ALC736/ALC736-4G

HYBRID ENERGY LIGHTING TOWER CONTROLLER

USER MANUAL

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Table 1 Software Version

Date	Version	Contents
2024-11-04	1.0	Original release

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Table 2 - Notation Clarification

Symbol	Instruction
⚠NOTE	Highlights an essential element of a procedure to ensure correctness.
⚠CAUTION	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
☠WARNING	Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.

Table 3 – Configuration Instruction

System Configuration	Description
Configuration 0	PV+Gen/Mains+BMS
Configuration1	PV+BMS
Configuration2	Gen/Mains+BMS
Configuration3	Gen/Mains

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CONTENTS

1 OVERVIEW

ALC736/ALC736-4G Hybrid Energy Lighting Tower Controller is used for automation control systems of single lighting tower unit to achieve not only scheduled/remote/SMS/light sensor/sunrise/sunset light on/light off, as well as light sensor + scheduled light on/light off, light sensor + sunrise/sunset light on/light off functions. Four configurations of PV + BMS + Gen/Mains, PV + BMS, Gen/Mains + BMS, and Gen/Mains are supported to apply to different applications. Meanwhile, the controller is applicable not only to AC lighting tower genset, but also to DC lighting tower genset. It integrates with digitalization, intellectualization and network technology and fits with LCD graphic display, optional Chinese, English and other languages interface (via language pack), and it is reliable and easy to use.

ALC736/ALC736-4G Hybrid Energy Lighting Tower Controller applies 32-bit microprocessor technology, realizing precise measuring of various parameters, value adjusting, and timing, threshold adjusting etc. functions. A majority of parameters can be adjusted from the front panel. All parameters can be adjusted via USB port on PC. With compact structure, simple wiring and high reliability, it can be used in various automation systems of lighting tower unit.

The built-in network communication module of the **ALC736-4G controller** enables the lighting tower unit to access the Internet. When the controller logs in the cloud server, the data information of the genset (including: GPS location, altitude, etc.) is uploaded to the corresponding cloud server in real time, and users can monitor the genset in real time and query the operating status and event log by mobile APP (IOS or Android system), computers and other terminal devices. In addition, the network communication module also has SMS function.

2 PERFORMANCE AND CHARACTERISTICS

Its main characteristics are as follows:

— 132x64 LCD with backlight, low temperature heating, optional Chinese, English and other multiple languages interface, which can be chosen at the site, making commissioning convenient for factory personnel;

— Wide operating temperature range (-40°C~+70°C) can suit for extremely harsh environments;

— With RS485 and CAN communication ports, the controller can connect with external devices (PV device, battery pack, PV-BMS all-in-one (custom protocol in need) to get and control the status of external devices in real-time;

— 4 kinds of system configuration 0/1/2/3 are optional, which can be applied to different occasions;

— With lamp fault check function;

— Reducing the number of the lighting lamps and luminance along with the fuel level drops;

— The low battery SOC decreases the lighting lamps and luminance functions;

— Starting battery under voltage condition can start genset to charge the battery;

— With low battery SOC power-on charging function, and three modes (economic/normal/power saving) are selectable;

— With lighting tower mast and tower head control function;

— The luminance adjustment function can set the luminance for different time periods;

— Multiple light on/light off modes for selection, scheduled light on/light off, remote/SMS/sunrise/sunset/ light sensor light on, light sensor + scheduled light on, light sensor + sunrise/sunset light on;

— Be compatible with both AC and DC genset application, 3P4W, 3P3W, 1P2W, 2P3W AC power system with 50Hz/60Hz frequency are supported, and also suitable for 0~75V DC power system;

— Collect and display parameters including generator 3 phase voltage and current, frequency, power, DC voltage and current, etc. as below:

Table 4 – Data Collection

Type		Item	Sign	Unit
Gen	AC	Line Voltage	Uab, Ubc, Uca	V
		Phase Voltage	Ua, Ub, Uc	V
		Frequency	F	Hz
		Phase Sequence	/	°
	DC	DC Voltage	U	V
Load	AC	Current	Ia, Ib, Ic	A
		Different Phases	P	kW

Type		Item	Sign	Unit
		and Total Active Power		
		Reactive Power	Q	kvar
		Apparent Power	S	kVA
		Power Factor	λ（PF）	/
		Gen Total Electric Energy	W	kWh
	DC	DC Current	I	A
		Power	P	W
		Gen Total Electric Energy	W	kWh

— Generator with over /under voltage, over/under frequency, over current, over power and reverse power functions;

— Precise collect engine parameters as below,

Temperature	°C/°F
Engine oil pressure	kPa/bar/psi
Fuel level	%
Engine speed	r/min(RPM)
battery voltage	V
D+ voltage of charger	V
Accumulated running time	Max. 65535 hours
Accumulated start times	Max. 65535 times

— Control protection function: to realize the automatic open/close of lamps, automatic start/stop of diesel genset and fault indication and protection functions;

— Up to 6 lighting lamps are under control and there's feedback of 6 lamps on LCD, the time interval of light on can be set;

— With ETS solenoid hold, idle speed control, preheating control, speed up/down control functions, which are relay outputs;

— Parameter setting function: parameters can be modified by users and cannot be lost even in case of power outage; most of them can be adjusted from the front panel of the controller and all of them can be modified on PC by USB port;

— 4 flexible sensors can be set to temperature, pressure, level and light sensor;

— Multiple temperature, pressure, and fuel level sensor curves can be used directly, and custom sensor curve can be done; among which Flex. sensor 4 can connect to resistance/pressure/current type sensor;

— Multiple crank disconnect conditions (gen frequency, speed, engine oil pressure, DC voltage) are optional;

— Wide power supply range DC (8~35)V, suitable for different starting battery voltage environment;

— Event log, real-time clock, scheduled start/stop (start the genset once a day/week/month) functions;

— Alarm data analysis (black box) function, which allows to record the genset data of 5 alarms;

— PLC function is fitted;

— CANBUS interface can connect with J1939 ECU engine, which can not only monitor the normal data of ECU engine (like water temp., oil pressure, speed, and fuel consumption), but also control genset start/stop and high/low speed via CANBUS port.

— Fuel pump control function is fitted;

— For ALC736 controller, it can connect to cloud server via 4G WiFi. It adopts network data communication protocol in JSON format to upload the data when it changes, and the compression algorithm to greatly reduce the network traffic. When the genset alarms, the data can be immediately uploaded to the server;

— ALC736-4G controller can connect to the cloud server through 4G WiFi. It adopts the network data communication protocol in JSON format to upload the unit data when it changes, and utilizes compression algorithm to significantly reduce the network traffic. When the genset alarms, the data can be immediately uploaded to the server;

— For ALC736 controller, the SMS function can send alarm information automatically to the pre-set 5 phone numbers, moreover, can realize the control and refer to the genset status by SMS function;

— For ALC736 controller, the GPS positioning function can be realized to obtain genset location;

— Modular design, pluggable terminal, built-in mounting, compact structure with easy installation;

3 SPECIFICATION

Table 5 – Performance Parameters

Items	Contents
Working Voltage	DC8V to 35V, DC reverse connection protection Resolution: 0.1V Accuracy: 1%
Overall Consumption	≤8.5W (Standby mode: ≤1W)
AC Voltage	Phase voltage Range: AC15V ~ AC360V (ph-N) Resolution: 0.1V Accuracy: 1%
	Line voltage Range: AC30V ~ AC620V (ph-ph) Resolution: 0.1V Accuracy: 1%
Alternator Frequency	Range: 5Hz ~ 75Hz Resolution: 0.01Hz Accuracy: 0.1Hz
AC Current	Rated: 5A Range: 0.1A Accuracy: 1%
Speed Sensor	Voltage Range: 1. 0 V ~ 24 V (RMS) Frequency Range: 5Hz ~ 10000Hz
Charger(D+) Voltage	Range: DC0V - DC60V continuous supply Resolution: 0.1V Accuracy: 1%
Analog Sensor	Resistor Input Range: 0Ω~ 6000Ω Resolution: 0.1Ω Accuracy: 1Ω (below 300Ω)
	Voltage Input Range: 0V ~ 10V Resolution: 0.01V Accuracy: 1%
	Current Input Range: 0mA ~ 20mA Resolution: 0.01mA Accuracy: 1%
Fuel Relay Output	8A 24V DC power supply output (relay output)
Crank Relay Output	8A 24V DC power supply output (relay output)
Digital Output 1	8A B+ DC power supply output (relay output)
Digital Output 2	8A B+ DC power supply output (relay output)
Digital Output 3	8A B+ DC power supply output (relay output)
Digital Output 4	8A Volt-free output (relay output)
Digital Output 5	8A Volt-free output (relay output)

Items	Contents
Digital Output 6	8A Volt-free output (relay output)
Digital Output 7	8A Volt-free output (relay output)
Digital Output 8	8A Volt-free output (relay output)
Digital Output 9	8A Volt-free output (relay output)
Digital Output 10	8A Volt-free output (relay output)
Digital Output 11	8A Volt-free output (relay output)
Digital Input 1-10	Low threshold voltage 1.9V; high limit voltage is 60V;
RS485 port	Isolated, half-duplex, 9600 baud rate, maximum communication length 1000m
CAN Port	Isolated, maximum communication length 250m, Belden 9841 cable or equivalent
AC CT Secondary Current	Rated: 5A
DC Current Input	Hall sensor's secondary side current: (4~20)mA
Case Dimensions	209mm x 166mm x 45mm
Panel Cutout	186mm x 141mm
Working Temperature	(-40~+70)°C
Working Humidity	(20~93)%RH
Storage Temperature	(-40~+80)°C
Protection Level	Front Enclosure: IP65 when rubber-ring gasket is installed between the enclosure and the control screen Back Enclosure: IP20
Insulation Intensity	Apply AC2.2kV voltage between high voltage terminal and low voltage terminal, and the leakage current is not more than 3mA within 1min.
Weight	754g

4 OPERATION

4.1 PUSHBUTTONS

Table 6 – Keys Description

Icon	Function	Description
	Stop/Reset	Stop the running genset in Auto/Manual mode; Press this key to reset alarm; Press this key for over 3s to test indicators (lamp test); During stop process, press this key again to stop the generator immediately.
	Start	Press this key to start the static genset.
	Manual Mode	Press this key can make controller goes in Manual mode.
	Auto Mode	Press this key can make controller goes in Auto mode and enter the setting screen of automatic light on.
	Light Off	In manual mode, press this key once to turn off one lamp.
	Light On	In manual mode, press this key once to turn on one lamp if light on conditions are satisfied.
	Set/Confirm	Press this key for over 3s to enter the menu screen, shift cursor and confirm the setting information in parameter setting page. In main display screen, press this key to scroll screens.
	Up/Increase	Scroll screens, shift the cursor up or increase value in parameter setting page.
	Down/Decrease	Scroll screens, shift the cursor down or decrease value in parameter setting page.
	Homepage/Return /Reset	Press this key to return to homepage in main screen; Press this key to return to previous screen in parameter setting screen; Press this key for over 3s to reset the alarm.

⚠NOTE: Press any key on main screen to mute the sound.

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4.2 CONTROLLER PANEL

Fig.1 – ALC736/ALC736-4G Front Panel

⚠️**NOTE: Partial indicators description.**

Table 7 – Alarm Indicators Description

Alarm Type	Indicator
Warning	Slow flashing (Twice per second)
Light off	Fast flashing (5 times per second)
Light Off Shutdown	Fast flashing (5 times per second)
Shutdown	Fast flashing (5 times per second)

⚠️**NOTE 1: Gen status indicator:** is normally illuminated after crank disconnection and before ETS stop and extinguished for other periods;

⚠️**NOTE 2: Gen normal indicator:** is normally illuminated when the generator is normal; flashing when generator state is abnormal; extinguished when there is no generating power.

⚠️**NOTE 3: Load indicator:** is normally illuminated when there is at least one lamp output.

⚠️**NOTE 4: Battery normal indicator:** for system configuration1, the indicator is normally illuminated when battery SOC is greater than the inhibit light on SOC, while extinguished when it is lower than the inhibit light on SOC; for system configuration 0 or 2, the indicator is normally illuminated when battery SOC is greater than the start SOC, and flashing when it is lower than the start SOC, extinguished when it is lower than the inhibit light on SOC; for system configuration 3, the indicator is not illuminated.

4.2.1 MAIN DISPLAY

▲ and ▼ are used to scroll up/down screen, [※/OK] is used to turn the page, [⌂/↩] is used to return to the main screen.

Table 8 – The 1st Screen Status Display

System Configuration	Main Screen	Description
0 (PV + BMS + Gen/Mains)	1 🛆 3 🛆 5 🛆 2 🛆 4 🛆 6 🛆 ⛽ ++++kPa 🚢 0. 0V 🌡 ++++℃ 🔋 0. 00V 0. 00A 0% Flexible Sensor 1 Open	First screen displays all lights status, genset voltage, BMS voltage, current, SOC, lighting tower set running status, and alarm information. 🛆 Light On ; 🛆 Light Off; ⛽ Oil Pressure (Main page display 2, definable) 🌡 Temperature (Main page display 1, definable); 🚢 Gen; 🚉 Mains; ⊞ PV; 🔋 Battery **Note:** When mains is enabled, Gen icon will not be displayed while mains icon is displayed. When genset is in standby status, mains is disabled and PV is in charging status, the PV icon is displayed. Coolant temp. and oil pressure can be configured as speed, illuminance, engine oil pressure (ECU), coolant temperature (ECU) through main display's related settings.
1 (PV + BMS)	1 🛆 3 🛆 5 🛆 2 🛆 4 🛆 6 🛆 ⛽ ++++kPa ⊞ 0. 0V 🌡 ++++℃ 🔋 0. 00V 0. 00A 0% Flexible Sensor 1 Open	First screen displays all lights status, PV array voltage, BMS voltage, current, SOC, lighting tower set running status, and alarm information. 🛆 Light On ; 🛆 Light Off; ⛽ Oil Pressure (Main page display 2, definable) 🌡 Temperature (Main page display 1, definable); ⊞ PV; 🔋 Battery; Coolant temp. and oil pressure can be configured as speed, illuminance, engine oil pressure (ECU), coolant temperature (ECU) through main display's related settings.
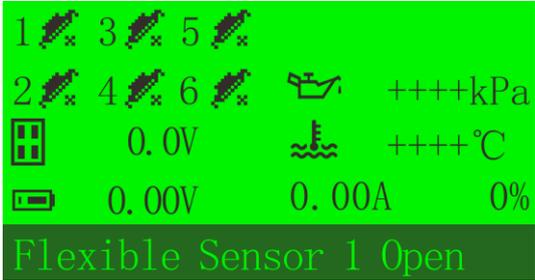
System Configuration	Main Screen	Description
2 (BMS + Gen /Mains)	1 ⚡ 3 ⚡ 5 ⚡ 2 ⚡ 4 ⚡ 6 ⚡ 🛢 ++++kPa 🚜 0.0V 🌡 ++++℃ 🔋 0.00V 0.00A 0% Flexible Sensor 1 Open	First screen displays all lights status, genset voltage, BMS voltage, current, SOC, lighting tower set running status, and alarm information. ⚡ Light On ; ⚡ Light Off; 🛢 Oil Pressure (Main page display 2, definable) 🌡 Temperature (Main page display 1, definable); 🚜 Gen; 🏭 Mains; 🔋 Battery; N**ote:** When mains is enabled, Gen icon will not be displayed while mains icon is displayed. Coolant temp. and oil pressure can be configured as speed, illuminance, engine oil pressure (ECU), coolant temperature (ECU) through main display's related settings.
3 (Gen /Mains)	1 ⚡ 3 ⚡ 5 ⚡ 2 ⚡ 4 ⚡ 6 ⚡ 🛢 ++++kPa 🚜 0.0V 🌡 ++++℃ 0.00Hz ⏱ 0rpm Flexible Sensor 1 Open	First screen displays all lights status, genset voltage, speed, lighting tower set running status, and alarm information. ⚡ Light On ; ⚡ Light Off; 🛢 Oil Pressure (Main page display 2, definable) 🌡 Temperature (Main page display 1, definable); 🚜 Gen; 🏭 Mains; ⏱ Speed; **Note:** When mains is enabled, Gen icon will not be displayed while mains icon is displayed. Coolant temp. and oil pressure can be configured as speed, illuminance, engine oil pressure (ECU), coolant temperature (ECU) through main display's related settings.
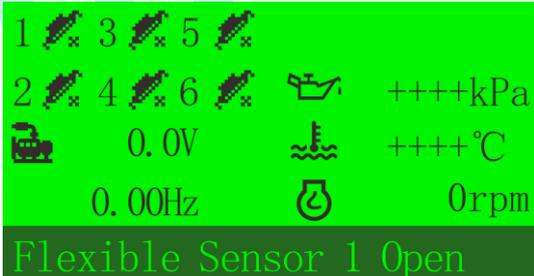
——The 2nd screen status display page: light on/light off mode, lamp mast status (displays when it acts, light luminance, light on time, time remaining (displays after scheduled light on), current time.

——Battery pack status page: real-time status, voltage, current, power, SOC and total capacity, etc.

——PV status page: real-time status, array voltage, array current, Gen power, load voltage, load current, load power, accumulated generating power.

——Engine page: speed, programmable analog 1, programmable analog 2, programmable analog 3,

programmable analog 4, battery voltage, charger voltage, total running time, total start times, current startup time.

——Gen AC page: phase voltage, line voltage, frequency, phase sequence.

——Gen DC page: DC voltage, DC current, power, current Generating power, total generating power.

——Gen load page: current, total active power (positive/negative), total reactive power (active/reactive), total apparent power, average power factor (positive/load), total electric energy.
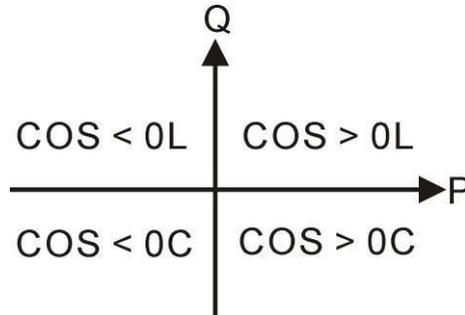
Fig.2 – Power Factor Display

NOTE: P is active power, Q is reactive power.

Table 9 – Power Factor Display Description

Power Factor	Conditions	Active Power	Reactive Power	Remark
COS>0L	P>0, Q>0	Input	Input	Load is resistive induction.
COS>0C	P>0, Q<0	Input	Output	Load is resistive capacitance.
COS<0L	P<0, Q>0	Output	Input	Load equals an under excitation generator.
COS<0C	P<0, Q<0	Output	Output	Load equals an over excitation generator.

⚠**NOTES:**

1. Input active power, and generator sends electricity to load.

2. Output active power, and load supplies electricity to generator.

3. Input reactive power, and generator sends reactive power to load.

4. Output reactive power, and load sends reactive power to generator.

——Alarm page: related alarm information.

——Input / Output status page: the status of input/output port.

——Lamp accumulated information page；

——About page: release software version, hardware version and release date.

⚠**NOTE 1:** Battery pack status page, it is displayed when system configuration is set as 0/1/2;

⚠**NOTE 2:** PV status page: is displayed when system configuration is set as 0/1;

⚠**NOTE 3:** The Gen load page will not be displayed when power system is DC, and the Gen page displays DC voltage, current and power.

⚠**NOTE 4:** ECU warning and shutdown alarm description, please refer to the engine manual for details according to SPN alarm code.

⚠**NOTE 5:** If using CANBUS port to read engine data via J1939, the engine page displays: coolant pressure, coolant level, fuel temperature, fuel pressure, intake temperature, exhaust temperature, turbine pressure, fuel consumption, total fuel consumption, etc. (Note that different engines may provide varying data)

4.2.2 USER MENU AND PARAMETER SETTING

Press ![key] key for more than 3s and it enters user menu.

— Parameter Setting: after inputting the correct password (factory default is 00318), you can enter the parameter setting screen.

— Event log: can query almost 1000 items of light off event, light off shutdown event and shutdown event record.

Parameter setting include the following contents:

— Module Setting
— Timer Setting
— Engine Setting
— Generator Setting
— AC Setting
— DC Setting
— Lighting Tower Setting
— Battery Pack Setting
— PV Setting
— Scheduled Run Setting
— Digital Input Port Setting
— Digital Output Port Setting
— Sensor Setting
— SGE02-4G Setting
— Server Setting

Example:

Table 10 – Timer Setting Steps

Display	Description
Module Setting Timer Setting Engine Setting Generator Setting AC Setting	Step 1: ![up], ![down] is used to change the contents needed to set; ![key] is used to enter the setting (Step 2); ![return] is used to return to previous menu.
Start Delay Preheat Delay Fuel Time Crank Time Crank Rest Time	Step 2： ![up], ![down] is used to change the contents needed to set; ![key] is used to enter the setting (Step 3); ![return] is used to return to previous menu. (Step 1)

Display	Description
Setting Value: 　　00005s	Step 3： 　![#/OK] is used to enter the setting (Step 4); ![⌂/↰] is used to return to previous menu. (Step 2)
Setting Value: 　00005s	Step 4： ![▲] , ![▼] is used to adjust the value of number in current position; ![#/OK] is used to move the cursor, when the cursor position is at 5, then press this key again to finish the setting (Step 5), ![⌂/↰] is used to return to previous menu (Step 3).
Setting Value: 　　00005s	Step 5： ![#/OK] is used to enter the setting (Step 4); ![⌂/↰] is used to return to the previous menu (Step 2).

4.3 AUTO LIGHT ON/LIGHT OFF OPERATION

Press ⊘ key, and the indicator beside is illuminated, which means the genset is in "Auto Light On" mode and enters the related setting menu.

4.3.1 AUTO SCHEDULED LIGHT ON/LIGHT OFF SETTING

a) SCHEDULED LIGHT ON/LIGHT OFF

```
1    Timer ON                        1 Timer Begin
2    Remote ON          Auto/Set     2 Timer End
3    SMS ON        ─────────────▶    3 Timer Set
4    Sunrise/Sunset ON ◀─────────────
5    Light Sensor ON    Homepage/Return
```

                                            Up/Down Key ↑↓

```
1 Timer Begin                        1 Timer Begin
2 Timer End        Auto/Set          2 Timer End
3 Timer Set    ◀─────────────        3 Timer Set
               ─────────────▶
               Homepage/Return
```

```
Homepage/Return ↓  ↑ Auto/Set

Timer ON Mode Set                    Light ON Mode Set:
Timer ON Date Set   Auto/Set         0 Daily
Timer ON Time Set ─────────────▶
                  ◀─────────────
                  Homepage/Return
```

b) Mode Begin:

```
1    Timer ON                        1 Timer Begin
2    Remote ON          Auto/Set     2 Timer End
3    SMS ON        ─────────────▶    3 Timer Set
4    Sunrise/Sunset ON ◀─────────────
5    Light Sensor ON    Homepage/Return
```

                                            ↓ Auto/Set

```
Timer Light ON (Daily)
Light ON Time:        18: 30
Light Luminance:          0%

2024-07-28 (3)   09:12:04
```

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c) Mode End:

```
1 Timer Light ON
2 Remote Light ON
3 SMS Light ON
4 Sunrise/Sunset Light ON
5 Light Sensor ON
```

Auto/Set →

← Homepage/Return

```
1 Timer Begin
2 Timer End
3 Timer Set
```

↑↓ Up/Down

```
Timer Light ON (Daily)
Light ON Time:      18: 30
Light Luminance:        0%

2024-07-28 (3)   09:12:04
```

← Auto/Set

```
1 Timer Begin
2 Timer End
3 Timer Set
```

4.3.2 AUTO REMOTE LIGHT ON/LIGHT OFF MODE SETTING

a) Mode Begin:
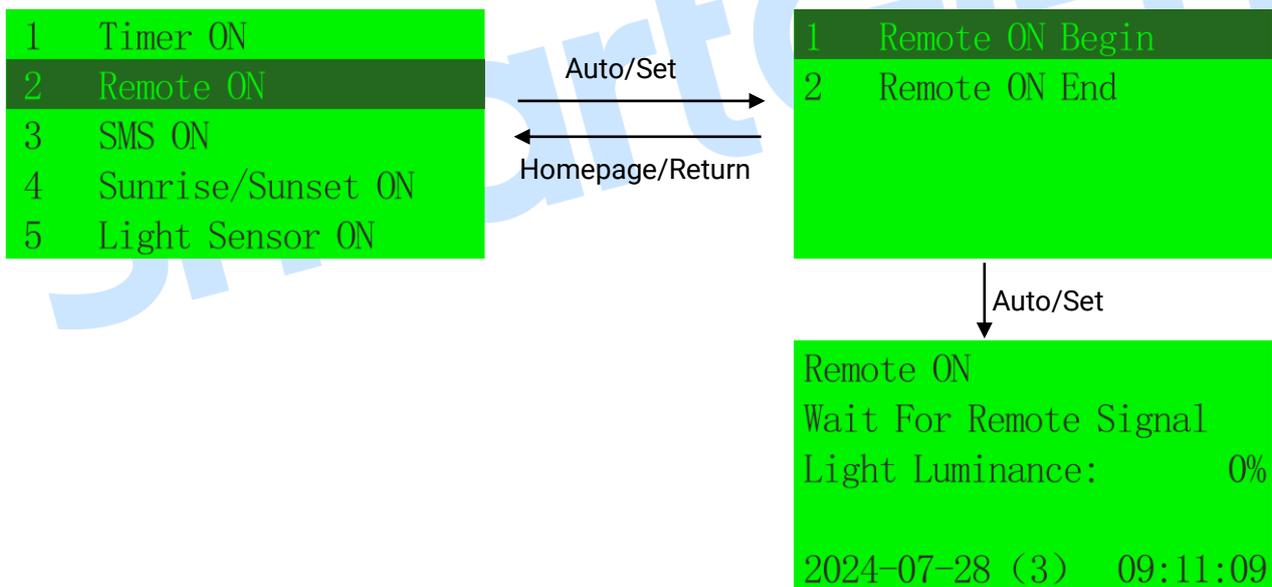
```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```

Auto/Set →

← Homepage/Return

```
1    Remote ON Begin
2    Remote ON End
```

↓ Auto/Set

```
Remote ON
Wait For Remote Signal
Light Luminance:        0%

2024-07-28 (3)   09:11:09
```

![SmartGen]

b) Mode End:

```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```

Auto/Set →
← Homepage/Return

```
1    Remote ON Begin
2    Remote ON End
```

↕ Up/Down

```
Remote ON
Wait For Remote Signal
Light Luminance:        0%


2024-07-28 (3)   09:11:09
```

← Auto/Set
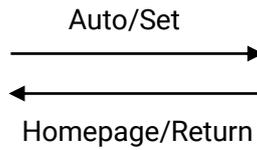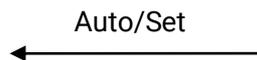
```
1    Remote ON Begin
2    Remote ON End
```

4.3.3 AUTO SMS LIGHT ON MODE SETTING

a) Mode Begin:

```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```

Auto/Set →
← Homepage/Return

```
1    SMS ON Begin
2    SMS ON End
```

↓ Auto/Set
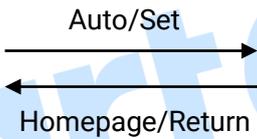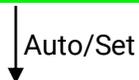
```
SMS ON
Wait For SMS ON Signal
Light Luminance:        0%


2024-07-28 (3)   09:11:22
```

b)   Mode End:

```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```
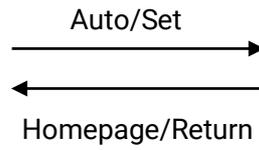
Auto/Set →

← Homepage/Return

```
1    SMS ON Begin
2    SMS ON End
```

↑↓ Up/Down

```
SMS ON
Wait For SMS ON Signal
Light Luminance:        0%


2024-07-28 (3)   09:11:22
```

← Auto/Set
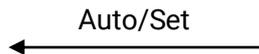
```
1    SMS ON Begin
2    SMS ON End
```

4.3.4   AUTO SUNRISE/SUNSET LIGHT ON/LIGHT OFF MODE SETTING

a)   Sunrise/Sunset Setting

Using a USB communication cable to connect PC with ALC736/ALC736-4G controller, open the test software on PC, select "Edit Configuration"---"Sunrise/Sunset" setting, and then select "City" or "Custom City" (longitude, latitude and time zone). Click on PC information and download it to the controller. Once the download is done, select any city to re-read the configuration, and then return to "Sunrise/Sunset" and ensure that the selected city differs from the one downloaded to confirm if the settings were successfully.

b)   Mode Begin:

```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```

Auto/Set →

← Homepage/Return

```
1 Sunrise/Sunset ON Begin
2 Sunrise/Sunset ON End
```

↓ Auto/Set

```
Sunrise/Sunset ON
Sunset Time:          00:00
Sunrise Time:         00:00
Light Luminance:         0%
2024-07-28 (3)   09:11:34
```

SmartGen

c) Mode End:

```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```

→ Auto/Set →

← Homepage/Return ←

```
1 Sunrise/Sunset ON Begin
2 Sunrise/Sunset ON End
```

↕ Up/Down
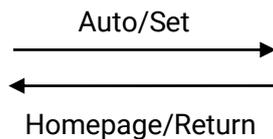
```
1 Sunrise/Sunset ON Begin
2 Sunrise/Sunset ON End
```

```
Sunrise/Sunset ON
Sunset Time:        00:00
Sunrise Time:       00:00
Light Luminance:       0%
2024-07-28 (3)   09:11:34
```

← Auto/Set ←
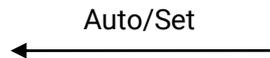
4.3.5 AUTO LIGHT SENSOR LIGHT ON/LIGHT OFF MODE SETTING

a) Light Sensor Setting

```
1    Timer ON
2    Remote ON
3    SMS ON
4    Sunrise/Sunset ON
5    Light Sensor ON
```

→ Auto/Set →

← Homepage/Return ←

```
1    Light Sensor ON Begin
2    Light Sensor ON End
3    Light Sensor Set
```

↕ Up/Down
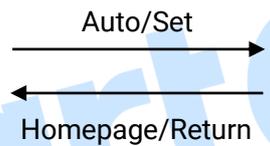
```
1    Light Sensor ON Begin
2    Light Sensor ON End
3    Light Sensor Set
```

```
1    Light Sensor ON Begin
2    Light Sensor ON End
3    Light Sensor Set
```

← Up/Down ←

↓ Auto/Set   ↑ Homepage/Return

```
Light ON Threshold
Light Off Threshold
```

→ Auto/Set →

← Homepage/Return ←
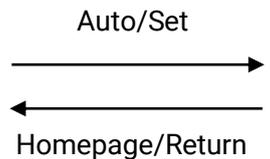
```
Light ON Threshold:
     00300 lx
```

```
Light ON Threshold:
   00300 lx
```

→ Auto/Set →
← Homepage/Return ←
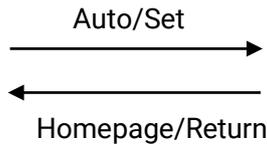
```
Light ON Threshold:
   00400 lx
```

↓ Auto/Set

```
Light ON Threshold:
   00400  lx
```

b)   Mode Begin:

```
1   Timer ON
2   Remote ON
3   SMS ON
4   Sunrise/Sunset ON
5   Light Sensor ON
```

→ Auto/Set →
← Homepage/Return ←
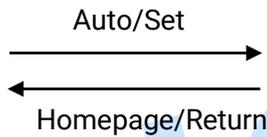
```
1   Light Sensor ON Begin
2   Light Sensor ON End
3   Light Sensor Set
```

↓ Auto/Set

```
Light Senson ON
Illumination Intensity++++ lx
L-Sensor ON Threshold:300 lx
L-Sensor OFF Threshold:500 lx
2024-07-28 (3)   09:11:34
```

c)   Mode End:

```
1   Timer ON
2   Remote ON
3   SMS ON
4   Sunrise/Sunset ON
5   Light Sensor ON
```

→ Auto/Set →
← Homepage/Return ←
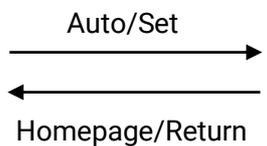
```
1   Light Sensor ON Begin
2   Light Sensor Off End
3   Light Sensor Set
```

↑↓ Up/Down

```
Light Senson ON
Illumination Intensity++++ lx
L-Sensor ON Threshold:300 lx
L-Sensor OFF Threshold:500 lx
2024-07-28 (3)   09:11:34
```

4.3.6 AUTO LIGHT SENSOR + SCHEDULED LIGHT ON/LIGHT OFF MODE SETTING

a) Light Sensor Setting

Same as light setting in "4.3.5 Auto Light Sensor On/Off Mode Setting".

b) Scheduled Light On/Light Off Setting

Same as scheduled light on/light off setting in "4.3.1 Auto Scheduled Light On/Light Off Mode Setting".

c) Mode Begin:
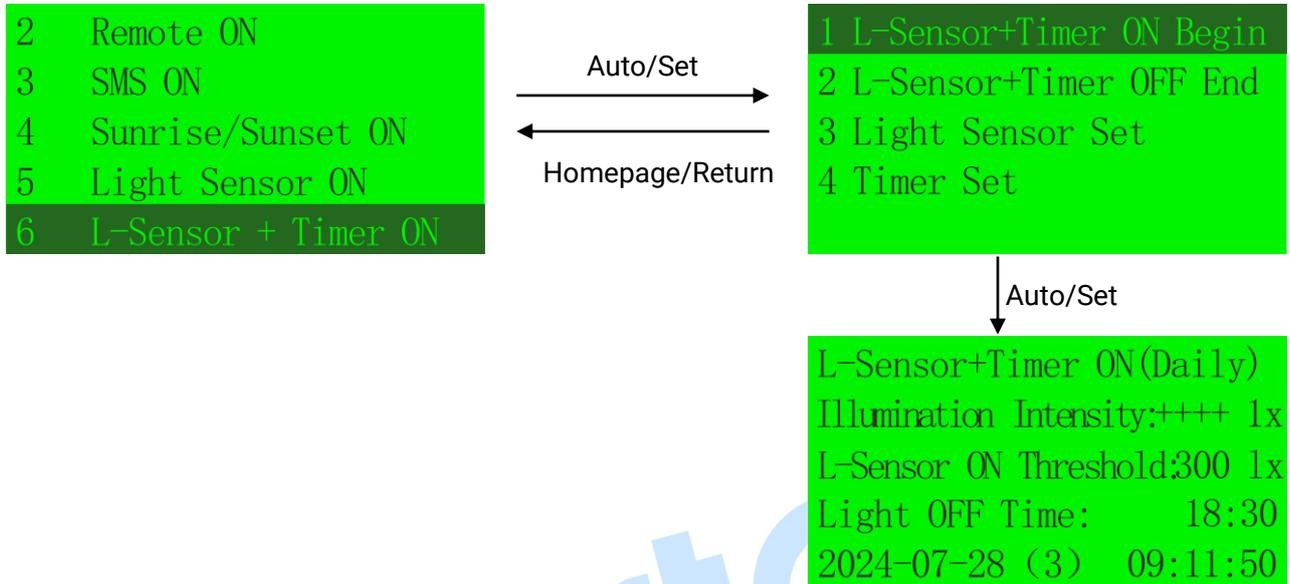
d) Mode End:
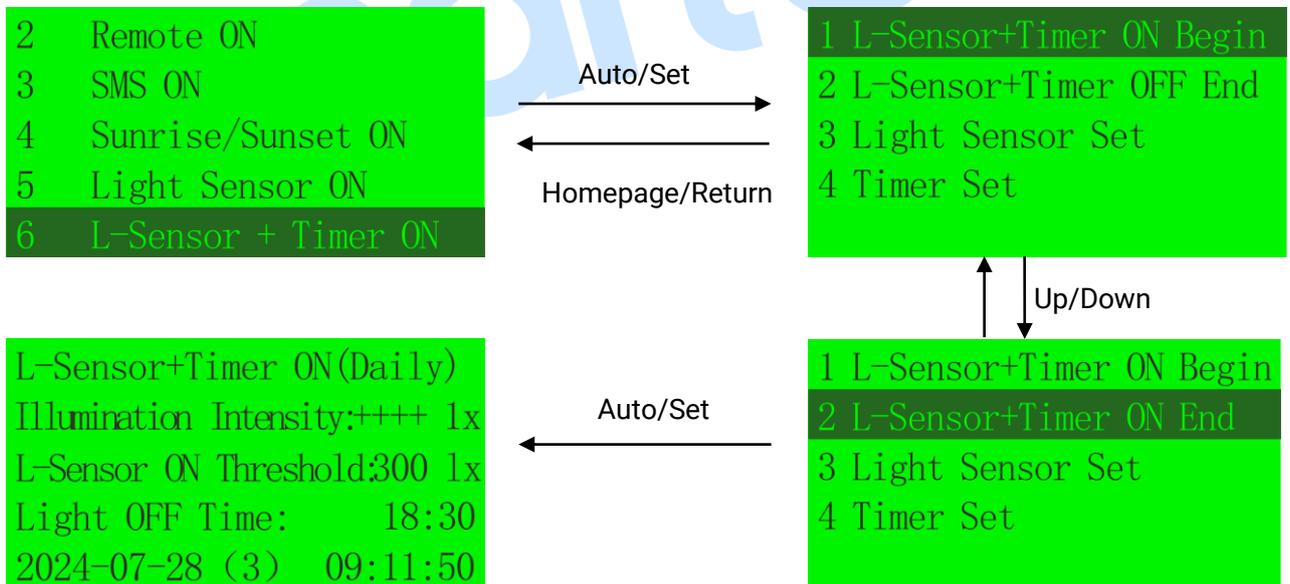
### 4.3.7 AUTO LIGHT SENSOR + SUNRISE/SUNSET LIGHT ON/LIGHT OFF MODE SETTING

a) Sunrise/Sunset Setting

Using a USB communication cable to connect PC with ALC736/ALC736-4G controller, open the test software on PC, select "Edit Configuration"---"Sunrise/Sunset" setting, and then select "City" or "Custom City" (longitude, latitude and time zone). Click on PC information and download it to the controller. Once the download is done, select any city to re-read the configuration, and then return to "Sunrise/Sunset" and ensure that the selected city differs from the one downloaded to confirm if the settings were successfully.
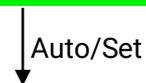
b) Light Sensor Setting

    Same as light setting in "4.3.5 Auto Light Sensor On/Off Mode Setting".

c) Mode Begin:

```
3 SMS ON
4 Sunrise/Sunset ON
5 Light Sensor ON
6 L-Sensor+Timer ON
7 L-Sensor+Sunrise/Sunset ON
```

Auto/Set →
← Homepage/Return

```
1 L-Sensor+Sunrise/Sunset Begin
2 L-Sensor+Sunrise/Sunset End
3 Light Sensor Set
```

↓ Auto/Set

```
L-Sensor+Sunrise/Sunset ON
Illumination Intensity:++++ lx
L-Sensor ON Threshold:300 lx
Sunset Time:         00:00
2024-07-28 (3)  09:13:23
```

d) Mode End

```
3 SMS ON
4 Sunrise/Sunset ON
5 Light Sensor ON
6 L-Sensor+Timer ON
7 L-Sensor+Sunrise/Sunset ON
```

Auto/Set →
← Homepage/Return

```
1 L-Sensor+Sunrise/Sunset Begin
2 L-Sensor+Sunrise/Sunset End
3 Light Sensor Set
```

↑↓ Up/Down

```
1 L-Sensor+Sunrise/Sunset ON
2 L-Sensor+Sunrise/Sunset End
3 Light Sensor Set
```

← Auto/Set

```
L-Sensor+Sunrise/Sunset ON
Illumination Intensity:++++ lx
L-Sensor ON Threshold:300 lx
Sunset Time:         00:00
2024-07-28 (3)  09:13:23
```

4.3.8 AUTO LIGHT ON/LIGHT OFF CONDITIONS

Table 11 – Auto Light On/Light Off Conditions

System Configuration	Type	Light On Conditions	Light Off Conditions
Configuration 0/2	Timer Light On	1. Light on time due; 2. SOC is greater than inhibit light on SOC/mains is active and mains is normal/generator is in normal running status	Timer light off time due/select timer light on end/SOC is lower than inhibit light on SOC and generator is in abnormal running status
	Remote Light On	1. Remote light on signal is active and light on delay end; 2. SOC is greater than inhibit light on SOC/mains is active and mains is in normal running status	Remote light on signal is inactive/select remote light on end/SOC is lower than inhibit light on SOC and generator is in abnormal running status
	SMS Light On	1. SMS light on signal is active; 2. SOC is greater than inhibit light on SOC/mains is active and mains is normal/generator is in normal running status	SMS light on signal is inactive/select SMS light on end/SOC is lower than inhibit light on SOC and generator is in abnormal running status
	Sunrise/Sunset Light On	1. Sunset light on time 2. SOC is greater than inhibit light on SOC/mains is active and mains is normal/generator is in normal running status	Sunrise light off/select sunrise/sunset light on end/SOC is lower than inhibit light on SOC and generator is in abnormal running status
	Light Sensor Light On	1. Illumination value is lower than light on threshold value and light on delay time due; 2. SOC is greater than inhibit light on SOC/mains is active and mains is normal/generator is in normal running status	Illumination value is higher than light off threshold value/select light sensor on end/SOC is lower than inhibit light on SOC and generator is in abnormal running status
	Light Sensor + Timer Light On	1. Illumination value is lower than light on threshold value or light on time due; 2. SOC is greater than inhibit light on SOC/mains is active and mains is normal/generator is in normal running status	Illumination value is higher than light off threshold value and timer light off time due/select light sensor + timer light on end/SOC is lower than inhibit light on SOC and generator is in abnormal running status

System Configuration	Type	Light On Conditions	Light Off Conditions
	Light Sensor + Sunrise/Sunset Light On	1. Illumination value is lower than light on threshold value or sunrise/sunset light on time due; 2. SOC is greater than inhibit light on SOC/mains is active and mains is normal/generator is in normal running status	Illumination value is higher than light off threshold value and sunrise/sunset light off time due/select light sensor + sunrise/sunset end/SOC is lower than inhibit light on SOC and generator is in abnormal running status
Configuration 1	Timer Light On	1. Timer light on time due; 2. SOC is greater than inhibit light on SOC	Timer light off time due/select timer light off end/SOC is lower than inhibit light on SOC.
	Remote Light On	1. Remote light on signal is active and light on delay end; 2. SOC is greater than inhibit light on SOC	Remote light on signal is inactive/select remote light on end/SOC is lower than inhibit light on SOC
	SMS Light On	1. SMS light on signal is active; 2. SOC is greater than inhibit light on SOC	SMS light on signal is inactive/select SMS light on end/ SOC is lower than inhibit light on SOC
	Sunrise/Sunset Light On	1. Sunset light on time 2. SOC is greater than inhibit light on SOC	Sunrise/sunset light off time due /select sunrise/sunset light on end/SOC is lower than inhibit light on SOC
	Light Sensor Light On	1. Illumination value is lower than light on threshold value and light on delay time due; 2. SOC is greater than inhibit light on SOC	Illumination value is higher than light off threshold value/select light sensor on end/SOC is lower than inhibit light on SOC
	Light Sensor + Timer Light On	1. Illumination value is lower than light on threshold value or light on time due; 2. SOC is greater than inhibit light on SOC	Illumination value is higher than light off threshold value and timer light off time due/select light sensor + timer light on end/SOC is lower than inhibit light on SOC
	Light Sensor + Sunrise/Sunset Light On	1. Illumination value is lower than light on threshold value or sunrise/sunset light on time due; 2. SOC is greater than inhibit light on SOC	Illumination value is higher than light off threshold value and sunrise/sunset light off time due/select light sensor + sunrise/sunset end/SOC is lower than inhibit light on SOC
Configuration 3	Timer Light On	1. Timer light on time due; 2. Generator is in normal operation/mains is active and mains is normal	Timer light off time due/select timer light on end/ generator is in abnormal running status

System Configuration	Type	Light On Conditions	Light Off Conditions
	Remote Light On	1. Remote light on signal is active and light on delay end; 2. Generator is in normal operation /mains is active and mains is in normal	Remote light on signal is inactive/select remote light on end/ generator is in abnormal running status
	SMS Light On	1. SMS light on signal is active; 2. Generator is in normal operation/mains is active and mains is normal	SMS light on signal is inactive/select SMS light on end/generator is in abnormal running status
	Sunrise/Sunset Light On	1. Sunset light on time 2. Generator is in normal operation/mains is active and mains in normal	Sunrise/sunset light off time due/select sunrise/sunset light on end/generator is in abnormal running status
	Light Sensor Light On	1. Illumination value is lower than light on threshold value and light on delay time due; 2. Generator is in normal operation/mains is active and mains is normal	Illumination value is higher than light off threshold value/select light sensor on end generator is in abnormal running status
	Light Sensor + Timer Light On	1. Illumination value is lower than light on threshold value or timer light on time due; 2. Generator is in normal operation/mains is active and mains is normal	Illumination value is higher than light off threshold value and timer light off time due/select light sensor + timer light on end/generator is in abnormal running status
	Light Sensor + Sunrise/Sunset Light On	1. Illumination value is lower than light on threshold value or sunrise/sunset light on time due; 2. Generator is in normal operation/mains is active and mains is normal/	Illumination value is higher than light off threshold value and sunrise/sunset light off time due/select light sensor + sunrise/sunset end generator is in abnormal running status

⚠**NOTE 1:** The relationship between different conditions of light on is "And";

⚠**NOTE 2:** All light off alarms/shutdown alarms will light off.

4.3.9 AUTO LIGHT ON/LIGHT OFF SEQUENCE

a) When reaching the light on conditions for Auto Mode, 1# light is activated first, then followed by 2# light on delay;

b) After 2# light on delay is over, 2# light is on, and enter the 3# light on delay;

c) As previous act, until the number of illuminated lights reach the setting number;

d) In case of all lights on, when reaching the light off conditions for Auto Mode, N# (the setting light number) light off is activated first, then followed by N-1 light off delay;

e) After N-1 light off delay is over, N-1 is light is off, and enter the N-2 light off delay;

f) As previous act, until all the lights are off; if the system configuration is set to 3, the power off signal is initiated.

4.4 MANUAL LIGHT ON/LIGHT OFF OPERATION

Press ✍ key and the indicator beside is illuminated, which means the genset is in "Manual Light On" mode.

4.4.1 MANUAL LIGHT ON CONDITIONS

Table 12 – Manual Light On Conditions

System Configuration	Light On Conditions
0/2	SOC is greater than inhibit light on SOC/mains is active/generator is in normal running status
1	SOC is greater than inhibit light on SOX
3	Generator is in normal running status/mains is active and mains is normal.

4.4.2 MANUAL LIGHT ON/LIGHT OFF SEQUENCE

a) Manual light on: press 🔆 key once, one light is on and act as this in turn until the set number of lights are all illuminated.

b) Manual light off: press 🔆 key once, one light is off and act as this in turn until the set numbers of lights are all extinguished.

4.5 AUTO START/STOP OPERATION

4.5.1 AUTO START/STOP CONDITIONS

Table 13 – Auto Start/Stop Conditions

System Configuration	Start Types	Start Conditions	Stop Conditions
Configuration 0/2	Starting Battery Under Volt.	1. Starting battery under voltage and start delay is over 2. The current mode of controller is in the setting active range 3. Mains is inactive	Starting battery voltage is higher than power off threshold value and fully charged delay is over/charging time reaches the setting max. charging time/mains is active
	Low Battery Pack SOC Start	1. Battery pack SOC is low and start delay is over 2 The current mode of controller is in the setting active range 3. Mains is inactive	Battery pack SOC is higher than shutdown threshold value and fully charged delay is over/charging time reaches the setting max. charging time/mains is active
	Remote Start	1. Auto mode 2. Remote start input signal is active 3. Mains is inactive	Remote start signal input is inactive/mains is inactive
	Scheduled Start	1. Auto mode 2. Controller time reaches the setting scheduled start time 3. Mains is inactive	Genset shut down when running time exceeds the setting scheduled start time duration/mains is active
	Light On Request	1. Auto mode 2. Light on conditions are triggered 3. Mains is inactive 4. Low SOC	Light on conditions are deactivated and shut down after light off/mains is active
Configuration 3	Starting Battery Under Volt.	1. Starting battery under voltage and start delay is over 2. The current mode of controller is in the setting	Starting battery voltage is higher than power off threshold value and fully charged delay is over/charging time duration reaches the setting max. charging

System Configuration	Start Types	Start Conditions	Stop Conditions
		active range 3. Mains is inactive	time/mains is active
	Remote Start	1. Auto mode 2. Remote start input signal is active 3. Mains is inactive	Remote start signal input is inactive/mains is inactive.
	Scheduled Start	1. Auto mode 2. Controller time reaches the setting scheduled start time 3. Mains is inactive	Genset shut down when running time exceeds the setting scheduled start time duration/mains is active
	Light On Request	1. Auto mode 2. Light on conditions are triggered 3. Mains is inactive	Light on conditions are deactivated and shut down after light off/mains is active

⚠**NOTE 1:** The relationship between different conditions of light on is "And";

⚠**NOTE 2:** All shutdown alarms/light off alarms will light off.

4.5.2 AUTO START SEQUENCE

a) When reaching the genset start conditions, the pre-heat relay outputs (if configured), and LCD status page displays "Preheating Delay XX s";

b) After the above delay, the fuel relay is energized, and then the starting relay is engaged. During the "start time", if the genset does not start, then fuel relay and starting relay stop outputting, and enters "crank rest time", waiting for next crank;

c) Should the start continue beyond the set attempts, the controller issues "start failure" and stops the genset and at the same time alarm page on LCD displays "start failure alarm";

d) If it starts during the attempts, it enters "safety on time", and during this period "Low Oil Pressure, High Temperature, Under Speed and Charge Alternator Failure" alarms are all inactive; After "safety on time", it enters "start idle delay" (if configured);

e) During "start idle delay", "Under Speed, Under Frequency, Under Voltage" alarms are inhibited. When this delay is over, "warming up delay" is initiated (if configured);

f) When warming up delay is over, if gen is normal, gen status indicator is illuminated, genset enters normal running status; if genset voltage or frequency is abnormal, controller issues alarm (LCD alarm page displays gen alarm type);

⚠**NOTE 1:** If oil pressure and water temperature is from ECU, the alarm will be activated during the safety delay and stop idle; if they are from flexible sensor, the alarm will be activated during setting sensor alarm range.

⚠**NOTE 2:** Due to no genset of system configuration 1, no such operation be executed.

4.5.3 AUTO STOP SEQUENCE

a) When reaching the genset shutdown conditions, "Stop Delay" is initiated;

b) After stop delay is over, "Cooling Time" is initiated;

c) At entering "stop idle delay" (if configured), the idling speed relay is energized;

d) "ETS solenoid hold" begins, ETS relay is energized while fuel relay is de-energized, and complete stop is detected automatically;

e) "Fail to stop delay" begins, and complete stop is detected automatically;

f) When generator stops completely, generator is placed into its standby mode; if generator fails to stop, controller issues alarm (LCD alarm page displays "Stop Failure" warning).

⚠**NOTE 1:** Due to no generator of system configuration 1, no such operation be executed.

4.6 MANUAL START/STOP OPERATION

4.6.1 MANUAL START/STOP CONDITIONS

Table 14 – Manual Start/Stop Conditions

System Configuration	Start Conditions	Description	Stop Conditions
0/2	1. Battery pack SOC is lower than manual start SOC/battery pack SOC is higher than manual start SOC and the start alarm type is set to warning. 2. Press ▮ key when genset is in Manual/Auto Mode.	Under Manual/Auto Mode	Press ⬤ key in Manual/Auto Mode
3	Press ▮ key when genset is in Manual/Auto Mode.	Under Manual/Auto Mode	Press ⬤ key in Manual/Auto Mode

⚠**NOTE 1: The relationship between different conditions of startup is "And";**

⚠**NOTE 2: All shutdown alarms/light off alarms will power off.**

4.6.2 MANUAL START/STOP SEQUENCE

a) Manual Start: Press ▮ key to start the genset; it can detect crank disconnect condition and generator accelerates to high-speed running automatically. With high temperature, low oil pressure, over speed and abnormal voltage during genset running, controller can protect genset to stop quickly.

b) Manual Stop: Press ⬤ key, it can shut down the running genset.

c) Auto Stop: When battery pack SOC is greater than the setting manual stop SOC, the genset will stop.

NOTE: Due to no genset of system configuration 1, no such operation be executed.

5 PROTECTIONS

5.1 WARNING ALARMS

When controller detects the warning signal, it will only warn.

Table 15 - Warning Alarms

No.	Type	Description
1	Over Speed	When controller detects the genset speed is over than the upper limit of preset value, it will send warning signal.
2	Under Speed	When controller detects the genset speed is under than the lower limit of preset value, it will send warning signal.
3	Loss of Speed Signal	When controller detects the genset speed is 0, and action select "Warning", it will send warning signal.
4	Over Frequency	When controller detects the genset frequency is higher than the upper limit of preset value, it will send warning signal.
5	Under Frequency	When controller detects the genset frequency is lower than the lower limit of preset value, it will send a warning signal.
6	Over Voltage	When controller detects the genset voltage is higher than the upper limit of preset value, it will send a warning signal.
7	Under Voltage	When controller detects the genset voltage is lower than the lower limit of preset value, it will send a warning signal.
8	Over Current	When controller detects the genset current is higher than the upper limit of preset value, meanwhile, action select as "Warning", it will send a warning signal.
9	Unbalanced Voltage	When controller detects the genset unbalanced voltage is higher than the upper limit of preset value, and action selects "Warning", it will send warning signal.
10	Fail to Stop	When the complete stop delay of genset is over, if engine is not stop completely, it will send warning signal.
11	Charge Alt Fail	When controller detects the charger voltage of genset is lower than the lower limit of preset value, it will send warning signal.
12	Battery Over Voltage	When controller detects the battery voltage of genset is higher than the upper limit of preset value, it will send warning signal
13	Battery Under Voltage	When controller detects the battery voltage of genset is lower than the lower limit of preset value, it will send warning signal.
14	DC Over Voltage	When controller detects the DC voltage is higher than the upper limit of preset value, it will send warning signal.
15	DC Under Voltage	When controller detects the DC voltage is lower than the lower limit of preset value, it will send warning signal.
16	DC Over Current	When controller detects the DC current is higher than the upper limit of preset value, it will send warning signal
17	BMS Comm. Failure	When controller detects the BMS communication failure, it will send warning signal.

No.	Type	Description
18	PV Comm. Failure	When controller detects the PV communication failure, it will send warning signal.
19	ECU Coolant Temp. High	When controller detects the coolant temperature is higher than the uuper limit of preset value, it will send warning signal.
20	ECU Oil Pressure Low	When controller detects the oil pressure is lower than the lower limit of preset value, it will send warning signal.
21	Reverse Power	When controller detects the reverse power of genset (power is negative) exceeds the preset value, and the action selects "Warning", it will send warning signal.
22	Over Power	When controller detects the genset power (power is positive) is over than the upper limit of preset value, and the action selects "Warning, it will send warning signal.
23	ECU Warning	When controller receives engine warning signals via J1939, it will send warning signal.
24	High Temperature	When controller detects the input signal is active, it will send warning signal.
25	Low Fuel Level	
26	Low Coolant Level	
27	High Control Cabinet Temperature	
28	Flex. Sensor 1 Open	When controller detects Flex. Sensor 1 is open, and the action selects" Warning", it will send warning signal.
29	Flex. Sensor 1 High	When controller detects Flex. Sensor 1 is higher than the upper limit of preset value, it will send warning signal.
30	Flex. Sensor 1 Low	When controller detects Flex. Sensor 1 is lower than the lower limit of preset value, it will send warning signal.
31	Flex. Sensor 2 Open	When controller detects Flex. Sensor 2 is open, and the action selects" Warning", it will send warning signal.
32	Flex. Sensor 2 High	When controller detects Flex. Sensor 2 is higher than the upper limit of preset value, it will send warning signal.
33	Flex. Sensor 2 Low	When controller detects Flex. Sensor 2 is lower than the lower limit of preset value, it will send warning signal.
34	Flex. Sensor 3 Open	When controller detects Flex. Sensor 3 is open, and the action selects" Warning", it will send warning signal.
35	Flex. Sensor 3 High	When controller detects Flex. Sensor 3 is higher than the upper limit of preset value, it will send warning signal.
36	Flex. Sensor 3 Low	When controller detects Flex. Sensor 3 is lower than the lower limit of preset value, it will send warning signal.
37	Flex. Sensor 4 Open	When controller detects Flex. Sensor 4 is open, and the action selects" Warning", it will send warning signal.
38	Flex. Sensor 43 High	When controller detects Flex. Sensor 4 is higher than the upper limit of preset value, it will send warning signal.
39	Flex. Sensor 4 Low	When controller detects Flex. Sensor 4 is lower than the lower limit of preset value, it will send warning signal.

No.	Type	Description
40	Input Port	If digital input port is configured as "Custom" and the action selects "Warning" , it will send warning signal when it is active.
41	PLC Function 1~10	When PLC function is configured as "Warning", controller will send warning signal when it is active.
42	Light Fault	When controller detects the load current is lower than the set value, it will send warning signal.
43	GSM Comm. Failure	When SGE02 (4G Wireless Communication Expansion Card) is enabled, and GSM module is not detected, it will send warning signal.

5.2 SHUTDOWN ALARMS

When controller detects shutdown alarm, it will shut down genset (if configbured) and corresponding alarm information will be displayed on LCD.

Table 16 - Shutdown Alarms

No.	Type	Description
1	Emergency Stop	When controller detects emergency stop signal, it will send a shutdown signal.
2	Over Speed	When controller detects the genset speed is over than the upper limit of preset value, it will send a shutdown signal.
3	Under Speed	When controller detects the genset speed is lower than the lower limit of preset value, it will send a shutdown signal.
4	Loss of Speed Signal	When controller detects the genset speed is 0, meanwhile, action select as "Shutdown", it will send a shutdown signal.
5	Over Frequency	When controller detects the genset frequency is higher than the upper limit of preset value, it will send a shutdown signal.
6	Under Frequency	When controller detects the genset frequency is lower than the lower limit of preset value, it will send a shutdown signal.
7	Over Voltage	When controller detects the genset voltage is higher than the upper limit of preset value, it will send a shutdown signal.
8	Under Voltage	When controller detects the genset voltage is lower than the lower limit of preset value, it will send a shutdown signal.
9	Fail To Start	If genset start failure within setting of start times, it will send a shutdown signal.
10	Over Current	When controller detects the genset current is higher than the upper limit of preset value, meanwhile, action select as "Shutdown", it will send a shutdown signal.
11	Unbalanced Voltage	When controller detects the genset unbalanced voltage is higher than the preset value, and action selects "Shutdown", it will send a shutdown signal.
12	Reverse Power	When controller detects the reverse power (power is negative) exceeds the preset value, and action selects "Shutdown", it will send a shutdown signal.

No.	Type	Description
13	Over Power	When controller detects the power (power is positive) exceeds the upper limit of preset value, and action selects "Shutdown", it will send a shutdown signal.
14	Temp. Sensor Open	When controller detects the input signal is active, it will send a shutdown signal.
15	High Temp.	
16	Oil Pressure Sensor Open	
17	Low Oil Pressure	
18	Low Water Level	
19	Low Fuel Level	
20	Flex. Sensor 1 Open	When controller detects the Flex. Sensor 1 is open, and action selects "Shutdown", it will send a shutdown signal.
21	Flex. Sensor 1 High	When controller detects Flex. Sensor 1 is higher than the upper limit of preset value, it will send a shutdown signal.
22	Flex. Sensor 1 Low	When controller detects Flex. Sensor 1 is lower than the lower limit of preset value, it will send a shutdown signal.
23	Flex. Sensor 2 Open	When controller detects the Flex. Sensor 2 is open, and action selects "Shutdown", it will send a shutdown signal.
24	Flex. Sensor 2 High	When controller detects Flex. Sensor 2 is higher than the upper limit of preset value, it will send a shutdown signal.
25	Flex. Sensor 2 Low	When controller detects Flex. Sensor 2 is lower than the lower limit of preset value, it will send a shutdown signal.
26	Flex. Sensor 3 Open	When controller detects the Flex. Sensor 3 is open, and action selects "Shutdown", it will send a shutdown signal.
27	Flex. Sensor 3 High	When controller detects Flex. Sensor 3 is higher than the upper limit of preset value, it will send a shutdown signal.
28	Flex. Sensor 3 Low	When controller detects Flex. Sensor 3 is lower than the lower limit of preset value, it will send a shutdown signal.
29	Flex. Sensor 4 Open	When controller detects the Flex. Sensor 4 is open, and action selects "Shutdown", it will send a shutdown signal.
30	Flex. Sensor 4 High	When controller detects Flex. Sensor 4 is higher than the upper limit of preset value, it will send a shutdown signal.
31	Flex. Sensor 4 Low	When controller detects Flex. Sensor 4 is lower than the lower limit of preset value, it will send a shutdown signal.
32	Input Port	When digital input port is configured as "Shutdown" and it is active, controller will send a corresponding shutdown signal.
33	PLC Function	When PLC function selects "Custom", controller will send a corresponding shutdown signal when it is active. It is active within the setting detection range of PLC function.
34	Light Fault	When controller detects the load current is lower than the preset value, it will send a shutdown signal.
35	GSM Comm. Failure	When SGE02 (4G Wireless Communication Expansion Card) is enabled, and GSM module is not detected, it will send shutdown signal.

5.3   LIGHT OFF SHUTDOWN ALARMS

When controller detects light off shutdown alarm, it will disconnect light output and shut down genset (if configured) after high speed cooling.

Table 17 – Light Off Shutdown Alarms

No.	Type	Description
1	Over Speed	When controller detects the genset speed is over than the upper limit of preset value, it will send a light off shutdown signal.
2	Under Speed	When controller detects the genset speed is lower than the lower limit of preset value, it will send a light off shutdown signal.
3	Loss of Speed Signal	When controller detects the genset speed is 0, meanwhile, action select as "Light Off Shutdown", it will send a shutdown signal.
4	Over Frequency	When controller detects the genset frequency is higher than the upper limit of preset value, it will send a light off shutdown signal.
5	Under Frequency	When controller detects the genset frequency is lower than the lower limit of preset value, it will send a light off shutdown signal.
6	Over Voltage	When controller detects the genset voltage is higher than the upper limit of preset value, it will send a light off shutdown signal.
7	Under Voltage	When controller detects the genset voltage is lower than the lower limit of preset value, it will send a light off shutdown signal.
8	Over Current	When controller detects the genset current is higher than the upper limit of preset value, meanwhile, action select as "Light Off Shutdown", it will send a shutdown signal.
9	Unbalanced Voltage	When controller detects the genset unbalanced voltage is higher than the upper limit of preset value, and action selects "Light Off Shutdown", it will send a shutdown signal.
10	Reverse Power	When controller detects the reverse power (power is negative) exceeds the preset value, and action selects "Light Off Shutdown", it will send a shutdown signal.
11	Over Power	When controller detects the genset power (power is positive) exceeds the upper limit of preset value, and action selects "Light Off Shutdown", it will send a shutdown signal.
12	Flex. Sensor 1 Open	When controller detects the Flex. Sensor 1 is open, and action selects "Light Off Shutdown", it will send a shutdown signal.
13	Flex. Sensor 1 High	When controller detects Flex. Sensor 1 is higher than the upper limit of preset value, it will send a light off shutdown signal.
14	Flex. Sensor 1 Low	When controller detects Flex. Sensor 1 is lower than the lower limit of preset value, it will send a light off shutdown signal.
15	Flex. Sensor 2 Open	When controller detects the Flex. Sensor 2 is open, and action selects "Light Off Shutdown", it will send a shutdown signal.
16	Flex. Sensor 2 High	When controller detects Flex. Sensor 2 is higher than the upper limit of preset value, it will send a light off shutdown signal.
17	Flex. Sensor 2 Low	When controller detects Flex. Sensor 2 is lower than the lower limit of preset value, it will send a light off shutdown signal.
18	Flex. Sensor 3 Open	When controller detects the Flex. Sensor 3 is open, and action

No.	Type	Description
		selects "Light Off Shutdown", it will send a shutdown signal.
19	Flex. Sensor 3 High	When controller detects Flex. Sensor 3 is higher than the upper limit of preset value, it will send a light off shutdown signal.
20	Flex. Sensor 3 Low	When controller detects Flex. Sensor 3 is lower than the lower limit of preset value, it will send a light off shutdown signal.
21	Flex. Sensor 4 Open	When controller detects the Flex. Sensor 4 is open, and action selects "Light Off Shutdown", it will send a shutdown signal.
22	Flex. Sensor 4 High	When controller detects Flex. Sensor 4 is higher than the upper limit of preset value, it will send a light off shutdown signal.
23	Flex. Sensor 4 Low	When controller detects Flex. Sensor 4 is lower than the lower limit of preset value, it will send a light off shutdown signal.
24	Input Port	When digital input port is configured as "Light Off Shutdown" and it is active, controller will send a corresponding light off shutdown signal.
25	PLC Function	When PLC function selects "Custom", controller will send a corresponding light off shutdown signal when it is active. It is active within the setting detection range of PLC function.
26	Light Fault	When controller detects the load current is lower than the lower limit of preset value, it will send a shutdown signal.
27	GSM Comm. Failure	When SGE02 (4G Wireless Communication Expansion Card) is enabled, and GSM module is not detected, it will send a light off shutdown signal.

5.4 LIGHT OFF ALARMS

When controller detects light off signal, it will disconnect light off output immediately, but genset will not stop (if configured).

Table 18 – Light Off Alarms

No.	Type	Description
1	Over Speed	When controller detects the genset speed is over than the upper limit of preset value, it will send light off alarm signal.
2	Under Speed	When controller detects the genset speed is lower than the lower limit of preset value, it will send light off alarm signal.
3	Loss of Speed Signal	When controller detects the genset speed is 0, meanwhile, action select as "Light Off Alarm", it will send light off alarm signal.
4	Over Frequency	When controller detects the genset frequency is higher than the upper limit of preset value, it will send light off alarm signal.
5	Under Frequency	When controller detects the genset frequency is lower than the lower limit of preset value, it will send light off alarm signal.
6	Over Voltage	When controller detects the genset voltage is higher than the upper limit of preset value, it will send light off alarm signal.
7	Under Voltage	When controller detects the genset voltage is lower than the lower limit of preset value, it will send light off alarm signal.
8	Over Current	When controller detects the genset current is higher than the upper limit of preset value, meanwhile, action select as "Light Off Alarm", it will send light off alarm signal.
9	Unbalanced Voltage	When controller detects the genset unbalanced voltage is higher than the upper limit of preset value, and action selects "Light Off Alarm", it will send light off alarm signal.
10	Reverse Power	When controller detects the reverse power (power is negative) exceeds the preset value, and action selects "Light Off Alarm", it will send light off alarm signal.
11	Over Power	When controller detects the genset power (power is positive) exceeds the upper limit of preset value, and action selects "Light Off Alarm", it will send light off alarm signal.
12	Flex. Sensor 1 Open	When controller detects the Flex. Sensor 1 is open, and action selects "Light Off Alarm", it will send light off alarm signal.
13	Flex. Sensor 1 High	When controller detects Flex. Sensor 1 is higher than the upper limit of preset value, it will send light off alarm signal.
14	Flex. Sensor 1 Low	When controller detects Flex. Sensor 1 is lower than the lower limit of preset value, it will send light off alarm signal.
15	Flex. Sensor 2 Open	When controller detects the Flex. Sensor 2 is open, and action selects "Light Off Alarm", it will send light off alarm signal.
16	Flex. Sensor 2 High	When controller detects Flex. Sensor 2 is higher than the upper limit of preset value, it will send a light off alarm signal.
17	Flex. Sensor 2 Low	When controller detects Flex. Sensor 2 is lower than the lower limit of preset value, it will send a light off alarm signal.

No.	Type	Description
18	Flex. Sensor 3 Open	When controller detects the Flex. Sensor 3 is open, and action selects "Light Off Alarm", it will send light off alarm signal.
19	Flex. Sensor 3 High	When controller detects Flex. Sensor 3 is higher than the upper limit of preset value, it will send light off alarm signal.
20	Flex. Sensor 3 Low	When controller detects Flex. Sensor 3 is lower than the lower limit of preset value, it will send light off alarm signal.
21	Flex. Sensor 4 Open	When controller detects the Flex. Sensor 4 is open, and action selects "Light Off Alarm", it will send light off alarm signal.
22	Flex. Sensor 4 High	When controller detects Flex. Sensor 4 is higher than the upper limit of preset value, it will send light off alarm signal.
23	Flex. Sensor 4 Low	When controller detects Flex. Sensor 4 is lower than the lower limit of preset value, it will send light off alarm signal.
24	Input Port	When digital input port is configured as "Light Off Alarm" and it is active, controller will send a corresponding light off alarm signal.
25	PLC Function	When PLC function selects "Custom", controller will send a corresponding light off alarm signal when it is active. It is active within the setting detection range of PLC function.
26	Light Fault	When controller detects the load current is lower than the lower limit of preset value, it will send light off alarm signal.
27	GSM Comm. Failure	When SGE02 (4G Wireless Communication Expansion Card) is enabled, and GSM module is not detected, it will send light off alarm signal.

6 WIRING CONNECTION

ALC736/ALC736-4G 's back panel is as follows:
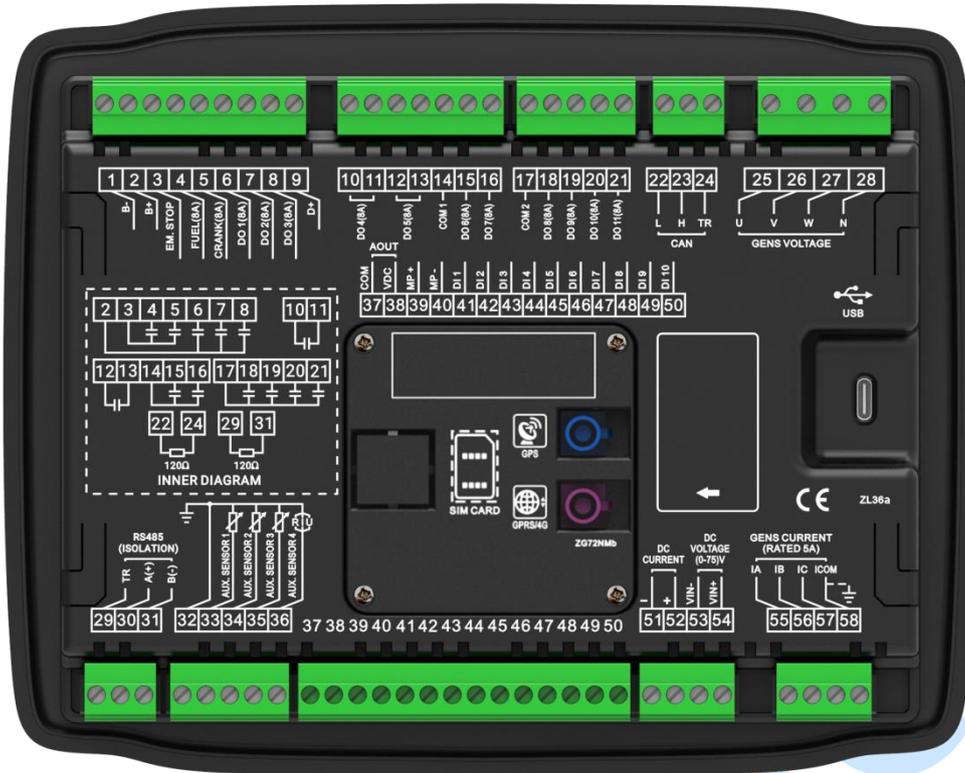
Fig.3 –Controller Back Panel Drawing

Table 19 - Terminal Connection Description

No.	Function	Cable Size	Description	
1	DC input B-	2.5 mm^2	DC power negative input and external connected with negative of starter battery.	
2	DC input B+	2.5 mm^2	DC power positive input and external connected with positive of starter battery. 20A fuse is recommended.	
3	Emergency Stop Input	2.5mm^2	Connect to B+ via emergency button.	
4	Fuel Relay	1.5mm^2	DC voltage is supplied by Terminal 3, rated 8A	
5	Crank	1.5mm^2	DC voltage is supplied by Terminal 3, rated 8A	
6	Digital Output 1	1.5mm^2	B+ output, rated 8A	See Table 21
7	Digital Output 2	1.5mm^2		
8	Digital Output 3	1.5mm^2		
9	Charger (D+)	1.0mm^2	Connected with charger's D+ (WL) terminal. If no this terminal in charger, this terminal is hanging in the air.	
10	Digital Output 4	1.5mm^2	Volt free output, rated 8A	See Table 21
11				
12	Digital Output 5	1.5mm^2		
13				

No.	Function	Cable Size	Description	
14	Digital Output 6~7 COM	1.5mm^2	Total output current 8A If both Terminal 6 and 7 are used, the max. current is 4A for each light.	
15	Digital Output 6	1.0mm^2	Default 1# light control relay output	See Table 21
16	Digital Output 7	1.0mm^2	Default 2# light control relay output	
17	Digital Output 8~11 COM	1.5 mm^2	Total output current 8A If both Terminal 8 and 11 are used, the max. current is 2A for each light.	
18	Digital Output 8	1.0mm^2	Default 3# light control relay output	See Table 21
19	Digital Output 9	1.0mm^2	Default 4# light control relay output	
20	Digital Output 10	1.0mm^2	Default 5# light control relay output	
21	Digital Output 11	1.0mm^2	Default 6# light control relay output	
22	CAN L	0.5mm^2	Impedance-120Ω shielding wire is recommended, its single-end connect with ground. 120Ω resistor is shorted connected between TR and H.	
23	CAN H	0.5mm^2		
24	CAN TR	0.5mm^2		
25	Genset U-phase Volt. Monitoring Input	1.0mm^2	Connect to U-phase output port of genset (recommend 2A fuse).	
26	Genset V-phase Volt. Monitoring Input	1.0mm^2	Connect to V-phase output port of genset (recommend 2A fuse).	
27	Genset W-phase Volt. Monitoring Input	1.0mm^2	Connect to W-phase output port of genset (recommend 2A fuse).	
28	Genset N-wire Input	1.0 mm^2	Connect to N-wire output port of genset.	
29	RS485 TR	0.5mm^2	Impedance-120Ω shielding wire is recommended, its single-end connect with ground. 120Ω resistor is shorted connected between TR and A(+).	
30	RS485 A	0.5mm^2		
31	RS485 B	0.5mm^2		
32	Sensor COM GND	1.0mm^2	Sensor common ground connection, can connect genset shell or negative of starter battery.	
33	Aux. Sensor 1 Input	1.0mm^2	Aux. sensor input and externally connect with resistance-type sensor.	
34	Aux. Sensor 2 Input	1.0mm^2	Aux. sensor input and externally connect with resistance-type sensor.	
35	Aux. Sensor 3 Input	1.0mm^2	Aux. sensor input and externally connect with resistance-type sensor.	
36	Aux. Sensor 4 Input	1.0mm^2	Aux. sensor input and externally connect with resistance/current/voltage-type sensor.	
37	Analog Volt. Output-	1.0mm^2	Can output voltage (0~10V), externally connect with	

No.	Function	Cable Size	Description
38	Analog Volt. Output+	1.0mm²	brightness adjustment controller and minimum resistance 2KΩ is available.
39	Speed Sensor Input		Connect with speed sensor, shielding wire is recommended.
40	Speed sensor input and controller inside has been connected with negative of battery		
41	Digital Input 1	1.0mm²	Digital input , connected B- to activate
42	Digital Input 2	1.0mm²	Digital input , connected B- to activate
43	Digital Input 3	1.0mm²	Digital input , connected B- to activate
44	Digital Input 4	1.0mm²	Digital input , connected B- to activate
45	Digital Input 5	1.0mm²	Digital input, connected B- to activate (default 1#light feedback input)
46	Digital Input 6	1.0mm²	Digital input, connected B- to activate (default 2#light feedback input)
47	Digital Input 7	1.0mm²	Digital input, connected B- to activate (default 3#light feedback input)
48	Digital Input 8	1.0mm²	Digital input, connected B- to activate (default 4#light feedback input)
49	Digital Input 9	1.0mm²	Digital input, connected B- to activate (default 5#light feedback input)
50	Digital Input 10	1.0mm²	Digital input, connected B- to activate (default 6#light feedback input)
51	DC Current Input -	0.5mm²	Connect to the output port of Hall DC 4-20mA sensor
52	DC Current Input +	0.5mm²	
53	DC Voltage Input -	0.5mm²	Connect to output port of DC generator.
54	DC Voltage Input +	0.5mm²	
55	CT A-phase Monitoring Input	1.5mm²	Externally connect to secondary coil of current transformer (max. 5A).
56	CT B-phase Monitoring Input	1.5mm²	Externally connect to secondary coil of current transformer (max. 5A).
57	CT C-phase Monitoring Input	1.5mm²	Externally connect to secondary coil of current transformer (max. 5A).
58	CT COM	1.5mm²	Common ground; Connect with negative of starter battery.

Note: For rows 41–50, the Description column also references "See Table 22".

No.	Function	Cable Size	Description
59	USB TYPE-C Port		Communicate with PC software.

⚠ **NOTE 1: USB port in the back of controller is communication port, which can realize controller programming via PC software.;**

⚠ **NOTE 2: The back of controller is available for monitoring expansion module to be plugged in.**

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7 SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

7.1   CONTENTS AND SCOPES OF PARAMETERS SETTING

Table 20 – Contents and Scopes of Parameters Setting

No.	Items	Range	Default	Description
Timer Setting				
0	Start Delay	(0-3600)s	5	Time from start signal of starter battery under voltage is active /start signal of battery pack low SOC is active or remote start signal is active to genset start.
1	Stop Delay	(0-3600)s	30	Time from start signal of starter battery under voltage is inactive /start signal of battery pack low SOC is inactive or remote start signal is inactive to genset stop.
2	Preheat Delay	(0-3600)s	0	It is pre-energized time of glow plug before starter is powered up.
3	Fuel Output Time	(1-3600)s	1	
4	Cranking Time	(3-60)s	8	It is each power-up time for the starter.
5	Crank Rest Time	(3-60)s	10	It is waiting time to repower-up when the engine start fails.
6	Safety On Time	(0-3600)s	10	During this time, alarms including low oil pressure, high temperature, under speed, gen under frequency, gen under voltage, and fail to charge are deactivated.
7	Start Idle Time	(0-3600)s	10	It is genset idle running time while starting up.
8	Warming Up Time	(0-3600)s	30	After genset entering into high speed running, it is warming up time before ramp-on load.
9	Cooling Time	(0-3600)s	60	After genset ramp-off load, it is cooling time before genset stop.
10	Stop Idle Time	(0-3600)s	10	It is genset idle running time while stopping.

No.	Items	Range	Default	Description
11	ETS Hold Time	(0-3600)s	20	It is electromagnet power-down time when it is going to stop.
12	Wait Stop Time	(0-3600)s	0	When "ETS Solenoid Hold" time is set as 0, it is time needed from idle delay expired to genset stop completely; when "ETS Solenoid Hold" time is not set as 0, it is time from ETS solenoid hold expired to genset stop completely;
13	Raise Speed Pulse Time	(0.1-30.0)s	1.0	It is rise speed pulse output time (output port configured as Rise Speed Pulse)
14	Drop Speed Pulse Time	(0.1-30.0)s	1.0	It is drop speed pulse output time (output port configured as Drop Speed Pulse)
15	Mains Normal Delay	(0-3600)s	10	The confirm time from abnormal mains to normal mains.
16	Mains Abnormal Delay	(0-3600)s	10	The confirm time from normal mains to abnormal mains.
Engine Setting				
0	Engine Type	(0-39)	0	Default as conventional engine. When connect to J1939 engine, please select the corresponding engine model.
1	Flywheel Teeth	(10-300)	118	Flywheel teeth that installed on the engine, which is used for judging starter disconnect conditions and testing engine speed.
2	Rated Speed	(0-6000) RPM	1500	Provide standard for judging over /under speed and loading speed.
3	Idle Speed	(0-6000) RPM	750	
4	Speed On Load	(0-100.0)%	90.0	The setting value is rated speed percentage, and controller detects while genset is in ready for load stage. If speed bellows

No.	Items	Range	Default	Description
				loading speed, genset will not enter into normal running stage.
5	Loss of Speed Signal Delay	(0-3600)s	5	Time from detecting the speed is 0 to confirming action.
6	Loss of Speed Signal Act	(0-5)	2	0: Not used; 1: Warn; 2: Light off; 3: Light off shutdown; 4: Shutdown; 5: Indication
7	Engine Over Speed Alarm 1 Set	(0-200.0)%	114.0	The setting value is rated speed percentage, return value and delay value can also be set.
8	Engine Over Speed Alarm 2 Set	(0-200.0)%	110.0	The setting value is rated speed percentage, return value and delay value can also be set.
9	Engine Under Speed Alarm 1 Set	(0-200.0)%	80.0	The setting value is rated speed percentage, return value and delay value can also be set.
10	Engine Under Speed Alarm 2 Set	(0-200.0)%	86.0	The setting value is rated speed percentage, return value and delay value can also be set.
11	Rated Starter Battery Voltage	(0-60.0)V	24.0	Provide standard for judging battery over/under voltage.
12	Over Voltage Alarm 1 Set	(0-200.0)%	120.0	The setting value is rated voltage percentage, return value and delay value can also be set.
13	Over Voltage Alarm 2 Set	(0-200.0)%	120.0	The setting value is rated voltage percentage, return value and delay value can also be set.
14	Under Voltage Alarm 1 Set	(0-200.0)%	85.0	The setting value is rated voltage percentage, return value and delay value can also be set.
15	Under Voltage Alarm 2 Set	(0-200.0)%	85.0	The setting value is rated voltage percentage, return value and delay value can also be set.
16	Charge Alternator Failure	(0-60.0)V	8.0	In genset normal running, when D+ (WL) voltage is

No.	Items		Range	Default	Description
					lower than this value, charge fail alarm will be initiated.
17	Start Attempts		(1-10)	3	It is the maximum start attempts if genset fail to start. If the preset start attempts been reached, controller will send start fail signal.
18	Disconnect DC Voltage Enable		(0~1)	0	0: Disable 1: Enable
19	Disconnect DC Voltage		(0-200)%	30	The setting value is rated voltage percentage. (Only if power system is configured as DC genset)
20	Disconnect Frequency Enable		(0~1)	0	0: Disable 1: Enable
21	Disconnect Frequency		(0-200)%	35	The setting value is rated frequency percentage of genset. When genset frequency is above the setting limit, starter will disconnect.
22	Disconnect Speed Enable		(0~1)	1	0: Disable 1: Enable
23	Disconnect Speed		(0-200)%	30	The setting value is rated speed percentage of genset. When genset speed is above the setting limit, starter will disconnect.
24	Disconnect Oil Pressure Enable		(0~1)	0	0: Disable 1: Enable
25	Disconnect Oil Pressure		(0-1000)kPa	200	When genset oil pressure is above the setting limit, starter will disconnect.
26	Fuel Pump Control	Enabled	(0~1)	0	0: Disable 1: Enable
		Related Sensor Set	(0-4)	3	0: Not Used; 1: Sensor 1 2: Sensor 2 3: Sensor 3 4: Sensor 4
		Turn On	(0-100)%	10	If fuel level bellows turn on limit, output port of fuel pump control starts output.
		Turn Off	(0-100)%	80	If fuel level exceeds turn off limit, output port of fuel pump control stops output.
		Max. Time(Turn On)	(0-3600)s	60	It is the maximum output time of fuel pump control, aiming to prevent fuel pump

![SmartGen logo]

No.	Items		Range	Default	Description
					continues working because of the sensor fault.
	Fuel Tank Capacity	Enabled	(0~1)	0	0: Disable 1: Enable
		Capacity	(0-10000)	100	After it is enabled, liquid unit displayed on the mains screen is changed from % to L. conversion formula: Fuel capacity = tank capacity * fuel level
27	ECU Fault Light Alarm Set		(0-5)	1	
28	ECU Shutdown Light Alarm Set		(0-5)	3	
29	ECU Warning Light Alarm Set		(0-5)	1	
30	ECU Protection Light Alarm Set		(0-5)	1	
31		Active Range	(0-3)	0	0: Not Used; 1: Active in Auto Mode; 2: Active in Manual Mode; 3: Active in Manual/Auto Mode.
32		Max. Time	(0.1-10.0)h	4.0	In under voltage starting process, engine will stop automatically if charging time exceeds the limit value, and charging process is terminated as well.
33	Starter Battery Under Volt. Start Set	Delay Time after Fully charged	(0-1000)min	60	This time duration is from when battery voltage is higher than fully charged voltage threshold value to under voltage startup.
34		Under Volt. Start Threshold Value	(0-200)%	80	Percentage of starter battery rated voltage; When controller detects that if genset is in standby status, controller will execute auto under voltage start if battery voltage is lower than under voltage start value.
35		Under Volt. Start Delay	(0-3600)s	30	It is time from controller detects battery under voltage start signal to genset start, or from battery under voltage start charging finished to genset is going to stop.
36		Fully Charged	(0-200)%	125	Percentage of rated battery

No.	Items	Range		Default	Description
	Threshold Value				voltage; When controller detects that if genset is in starter battery under voltage start status and genset is in normal running, controller will enter trickle charging end countdown if battery voltage is higher than fully charged voltage threshold value.
37	ECU Display Parameter 1	(0-0xffff)		0x0000	All are disabled in default.
38	D+ Selection Set	(0-1)0		0	0: Controller 1:: ECU
39	Speed Selection Set	(0-1)0		0	
40	Coolant Temp. Selection Set	(0-1)		0	
41	Engine Oil Pressure Selection Set	(0-1)		0	
42	Main Screen Display 1 Related Set	(0-8)		1	0: Not used 1: Sensor 1 2: Sensor 2 3: Sensor 3 4: Sensor 4 5: Engine Oil Pressure (ECU) 6: Coolant Temperature (ECU) 7: Speed 8: Power Voltage
43	Main Screen Display 2 Related Set	(0-8)		2	
44	Quick Start Set	（0-1）		0	0: Disable 1: Enable
45	Coolant Temp. Related Set	(0-4)		3	0: Not used 1: Sensor 1 2: Sensor 2 3: Sensor 3 4: Sensor 4 5: Coolant Temperature (ECU)
Generator Setting					
0	Power System	(0-4)		4	0 3P4W 1 3P3W 2 2P3W 3 1P2W 4 DC
1	DC Genset Check AC Set	Enabled	(0-1)	0	0: Disable 1: Enable
		AC System	(0-3)	0	0 3P4W 1 3P3W 2 2P3W 3 1P2W
		⚠NOTE: if users select power supply type as 4 DC Power, meanwhile,			

No.	Items		Range	Default	Description
					crank disconnect conditions include speed, when this function is enabled, controller will collect AC parameters based on the AC system of DC genset and coordinate with poles of geset to calculate engine speed. Speed sensor cannot be connected, but it warns when AC voltage is abnormal.
2	Generator Poles		(2-64)	4	Generator poles only can be set as an even number, which use to calculate engine speed if there is no speed sensor installed.
3	Generator Voltage On Load		(0-200.0)%	85.0	The setting limit is percentage generator rated voltage. Controller detects unit genset is ready for load stage, if voltage bellows loading voltage, genset will not enter into normal running status.
AC System Setting					
0	PT Set	Enabled	(0-1)	0	0: Disable 1: Enable
1		Primary Volt.	(30-1000)V	100	
2		Secondary Volt.	(30-1000)V	100	
3	Gen Rated Voltage		(30-30000)V	230	Provide standard for the judgment of Gen power over voltage, under voltage and on-load voltage. It is primary voltage if PT is used. When AC system is set as 3P3W, it is line voltage; while it is phase voltage when other AC systems.
4	Gen Rated Frequency		(10.0-75.0)Hz	50.0	Provide standard for the judgment of Gen power over frequency, under frequency and on-load frequency.
5	On Load Frequency		(0-200.0)%	85.0	The setting value is the percentage of Gen rated frequency. When controller detects that Gen frequency is lower than on-load frequency, it will not enter the normal running.
6	Rated Current		(5-6000)A	500	It refers to genset rated current and the standard for load current.

No.	Items	Range	Default	Description
7	CT Ratio	(5-6000)/5	500	The ratio of external connected CT.
8	Rated Power	(0-6000)kW	500	It refers to genset rated power and the standard for load power.
9	AC Over Volt. Alarm 1 Set	(0-200.0) %	120.0	The setting value is the percentage of Gen rated voltage, and the return value, delay value, action can be set.
10	AC Over Volt. Alarm 2 Set	(0-200.0) %	110.0	
11	AC Under Volt. Alarm 1 Set	(0-200.0) %	80.0	
12	AC Under Volt. Alarm 2 Set	(0-200.0) %	84.0	
13	Over Frequency Alarm 1 Set	(0-200.0) %	114.0	The setting value is the percentage of Gen rated frequency, and the return value, delay value, action can be set.
14	Over Frequency Alarm 2 Set	(0-200.0) %	110.0	
15	Under Frequency Alarm 1 Set	(0-200.0) %	80.0	
16	Under Frequency Alarm 2 Set	(0-200.0) %	84.0	
17	Unbalanced Volt.1 Set	(0-200.0) %	10.0	
18	Unbalanced Volt.2 Set	(0-200.0) %	10.0	
19	AC Over Current Alarm 1 Set	(0-200.0)%	120.0	The setting value is the percentage of AC rated current, and the return value, delay value, action can be set.
20	AC Over Current Alarm 2 Set	(0-200.0)%	110.0	
21	Over Power Alarm 1 Set	(0-200.0)%	120.0	The setting value is the percentage of AC rated power, and the return value and delay value can be set.
22	Over Power Alarm 2 Set	(0-200.0)%	110.0	
23	Reverse Power Alarm 1 Set	(0-200.0)%	100.0	The setting value is the percentage of AC rated power, and the return value and delay value can be set.
24	Reverse Power Alarm 2 Set	(0-200.0)%	50.0	
DC Setting				
0	Type Selection	（0-1）	0	0: Not used; 1: Reserved
1	CT	(5-6000) /20	100	
2	CT Position	(0-1)	0	0:Gen side; 1: Reserved
3	Rated Voltage	(12.0-100.0)V	48.0	
4	Rated Current	(1.0-100.0)A	10.0	
5	DC Over Volt.1 Set	(0-200.0)%	114.0	The setting value is the percentage of AC rated voltage, the return value, delay value and action can be set.
6	DC Over Volt.2 Set	(0-200.0) %	110.0	
7	DC Under Volt.1 Set	(0-200.0) %	80.0	
8	DC Under Volt.2 Set	(0-200.0) %	84.0	
9	DC Overcurrent 1Set	(0-200.0)%	114.0	The setting value is the percentage of AC rated current, the return value,
10	DC Overcurrent 2 Set	(0-200.0) %	110.0	

No.	Items		Range	Default	Description
					delay value and action can be set.
Module Setting					
0	Power On Mode		(0-1)	1	0 Auto Mode 1 Manual Mode
1	Module Address		(1-254)	1	The controller address of remote monitoring.
2	Language Select		(0-2)	0	0 Simplified Chinese 1 English 2 Others
3	Password Set		(0-65535)	318	It is used to enter into dvanced parameter settings.
4	Module Mute		(0-2)	0	0 Disabled 1 Mute sound only for keys 2 Mute sound
5	Temperature Unit Selection		(0-1)	0	0 ℃ 1 ℉
6	Pressure Unit Selection		(0-2)	0	0 kPa 1 psi 2 bar
7	Backlight Time		(0-3600)s	300	
8	Contrast Set		(0-10)	5	
9	Comm. Stop Bit Set		(0-1)	1	0 2 bits 1 1 bit
10	Comm. Baud Set		(0-3)	1	0 4800 1 9600 2 19200 3 115200
11	System Configuration		(0-3)	0	0 PV+Gen/Mains+BMS 1 PV+BMS 2 Gen/Mains+BMS 3 Gen/Mains
12	Alarm Event Save Time		(0-10.0)s	1.0	
13	Start Interface Set	Start Interface Enabled	(0-1)	0	0: Disable 1: Enable
		Start Interface Delay	(0-3600)s	2	
Lighting Tower Setting					
0	Light Amount		(0-6)	6	Number of lights that the system can control effectively.
1	Single Light Rated Current		(0.01-99.99)A	4.00	Rated current consumption for each light, which is used to provide standard for judging light fault.

No.	Items		Range	Default	Description
2		Enabled	（0-1）	0	0: Disable 1: Enable
3		Single Light Fault	（0-200）%	75	It is the percentage of rated current for each light.
4	Light Fault Check Set	Return Value	（0-200）%	80	
5		Delay Value	（0-3600）s	5	
6		Action	（0-5）	1	0: Not used; 2: Warn; 2: Light off; 3: Light off shutdown; 4: Shutdown; 5: Indication
7		Enabled	（0-1）	0	0: Disable 1: Enable
8		Reduce Light-on Amount and Brightness Level	（0-100.0）%	20.0	While genset is normal running, when fuel level bellows the setting limit, controller will send fuel level drop and reduce the light-on warning signal. Then controller automatically adjust the max. number /luminance of turned on lights that allowed in this mode.
9	Low Fuel Level Reduce Light Amount	Recover Light-on Amount /Brightness Level	（0-100.0）%	25.0	While genset is normal running, when fuel level exceeds the setting limit after controller sent fuel level drop and reduce the light-on warning signal, the number/ luminance of turned on lights are allowed return to the pre-set total lights/brightness level.
10		Delay	（0-3600）s	30	It is delay time to confirm that fuel level drop turn off the light warning.
11		Allowed Light-on Amount	（0-6）	1	The number of turned on lights that allowed after controller sending fuel level drop turn off the light signal.
12		Allowed light-on luminance	（0-100）%	100	The luminance of turned on lights that allowed after controller sending fuel level drop turn off the light signal.
13	⚠NOTE: This function is invalid when mains power supply is active /system configuration is 1/fuel level does not associate with sensors.				
14	Total Stroke of Mast Lifting		(0-20.0)m	10.0	It is used to calculate the rise/drop time of remote

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No.	Items		Range	Default	Description
					control setting.
15	Total Time of Mast Rise		(0-100)s	10	Time from mast rise begin to end.
16	Total Time of Mast Drop		(0-100)s	10	Time from mast drop begin to end.
17	Max. Time for Single Lifting		(0-100)s	10	Max. time of mast rise/drop for singe lifting.
18	Interval Time for Single Lifting		(0-100)s	10	Pause time when the mast rise has reached the single maximum time.
19	Whole Angle of Tower Head Down		(0-180) °	0	It is used to calculate the head up/down time of remote control setting.
20	Total Time of Tower Head Up		(0-100)s	10	The total time from mast rise begin to end.
21	Total Time of Tower Head Down		(0-100)s	10	The total time from mast drop begin to end.
22	Whole Angle of Tower Head Left/Right Rotate		(0-180) °	0	It is used to calculate the head left/right rotate time of remote control setting.
23	Total Time of Tower Head Left Rotate		(0-100)s	10	The total time from mast left rotate begin to end.
24	Total Time of Tower Head Right Rotate		(0-100)s	10	The total time from mast right rotate begin to end.
25	Light On Delay Set		(0-3600)s	5	Time from remote light-on signal active or light sensor signal active to light on begin.
26	Light Off Delay Set		(0-3600)s	5	Time from remote light-on signal inactive or light sensor signal active to light off begin.
27	Light Output Interval Delay		(0-100)s	2	In Auto mode, time between one light illuminated ends to next light illuminated.
28	Light Luminance	Luminance Set	(0-100)%	100	The value of luminance under control.
		Volt. Value for luminance 100%	(0-10.0)V	10.0	The analog voltage output value corresponds to luminance 100% under control.
		Volt. Value for luminance 0%	(0-10.0)V	0	The analog voltage output value corresponds to luminance 0% under control.
		Time 1 Adjust	(0-1)	0	0: Disable 1: Enable

No.		Items	Range	Default	Description
		Enabled			
		Time 1 Luminance	(0-100)%	50	The luminance value under control at Time 1.
		Time 1 Begin	(0:00-23:59)	18:00	Time begins when luminance under control is at Time 1.
		Time of Duration	(0:00-23:59)	08:00	The time duration when luminance under control at Time 1.
		Time 1 Luminance	(0-100)%	50	The luminance value under control in Time 2.
		Time 1 Begin	(0:00-23:59)	00:00	Time begins when luminance under control is at Time 2.
		Time of Duration	(0:00-23:59)	06:00	The time duration when luminance under control at Time 2.
29	SOC Low Luminance Limit Set	Limit Enabled	(0-1)	0	0: Disable 1: Enable
		Reduce Light-on Amount/Luminance SOC	(0-100)%	50	When battery pack SOC is lower than threshold value, the controller will send SOC low light off/reduce luminance warning; Controller will automatically adjust light-on amount/luminance that allowed.
		SOC Recover Light-on Amount/Luminance SOC	(0-100)%	50	When controller send battery pack SOC low light off/reduce luminance warning, the warning reset will activate when SOC is higher than the recovered SOC, and the light-on amount/luminance will recover to the settings that allowed.
		Delay Time	(0-3600)s	30	It is used to delay and confirm the battery pack SOC low light off/reduce luminance warning.
		Light-on Amount Allowed	(0-6)	6	When controller send battery pack SOC low light off/reduce luminance warning, the light-on amount

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No.	Items		Range	Default	Description
					that allowed.
		Light-on Luminance Allowed	(0-100)%	50	When controller send battery pack SOC low light off/reduce luminance warning, the light-on luminance that allowed.
		NOTE: It is inactive when genset is in normal running status (system configuration includes genset)/Mains is active and normal (system configuration includes Mains).			
Battery Pack Setting					
0	BMS Type Selection		(0-4)	0	0 Not Used 1 Reserved 2 Reserved 3 PACEEX RS485 (Smart Power
0	Comm. Address		(1-254)	1	The communication address of externally connected battery pack.
1	Comm. Failure Action		(0-5)	1	0: Warn; 1: Warn; 2: Light off; 3: Light off shutdown; 4: Shutdown; 5: Indication
2	Light On Inhibit SOC		(0-70)%	4	When battery pack SOC is lower than this value, all lights are off or light on is inhibited.
3	Start Mode Selection		(0-2)	0	0 Economic Mode 1 Normal Mode 2 Power Save Mode
4	Economic Mode (SOC ON)		(0-100)%	5	SOC ON
5			(0-100)%	20	SOC OFF
6	Normal Mode (SOC ON)		(0-100)%	20	SOC ON
7			(0-100)%	60	SOC OFF
8	Power Save Mode (SOC ON)		(0-100)%	20	SOC ON
9			(0-100)%	95	SOC OFF
10	SOC Start Set	Active Range	(0-3)	1	0: Deactivated 1: Activated in Auto Mode 2: Activated in Manual Mode 3: Activated in Manual/Auto Mode
		Low SOC Start Delay	(0-3600)s	30	Time from controller detects battery pack SOC is lower than start limit time to genset start time.
		Max. Time	(1-100)h	4.0	In battery pack SOC low start process, if charging time exceeds the threshold value,

No.	Items		Range	Default	Description
					the engine will stop automatically and charging is also terminated.
		Delay Time for Charging Finished	(0-1000)min	60	Time when controller detects the battery pack SOC is higher than the shutdown limit to genset is going to shut down.
11	Manual Start Set	Shutdown SOC Set	(0-100)%	95	After start in Manual Mode, if battery pack SOC is higher than this value, the engine will shut down.
		Forced Start Alarm Set	(0-1)	0	0: Warn 1: Start Inhibit
	⚠NOTE: It is inactive when system configuration is 1 or 3.				
12	Up Limit of PV Charging (SOC)		(0-100）%	95	PV will stop charging when it reaches the battery pack SOC value.
	⚠NOTE: It is inactive when system is 3.				
PV Setting					
0	PV Type Selection		(0-2)	0	0: Not Used 1: Reserved 2：EPEVER
1	Comm. Address		(1-254)	1	The communication address of externally connected PV.
2	PV Comm. Failure Action		(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
Scheduled Start Setting					
0	Scheduled Start Enabled		(0-1)	0	0: Disable 1: Enable
1	Start Mode		(0-3)	0	0: Daily 1: Weekly 2: Monthly 3: Custom Week
2	Scheduled Start Day		(1-31)	1	
3			(0-6)	0	It can be set when selecting "Weekly Start".
4	Scheduled Start Time		(00:00-23:59）	18:30	Start time
5			(00:00-23:59）	12:00	Operating time
SGE02-4G Setting					
0	SMS Enabled		(0-1)	0	0: Disable 1: Enable
1	Phone Number 1 Enabled		(0-1)	0	0: Disable 1: Enable
2	Phone Number 2 Enabled		(0-1)	0	0: Disable 1: Enable
3	Phone Number 3 Enabled		(0-1)	0	0: Disable 1: Enable
4	Phone Number 4 Enabled		(0-1)	0	0: Disable 1: Enable

No.	Items	Range	Default	Description
5	Phone Number 5 Enabled	(0-1)	0	0: Disable 1: Enable
6	Comm. Failure Action Type	(0-5)	0	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
7	GPRS Enabled	(0-1)	0	0: Disable 1: Enable
8	GPS Enabled	(0-1)	0	0: Disable 1: Enable
9	Flow Save Mode Enabled	(0-1)	0	0: Disable 1: Enable "Disable" is selected, when controller active data varies, the corresponding parameters changed are uploaded. "Enable" is selected, only when controller common alarm, genset status, on/off status, light on/off status varies, the current changed parameters will be uploaded.
10	Base Station Location Enabled	(0-1)	0	0: Disable 1: Enable
Server Setting				
0	Server Port Number	(0-65535)	21318	
1	Server Set	(0-1)	1	
Digital Input Port 1 Setting				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 2 Setting				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive

No.	Items	Range	Default	Description
				1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 3 Setting				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 4 Setting				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 5 Setting				
0	Content Set	(0-86)	16	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*

No.	Items	Range	Default	Description
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	4	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 6 Setting				
0	Content Set	(0-86)	17	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	4	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 7 Setting				
0	Content Set	(0-86)	18	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	4	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 8 Setting				

No.	Items	Range	Default	Description
0	Content Set	(0-86)	19	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	4	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 9 Setting				
0	Content Set	(0-86)	20	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	4	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 10 Setting				
0	Content Set	(0-86)	21	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	4	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication

No.	Items	Range	Default	Description
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 11 Setting (Flex. Sensor 1 Reuse)				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 12 Setting (Flex. Sensor 2 Reuse)				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 13 Setting (Flex. Sensor 3 Reuse)				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on

No.	Items	Range	Default	Description
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
Digital Input Port 14 Setting (Flex. Sensor 4 Reuse)				
0	Content Set	(0-86)	0	See Table 22 *DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1~14*
1	Active Type	(0-1)	0	0: Close to activate 1: Open to activate
2	Active Range	(0-4)	1	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
3	Active Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
4	Input Delay	(0-20.0)s	2.0	Time from detecting input port is active to confirming.
⚠NOTE: For all the above input ports, it is available only when input port content is set to user-defined, the active range, active action, input delay can be set.				
Digital Output Ports Setting				
Digital Output Port 1				
0	Output Port 1 Set	(0-190)	0	表 21 可编程输出口 1-11 可定义内容一览表 See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 2				
0	Output Port 2 Set	(0-190)	0	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 3				
0	Output Port 3 Set	(0-190)	0	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 4				

No.	Items	Range	Default	Description
0	Output Port 4 Set	(0-190)	0	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 5				
0	Output Port 5 Set	(0-190)	0	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 6				
0	Output Port 6 Set	(0-190)	35	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 7				
0	Output Port 7 Set	(0-190)	36	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 8				
0	Output Port 8 Set	(0-190)	37	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 9				
0	Output Port 9 Set	(0-190)	38	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 10				
0	Output Port 10 Set	(0-190)	39	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Digital Output Port 11				
0	Output Port 11 Set	(0-190)	40	See Table 21 *DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11*

No.	Items	Range	Default	Description
1	Active Type	(0-1)	0	0: Normally Open 1: Normally Close
Sensor 1 Setting				
0	Sensor Type	(0-4)	1	See Table 23 *SENSOR SELECTION*
1	Curve Type	(0-13)	8	
2	Open Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
3	Sensor Upper Limit 1 Set	(0-2000) ℃	95	
4	Sensor Upper Limit 2 Set	(0-2000) ℃	98	
5	Sensor Lower Limit 1 Set	(0-2000) ℃	70	
6	Sensor Lower Limit 2 Set	(0-2000) ℃	0	
7	Alarm Active Range	(0-4)	3	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
Sensor 2 Setting				
0	Sensor Type	(0-4)	2	See Table 23 *SENSOR SELECTION*
1	Curve Type	(0-15)	8	
2	Open Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
3	Sensor Upper Limit 1 Set	(0-2000) kPa	0	
4	Sensor Upper Limit 2 Set	(0-2000) kPa	0	
5	Sensor Lower Limit 1 Set	(0-2000) kPa	124	
6	Sensor Lower Limit 2 Set	(0-2000) kPa	103	
7	Alarm Active Range	(0-4)	3	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
Sensor 3 Setting				
0	Sensor Type	(0-4)	3	See Table 23 *SENSOR SELECTION*
1	Curve Type	(0-7)	4	
2	Open Action	(0-5)	1	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
3	Sensor Upper Limit 1 Set	(0-2000) %	0	
4	Sensor Upper Limit 2 Set	(0-2000)%	0	
5	Sensor Lower Limit 1 Set	(0-2000) %	0	
6	Sensor Lower Limit 2 Set	(0-2000)%	10	
7	Alarm Active Range	(0-4)	3	0: Inactive 1: Always active

No.	Items	Range	Default	Description
				2: From start 3 After safety on delay 4: After light on
Sensor 4 Setting				
0	Sensor Type	(0-4)	4	See Table 23 *SENSOR*
1	Curve Type	(0-5)	1	*SELECTION*
2	Open Action	(0-5)	0	0: No 1: Warn; 2: Light off; 3:Light off shutdown; 4: Shutdown; 5: Indication
3	Sensor Upper Limit 1 Set	(0-2000)	100	
4	Sensor Upper Limit 2 Set	(0-2000)	90	
5	Sensor Lower Limit 1 Set	(0-2000)	10	
6	Sensor Lower Limit 2 Set	(0-2000)	20	
7	Alarm Active Range	(0-4)	3	0: Inactive 1: Always active 2: From start 3 After safety on delay 4: After light on
Coolant Temperature (ECU) Setting				
0	High Alarm 1	(0-300) ℃	95	The setting value is the high temperature alarm value, the return value, delay value and action can be set.
1	High Alarm 2	(0-300) ℃	98	
Engine Oil Pressure (ECU) Setting				
0	Lower Alarm 1	(0-1000) kPa	124	The setting value is the low oil pressure alarm value, the return value, delay value and action can be set.
1	Lower Alarm 2	(0-1000) kPa	103	

7.2 DEFINABLE CONTENTS OF DIGITAL OUTPUT PORTS 1~11

Table 21 – Definable Contents of Digital Output Ports 1~11

No.	Items	Descriptions
0	Not used	
1	Air Flap Control	Act on over speed shutdown and emergency stop. Air inflow can be closed.
2	Audible Alarm	Act on warning, shutdown, light off shutdown and light off. An annunciator can be connected externally. If "alarm mute" or "key mute" configurable input port is active, this is prohibited.
3	Louver Control	Act when genset is starting and disconnect when genset is stopped completely.
4	Fuel Pump Control	When fuel level (related sensor data) is lower than the preset fuel pump open threshold value, it closes; while the fuel level is higher than the preset fuel pump close threshold value or exceeds the max. output time, it opens.
5	Fuel Pre-supply Output	Act in the period of "safety on".
6	Generator Excite	Output in start process. If there is no generator frequency during high-speed running, it shall output for 2 seconds again.
7	Pre-lubricate	Act from "pre-heating" to "cranking".
8	Speed Raise Output	Act during warming up time.
9	Speed Drop Output	Act between the period "stop idle" and "failed to stop".
10	Remote Control	Operate via PC monitoring interface or remote communication command.
11	Reserved	
12	Flashlight Output	Output from genset normal running to stop cooling, and output when fails to stop.
13	Sound Warning Output	In auto start mode, 10s before genset start, the output begins; and stops after genset starts.
14	Reserved	
15	Crank Relay	Genset outputs at crank status, disconnects after crank success.
16	Fuel Relay	Act when genset is starting and disconnect when fails to stop.
17	Idle/High-speed Control	Act between "crank-start idle" and "stop idle-fail to stop".
18	Raise Speed Pulse	Act when controller enters warming up setting time (raise speed pulse output time in timer set); used for control parts of ECU raising to normal speed. The default action 0.1s and it is user-defined.
19	Drop Speed Pulse	Act when controller enters stop idle setting time (drop speed pulse output time in timer set); used for control parts of ECU dropping to normal speed. The default action 0.1s and it is user-defined.
20	ETS Solenoid Hold	Act in ETS solenoid hold delay.
21	Crank Success	Act between "safety on running" and "High-speed cooling".
22	Gen Active	Act between "genset normal running" and "high-speed cooling"

No.	Items	Descriptions
23	Gen Normal Output	Act when genset is normally running.
24	Common Alarm	Act when common alarms.
25	Common Light Off Shutdown Alarm	Act when common light off shutdown alarms.
26	Common Shutdown Alarm	Act when common shutdown alarms.
27	Common Warning Alarm	Act when common warning alarms.
28	Common Light Off Alarm	Act when common light off alarms.
29	Reserved	
30	Reserved	
31	Reserved	
32	High Voltage of Power Supply	Act when high voltage alarms.
33	Low Voltage of Power Supply	Act when low voltage alarms.
34	Charge Alternator Failure	Act when charging failure/light off/light off shutdown/shutdown/shutdown alarms or the input port is configured as external charger and charging failure is active.
35	1#Light Control	Used for 1#light output act.
36	2# Light Control	Used for 2#light output act.
37	3# Light Control	Used for 3#light output act.
38	4# Light Control	Used for 4#light output act.
39	5# Light Control	Used for 5#light output act.
40	6# Light Control	Used for 6#light output act.
41	Mast Raise	Output when control genset mast raising acts.
42	Mast Drip	Output when control genset mast dropping acts.
43	Tower Head Left Rotate	Output when control tower head left rotate acts.
44	Tower Head Right Rotate	Output when control tower head right rotate acts.
45	Tower Head Up	Output when control tower head up acts.
46	Tower Head Down	Output when control tower head down acts.
47	Reserved	
48	ECU Shutdown	Suit for engines supporting ECU and used to control ECU shutdown.
49	ECU Power Supply	Suit for engines supporting ECU and used to control ECU power supply.
50	ECU Warning Alarm	Indicate ECU sends a warning signal.
51	ECU Shutdown	Indicate ECU sends a shutdown signal.
52	ECU Comm. Failure Shutdown	Indicate controller can't communicate with ECU.
53	High ECU Coolant Temp.	Output when high ECU coolant temperature warns.
54	High ECU Coolant Temp.	Output when high ECU coolant temperature shuts down.
55	Low ECU Oil Pressure Warn	Output when low ECU oil pressure warns.
56	Low ECU Oil Pressure	Output when low ECU oil pressure shuts down.

No.	Items	Descriptions
	Shutdown	
57	Reserved	
58	Reserved	
59	Input 1 Active	Act when input port 1 is active.
60	Input 2 Active	Act when input port 2 is active.
61	Input 3 Active	Act when input port 3 is active.
62	Input 4 Active	Act when input port 4 is active.
63	Input 5 Active	Act when input port 5 is active.
64	Input 6 Active	Act when input port 6 is active.
65	Input 7 Active	Act when input port 7 is active.
66	Input 8 Active	Act when input port 8 is active.
67	Input 9 Active	Act when input port 9 is active.
68	Input 10 Active	Act when input port 10 is active.
69	Input 11 Active	Act when input port 11 is active.
70	Input 12 Active	Act when input port 12 is active.
71	Input 13 Active	Act when input port 13 is active.
72	Input 14 Active	Act when input port 14 is active.
73	Reserved	
74	Preheat-Crank Begin	Act when genset is from "preheat delay" to "crank begin".
75	Preheat-Crank End	Act when genset is from "preheat delay" to "crank end".
76	Preheat-Warmup End	Act when genset is from "preheat delay" to "warmup end".
77	Preheat-Safety On End	Act when genset is from "preheat delay" to "safety on end delay".
78	Cooling Delay	Act when genset is in high-speed cooling.
79	Reserved	
80	Emergency Stop	Act when emergency stop alarms
81	Fail to Start	Act when start failure alarms.
82	Fail to Stop	Act when stop failure alarms.
83	Under Speed Warn	Act when under speed warns.
84	Under Speed Alarm	Act when under speed light off/light off shutdown/shutdown alarms.
85	Over Speed Warn	Act when over speed warns.
86	Over Speed Alarm	Act when over speed light off/light off shutdown/shutdown alarms.
87	Loss of Speed Signal Warn	Act when loss of speed signal warns.
88	Loss of Speed Signal Alarm	Act when loss of speed signal light off/light off shutdown/shutdown alarms.
89	Reserved	
90	Reserved	
91	AC Over Frequency Warn	Act when AC over frequency warns.
92	AC Over Frequency Alarm	Act when AC over frequency light off/light off shutdown/shutdown alarms.
93	AC Over Voltage Warn	Act when AC over voltage warns.

No.	Items	Descriptions
94	AC Over Voltage Alarm	Act when AC over voltage light off/light off shutdown/shutdown alarms.
95	AC Under Frequency Warn	Act when AC under frequency warns.
96	AC Under Frequency Alarm	Act when AC under frequency light off/light off shutdown/shutdown alarms.
97	AC Under Voltage Warn	Act when AC under voltage warns.
98	AC Under Voltage Alarm	Act when AC under voltage light off/light off shutdown/shutdown alarms.
99	Reserved	
100	Reserved	
101	Over Power Warn	Act when over power warns.
102	Over Power Alarm	Act when over power light off/light off shutdown/shutdown alarms.
103	Reverse Power Warn	Act when reverse power warns.
104	Reverse Power Alarm	Act when reverse power light off/light off shutdown/shutdown alarms.
105	AC Over Current Warn	Act when AC over current warns.
106	AC Over Current Alarm	Act when AC over current light off/light off shutdown/shutdown alarms.
107	Reserved	
108	Mains Normal	Act when mains is normal.
109	Mains Abnormal	Act when mains is abnormal.
110	AC Unbalanced Voltage Warn	Act when AC unbalanced voltage warns.
111	AC Unbalanced Voltage Alarm	Act when AC unbalanced voltage light off/light off shutdown/shutdown alarms.
112	Reserved	
113	Reserved	
114	Flex. Sensor 1 High Warn	Act when Flex. Sensor 1 high warns.
115	Flex. Sensor 1 High Alarm	Act when Flex. Sensor 1 high light off/light off shutdown/shutdown alarms.
116	Flex. Sensor 1 Low Warn	Act when Flex. Sensor 1 low warns.
117	Flex. Sensor 1 Low Alarm	Act when Flex. Sensor 1 low light off/light off shutdown/shutdown alarms.
118	Flex. Sensor 1 Open Warn	Act when Flex. Sensor 1 open warns.
119	Flex. Sensor 1 Open Alarm	Act when Flex. Sensor 1 open light off/light off shutdown/shutdown alarms.
120	Flex. Sensor 2 High Warn	Act when Flex. Sensor 2 high warns.
121	Flex. Sensor 2 High Alarm	Act when Flex. Sensor 2 high light off/light off shutdown/shutdown alarms.
122	Flex. Sensor 1 Low Warn	Act when Flex. Sensor 2 low warns.
123	Flex. Sensor 2 Low	Act when Flex. Sensor 2 low light off/light off

No.	Items	Descriptions
	Alarm	shutdown/shutdown alarms.
124	Flex. Sensor 2 Open Warn	Act when Flex. Sensor 2 open warns.
125	Flex. Sensor 2 Open Alarm	Act when Flex. Sensor 2 open light off/light off shutdown/shutdown alarms.
126	Flex. Sensor 3 High Warn	Act when Flex. Sensor 3 high warns.
127	Flex. Sensor 3 High Alarm	Act when Flex. Sensor 3 high light off/light off shutdown/shutdown alarms.
128	Flex. Sensor 3 Low Warn	Act when Flex. Sensor 3 low warns.
129	Flex. Sensor 3 Low Alarm	Act when Flex. Sensor 3 low light off/light off shutdown/shutdown alarms.
130	Flex. Sensor 3 Open Warn	Act when Flex. Sensor 3 open warns.
131	Flex. Sensor 3 Open Alarm	Act when Flex. Sensor 3 open light off/light off shutdown/shutdown alarms.
132	Flex. Sensor 4 High Warn	Act when Flex. Sensor 4 high warns.
133	Flex. Sensor 4 High Alarm	Act when Flex. Sensor 4 high light off/light off shutdown/shutdown alarms.
134	Flex. Sensor 4 Low Warn	Act when Flex. Sensor 4 low warns.
135	Flex. Sensor 4 Low Alarm	Act when Flex. Sensor 4 low light off/light off shutdown/shutdown alarms.
136	Flex. Sensor 4 Open Warn	Act when Flex. Sensor 4 open warns.
137	Flex. Sensor 4 Open Alarm	Act when Flex. Sensor 4 open light off/light off shutdown/shutdown alarms.
138	Reserved	
139	Reserved	
140	Reserved	
141	PV Fault Output	Act when PV fault occurs.
142	Reserved	
143	Tilt Sensor Alarm	Act when tilt sensor alarms.
144	Reserved	
145	Reserved	
146	Reserved	
147	System In Stop Mode	系统在停机模式时动作。 Act when system is in Stop Mode.
148	System In Manual Mode	Act when system is in Manual Mode.
149	System In Auto Mode	Act when system is in Auto Mode.
150	Reserved	
151 -190	PLC Flag 1-40	PLC flag outputs.

7.3 DEFINABLE CONTENTS OF DIGITAL INTPUT PORTS 1~14

Table 22 − Definable Contents of Digital Input Ports 1~14 (GND Connected (B-) is active)

No.	Items	Description
0	User-defined	Users-defined alarm. Active range: Never: input inactive. Always: input is active all the time. From crank: detecting as soon as start. From safety on: detecting after safety on run delay. Active type: Close to activate; Open to activate. Delay: range (0-20.0s), default 2.0s.
1	Reserved	
2	Alarm Mute	When it is active, can inhibit "Audible Alarm" output in configuration.
3	Alarm Reset	When it is active, can reset shutdown/light off shutdown/light off/warning alarms.
4	60Hz Active	Used for ECU engine with CANBUS, it is 60Hz when activated.
5	Lamp Test	All LED indicator lights on the panel are illuminated when input is active.
6	Panel Key Inhibit	When input is active, other keys on the panel will deactivate except the NVA key. The 🔒 will be displayed in the upper right corner on LCD homepage.
7	Preheat Input	When genset enters preheating status, it will always in preheating status if input is active.
8	Idle Mode	The under voltage/frequency/speed will not in protection.
9	Raise Speed Pulse (ECU)	Used for ECU engine with CANBUS. Suitable for No.35 engine.
10	Drop Speed Pulse (ECU)	Used for ECU engine with CANBUS. Suitable for No.35 engine.
11	Back Idle Pulse Input (ECU)	Used for ECU engine with CANBUS. Suitable for No.35 engine.
12	Auto Stop Disabled	In Auto mode, after genset normal running, the auto stop is disabled.
13	Auto Stat Disabled	In Auto mode, the auto start is disabled when input is active.
14	Scheduled Start Disabled	In Auto mode, the auto start is disabled when input is active.
15	Reserved	
16	1#Light Feedback Input	When input is active, the light of the genset is connected to controller through the feedback input method to realize auto control. Control method see*7.8 LIGHT INPUT CONTROL MODE.*
17	2# Light Feedback Input	
18	3# Light Feedback Input	
19	4# Light Feedback Input	
20	5# Light Feedback Input	
21	6# Light Feedback Input	
22	Reserved	
23	1#Light Control Input	Control method see *7.8 LIGHT INPUT CONTROL MODE.*

No.	Items	Description
24	2# Light Control Input	
25	3# Light Control Input	
26	4# Light Control Input	
27	5# Light Control Input	
28	6# Light Control Input	
29	Reserved	
30	1#Light Absolute Control Input	Control method see *7.8 LIGHT INPUT CONTROL MODE.*
31	2# Light Absolute Control Input	
32	3# Light Absolute Control Input	
33	4# Light Absolute Control Input	
34	5# Light Absolute Control Input	
35	6# Light Absolute Control Input	
36	Remote Light On Input	In Auto mode, can turn on all the lights automatically when input is active.
37	Manual Light On Input Inhibit	In Manual mode, can inhibit light on when input is active.
38	Auto Light On Input Inhibit	In Auto mode, can inhibit light on when input is active.
39	Manual Mast Up Input	In Manual mode, when input is active, mast executes the raising action according to setting time.
40	Manual Mast Down Input	In Manual mode, when input is active, mast executes the dropping action according to setting time.
41	Mast Control Inhibit	When input is active, operate the mast in manual mode is prohibited.
42	Manual Tower Head Left Rotate	When input is active, manually operate tower head is enabled.
43	Manual Tower Head Right Rotate	
44	Manual Tower Head Up Rotate	
45	Manual Tower Head Down Rotate	
46	Manual Tower Head Left Rotate Inhibit	When input is active, manually operate tower head is disabled.
47	Manual Tower Head Right Rotate Inhibit	
48	Manual Tower Head Up Rotate Inhibit	
49	Manual Tower Head	

No.	Items	Description
	Down Rotate Inhibit	
50	Tower Head Control Inhibit	When input is active, manual/auto control tower head is disabled.
51	Reserved	
52	Reserved	
53	Reserved	
54	Reserved	
55	Reserved	
56	Reserved	
57	Auto Mode Input	When input is active, controller operates in auto mode.
58	Auto Mode Inhibit	When input is active, controller isn't able to operate in auto mode. The Auto key and Simulate key on the panel will deactivate.
59	Reserved	
60	Shutdown Alarm Inhibit	All the shutdown alarms are disabled except emergency stop.(i.e. battle mode or override mode).
61	High Temp. Shutdown Input	When safety on delay is over, if the signal is active, genset will shut down immediately. Controller will send shutdown alarm.
62	Low Oil Pressure Shutdown Input	
63	Low Fuel Level Shutdown Input	
64	Low Coolant Level Shutdown Input	
65	Oil Pressure Open Shutdown Input	Connect to sensor digital input, when input is active, controller will send waring alarm.
66	Temp. Open Shutdown Input	
67	High Temp. Warn Input	
68	Low Oil Pressure Warn Input	
69	Low Fuel Level Warn Input	
70	Low Coolant Level Warn Input	
71	Box High Temp. Warn Input	
72	Remote Start	In Auto mode, when input is active, can automatically start genset. While input is inactive, can automatically stop the genset.
73	Reserved	
74	Reserved	
75	Simulate Stop Key	Can externally connected with a button to simulate panel key be pressed.
76	Simulate Manual Key	Can externally connected with a button to simulate panel key be pressed.

No.	Items	Description
77	Reserved	
78	Simulate Auto Key	Can externally connected with a button to simulate panel key be pressed.
79	Simulate Start Key	Can externally connected with a button to simulate panel key be pressed.
80	External Charger Fail	The charging failure of external connected charger alarms, the controller will send a warning alarm when input is active.
81	Tilt Over Threshold Input	The connected detection module alarms, the mast operation is disabled when input is active, and send tilt sensor warning alarm.
82	Mains Input Active	When input port is active, the gen acquisition port of the controller detects the mains voltage, and the controller acts the operation according to the logic of mains power supply
83	DPF Regeneration Inhibit Switch Input	
84	DPF Regeneration Switch Input	
85	Reserved	
86	Reserved	

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7.4 SENSOR SELECTIONS

Table 23 −Sensor Selections

No.	Sensor	Curve Type	Remarks
0	Temperature Sensor	00 Not used 01 Custom Resistance Type 02 Custom Current Type (customized) 03 Custom Voltage Type (customized) 04 VDO 05 CURTIS 06 DATCON 07 SGX 08 SGD 09 SGH 10 PT100 11 SUSUKI 12 PRO 13 Reserved	Defined resistance's range is (0~6)kΩ. Factory default is SGD sensor. The temperature curve is set via PC software/controller. Flexi. sensor 1-3 display need to be customized.
1	Pressure Sensor	00 Not used 01 Custom Resistance Type 02 Custom Current Type (customized) 03 Custom Voltage Type (customized) 4 VDO 10Bar 5 CURTIS 6 DATCON 10Bar 7 SGX 8 SGD 9 SGH 10 VDO 5Bar 11 DATCON 5Bar 12 DATCON 7Bar 13 SUSUKI 14 PRO 15 Reserved	Default resistance type; Defined resistance's range is (0~6)kΩ. Default is SGD sensor. The pressure curve is set via PC software/controller. Flexi. sensor 1-3 display need to be customized.

No.	Sensor	Curve Type	Remarks
2	Level Sensor	00 Not used 01 Custom Resistance Type 02 Custom Current Type (customized) 03 Custom Voltage Type (customized) 04 SGH 05 SGD 06 Reserved 07 Reserved	Defined resistance's range is (0~6)kΩ. Factory default is SGD sensor. The level sensor curve is set via PC software/controller. Flexi. sensor 1-3 display need to be customized.
3	Light Sensor	00 Not used 01 Custom Resistance Type 02 Custom Current Type (customized) 03 Custom Voltage Type (customized)	Defined resistance's range is (0~6)kΩ. The sensor curve is set via PC software/controller. Flexi. sensor 1-3 display need to be customized.

7.5   CONDITIONS OF CRANK DISCONNECT SELECTION

Table 24 – Crank Disconnect Conditions Selection For AC Genset

No.	Setting Description
0	Frequency
1	Speed
3	Oil pressure

Table 25 – Crank Disconnect Conditions Selection For DC Genset

No.	Setting Description
0	DC Voltage
1	Speed
3	Oil pressure

a)   There are 4 conditions to make starter disconnected with engine, that is, DC voltage, speed, frequency and oil pressure. They all can be used separately. We recommend that engine oil pressure should be used with speed and generator frequency together, in order to make the starter motor separated with engine immediately.

b)   Speed sensor is the magnetic equipment which is installed in starter for detecting flywheel teeth.

c)   When it is set as speed sensor, users must ensure that the number of flywheel teeth is the same as setting, otherwise, "over speed stop" or "under speed stop" may be caused.

d)   If genset without magnetic sensor, please don't select corresponding items, otherwise, "start fail" or "loss speed signal" may be caused.

e)   If genset without oil pressure sensor, please don't select corresponding items.

f)   If generator frequency is not selected in crank disconnect setting, the controller will not collect and display the relevant power generated (can be applied to the pump unit); if speed is not selected in crank disconnect setting, the speed displayed on controller is calculated by generating signals.

7.6 SYSTEM CONFIGURATION SETTING

The controller supports 4 types of system configuration, they are system configuration 0, system configuration 1, system configuration 2 and system configuration 3 (See Table 3), and they can be selected on module setting page.

When system configuration selects 0/1/2, if PV-BMS all-in-one mode is selected onsite, users need to select the corresponding model on PV setting page. If the split mode (PV converter + battery pack) is used onsite, users need to select the corresponding model on PV setting page and battery pack setting page respectively. Meanwhile, ensure that the communication rules of the two are the same.

When system configuration selects 2, users only need to select the corresponding model in type options on battery pack setting page.

7.7 GENSET WORKING MODE SETTING

Normal mode, economic mode and power save mode are provided, which are applied for system configuration of genset and energy storage.

The start/stop SOC value in three modes can be set on battery pack setting page. The controller obtains the real-time SOC of the battery pack and determines whether it is lower than the startup SOC value or higher than the stop SOC value to control the genset.

When the mains supply is activated, the genset stops.

7.8 LIGHT INPUT CONTROL MODE

ALC736/ALC736-4G controller can define light input port as 3 modes: feedback input, control input and major control input.

For the light that configured as feedback input mode, controller automatically controls the output of the light according to the control logic, and the indicator on the panel shows the light on/off based on the light input port status.

For the light that configured as control input, controller controls the output of the light according to the light input port status, and the indicator on the panel shows the light on/off based on the light input port status; and the indicator on the panel shows the light on/off based on the light output port status.

For the light that configured as major control input, the light output open/close only judged by the light input port status, and the indicator on the panel shows the light on/off based on the light input port status. Under this mode, controller cannot automatic control the light on/off.

⚠ NOTE: Recommend users set all lights as the same control mode.

7.9 BATTERY LOW VOLTAGE START MODE

This feature is designed to ensure that the battery has enough power to start the unit. When the battery voltage has fallen below the set value, the unit cranks for a while and charge the battery; after running for a while (delay time after fully charged), the unit will stop automatically after the battery voltage arrives at the pre-set fully charged voltage limit. If starting battery damaged and cannot been full charged, controller will force the unit to stop after the pre-set maximum charging time to prevent accidents.

The working mode can be set as Invalid, Manual Mode Active, Auto Mode Active, Auto And Manual Mode Active.

7.10 BATTERY PACK LOW SOC START (INVALID WHILE MAINS SUPPLY POWER)

This feature is designed to ensure that battery has enough power to meet the setting threshold value. When SOC is lower than startup SOC setting value, the unit cranks for a while and charge the battery; after running for a while (delay time after fully charged) to ensure that the battery is fully charged, the unit will stop automatically after the SOC rises to the setting stop SOC value.

The working mode can be set as Invalid, Manual Mode Active, Auto Mode Active, Auto and Manual Mode Active.

7.11 SCHEDULED START

Scheduled start mode can be set as daily, weekly, monthly and custom daily start time in one week. Users can set the start time, run duration, detailed one day to start for each month/week, or custom weekday start or not start functions. If the run duration is set as 00:00, then the unit will not be started.

7.12 SUNRISE/SUNSET SETTING

Users can select corresponding city or define city's information (longitude, latitude and time zone) via PC software Sunrise/set settings and click Sunrise/set Massage to download the information into controller; then controller will run in auto sunrise/sunset mode.

⚠ NOTE：**The information can be configured by software via PC only.**

7.13 BATTERY LOW SOC REDUCE LIGHT NUMBER/LUMINANCE (INVALID WHILE MAINS SUPPLY IS NORMAL)

System is able to reduce the light number/luminance at low SOC by setting SOC Low Luminance Limit.

7.14 LOW FUEL LEVEL REDUCE LIGHT NUMBER (INVALID WHILE MAINS SUPPLY IS NORMAL)

System is able to reduce the light number/luminance at low fuel level by setting Low Fuel Level reduce light number.

7.15 REALIZE MAINS SUPPLY POWER VIA EXTERNAL DIGITAL INPUT PORT (INVALID IN SYSTEM CONFIGURATION 1)

This function allows external connected mains to supply power for the unit. If mains are active, whatever working mode the unit states (normal mode, economic mode and power save mode), genset will stop (genset not in standby status) and not allowed to start. At the moment, mains active/reactive/apparent power and power factor are calculated by the controller, meanwhile, controller overall controls the light based on the mains status.

Controller uses the same port as the generator sampling voltage to sampling mains voltage. If use this function, mains/generator switch function must be controller external of the controller. When the input port

that configured as 82 Mains Supply Active is active, controller will judge the detecting voltage is mains supply.

7.16   LIGHT FAULT DETECTION

In light on status, the controller can calculate the theoretical operating current and collect the actual load current according to the rated current, light on amount and luminance. It also calculates the ratio of load current and theoretical operating current, and compares this ratio against a setting fault threshold. If this percentage falls below the setting value, an alarm will be triggered.

7.17   LUMINANCE PERIOD ADJUSTMENT

The luminance in different periods by can be realized by adjusting the time period in light setting. Period 1 and Period 2 is available at present.

For example, enable the period adjustment function in setting and set the luminance of Period 1 to 50%, the start time to 00:00, and the duration to 02:00; set the luminance of Period 2 to 100%, the start time to 03:00, and the duration to 06:00.

During the running process, the controller will adjust the output luminance of the light to 50% in the time interval of Period 1 and 100% in the time interval of Period 2. In other time intervals, the controller outputs the light luminance according to the setting.

⚠   **NOTE: The specific luminance output is related to the low fuel level reducing light number and SOC low luminance limit. Details see the description in parameter setting.**

8 SENSOR SETTING

When sensors are reselected, the sensor curves will be transferred into the standard value. For example, if temperature sensor is SGH (120°C resistor type), its sensor curve is SGH (120°C resistance type); if select the SGD (120°C resistance type), the temperature sensor curve is SGD curve.

When there is difference between standard sensor curves and used sensor curves, users can select custom sensor curve and input self-defined sensor curve.

When the sensor curve is inputted, X value (resistor) must be inputted from small to large, otherwise, mistake occurs.

If sensor type is selected as "none", sensor curve is not working.

If the corresponding sensor has alarm switch only, users must set this sensor as "none", otherwise, shutdown or warning may occur.

The headmost or backmost values in the vertical coordinates can be set as the same as below.
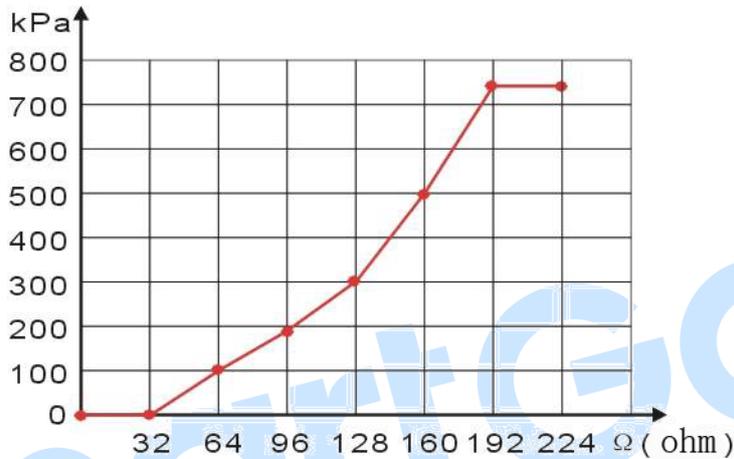
Fig. 4 –Sensor Curve Diagram

Table 26 - Normal Pressure Unit Conversion Form

Item	N/m^2 / pa	kgf/cm^2	bar	1b/in^2.psi
1Pa	1	1.02×10^{-5}	1×10^{-5}	1.45×10^{-4}
1kgf/cm^2	9.8×10^4	1	0.98	14.2
1bar	1×10^5	1.02	1	14.5
1psi	6.89×10^3	7.03×10^{-2}	6.89×10^{-2}	1

9 COMMISSIONING

Please make the under procedures checking before commissioning,

— Ensure all the connections are correct and wires diameter is suitable.

— Check system configuration, PV type (if configured) setting, battery pack type (if configured) setting are correct;

— Check PV (if configured) communication address or battery pack (if configured) communication address is correct;

— Ensure that the controller DC power has fuse, controller's positive and negative connected to start battery are correct;

— Emergency stop input is connected to the positive of the starting battery through the normal closing point of the emergency stop button and fuse (suitable for system configuration 0/2/3);

— Take proper action to prevent engine to crank disconnect (e. g. Remove the connection wire of fuel valve). If checking is OK, make the start battery power on; choose manual mode and controller will executive routine (suitable for system configuration 0/2/3);

— Set controller under manual mode, press "start" button, genset will start. After the cranking times as setting, controller will send signal of *Start Fail*; then press "stop" to reset controller(suitable for system configuration 0/2/3);

— Recover the action of prevent engine start (e. g. Connect wire of fuel valve), press start button again, genset will start. If everything goes well, genset will normal run after idle running (if idle run be set). During this time, please watch for engine's running situations and AC generator's voltage and frequency. If abnormal, stop genset running and check all wires connection according to this manual (suitable for system configuration 0/2/3);

— Set inhibit light on SOC value on battery pack setting page or PC software higher than current real-time SOC value, and set controller as manual mode, then press light on key, the light is not illuminated (suitable for system configuration 0/2/1);

— Set inhibit light on SOC value on battery pack setting page or PC software lower than current real-time SOC value, and set controller as manual mode, then press light on key, the light is illuminated (suitable for system configuration 0/2/1);

Any other questions please contact technical personnel of factory in time.
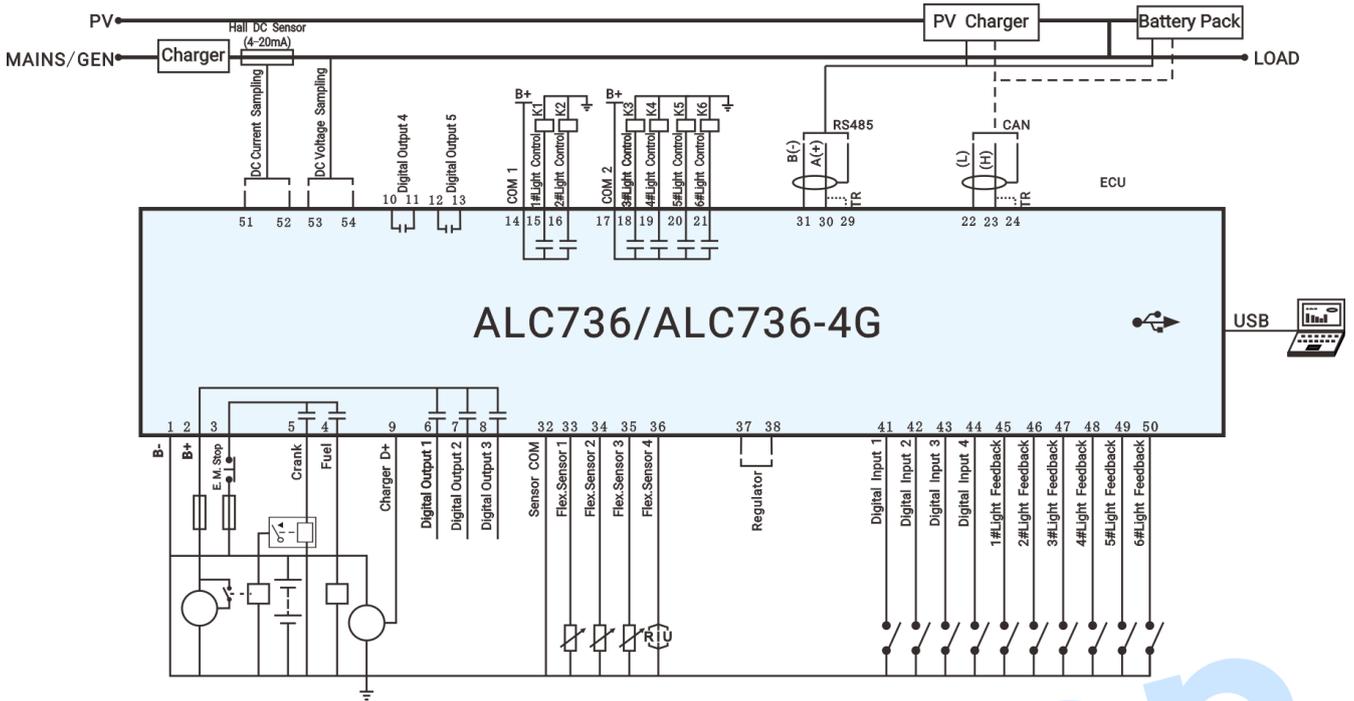
10 TYPICAL APPLICATION

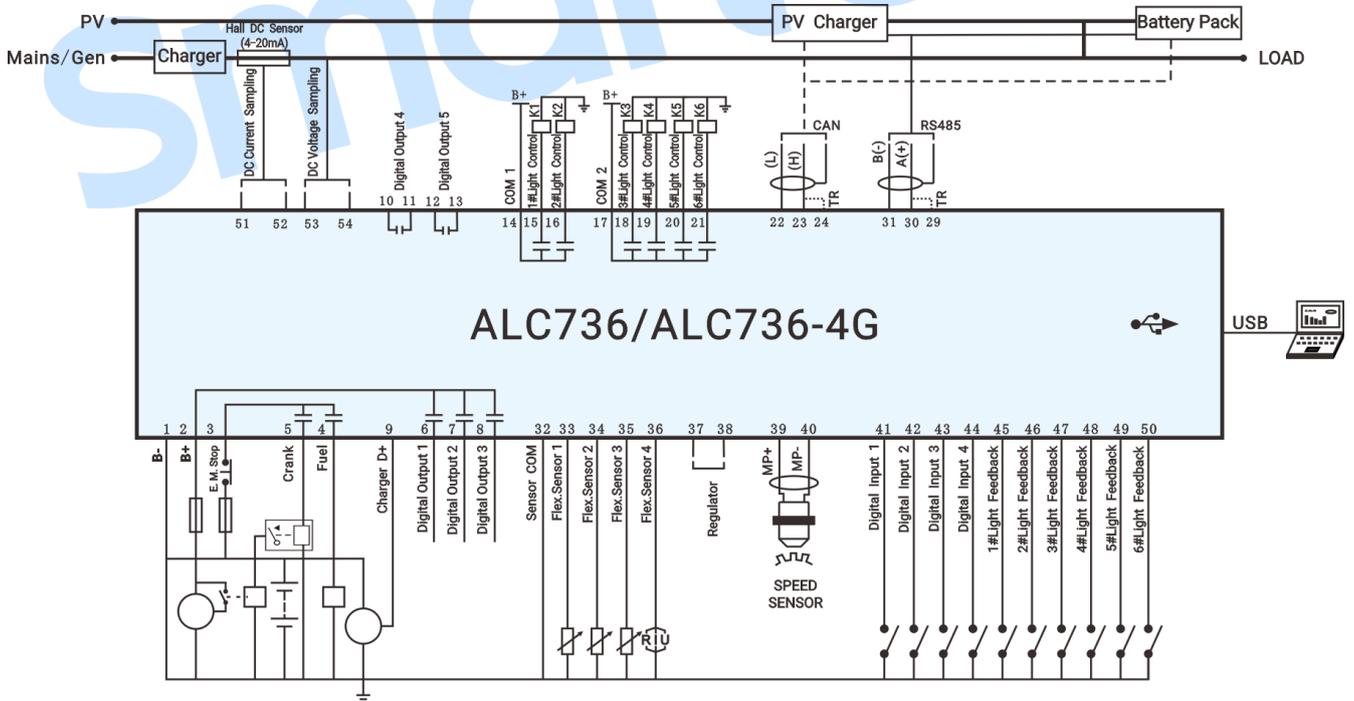**Fig. 5 – System Configuration 0 ECU Engine Set Application (Split Mode)**

Fig. 6 – System Configuration 0 Non-ECU Engine Set Application (Split Mode)
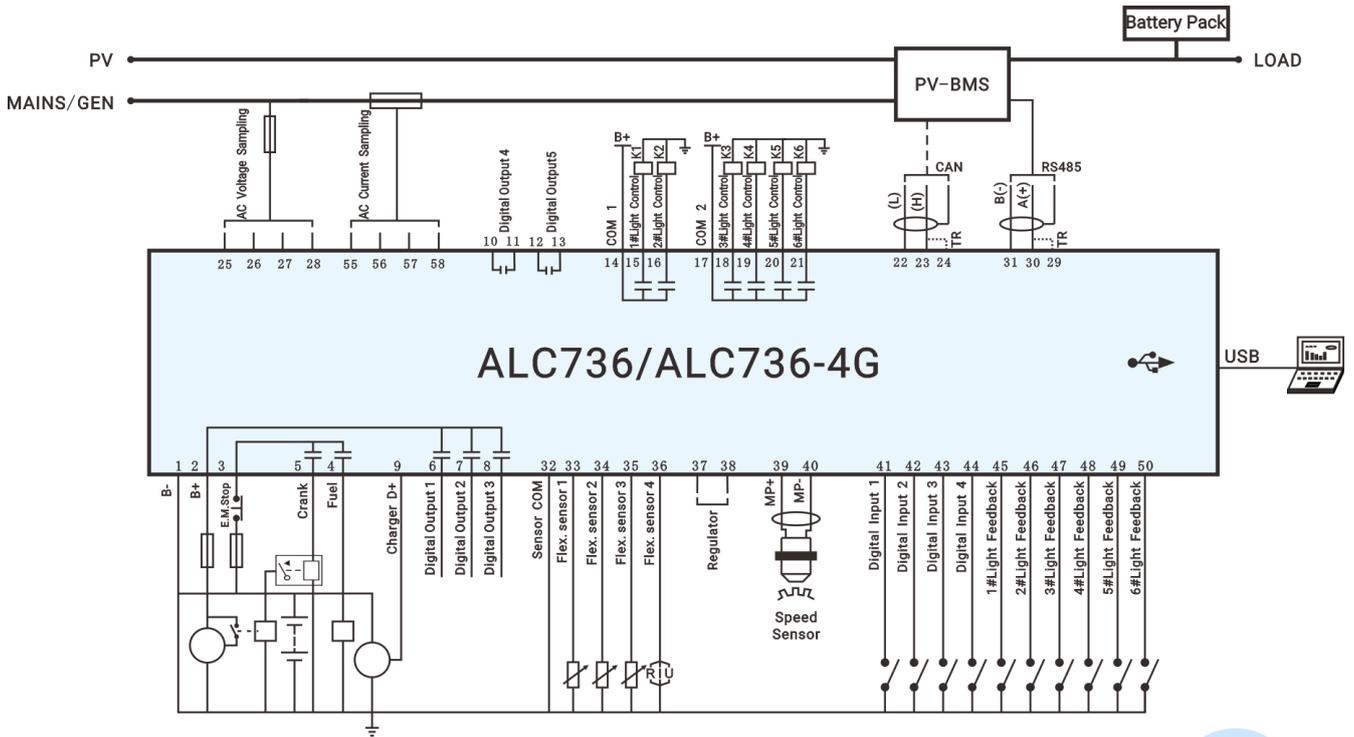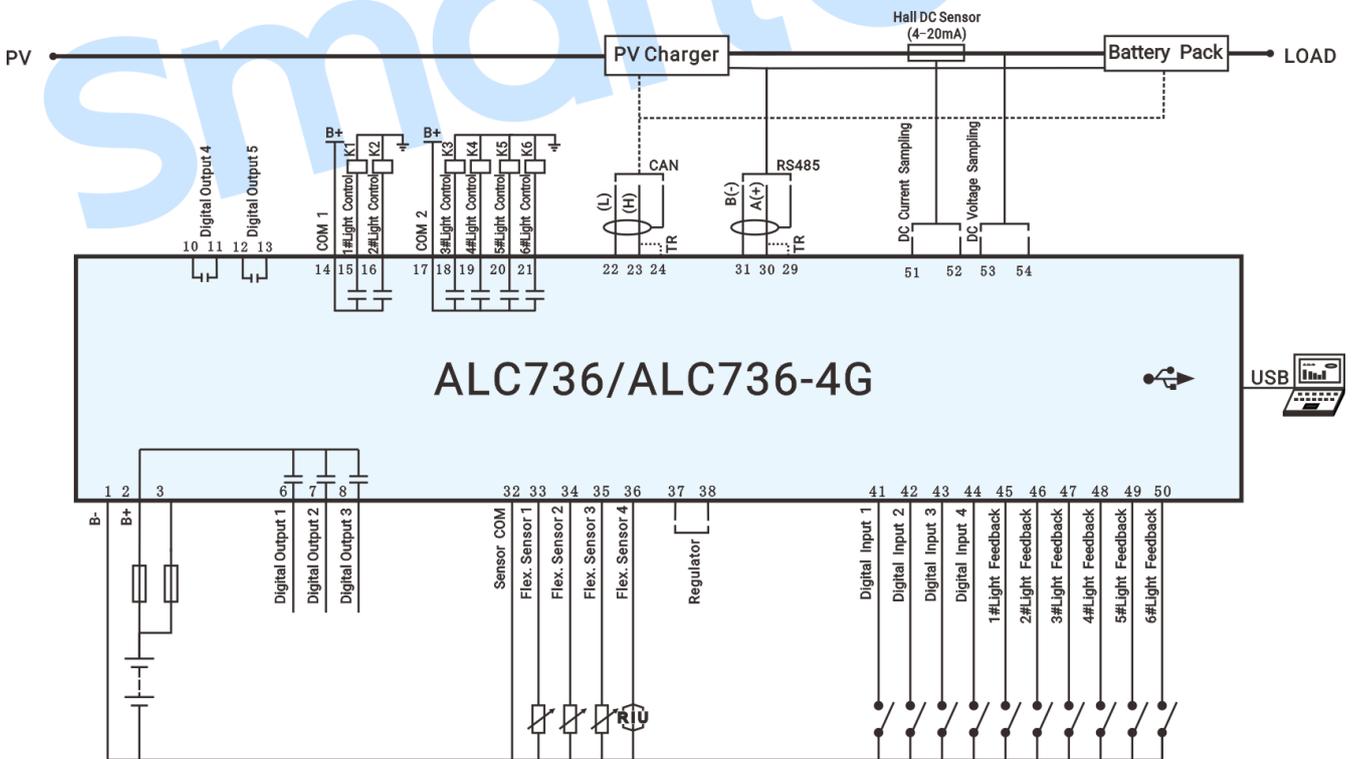
Fig. 7 – System Configuration 0 Application (PV-BMS)
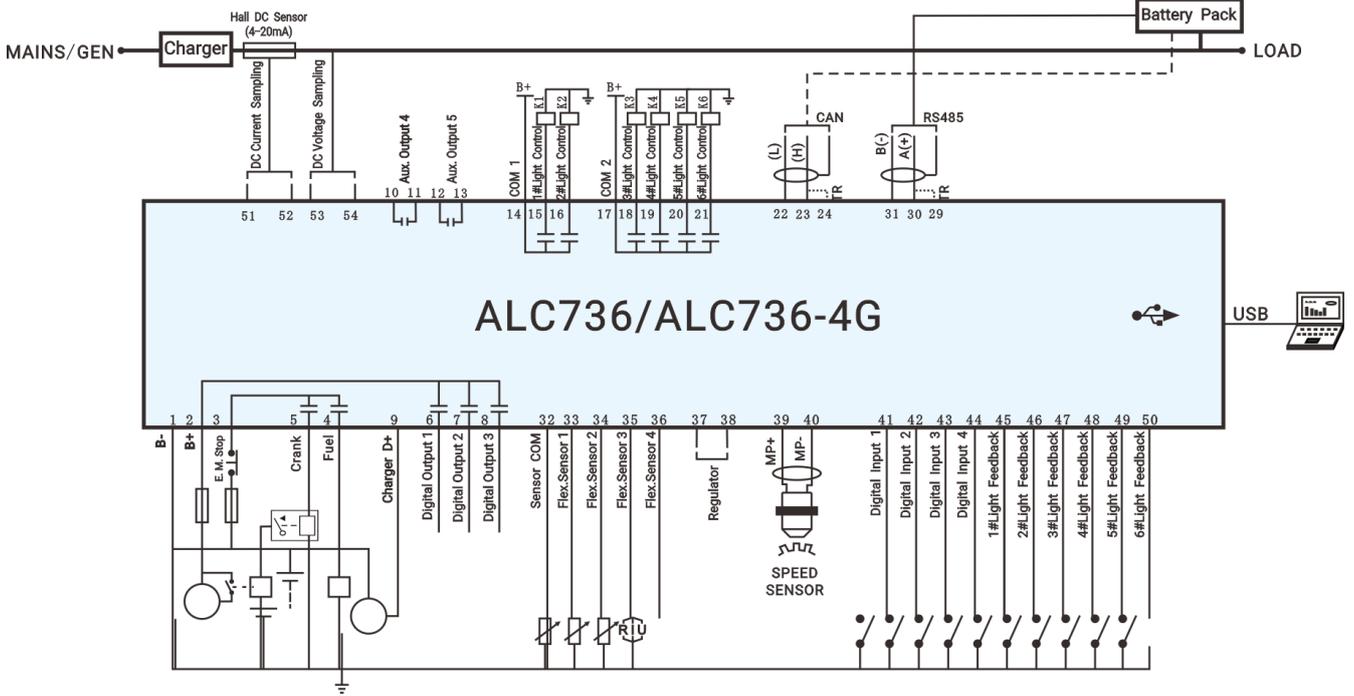

Fig.8 – System Configuration 1 Application

SmartGen

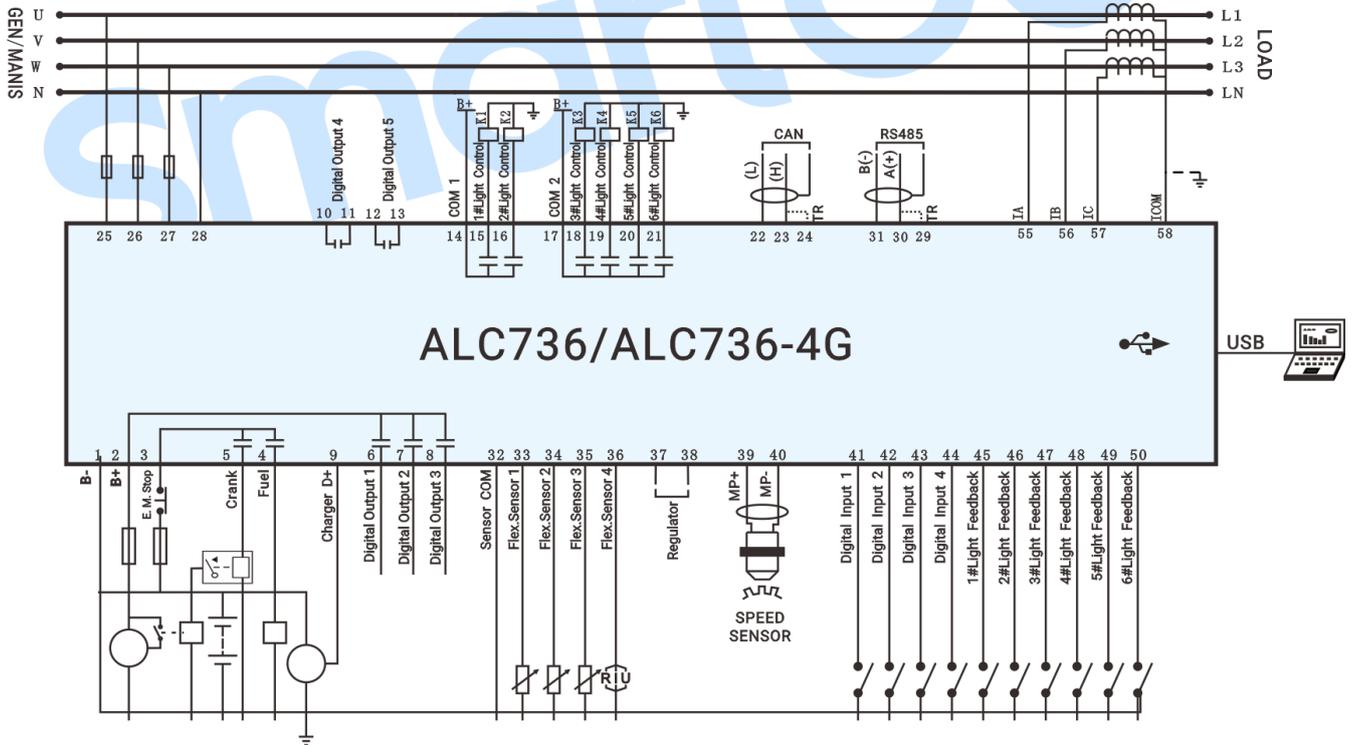**Fig. 9 – System Configuration 2 Application**

Fig. 10 – System Configuration 3 AC Unit Application (3P4W)

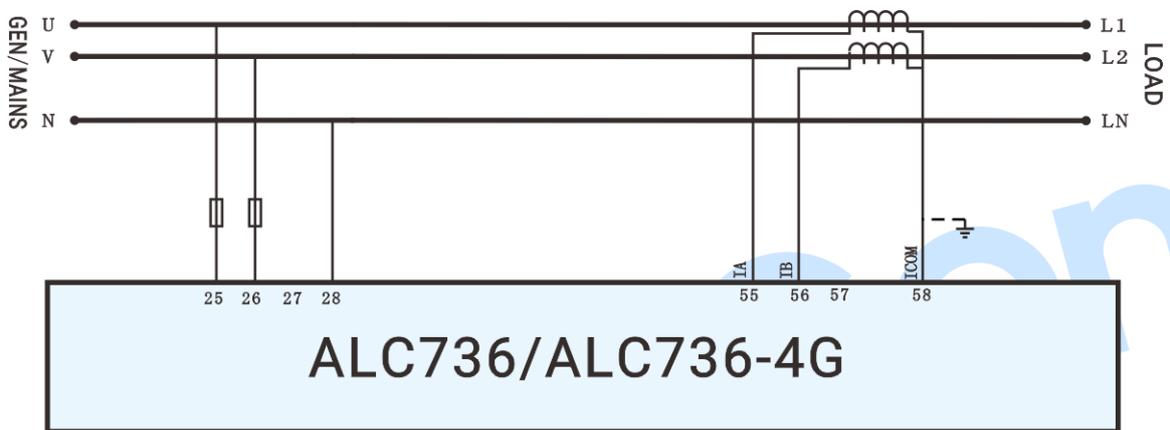**Fig. 11 − System Configuration 3 AC Unit Application (3P3W)**

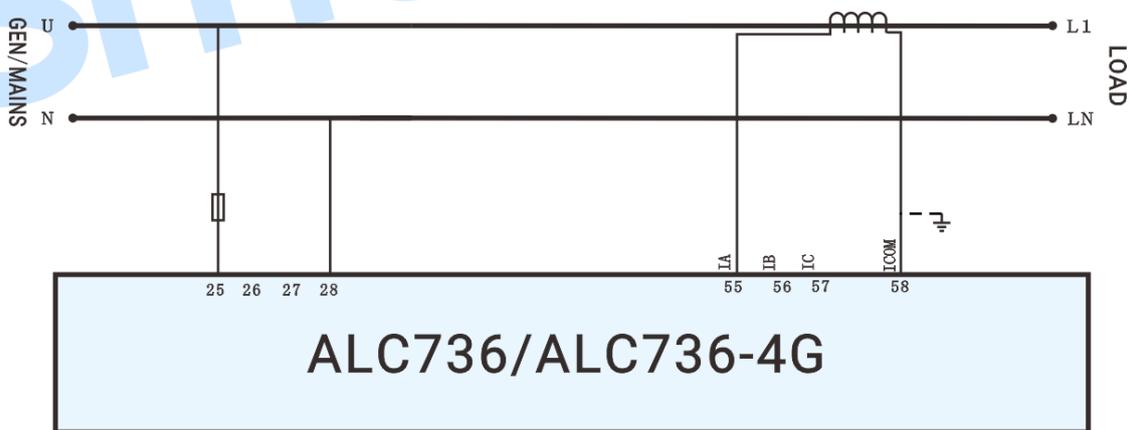**Fig. 12 − System Configuration 3 AC Unit Application (2P3W)**

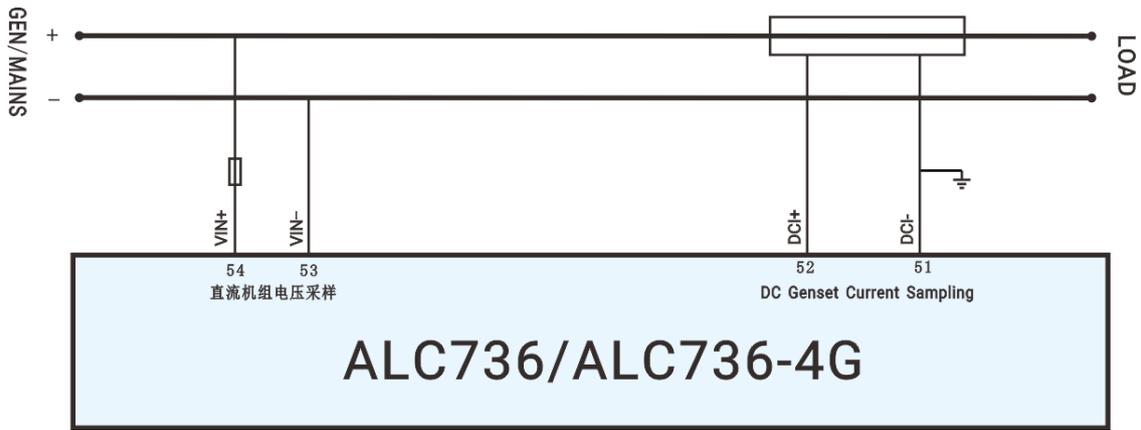**Fig. 13 − System Configuration 3 AC Unit Application (1P2W)**

Fig. 14 – System Configuration 3 DC Unit Application

⚠ **NOTE 1:** If external lamps needed to be connected, users can configure 6 of the relay output ports 1~11 as 1#~6# lamp output, simultaneously, select the corresponding external expand capacity relay based on the load power.

⚠ **NOTE 2:** Non-ECU engine can configure the flexible sensor 1-4 separately as engine temperature, oil pressure and fuel level to realize the routine controlling of the genset.

⚠ **NOTE 3:** ECU engine set can configure flexible sensor 1 as fuel level, and the other 3 sensors are freely set to realize the routine controlling of the genset.

⚠ **NOTE 4:** While controlling of the DC genset, users need to select the appropriate DC Hall sensors based on the output power and current of the lighting tower unit.

⚠ **NOTE 5:** While controlling of the DC genset, related generator over/under frequency alarms are inactive.

11 INSTALLATION

11.1 SGE02 EXPANSION MODULE

11.1.1 4G ANTENNA PORT

Connect 4G antenna with 4G port of SGE02.
Antenna port: 50Ω/SMA connector.

11.1.2 GPS ANTENNA PORT

By using GPS function, connect GPS antenna and GPS port of SGE02.

⚠NOTE: GPS antenna needs to be put outdoor, otherwise location information is not correct or users cannot obtain location information.

Antenna port: 50Ω/SMA connector, active antenna.

Fig.15 – ALC736-4G Antenna Connection
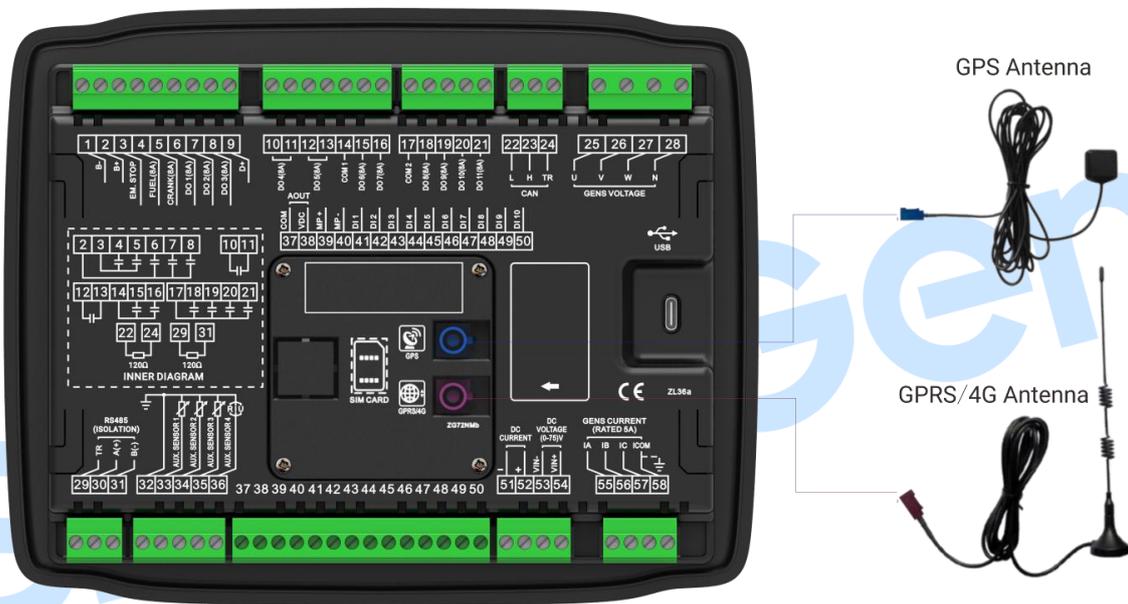
11.1.3 SIM CARD INSTALLATION

Insert 4G SIM card, controller will connect the server by wireless mobile network.

⚠NOTE: This module supports Netcom 4G wireless network, applying standard SIM card (dimension 25mmx15mm); if controller displays ⊠ mark, it means SIM card is not in, or SIM card is poor contact.

Installation Step is as below.

Fig.16– SIM Card Installation Method

11.2 FIXING CLIPS

— This controller is built-in design and is fixed by clips when installation.
— Withdraw the fixing clip screw (turn anticlockwise) until it reaches proper position.
— Pull the fixing clip backwards (towards the back of the module) ensuring four clips are inside their allotted slots.
— Turn the fixing clip screws clockwise until they are fixed on the panel.
— Care should be taken not to over tighten the screws of fixing clips.

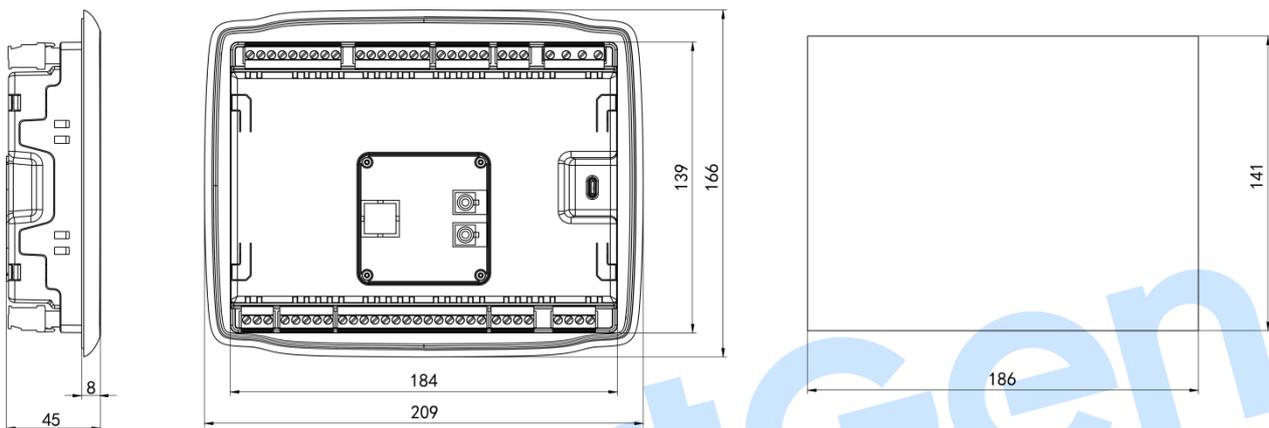## 11.3 CASE DIMENSIONS AND CUTOUT SIZE

Unit: mm

Fig.17– Case Dimension and Cutout Size

ALC736/ALC736-4G Hybrid Energy Lighting Tower controller can suit for (8~35) VDC battery voltage environment. Battery negative electrode must be connected with the starter shell stably. The wire area connecting controller power B+/B- with negative and positive electrodes of battery mustn't be less than 2.5mm². If floating charger is configured, please firstly connect output wires of charger to battery's positive and negative directly, and then connect wires from battery's positive and negative to controller's positive and negative input ports separately in order to prevent the charger from disturbing the controller's normal working.

— **Speed Sensor Input:** Speed sensor is the magnetic equipment installed in the engine body to detect flywheel teeth number. The wires used to connect with the controller shall be 2-core shielding wires. The shielding layer shall be connected to No.40 terminal on the controller, and meanwhile the other terminal shall be hanging in the air. Another two signal wires shall be connected to No.39 and No.40 terminals on the controller. The output voltage of the speed sensor shall be within (1~24) VAC (effective value) in the range of full speed and 12VAC is recommended (at rated speed). As to speed sensor installation, the sensor can firstly be spun to the connection flywheel, then invert 1/3 lap, and finally tighten up the screw on the sensor.
— **Output and Expand Relays:** All controller outputs are relay contact outputs. If the expansion relay is needed, freewheel diode (relay coil is DC) and resistor and capacitor circuit (relay coil is AC) shall be added to the two ends of the relay coils in order to prevent disturbing the controller or others equipment.
— **Alternate Current Input:** ALC736/ALC736-4G Hybrid Energy Lighting Tower controller current input must be connected to outside current transformer. The secondary side current of the current transformer must be 5A and at the same time current transformer phase and input voltage phase must be correct, otherwise the collected current and active power may not be correct.

- **Withstand Voltage Test:** When controller had been installed in control panel, if high voltage test is needed, please disconnect controller's all terminal connections, in order to prevent high voltage into controller and damage it.

⚠**NOTE:** When there is load current, transformer's secondary side is prohibited open circuit.

12 SMS MESSAGE ALARM AND REMOTE CONTROL

12.1 SMS MESSAGE ALARM

When controller detects alarms, it will send message automatically to the pre-set telephone numbers.

⚠**NOTE: All shutdown alarms, light off shutdown and light off alarms can send messages to the pre-set telephone numbers automatically. For warning alarms, controller will send messages to the phone according to user configurations.**

12.2 SMS MESSAGE REMOTE CONTROL

Users send message commands to wireless communication module, then controller will execute related actions based on message commands, and return related execution information. Controller only executes the message commands from its own pre-set phone numbers. Detailed message commands are as below.

Table 27 SMS Message Order List

No.	Message Command	Message Return Information	Description
0	SMS MANUAL MODE	SMS MANUAL MODE OK	Set to manual mode
1	SMS AUTO MODE	SMS AUTO MODE OK	Set to auto SMS light on mode
2	SMS DETAIL	Return information can be set by PC software.	Obtain genset details
3	SMS OPEN LIGHT	SMS OPEN LIGHT OK	In SMS light on mode, light on
4	SMS CLOSE LIGHT	SMS CLOSE LIGHT OK	In SMS light on mode, light off

⚠**NOTE: Users shall send commands according to the contents of above table. All letters shall be capital.**

⚠**NOTE: SMS DETAIL returned detailed information includes: working mode, auto light on mode, genset working mode, AC voltage, AC current, DC voltage, DC current, Gen frequency, active power, apparent power, power factor, battery voltage, D+ voltage, water temperature, oil pressure, fuel level, speed, accumulated running time, genset status, light on status and light on amount.**

13 CONNECTIONS OF CONTROLLER WITH J1939 ENGINE

13.1   CUMMINS QSL9

Suitable for CM850 engine control module.

Table 28 50-Pin Connector

Terminals of controller	50 pins connector	Remark
Fuel Relay Output	39	
Starting relay output	-	Connected as starter coil directly.

Table 29 9-Pin Connector

Terminals of controller	9 pins connector	Remark
CAN_SCR	SAE J1939 shield-E	CAN communication shielding line (connected with ECU terminal only);
CAN(H)	SAE J1939 signal-C	Using impedance 120Ω connecting line;
CAN(L)	SAE J1939 return-D	Using impedance 120Ω connecting line.

Engine type: Cummins-CM850.

13.2   CUMMINS QSX15-CM570

It is suitable for CM570 engine control module. Engine type is QSX15 etc.

Table 30 50-Pin Connector

Terminals of controller	50 pins connector	Remark
Fuel Relay Output	38	Injection switch;
Starting relay output	-	Connected to starter coil directly.

Table 31 9-Pin Connector

Terminals of controller	9 pins connector	Remark
CAN_SCR	SAE J1939 shield-E	CAN communication shielding line (connected with ECU terminal only);
CAN(H)	SAE J1939 signal-C	Using impedance 120Ω connecting line;
CAN(L)	SAE J1939 return-D	Using impedance 120Ω connecting line.

Engine type: Cummins QSX15-CM570.

13.3 CUMMINS QSM11

Table 32 Engine OEM Connector

Terminals of controller	OEM connector of engine	Remark
Fuel Relay Output	38	
Starting relay output	-	Connected with starter coil directly;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	46	Using impedance 120Ω connecting line;
CAN(L)	37	Using impedance 120Ω connecting line.

Engine type: Common J1939.

13.4 CUMMINS QSZ13

Table 33 Engine OEM Connector

Terminals of controller	OEM connector of engine	Remark
Fuel Relay Output	45	
Starting relay output	-	Connected to starter coil directly;
Aux. output 2	16&41	Set as idling speed control; (N/C) output; by expansion relay, make 16&41 close as the controller is running;
Aux. output 3	19&41	Set as pulse speed raising control; (N/O) output; by expansion relay, make 19&41 close for 1s as the controller is entering warming-up time;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	1	Using impedance 120Ω connecting line;
CAN(L)	21	Using impedance 120Ω connecting line.

Engine type: Common J1939.

13.5 DETROIT DIESEL DDEC III/IV

Table 34 Engine CAN Port

Terminals of controller	CAN port of engine	Remark
Fuel Relay Output	Expansion 30A relay, proving battery voltage for ECU.	
Starting relay output	-	Connected to starter coil directly;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	CAN(H)	Using impedance 120Ω connecting line;
CAN(L)	CAN(L)	Using impedance 120Ω connecting line.

Engine type: Common J1939.

13.6 DEUTZ EMR2

Table 35 F Connector

Terminals of controller	F connector	Remark
Fuel Relay Output	Expansion 30A relay, proving battery voltage for terminal 14; Fuse is 16A.	
Starting relay output	-	Connected to starter coil directly;
-	1	Connected to battery negative;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	12	Impedance 120Ω connecting line is recommended;
CAN(L)	13	Impedance 120Ω connecting line is recommended.

Engine type: VOLVO-EDC4.

13.7 JOHN DEERE

Table 36 21-Pin Connector

Terminals of controller	21 pins connector	Remark
Fuel Relay Output	G, J	
Starting relay output	D	
CAN_SCR	-	CAN communication shielding line;
CAN(H)	V	Using impedance 120Ω connecting line;
CAN(L)	U	Using impedance 120Ω connecting line.

Engine type: JOHN DEERE.

13.8 MTU MDEC

Suitable for MTU engines 2000 series, 4000series.

Table 37 X1 Connector

Terminals of controller	X1 Connector	Remark
Fuel Relay Output	BE1	
Starting relay output	BE9	
CAN_SCR	E	CAN communication shielding line (Connect with one terminal only);
CAN(H)	G	Using impedance 120Ω connecting line;
CAN(L)	F	Using impedance 120Ω connecting line.

Engine type: MTU-MDEC-303.

13.9 MTU ADEC (SMART MODULE)

It is suitable for MTU engine with ADEC (ECU8) and SMART module.

Table 38 ADEC (X1 Port)

Terminals of controller	ADEC (X1 port)	Remark
Fuel Relay Output	X1 10	X1 9 shall connect negative of battery.
Starting relay output	X1 34	X1 33 shall connect negative of battery.

Table 39 SMART (X4 Port)

Terminals of controller	SAM (X4 port)	Remark
CAN_SCR	X4 3	CAN communication shielding line;
CAN(H)	X4 1	Using impedance 120Ω connecting line;
CAN(L)	X4 2	Using impedance 120Ω connecting line.

Engine type: MTU-ADEC.

13.10 MTU ADEC (SAM MODULE)

Suitable for MTU engine with ADEC (ECU7) and SAM module.

Table 40 ADEC (X1 Port)

Terminals of controller	ADEC (X1 port)	Remark
Fuel Relay Output	X1 43	X1 28 shall connect negative of battery.
Starting relay output	X1 37	X1 22 shall connect negative of battery.

Table 41 SAM (X23 Port)

Terminals of controller	SAM (X23 Port)	Remark
CAN_SCR	X23 3	CAN communication shielding line;
CAN(H)	X23 2	Using impedance 120Ω connecting line;
CAN(L)	X23 1	Using impedance 120Ω connecting line.

Engine type: Common J1939.

13.11 PERKINS

It is suitable for ADEM3/ADEM4 engine control module. Engine type is 2306, 2506, 1106, and 2806.

Table 42 Connector

Terminals of controller	Connector	Remark
Fuel Relay Output	1, 10, 15, 33, 34	
Starting relay output	-	Connected to starter coil directly;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	31	Using impedance 120Ω connecting line;
CAN(L)	32	Using impedance 120Ω connecting line.

Engine type: PERKINS.

13.12 SCANIA

It is suitable for S6 engine control module. Engine type is DC9, DC12, and DC16.

Table 43 B1 Connector

Terminals of controller	B1 connector	Remark
Fuel Relay Output	3	
Starting relay output	-	Connected to starter coil directly;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	9	Using impedance 120Ω connecting line;
CAN(L)	10	Using impedance 120Ω connecting line.

Engine type: SCANIA.

13.13 VOLVO EDC3

Suitable engine control mode is TAD1240, TAD1241, and TAD1242.

Table 44 "Stand Alone" Connector

Terminals of controller	"Stand alone" connector	Remark
Fuel Relay Output	H	
Starting relay output	E	
Aux. output 2	P	Set to "ECU power".

Table 45 "Data Bus" Connector

Terminals of controller	"Data bus" connector	Remark
CAN_SCR	-	CAN communication shielding line
CAN(H)	1	Using impedance 120Ω connecting line;
CAN(L)	2	Using impedance 120Ω connecting line.

Engine type: VOLVO.

⚠**NOTE: When this engine type is selected, preheating time should be set to at least 3 seconds.**

13.14 VOLVO EDC4

Suitable engine types are TD520, TAD520 (optional), TD720, TAD720 (optional), TAD721, TAD722, and TAD732.

Table 46 Connector

Terminals of controller	Connector	Remark
Fuel Relay Output	Expansion 30A relay, providing battery voltage for terminal 14. Fuse is 16A.	
Starting relay output	-	Connected to starter coil directly;
	1	Connected to negative of battery;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	12	Using impedance 120Ω connecting line;
CAN(L)	13	Using impedance 120Ω connecting line.

Engine type: VOLVO-EDC4.

13.15 VOLVO-EMS2

Volvo Engine types are TAD734, TAD940, TAD941, TAD1640, TAD1641, and TAD1642.

Table 47 Engine CAN Port

Terminals of controller	Engine's CAN port	Remark
Aux. output 1	6	ECU stop Set output 1 to "ECU stop";
Aux. output 2	5	ECU power Set output 2 to "ECU power";
	3	Power negative;
	4	Power passive;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	1(Hi)	Using impedance 120Ω connecting line;
CAN(L)	2(Lo)	Using impedance 120Ω connecting line.

Engine type: VOLVO-EMS2.

⚠**NOTE: When this engine type is selected, preheating time should be set to at least 3 seconds.**

13.16 YUCHAI

It is suitable for BOSCH common rail electronic-controlled engine.

Table 48 Engine 42-Pin Port

Terminals of controller	Engine 42 pins port	Remark
Fuel Relay Output	1.40	Connected to engine ignition lock;
Starting relay output	-	Connected to starter coil directly;
CAN_SCR	-	CAN communication shielding line;
CAN(H)	1.35	Using impedance 120Ω connecting line;
CAN(L)	1.34	Using impedance 120Ω connecting line.

Table 49 Engine 2-Pin Port

Battery	Engine 2 pins port	Remark
Battery negative	1	Wire diameter 2.5mm^2;
Battery positive	2	Wire diameter 2.5mm^2.

Engine type: BOSCH.

13.17 WEICHAI

It is suitable for Weichai BOSCH common rail electronic-controlled engine.

Table 50 Engine Port

Terminals of controller	Engine port	Remark
Fuel Relay Output	1.40	Connected to engine ignition lock;
Starting relay output	1.61	
CAN_SCR	-	CAN communication shielding line;
CAN(H)	1.35	Using impedance 120Ω connecting line;
CAN(L)	1.34	Using impedance 120Ω connecting line.

Engine type: GTSC1.

⚠️**NOTE: If there is any question of connection between controller and ECU communication, please feel free to contact SmartGen's service.**

14 TROUBLESHOOTING

Table 51 Troubleshooting

Symptoms	Possible Solutions
Controller no response for power	Check starting batteries; Check controller connection wirings; Check DC fuse.
Genset shutdown	Check the water/cylinder temperature is too high or not; Check the genset AC voltage; Check DC fuse.
Controller emergency stop	Check emergence stop button is correct or not; Check whether the starting battery positive is connected with the emergency stop input; Check whether there is open circuit.
Low oil pressure alarm after crank disconnect	Check the oil pressure sensor and its connections.
High water temperature alarm after crank disconnect	Check the water temperature sensor and its connections.
Shutdown alarm in running	Check related switch and its connections according to the information on LCD; Check digital inputs.
Crank disconnect failure	Check fuel circuit and its connections; Check starting batteries; Check speed sensor and its connections; Refer to engine manual; Check manual start configuration.
No response for starter	Check starter connections; Check starting batteries.
Light on failure	System configuration 0/2: Check whether battery SOC is lower than inhibit light on SOC; Check whether genset is normal running /mains is active and normal; System configuration1: Check whether battery SOC is lower than inhibit light on SOC; System configuration 3: Check whether genset is normal running /mains is active and normal; Check related configuration and connections according to LCD displayed information; Check if there voltage outputs of light luminance analog output port (if configured) .
Luminance reduce/light number decrease	Check whether battery pack SOC is lower than the lower limit; Check whether fuel level is lower than light decreased setting number.

Symptoms	Possible Solutions
RS485 communication abnormal	Check connections; Check settings of COM port is correct or not; Check RS485's A and B connections is reversely connected or not; Check communication port of PC is damaged or not. It is recommended to connect a 120Ω resistor between A & B of RS485.
4G communication failure	Check whether fix clip installation is correct; Check whether the card works; Check the cables between controller and 4G module are damaged or not; Check whether the local signal works or not.

15 APPENDIX

Table 52 Order Model

Order Model	Country/Region	Frequency Band	Remark
ALC736-4G	All Regions	FDD-LTE: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B26/B28 TDD-LTE: B38/B39/B40/B41 TD-SCDMA: B34/B39 WCDMA: B1/B2/B5/B8 EVDO/CDMA: BC0 GSM: 850/900/1800/1900MHz	GSM

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