low oil pressure switch"** alarm.
E10	Oil Pressure sensor open	When the controller parameter "**Action if oil pressure sensor disconnected**" is set to "**Alarm and stop**", When the oil pressure sensor is detected to be disconnected, it will report the **"Oil Pressure sensor open"**
E11	High WT sensor	When the controller parameter **"High coolant temperature Sensor Alarm Action"** is set to **"Alarm and stop"**, detected sensor less than the **"Alarm Threshold"**, after the alarm delay, it will report the "**High WT sensor**"alarm.
E12	High WT switch	When the controller detects that the AUX. Input **"High coolant temperature alarm"** switch is active, after the alarm delay, it will report the **"High WT switch"** alarm.
E13	WT sensor open	When the controller parameter "**Action if coolant temperature sensor disconnected**" is set to "**Alarm and stop**", When the coolant temperature sensor is detected to be disconnected, it will report the **"WT sensor open".**
E20	Low water level switch	When the controller detects that the AUX. Input **"Low coolant level alarm"** switch is active, after the alarm delay, it will report the **"Low water level switch"** alarm.
E21	Crank failure	If the number of cranks exceeds the predetermined number of cranks, the **"Crank failure"** will be reported if the start-up of the generating unit is still unsuccessful.
E22	RPM Signal lost	When the controller parameter "**Action if RPM lost**" is set to "**Alarm and stop**", the detected speed value is 0, after the alarm delay, it will report the "**RPM Signal lost**" alarm.
E23	Stop failure-RPM	When the controller detects that the speed is not "0" after the execution of the shutdown, it will report the "**Stop failure-RPM**" alarm.
E24	Stop failure-Oil pres	When the controller detects that the oil pressure switch has not returned after the stop, it will report the "**Stop failure-Oil pres**" alarm.
E26	Stop failure-Oil pres	When the controller detects that the Oil Pressure is not "0" after the execution of the shutdown, it will report the "**Stop failure-Oil pres**" alarm.
E32	Fuel level sensor open	When the controller parameter "**Action if Fuel level sensor disconnected**" is set to "**Alarm and stop**", When the Fuel level sensor is detected to be disconnected, it will report the **"Fuel level sensor open"**
E33	High Box Temp-D	When the controller detects that the AUX. Input

		"High Genset box temperature alarm" switch is active, after the alarm delay, it will report the **"High Box Temp-D"** alarm.
E34	Low fuel level switch	When the controller detects that the AUX. Input **"Low Fuel level alarm"** switch is active, after the alarm delay, it will report the **"Low fuel level switch"** alarm.
E39	Instant alarm switch	When the controller detects that the AUX. Input "**External instant alarm input"** switch is active, after the alarm delay, it will report the **"Instant warning switch"** alarm.
E42	Non-balance of current	When the controller parameter **"Non-balance current action"** is set to **"Trip and stop"**, 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**". after the alarm delay, it will report the "**Non-balance of current**" alarm.
E43	Over power	When the controller parameter **"Over power action"** is set to **"Trip and stop"**, the controller detects that the generator power is higher than "**Over total power Alarm**", after the alarm delay, it will report the "**Over power**" alarm.
E45	Phase Sequence Wrong	When the controller parameter "**Phase Sequence Wrong**" is set to **"Alarm and stop"**, detects that the generator "**Phase Sequence Wrong**" , it will report the **"Phase Sequence Wrong"** alarm.
E46	Maintain end	When the controller parameter **"Maintenance expire"** is set to **""Alarm and stop"**, when the countdown to maintenance is detected as "0" or maintenance date less than current date, it will report the "**Maintain end**" alarm.
E49	ECU Alarm	When the controller detects a alarm message from the ECU, after the alarm delay, an ECU alarm is reported (The corresponding ECU alarm code displayed).
E50	ECU Comms. fail	When the controller parameter "**ECU failure**" Action is set to "**Alarm and stop**", and no message is received from the ECU within a fixed period of time, it will report **"ECU Comms.fail"** alarm.
E51	Louver opening exception	When opening the Louver control , the controller detects that the AUX. Input **"Louver status input"** switch is inactive, after the alarm delay, it will report the **"Louver opening exception"** alarm.
E54	Stop failure-Hz	When the controller detects that the frequency is not "0" after the execution of the shutdown, it will report the "**Stop failure-Hz**" alarm.
E55	Over current	When the controller parameter "**Action in case of over current"** is set to **"Trip and stop"**, the

		controller detects that the generator current is higher than **"Phase current over-load alarm"**, after the alarm delay, it will report the "**over current**" alarm.
E56	Low fuel level sensor	When the controller parameter **"Low fuel level Sensor Alarm Action"** is set to **"Alarm and stop"**, detected sensor less than the **"Alarm Threshold"**, after the alarm delay, it will report the "**Low fuel level sensor**"alarm.
E79	Broken fan belt	When the controller detects that the AUX. Input "**Broken fan belt input"** switch is active, after the alarm delay, it will report the **"Broken fan belt"** alarm.
E82	Alternative config conflict	When the controller detects that several "**Alternative config conflict**"are valid before startup or during operation, it will report the **"Alternative config conflict"** alarm.

12. Parameters setting

◆ Enter the edition page

Please set the parameters according to below steps:

1) The setting mode can be active after pressing and 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 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 to get into parameters setting page.

4) Press to shift up the parameters, press to shift down the parameters, press 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 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 and to save the parameters and exit from edition page.

7) 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 setting**

1)Basic setting

No	Parameter	Range ***(default)***	Notes
0	Language	0-English ***1-简体中文*** 2-繁体中文 3-Русский 4-Espanol 5-Türk dili 6-Français 7-Românesc 8-Polski 9-Português 10-Deutsch 11-한국어 12-Tiếng Việt 13-بالعربية 14-Bahasa Indonesia; 15-فارسی 16-Україна 17-বাংলা; 18-Lietuvių kalba 19-Italiano 20-हिन्दी-印地语	Display language selection. 0: English, 1: Simplified Chinese, 2: Traditional Chinese, 3: Spanish, 4: Russian, 5: Turkish, 6: French, 7: Romanian, 8: Polish, 9: Portuguese, 10: German, 11: Korean, 12: Vietnamese, 13:Arabic 14: Bahasa Indonesia, 15:Persian, 16:Ukrainian, 17:Bengali, 18:Lithuanian, 19:Italian 20:Hindi;
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*** 3 phase 4 wire ANC	Gens phases:No gens parameters can be displayed if setting as disable, which is applied to water pump genset. 3 phase 4 wire ANC: Suitable for special motors where the phase voltage of phase B is different from that of phases A and C.
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 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-Resistance ***2: VDO 40-120℃*** 3: MEBAY-001B 4: SGH 5: SGD 6: SGX 7: CURTIS 8: DATCON 9: VOLVO-EC 10: 3015238 11:PT100 12: MEBAY-Mier 13: WEICHAI 40-120℃ 14: GENCON 40-120℃ 15: VDO -10-140℃	Choose the usual temperature sensor, if the sensor users choose is not the 11 types, it can be User-defined.
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	If the sensor users choose is not the 3 types, it can be User-defined.

		16: 240-33Ω 17: 33-100Ω 18: 0-200Ω 19: 200-0Ω 20: 0-190Ω 21: 190-0Ω 22: Reserved 23: Reserved 24: Reserved 25: Reserved 26: User defined-Voltage 27: Volt In 0-5V 28: Volt In 0.5-4.5V	
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 AUX. 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 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. If setting as warning:the AUX. 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 AUX. 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	Action if oil pressure sensor disconnected	Disable ***Warning*** Alarm and stop	Action if oil temperature sensor disconnected.
18	Action if temperature sensor disconnected	Disable ***Warning*** Alarm and stop	

19	Action if fuel Level sensor disconnected	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)***	Generator voltage transformer primary voltage.
22	Gens volt. Secondary(PT)	30-30000V***(100V)***	Generator voltage transformer secondary voltage.
23	Mains volt. Primary(PT)	30-30000V***(100V)***	Mains voltage transformer primary voltage.
24	Mans volt. Secondary(PT)	30-30000V***(100V)***	Mains voltage transformer secondary voltage.
25	Load rate based on	Current A Active power kW Apparent power kVA	Calculation basis for selecting generation load rate.
26	Switch Type	***0:*** Three-stage 1: Two-stage	0: PC switch with OFF position; 1: PC switch without OFF position.

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 Oil pressure(delay) ***RPM/Frequency*** RPM/Oil Pressure Frequency/Oil Pressure RPM/Frequency/Oil press.	1.If there is no oil pressure sensor, please don't choose it. 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	0-200%***(28%)***	Rated frequency multiplying by this value is

	disconnect		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 higher than the close value and remains 20 minutes, relay is closed. Once coming into running mode, there is no output.
20	Battery charging stop	10.0-36.0***(27.8V)***	
21	2 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.
22	2 Maintenance expiry reset password	0-65535（***06869***）	When the maintenance countdown time arrives, enter the password to reset the maintenance countdown time, this password

			cannot be the same as the parameter setting password.
23	Heating Open Value	-50℃-300℃ ***(-50 ℃)***	Heating Control Setting Minimum 0:Disable; Maximum value: 7200(continuously effective)
24	Heating Close Value	-50℃-300℃ ***(-50 ℃)***	
25	Heating Maximum time	0-7200Min ***(0Min)***	
26	Cooling Open Value	-50℃-300℃ ***(-50 ℃)***	Cooling Control Setting Minimum 0:Disable; Maximum value: 7200(continuously effective)
27	Cooling Close Value	-50℃-300℃ ***(-50 ℃)***	
28	Cooling Maximum time	0-7200Min ***(0Min)***	

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	10-3600.0s ***(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	10-3600.0s ***(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 (DC5XD MK3 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	Over 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	Over 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	Gens/Mains closing delay	0-3600.0s***(1.0s)***	The time from Mains to Gens or Gens to Mains closing delay.
26	Opening/Closing output time	1.0-10.0s ***(5.0s)***	Mains and Gens loading and unloading output time, 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	Maximum fuel pump on time	0-65000s ***(65000s)***	When the fuel pump is operating, if an increase in the sensor fuel level value of less than 3% is detected during this time, a fuel filler system fault warning is reported.
31	Fuel pump filling detection	0-600s***(30S)***	

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 warning	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 warning	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 30.0, 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 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 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.
10	Phase current over-load warning	0-200% ***(200%)***	Rated current multiplying by this value is regarded as over current warning 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 warning. If the value is set as 200, then the warning is disabled.
11	Over total power warning	0-200% ***(200%)***	Rated power multiplying by this value is regarded as over power warning value. When the loading power is higher than the value and comes into delay but still higher (power faults delay), then over power warning. If the value is set as 200, then the warning is disabled.
12	Phase Sequence	***0- Disable*** 1-Warning 2-Alarm and stop	Monitor whether the phase sequence is normal.

6)Output / Input setting

No	Parameters	Range***(defaults)***	Notes
1	AUX. OUTPUT 1 (Functional of PIN 6)	0-100 ***(17.* E.S.T. hold*)***	Set the default value (please refer to the AUX. Output function table) **Set the state when the AUX. output is valid.**
2	AUX. OUTPUT 2 (Functional of PIN 7,8,9)	0-100 ***(10.Idle speed control)***	
3	AUX. OUTPUT 3 (Functional of PIN 10,11)	0-100 ***(14.Gens load)***	
4	AUX. OUTPUT 4 (Functional of PIN 12,13)	0-100 ***(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: The output is valid after idle delay is completed, and the output is closed after high-speed heat dissipation.
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 MK3.
24. **Mains unload:** continuous or pulse type according to time setting. Only for DC52D MK3.
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. **Public unload:** Public unload of Gens and Mains.
28. **Mains load/unload:** disconnect when mains is load, output when mains is unload, only [AUX.Output 2] is valid.
29. **Alternative config 1:** Output when alternate Alternative config 1 as valid.
30. **Alternative config 2:** Output when alternate Alternative config 2 as valid.
31. **Alternative config 3:** Output when alternate Alternative config 3 as valid.
32. **Preheat mode 2:** preheat before crank success.
33. **Preheat mode 3:** preheat after safety delay.
34. **Preheat mode 4:** preheat till temperature-up end.
35. **Preheat mode 5:** preheat till temperature-up end, but no preheat when motor starts.
36. **Emergency stop:** Output when emergency stop alarm.
37. **Over speed alarm:** Output when Over Speed alarms.
38. **Under speed alarm:** Output when engine under speed alarm.
39. **Over frequency alarm:** Output when over frequency alarm.
40. **Under frequency alarm:** Output when under frequency alarm.
41. **Over voltage alarm:** Output when over voltage alarm.
42. **Under voltage alarm:** Output when under voltage alarm.
43. **Low oil pressure sensor alarm:** Output when low oil pressure sensor alarm.
44. **Low oil pressure switch alarm:** Output when low oil pressure switch alarm.
45. **Oil pressure sensor open alarm:** Output when oil pressure sensor open alarm.
46. **High WT sensor alarm:** Output when high WT sensor alarm.
47. **High WT switch alarm:** Output when high WT switch alarm.
48. **WT sensor open alarm:** Output when WT sensor open alarm.
49. **Low water level switch alarm:** Output when low water level switch alarm.
50. **Crank failure alarm:** Output when the engine fails to start.
51. **RPM Signal lost alarm:** Output when Speed signal lost alarm.
52. **Stop failure alarm-RPM:** Output when the engine shutdown fails to alarm.
53. **Stop failure alarm-Hz:** Output when the engine shutdown fails to alarm.
54. **Stop failure alarm-Oil pres:** Output when the engine shutdown fails to alarm.
55. **Fuel level sensor open alarm:** Output when Fuel level sensor open alarm.
56. **Low fuel level switch alarm:** Output when low Fuel level switch alarm.
57. **Instant alarm switch alarm:** Output when Instant alarm switch.
58. **Non-balance of current alarm:** Output when non-balance current ratio alarm.
59. **Over power alarm:** Output when over power alarm.

60. Maintain end alarm: Output when maintain end alarm.
61. Shades open abnormal alarm: Output when Shades open abnormal alarm.
62. Over current alarm: Output when over current alarm.
63. Phase Sequence alarm: Output when Phase Sequence alarm.
64. Low fuel level sensor alarm: Output when low Fuel level sensor alarm.
65. Alternative config conflict alarm: Output when Alternative config conflict alarm.
66. Over battery volt: Output when over battery voltage warning.
67. Under battery volt: Output when under battery voltage warning.
68. Broken fan belt: Output when Broken fan belt alarm.
69. Heating output: output according to the heating condition setting.
70. Cooling output: output according to the cooling condition setting.
71….100 Reserved.

5	AUX. INPUT 1 (Functional of PIN 20)	0-40***(2.High temperature 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	***Normal close*** Normal open	
7	AUX. INPUT 2 (Functional of PIN 21)	0-40***(1.Low oil pressure alarm switch)***	
8	AUX. INPUT 2 valid	***Normal close*** Normal open	
9	AUX. INPUT 3 (Functional of PIN 22)	0-40***(18.Remote start(with load))***	
10	AUX. INPUT 3 valid	***Normal close*** Normal open	
11	AUX. INPUT 4 (Functional of PIN 38)	0-40***(5.Low Fuel level warning input)***	
12	AUX. INPUT 4 valid	***Normal close*** Normal open	
13	AUX. INPUT 5 (Functional of PIN 39)	0-40***(3.Low water level warning switch)***	
14	AUX. INPUT 5 valid	***Normal close*** 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 switchs auxiliary point.
13. Mains un/loading input: connect to auxiliary point of mains loading switch.(Only for DC52D MK3).
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,Closing with load.
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 start(without load):** the gens comes into start procession if this signal is valid and under auto mode,No closing with load.
24. **Alarm shutdown prohibition** (War mode)**:** this mode, in addition to the "emergency shutdown", all other alarms are invalid.
25. **Alternative config 1:** Alternate configuration 1 and switch input active at the same time.
26. **Alternative config 2:** Alternate configuration 2 and switch input active at the same time.
27. **Alternative config 3:** Alternate configuration 3 and switch input active at the same time.
28. **Broken fan belt input;**
29. **….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 per month	From 1st to 31st ***Default: the first day***	The date chosen for every month.
3	Maintenance date per 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 running time	1-120m***(5m)***	Maintenance running time setting.

8)Mains protection

No	Parameter	Range***(defaults)***	Notes
1	Mains phase	***Disable(50D)*** 1 Phase 2 Wire 2 Phase 3 Wire 3 Phase 3 Wire	Choose the input, there is no display if setting as disable.

		3 Phase 4 Wire(52D)	
2	Mains under volt	55-40000V***(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	55-40000V***(207V)***	
4	Mains over volt	55-40000V***(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	55-40000V***(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)***	
8	Loss of Phase judgment	***Loss of Phase 1*** Loss of Phase 2 Loss of Phase 3	Set the phase loss condition to judge whether the mains is abnormal.

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 6000s, 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	LOGO delay display under standby	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(Adaptive contrast when set to 82.)

a) USB/RS485 PORT

No	Parameter	Range***(default)***	Notes
1	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	CRC setting	***CRC: L_H*** CRC: H_L	RS485 communication CRC correction high and low bits

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	00:00:00-23:59:59	Permanent calendar inside, please correct the time timely.

d) Self-define curve

NO	Parameter	Notes
1	Self-define oil pressure resistance 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	Self-define oil pressure voltage curve	
3	Self-define water temperature curve	
4	Self-define fuel level resistance curve	
5	Self-define fuel level voltage curve	

e) Alternative config setting

No	Parameter	Range***(defaults)***	Notes
1	Alternative config 1	***Disable***/ Enable	Sets whether Alternative config 1 is enabled.
2	Alternative config 2	***Disable***/ Enable	Sets whether Alternative config 2 is enabled.
3	Alternative config 3	***Disable***/ Enable	Sets whether Alternative config 3 is enabled.
Detailed list of Alternative config parameter settings (only via the host computer)			
Gens AC system; Rated RPM; Over speed alarm; Under speed alarm; Rated frequency; Over freq alarm; Under freq alarm; Rated Phase voltage; Over voltage warning; Under voltage alarm; Rated phase current; Phase current over-load alarm; Over current recovery hysteresis width; Rated total power; Over total power alarm; Over power recovery hysteresis width; Mains Phase; Mains under volt; Revert under volt; Mains over volt; Revert over volt; Loss of Phase judgment;			

13. 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 AUX. 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.