GCU-5K *Ver1.0*

Automatic Control & Protection Module for Generator

GENERATOR CONTROL **GCU-5K**

GCU-5KC

EMERGENCY STOP

FUNCTION

KUTAI

＊Support Electronic Engine (SAE J1939) parameter reading and display

ISO 9001
ETC

TABLE OF CONTENTS

SECTION 1 : SAFETY PRECAUTIONS

NOTICE	**Ensure all necessary procedures have been completed correctly.**
⚠ CAUTION	**Failure to follow the correct procedures may lead to permanent damage to the equipment.**
⚠WARNING	**Failure to follow the correct procedures may result in personal injury or death.**

This manual contains information on the installation, wiring, application, operation, and maintenance of the GCU-5K Auto Start Control & Ptorection Module for Generator. It should be thoroughly read before operation.

⚠WARNING

The installation, wiring, and parameter settings of the GCU-5K Auto Start Control & Protection Module should be performed by qualified professional technicians. Improper installation, wiring, or parameter settings may lead to personal injury or equipment damage.
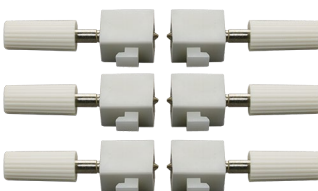
⚠ CAUTION

Use fine fiber cloth with clean water or neutral screen cleaning liquid for gentle wiping DP-70G LCD display panel. Do not use organic solvent cleaners (ex. alcohol, toluene, or acetone) to wipe the LCD display panel, or it may cause the panel to become fogged, yellowed, or rough.

SECTION 2 : GCU-5K Component Overview

Upon arrival of the product, it should be immediately unboxed and inspected for any external damage caused by impacts during transportation. Also, check if the standard accessories (listed in Table 2.1) are complete. If any items are missing or damaged, please contact us or the distributor from whom you purchased immediately.

2.1 Package Contents

DP-70G Operation Display Unit x 1	VDO 360-905 0 - 150 Psi Oil Pressure Sender x 1	DB9 Connector Cable (1 meter) x 1
GCU-5KC Control Unit x 1	VDO 323-417 0 - 120 ℃ Temperature Sender x 1	Display Unit Mounting Accessories x 1 pack

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2.2 DP-70G Overview

Information Bar

- 🔗 Connectted with KUTAI server
- 🧭 Unit is successfully positioned
- 👁 Remote login connection
- ⚙ Control unit settings allowed
- ⬇ Firmware update prompt

Front View

7" Color LCD Panel
Screen resolution
800×480
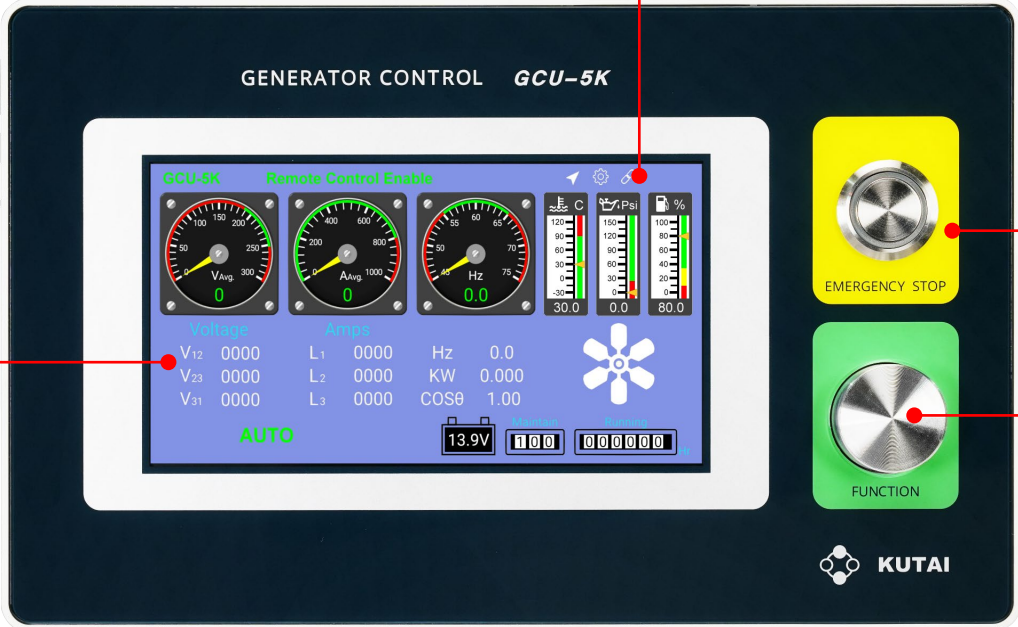
Emergency
Stop Button

Multi-function
Rotary Knob

Rear View

Waterproofing
Gasket

DB9 Port

GCU-5K SPECIFICATION	
DC Power Supply	9 to 40 Vdc
AC Voltage Input	15 to 500 Vac (Ph to Ph)
AC Frequency	50/60 Hz
WiFi Protocol	IEEE802.11 b/g/n
Current Transformer (CT)	50 to 3000A / 5A or 1A
Magnetic Pick-up (MPU)	2 to 70 Vac / 100 Hz to 10K Hz
Temperature Sender	VDO 0 to +120 °C
Oil Pressure Sender	VDO 0 to 150 PSI
Fuel Level Sender	0 to 480 ohms
Operating Temperature	-20 to +60 °C
Relative Humidity	Max. 95%

Part NO : DP-70G

Sound Outlet

Mounting Holes x 6

2.3 GCU-5KC Overview

Mounting Holes

Current Transformer Inputs

AC Voltages Inputs

Battery Power Inputs

Output Signals

Wiring Fixture

4G/5G Wi-Fi Router USB Power Supply

Input Signals

Owner Button

CAN bus Terminals

Status Indicators

KCU-Module Expansion Slot

DB9 Port

CT Input
7 Com.
8 L1
9 L2
10 L3

AC Power Input
1 V1
2 V2
3 V3
4 N

Battery
5 B+
6 B-

11 Start
12 Stop
13 Prog. Output-A
14 Prog. Output-B
15 Prog. Output-C
16 Prog. Output-D
17 Prog. Output-E

18 MPU+
19 MPU-
20 D+ Terminal
21 Oil Pressure Sender
22 Temperature Sender
23 Fuel Level Sender
24 Remote Start
25 Prog. Input-A
26 Prog. Input-B
27 Prog. Input-C
28 Prog. Input-D
29 Prog. Input-E

CanBus
30 Shield
31 CAN-L
32 CAN-H

Owner SW
Running
Status
CanBus
Power Meter

KCU Module

J2 To Display Panel

USB Power J1

KUTAI

GCU-5KC

S/N740021307021

SECTION 3 : PRODUCT INSTALLATION

3.1 Panel Cutout Dimensions and Installation

3.1.1 DP-70G
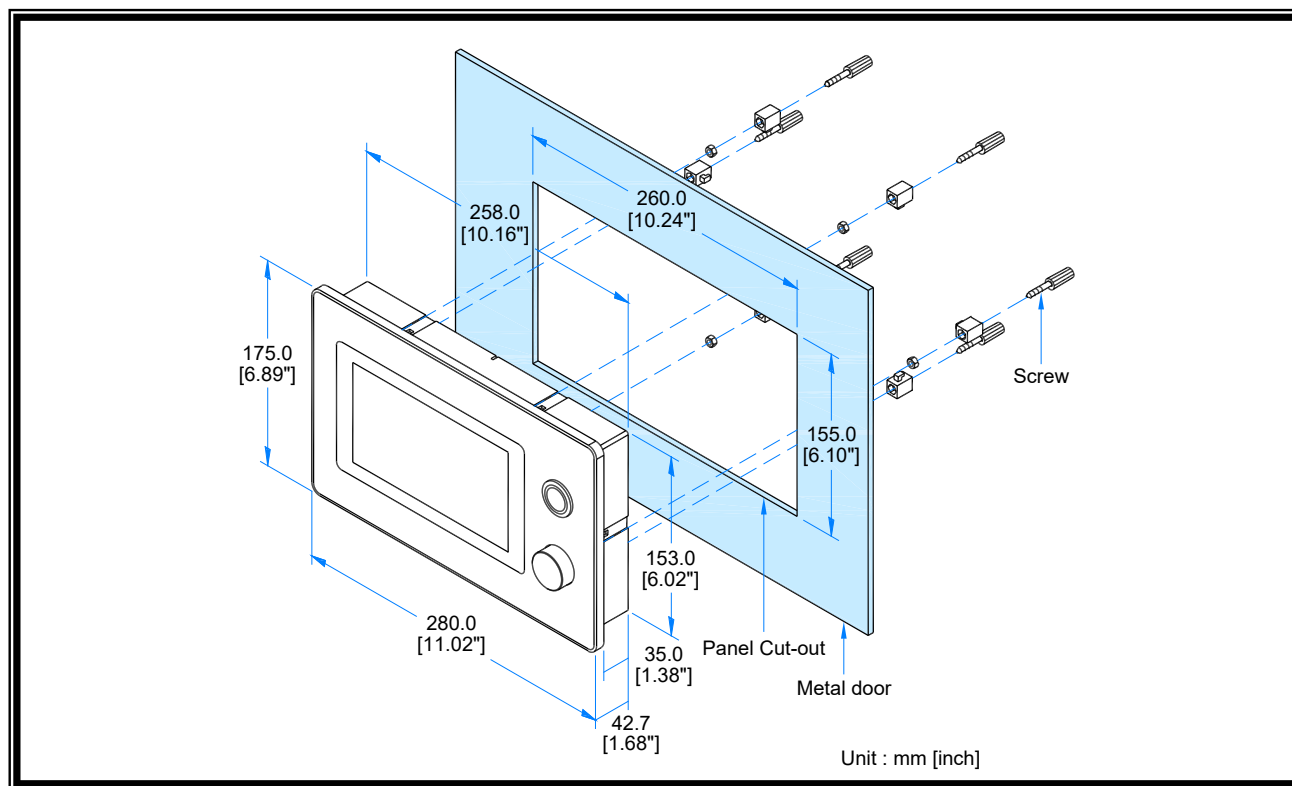
3.1.2 GCU-5KC
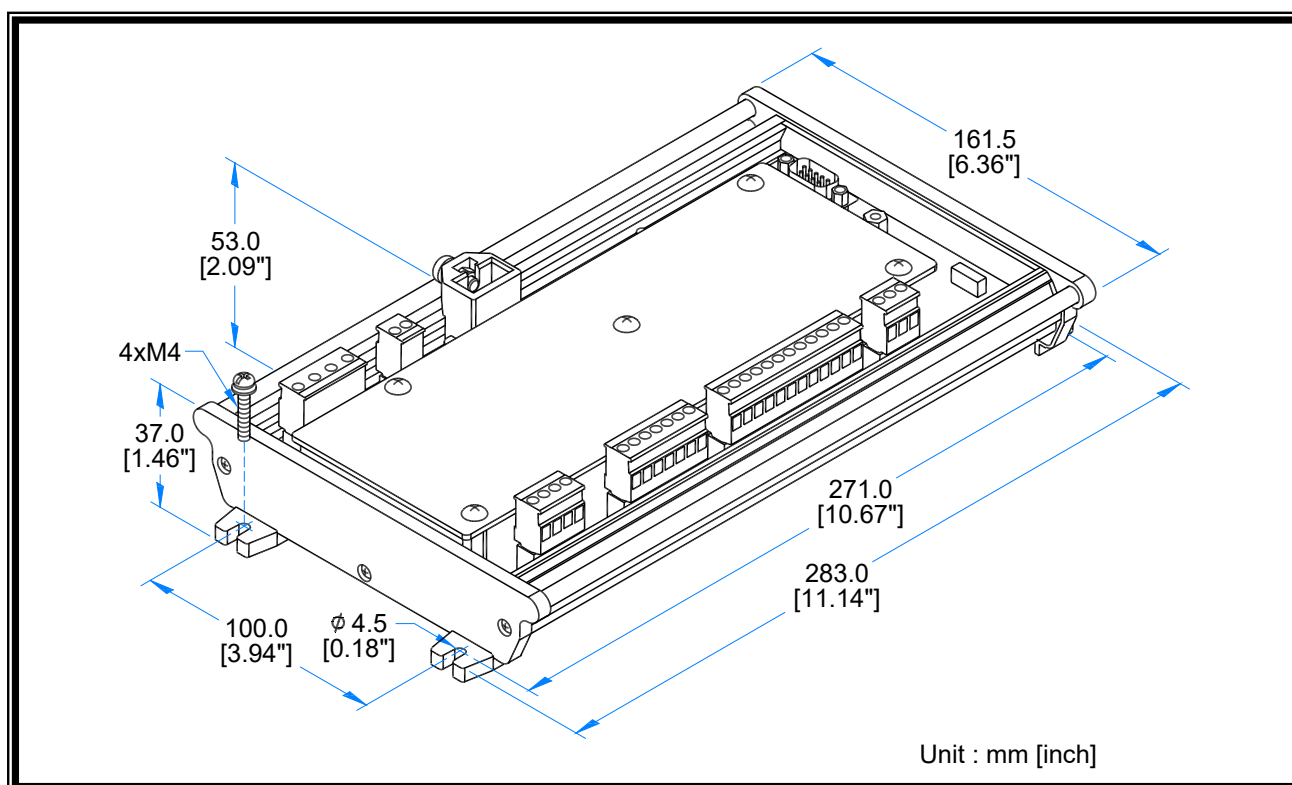
3.1.3   Precautions for Assembly Wiring

The GCU-5KC control unit is equipped with wiring fixture on both sides. After the assembly wiring of the unit is completed, all control wires should be securely fastened to the wiring fixture using cable ties. This reduces the possibility of poor contact or failure due to vibrations.
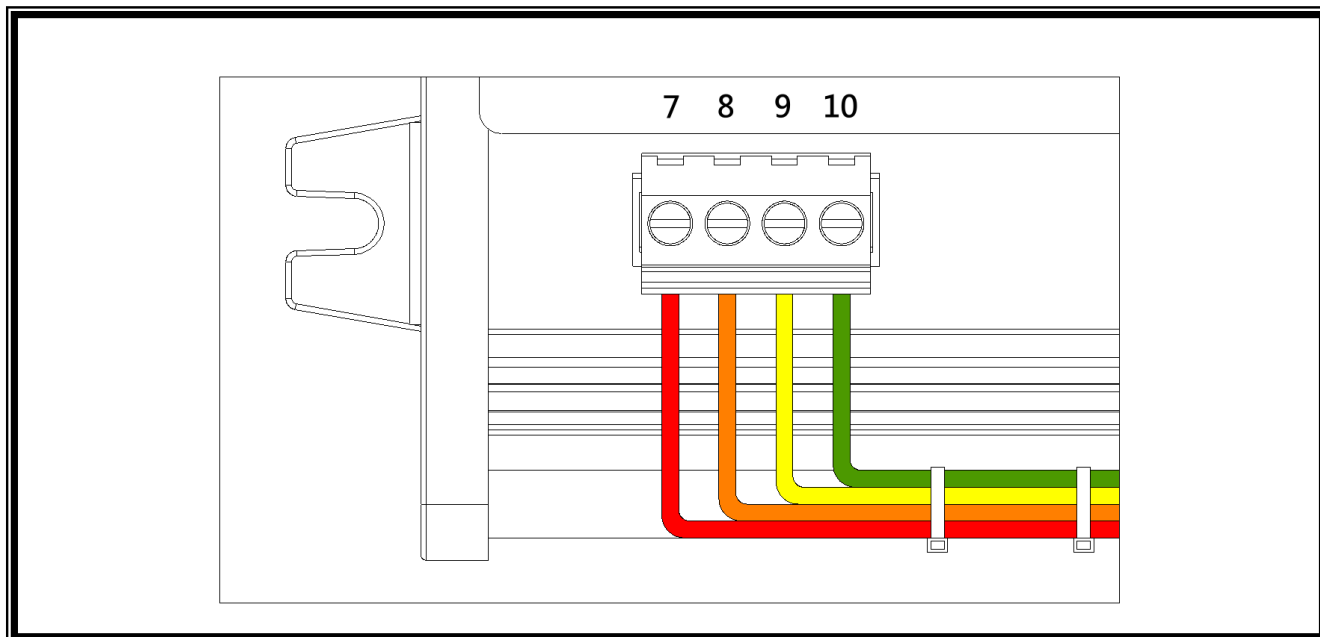
3.2 Wiring Installation of the GCU-5KC and DP-70G

The GCU-5KC control unit and DP-70G display panel are connected by a standard DB9 connector cable.
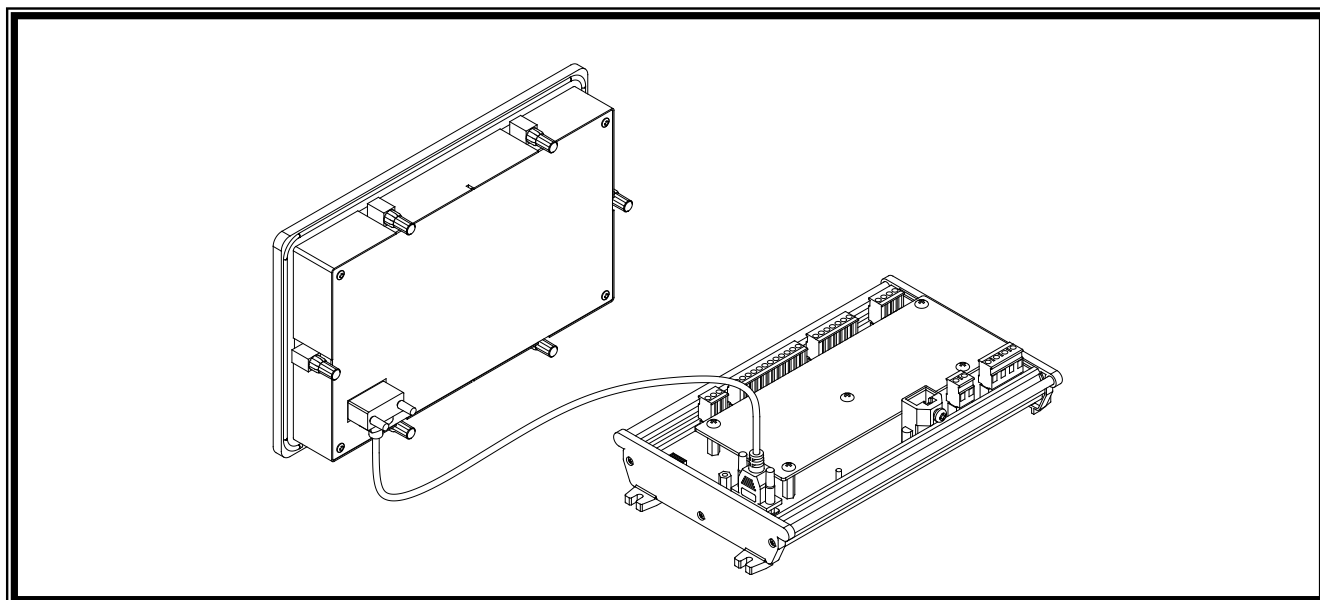
⚠ CAUTION
1. **If the DB9 cable is not properly secured, severe vibrations from long periods of generator operation may lead to poor contact or loosening of the connectors.**
2. **A loose DB9 connector will result in a disconnection between the GCU-5KC and DP-70G. The DP-70G will not function properly and remote monitoring operations cannot be performed.**

3.3　Wiring Assembly of the GCU-5K and Generator

> **⚠WARNING**
>
> **Follow wiring connection steps below**
> **1. Complete all wiring connection (except the battery cables).**
> **2. Check whether all wiring connections are correct.**
> **3. Connect the battery power.**
> **4. Set the GCU-5K to the "STOP" position.**

3.3.1　Schematic Diagram of GCU-5KC Wiring Terminal and Number Positions
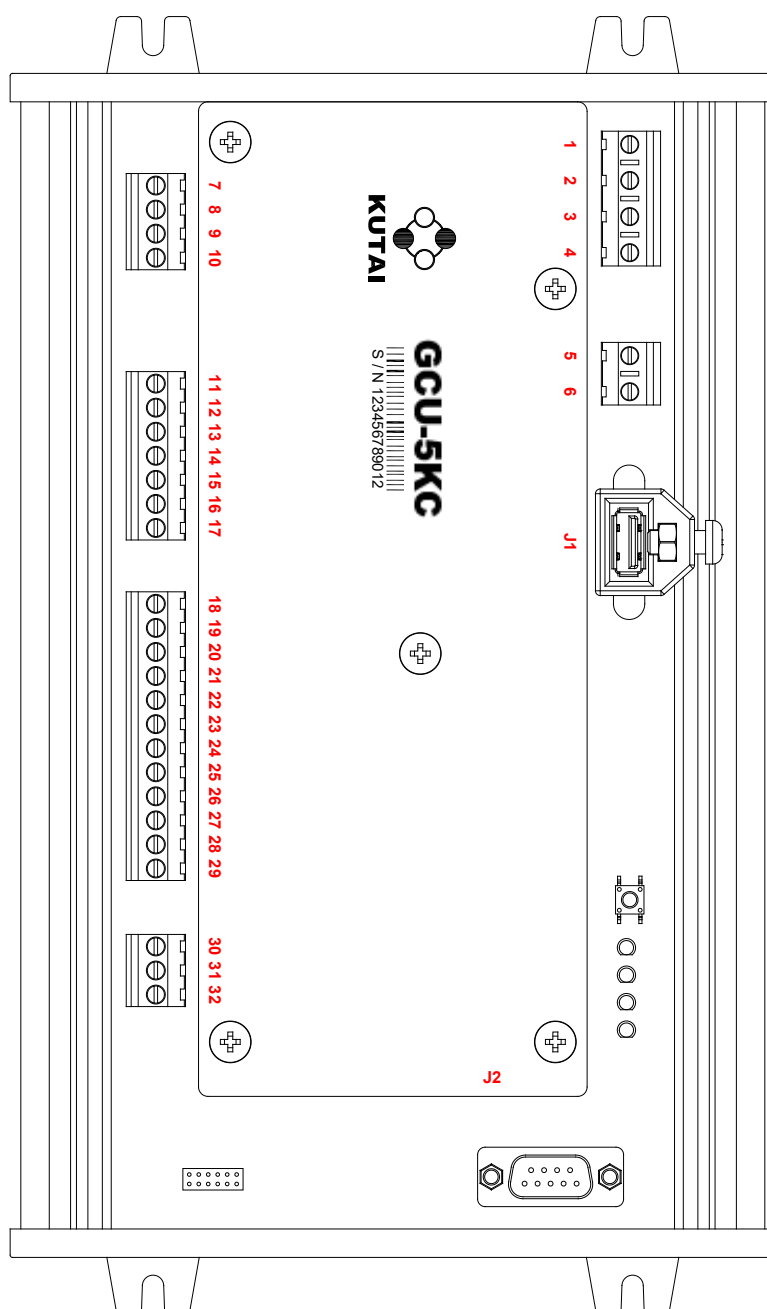
3.3.2 GCU-5KC Connection Terminals, Communication Ports, and Connectors

PIN No.	Connection	Recommended wire size	Description
1	AC Power Input (V1)	AWG 18	Connect to AC power source L1 phase
2	AC Power Input (V2)	AWG 18	Connect to AC power source L2 phase
3	AC Power Input (V3)	AWG 18	Connect to AC power source L3 phase
4	AC Power Input (N)	AWG 18	Connect to AC power source Neutral point N
5	Battery Power Input (B+)	AWG 12	Connect to Battery positive (+) terminal
6	Battery Power Input (B-)	AWG 12	Connect to Battery negative (-) terminal
7	CT secondary common input	AWG 13	Connect to CT common terminal
8	CT secondary input (L1)	AWG 13	Connect to CT terminal of L1
9	CT secondary input (L2)	AWG 13	Connect to CT terminal of L2
10	CT secondary input (L3)	AWG 13	Connect to CT terminal of L3
11	Engine Start output	AWG 18	Connect to starter power relay (maximum output B+ / 5 Amp)
12	Engine Stop Output	AWG 18	Connect to engine stop power relay (maximum output B+ / 5 Amp)
13	User Configurable Output A	AWG 18	Connect to user specified output device (maximum output B+ / 5 Amp)
14	User Configurable Output B	AWG 18	Connect to user specified output device (maximum output B+ / 5 Amp)
15	User Configurable Output C	AWG 18	Connect to user specified output device (maximum output B+ / 5 Amp)
16	User Configurable Output D	AWG 18	Connect to user specified output device (maximum output B+ / 5 Amp)
17	User Configurable Output E	AWG 18	Connect to user specified output device (maximum output B+ / 5 Amp)
18	MPU input (MPU+)	AWG 20	Connect to MPU+ (use isolated twisted pair wire)
19	MPU input (MPU-)	AWG 20	Connect to MPU- (use isolated twisted pair wire)
20	D+ terminal input	AWG 18	Connect to charge alternator D+ terminal
21	Oil Pressure Sender Signal Input	AWG 18	Connect to VDO Oil Pressure Sender
22	Temperature Sender Signal Input	AWG 18	Connect to VDO Temperature Sender
23	Fuel Level Sender Input	AWG 18	Connect to Fuel level Sender (impedance range 0 to 480 Ω)
24	Remote Start Signal Input	AWG 18	Connect to A.T.S or remote control start signal (Battery B- input signal)
25	User Configurable Input F	AWG 18	Input Signal must be Battery B- Input Signal
26	User Configurable Input G	AWG 18	Input Signal must be Battery B- Input Signal
27	User Configurable Input H	AWG 18	Input Signal must be Battery B- Input Signal
28	User Configurable Input J	AWG 18	Input Signal must be Battery B- Input Signal

PIN No.	Connection	Recommended wire size	Description
29	User Configurable Input K	AWG 18	Input Signal must be Battery B- Input Signal
30	Shield Input Terminal	AWG 20	Connect to CAN bus Isolated wire ground (The other end is strictly prohibited to be grounded)
31	CAN-L Input Terminal	AWG 20	Connect to Electronic Engine Computer CAN-LO
32	CAN-H Input Terminal	AWG 20	Connect to Electronic Engine Computer CAN-HI
J1	USB Power Slot		Connect to Wi-Fi router power output
J2	DB9 Port		Connect to DP-70G Display Panel

3.3.3   Recommended Wiring Diagram
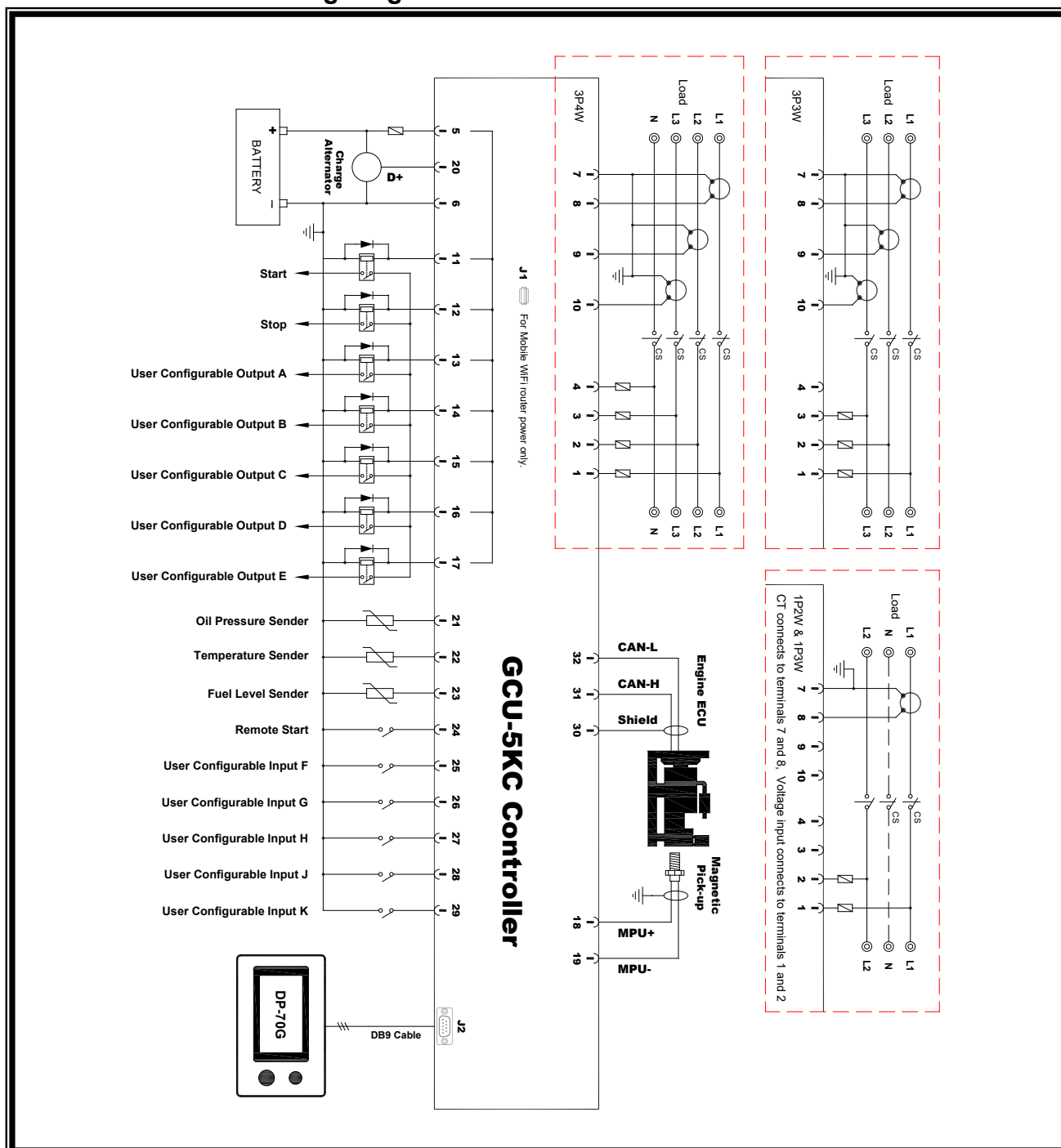
SECTION 4 : Front Panel Configuration

> **NOTICE**
>
> If using remote monitoring, it is recommended to use the GenOnCall® App for system parameter settings (refer to Section 6 and 7)

4.1 Front Panel Configuration

4.1.1 Enabling On-Site Parameter Configuration Permissions

Implementing the system parameter configuration, the GCU-5K must be in Stop mode and hold the Owner button on. The screen will display the following options:

● Onsite Configuration Enable

● Unbind Device (refer to Section 6.4.6)

Click on Onsite Configuration Enable, the symbol ⚙ will appear in the upper right corner of the screen, and the valid duration of the configurations is 2 hours.

4.1.2 Operations of On-Site System Parameter Configuration

In STOP mode ► Press the Multi-function Rotary Knob to enter the function menu ► Click on *System Configuration* ► Rotate the knob to the desired setting item ► Press the Multi-function Knob ► Adjust to the correct setting value by rotating the knob left and right ► Press the Multi-function Knob to confirm ► Repeat the above steps until all options are set ► Click *Exit* to complete the configuration.

LINE	DESCRIPTION	FACTORY SETTING
01	Language / 語言 / 言語 / Idioma	**English**
	Options: English / 繁體中文 / 日本語 / Español	
02	Tranditional Engine / Electronic Engine	**Tranditional Engine**
	Options: Tranditional Engine / Electronic Engine *1	
03	Phase	**3P3W**
	Options: 3P4W/3P3W/1P2W	
04	Nominal Voltage	**220 Vac**
	Adjustment range: 100 ~ 550 Vac	
05	Active Value of Over AC Voltage Warning	**None**
	Adjustment range: None / 101 ~ 130%	
06	Active Value of Over AC Voltage Shutdown	**115%**
	Adjustment range: None / 101 ~ 130%	
07	Active Value of Under AC Voltage Warning	**None**
	Adjustment range: None / 70 ~ 99%	
08	Active Value of Under AC Voltage Shutdown	**85%**
	Adjustment range: None / 70 ~ 99%	
09	Abnormal Voltage Permitted Delay	**10 Sec**
	Adjustment range: 1 ~ 99 s	

LINE	DESCRIPTION	FACTORY SETTING
10	AC Voltage Readings Calibration	+0.0%
	Adjustment range: -10.0 ~ 10.0% (0.5/unit)	
11	Primary Current of CT	1000 A
	Adjustment range: None / 50A~3000A	
12	Secondary Current of CT	5 A
	Options: 1A / 5A	
13	Active Value of Over Current Warning	None
	Adjustment range: None / 50 ~ 100%	
14	Active Value of Over Current Shutdown	80%
	Adjustment range: None / 50 ~ 100%	
15	Over Current Permitted Delay	15 Sec
	Adjustment range: 1 ~ 99 s	
16	Current Readings Calibration	+0.0%
	Adjustment range: -10.0 ~ 10.0% (0.5/unit)	
17	Active Value of Over Frequency Warning	None
	Adjustment range: None / 51 ~ 75Hz	
18	Active Value of Over Frequency Shutdown	65 Hz
	Adjustment range: None / 51 ~ 75Hz	
19	Over Frequency Permitted Delay	5 Sec
	Adjustment range: 1 ~ 99 s	
20	Active Value of Under Frequency Warning	None
	Adjustment range: None / 40 ~ 59Hz	
21	Active Value of Under Frequency Shutdown	55 Hz
	Adjustment range: None / 40 ~ 59Hz	
22	Under Frequency Permitted Delay	10 Sec
	Adjustment range: 1 ~ 99 s	
23	MPU Failure Warning or Shutdown	None
	Options: None / Warning / Shutdown	
24	MPU Failure Permitted Delay	5 Sec
	Adjustment range: 1 ~ 99 s	
25	Number of Flywheel Teeth (Ignore, when RPM meter not in use)	0
	Adjustment range: 0 ~ 300（0 – RPM meter Not used）	
26	Oil Pressure Sender Failure Warning or Shutdown	Shutdown
	Options: None / Warning / Shutdown	
27	Oil Pressure Sender Failure Permitted Delay	10 Sec
	Adjustment range: 1 ~ 99 s	
28	Active Value of Low Oil Pressure Warning	25 Psi
	Adjustment range: None / 10 ~ 50Psi	

LINE	DESCRIPTION	FACTORY SETTING
29	Active Value of Low Oil Pressure Shutdown	**15 Psi**
	Adjustment range: None / 10 ~ 50Psi	
30	Low Oil Pressure Failure Permitted Delay	**5 Sec**
	Adjustment range: 1 ~ 99 s	
31	Temperature Sender Failure Warning or Shutdown	**Shutdown**
	Options: None / Warning / Shutdown	
32	Temperature Sender Failure Permitted Delay	**10 Sec**
	Adjustment range: 1 ~ 99 s	
33	Active Value of Over Coolant Temperature Warning	**85℃**
	Adjustment range: None / 70 ~ 120℃	
34	Active Value of Over Coolant Temperature Shutdown	**95℃**
	Adjustment range: None / 70 ~ 120℃	
35	Over Coolant Temperature Failure Permitted Delay	**5 Sec**
	Adjustment range: 1 ~ 99 s	
36	Fuel Level Sender Failure Warning or Shutdown	**None**
	Options: None / Warning / Shutdown	
37	Fuel Level Sender Failure Permitted Delay	**15 Sec**
	Adjustment range: 1 ~ 99 s	
38	Full Fuel Level Resistance Value (100%)	**480Ω**
	Adjustment range: 0 ~ 480Ω	
39	Empty Fuel Level Resistance Value (0%)	**10Ω**
	Adjustment range: 0 ~ 480Ω	
40	Active Value of Low Fuel Level Warning	**25%**
	Adjustment range: None / 1 ~ 50%	
41	Active Value of Low Fuel Level Shutdown	**None**
	Adjustment range: None / 1 ~ 50%	
42	Low Fuel Level Failure Permitted Delay	**15 Sec**
	Adjustment range: 1 ~ 99 s	
43	Active Value of Battery Under Voltage Alert (Constant Permitted Delay 30s)	**8 Vdc**
	Adjustment range: 8 ~ 24Vdc	
44	Active Value of Battery Over Voltage Alert (Constant Permitted Delay 30s)	**30 Vdc**
	Adjustment range: 13 ~ 36Vdc	
45	Active Value of Charge Alternator Fault Protection	**None**
	Adjustment range: None / 8 ~ 25 Vdc	
46	Charge Alternator Fault Warning or Shutdown	**Warning**
	Options: Warning / Shutdown	
47	Charge Alternator Fault Permitted Delay	**10 Sec**
	Adjustment range: 1 ~ 99 s	
48	Pre-Heat or Crankings Interval Timer	**6 Sec**
	Adjustment range: 2 ~ 99 s	

LINE	DESCRIPTION	FACTORY SETTING
49	Numbers of Repeated Cranking	**3 Attempt**
	Adjustment range: 1~9	
50	Cranking	**6 Sec**
	Adjustment range: 2 ~ 30 s	
51	Detect oil pressure to confirm engine startup	**25 Psi**
	Adjustment range: None / 1 ~ 40Psi	
52	Engine shutdown actuation time (Only for Engine Throttle Actuator)	**10 Sec**
	Adjustment range: 2 ~ 99 s	
53	Engine shutdown mode	**Energized to Run**
	Options: Energized to Stop / Energized to Run	
54	Engine cooling operation time in AUTO mode	**0 min**
	Adjustment range: 0 ~ 30 Mins	
55	Voice Alarm language	**English**
	Options: None/English/Chinese/French/German/Spanish/Japanese/Russian/Indian/Portuguese/Arabic	
56	Human Voice Alert Volume	**8**
	Adjustment range: 1 ~ 10	
57	Fault Sound Volume	**8**
	Adjustment range: 1 ~ 10	
58	Screen Auto-Wake Volume	**8**
	Adjustment range: 1 ~ 10	
59	Multi-function Rotary Knob Action Volume	**8**
	Adjustment range: 1 ~ 10	
60	Screen Brightness	**8**
	Adjustment range: 1 ~ 10	
61	Year	**Current Time**
	Adjustment range: 2021 ~ 2099	
62	Month	**Current Time**
	Adjustment range: 1 ~ 12	
63	Date	**Current Time**
	Adjustment range: 1 ~ 31	
64	Day of Week	**Current Time**
	Options: Monday to Sunday	
65	Hour	**Current Time**
	Adjustment range: 0 ~ 23 (24Hr)	
66	Minute	**Current Time**
	Adjustment range: 0 ~ 59	
67	Restore Factory Configuration	**No**
	Options: Yes / No	

LINE	DESCRIPTION	DESCRIPTION
68	User Configurable Output A	**ACC**
	Options: None/ACC/Pre-Heat Output/Idle Output/Engine Warm Up/Refuel Pump/Common Shutdown/Common Warning/High Temperature Shutdown/Low Oil Pressure Shutdown/Over Speed Shutdown/Low Fuel level/Over Load Shutdown/AC Voltage Abnormal/Service Maintenancer/Not in AUTO Mode/Engine is Running/ Utility Power Outage Simulation	
69	User Configurable Output B	**Pre-Heat Output**
	Setting options are the same as User Configurable Output A	
70	User Configurable Output C	**Idle Output**
	Setting options are the same as User Configurable Output A	
71	User Configurable Output D	**Engine Warm Up**
	Setting options are the same as User Configurable Output A	
72	User Configurable Output E	**Refuel Pump**
	Setting options are the same as User Configurable Output A	
73	Idle Running Time	**0 min**
	Adjustment range: 0 ~ 30 min (User Configurable Terminal Function Must Be Specified)	
74	Engine Warming	**0 min**
	Adjustment range: 0 ~ 30 min (User Configurable Terminal Function Must Be Specified)	
75	Main Fuel Tank Level To Start Refuel Pump (Ignore, when auxiliary fuel tank not in use)	**None**
	Adjustment range: None / 1 ~ 50% (Only in term of fuel level sender has installed and set user configurable terminal function must be specified.)	
76	Main Fuel level to Stop Refuel Pump	**None**
	Adjustment range: None / 50 ~ 95%	
77	User Configurable Input F	**None**
	Option: None/Oil pressure Switch Input/Temperature Switch Input/Fuel Level Switch Input/ Coolant Level Switch Input/User Define Input/Utility Power Outage/Forced to Idel	
78	Checked User Configurable Input F when Engine is running	**Yes**
	Options: Yes / No	
79	User Configurable Input F Failure Warning or Shutdown	**Function Closed**
	Options: Function Closed / Warning / Shutdown	
80	User Configurable Input F Signal NO or NC	**Normal Open (NO)**
	Options: Normal Open (NO) / Normal Close (NC)	
81	User Configurable Input F Failure Permitted Delay	**10 Sec**
	Adjustment range: 1 ~ 99 s	
82	User Configurable Input G	**None**
	Options: None/Oil pressure Switch Input/Temperature Switch Input/Fuel Level Switch Input/ Coolant Level Switch Input/User Define Input/Utility Power Outage/Forced to Idel	
83	Checked User Configurable Input G when Engine is running	**Yes**
	Options: Yes / No	
84	User Configurable Input G Failure Warning or Shutdown	**Function Closed**
	Options: Function Closed / Warning / Shutdown	

LINE	DESCRIPTION	DESCRIPTION
85	User Configurable Input G Signal NO or NC	Normal Open (NO)
	Options: Normal Open (NO) / Normal Close (NC)	
86	User Configurable Input G Failure Permitted Delay	10 Sec
	Adjustment range: 1 ~ 99 s	
87	User Configurable Input H	None
	Options: None/Oil pressure Switch Input/Temperature Switch Input/Fuel Level Switch Input/ Coolant Level Switch Input/User Define Input/Utility Power Outage/Forced to Idel	
88	Checked User Configurable Input H when Engine is running	Yes
	Options: Yes / No	
89	User Configurable Input H Failure Warning or Shutdown	Function Closed
	Options: Function Closed / Warning / Shutdown	
90	User Configurable Input H Signal NO or NC	Normal Open (NO)
	Options: Normal Open (NO) / Normal Close (NC)	
91	User Configurable Input H Failure Permitted Delay	10 Sec
	Adjustment range: 1 ~ 99 s	
92	User Configurable Input J	None
	Options: None/Oil pressure Switch Input/Temperature Switch Input/Fuel Level Switch Input/ Coolant Level Switch Input/User Define Input/Utility Power Outage/Forced to Idel	
93	Checked User Configurable Input J when Engine is running	Yes
	Options: Yes / No	
94	User Configurable Input J Failure Warning or Shutdown	Function Closed
	Options: Function Closed / Warning / Shutdown	
95	User Configurable Input J Signal NO or NC	Normal Open (NO)
	Options: Normal Open (NO) / Normal Close (NC)	
96	User Configurable Input J Failure Permitted Delay	10 Sec
	Adjustment range: 1 ~ 99 s	
97	User Configurable Input K	None
	Options: None/Oil pressure Switch Input/Temperature Switch Input/Fuel Level Switch Input/ Coolant Level Switch Input/User Define Input/Utility Power Outage/Forced to Idel	
98	Checked User Configurable Input K when Engine is running	Yes
	Options: Yes / No	
99	User Configurable Input K Failure Warning or Shutdown	Function Closed
	Options: Function Closed / Warning / Shutdown	
100	User Configurable Input K Signal NO or NC	Normal Open (NO)
	Options: Normal Open (NO) / Normal Close (NC)	
101	User Configurable Input K Failure Permitted Delay	10 Sec
	Adjustment range: 1 ~ 99 s	
102	Detect Engine Startup Using Oil Pressure Switch	No
	Options: Yes / No	

LINE	DESCRIPTION	FACTORY SETTING
103	Detect Engine Startup Using Frequency from MPU	No
	Options: Yes / No	
104	Maintenance reminder time	100 hours
	Adjustment range: None / 1 ~ 300 hours	
105	Reset Maintenance Timer	No
	Options: Yes / No	
106	Reset Running Hours	No
	Options: Yes / No	
107	Reset KWH meter value	No
	Options: Yes / No	
108	Push Notification Interval Time During Continuous Generator Running	None
	Adjustment range: None / 1 ~ 10 hours	
109	Radar Human Detection For Automatic Screen Wake-Up Function	Open
	Options: Open / Close	
110	KCU-XX Module Address	None
	Adjustment range: None / 1 ~ 99	
111	KCU-XX Baud Rate	38400
	Options:115200 / 57600 / 38400 / 19200 / 14400 / 9600 / 4800 / 2400	
112	KCU-XX Parity Bit	N81
	Options: N81 / N82 / E81 / O81	
113	WPS Location Service	Yes
	Options: Yes / No	

SECTION 5 : GENERATOR OPERATIONAL TEST

5.1 Main Menu Introduction

Pressing the multi-function knob to enter the Main function menu. The operation mode are detailed as follows:
- **STOP**: 1) Generator shutdown immediately without engine cooling down delay

   2) If there's a shutdown alarm due to a fault, pressing *STOP* can clear the fault alarm message and sound.
- **START**：Manually force the generator to start. (Unless the fault alarm message is not cleared)
- **AUTO**： Press "*AUTO*". The word "AUTO" blinking at the bottom left of the screen indicates standby mode. Once the genset enters the operation mode, the word "AUTO" will stay lit. In "AUTO" mode, the Start / Stop of the genset will be controlled by remote start signal.
- **Ethernet Enable/Disable:** This setting enables or disables the Wi-Fi connection feature of the device.
- **Event Log**：Selecting the *Event Log* option allows access to the history list of the generator events, which aids in fault diagnosis, (refer to section 6.1.3).
- **System Setting**：Before executing On-Site system parameter setting, the setting permission must be unlocked by pressing and holding the Owner button in *STOP* mode.
- **J1939 Paramater**：This option provides the SAE J1939 parameter list for the electronic engine, but only appears when the engine type is set as an electronic engine. (Refer to section 6.1.4).
- **Other Setting:** This option includes the following settings.
  - ＊ **Meter Setting:** This item allows the execution of the graphical needle meter display replacement function.
  - ＊ **Wi-Fi WPS Setting:** Execute the Wi-Fi network MAC address and SSID setting, (refer to section 6.3.1.1).
  - ＊ **Wi-Fi AP Setting:** Execute the Wi-Fi setting on GenOnCall® App (refer to section 6.3.1.2).
  - ＊ **Firmware Update Execution**: Execute firmware update when 🔻 displayed at Information Bar.
  - ＊ **Zero Correction for Ammeter:** Click this item to perform ammeter zero calibration.
- **About This Device:** The content includes information related to GCU-5K firmware version, product serial number, currently connected Wi-Fi MAC / SSID, and location coordinates.

⚠ **CAUTION**

Be sure "Emergency Stop Button" must be pressed before working on genset maintenance to avoid of personal injury. The generator will be locked in at OFF state until the "Emergency Stop Button" is pressed again to unlock it.

NOTICE

When Ethernet control is activated, GCU-5K will execute STOP / START / Auto modes based on the most recent command received (through Ethernet or On-Site).

5.2 Trial Run Operation

Once the generator unit has been fully assembled and wired, and all system parameters have correctly set, the user should execute generator operation in START and AUTO, this is to ensure that the assembly wiring and control module parameter settings meet the unit's control and protection requirements.

5.2.1   Inspection Items
1. Emergency Stop Button Function
2. Over Speed Protection Function
3. High Collant Water Temperature Protection Function
4. Low Oil Pressure Protection Function
5. All display screen

5.2.2   Start-Up Procedure
Select START on the operating panel. GCU-5K will immediately execute the start-up procedure according to the system settings until one of the following conditions occurs:
Starter motor operation → interval stop → Starter motor operation → interval stop → Starter motor operation.
- Engine oil pressure reading established (Must be set to detect engine start with oil pressure reading)
- Engine oil pressure switch action (Must be set to detect engine start with oil pressure switch)
- AC voltage builds up
- AC frequency reaching a rated value of 18 Hz or above
- MPU frequency reaching above the start standard (Must be set to detect engine start with MPU)

5.2.3 Shutdown Procedure

Select STOP on the operating panel, and the generator will immediately shut down.

5.2.4 AUTO Function Test

Select AUTO mode on the operating panel. When the external remote control contact is closed, the generator will automatically execute the start-up procedure. When the remote control contact is open, the generator will immediately shut down, unless a cool-down time delay countdown has been set (refer to setting item 54).

SECTION 6 : REMOTE MONITORING

6.1 Display Screen of GenOnCall® App 📱

The smart mobile device screen is designed to display five types of parameter screens, which can be switched by swiping left or right on the screen.

| **Location Map** | **Event Log** | **Main Screen** | **Power Measurement** | **J1939 parameter (Electronic Engine only)** |

6.1.1 GenOnCall® App Main Screen 📱

Graphical Needle Meter Display Area
Long-pressing on the meter can bring up the display options for: V(RMS), A(RMS), Hz, KVA, KW, KVAR, RPM, KWH or PF.

Unit Name
Genset unit name (identifier) in the APP can be edited and named by Owner.

Information Bar

🔄 ：Connected with KUTAI server

📍 ：Unit is successfully positioned

👤 ：Remote Login connection

⚙️ ：Control Unit settings allowed

❮ ：Back to previous page

❎ ：Close Remote APP application

❌ ：Close Information page

❓ ：HELP function

⬇️ ：Firmware update prompt

Fuel Level Gauge

Oil Pressure Gauge
Long-pressing on meter to switch between Psi and Bar

Engine Temperature Gauge
Long-pressing on meter to switch between ˚C and ˚F

Message Area
Display operating status and Messages

✴️ Steady = Stop Rotating = Operating

： Time delay countdown

⚠️ ： Fault warning message

⛔ ： Shutdown message

Operating Mode
AUTO / STOP / START

Power measurement Readings

Battery Voltage

Maintenance Reminder
Countdown timer

Running Hours

6.1.2   Power Measurement Readings Display

The power measurement reading display includes generator's total phase voltage, current, frequency, KVA, KW, KVAR, RPM, KWH, and power factor (PF).
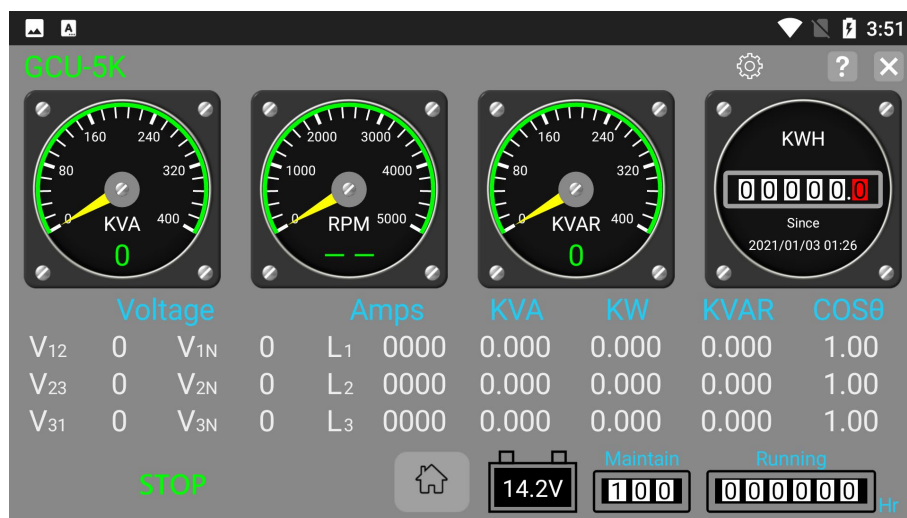
6.1.3   Event Log Display

The GCU-5K provides the latest 250 event history records. Each fault record includes the Event Type, Occurrence Time, and Event Content.

Event Type：
Event type include Failure Warning, Shutdown, Engine Start, Operation mode changed, and other event records.

Occurence Time   **Event Content**

6.1.4   ECU (SAE J193) Electronic Engine Parameter Display

ECU (SAE J1939) Electronic Engine Parameter Content

ECU (SAE J1939) Electronic Engine Parameter SPN NO.

ECU (SAE J1939) Electronic Engine measurement Value

Item	SPN	Description	Value
01	573	Transmission Torque Converter Lockup Engaged	– –
02	92	Engine Percent Load At Current Speed	– –
03	512	Driver's Demand Engine - Percent Torque	– –
04	513	Actual Engine - Percent Torque	– –
05	441	Auxiliary Temperature 1	– –
06	1387	Auxiliary Pressure #1	– –
07	1239	Engine Fuel Leakage 1	– –
08	1240	Engine Fuel Leakage 2	– –

NOTICE

KUTAI GCU-5K can display up to 53 electronic engine parameters. Actual displayable items may vary based on the permissions of the installed ECU brand.

6.1.5   Location Map Display

The Location Map is only displayed on the GenOnCall® screen.

Unit Position Symbol

📗：Current connected unit

📘：The unit is operating

⬛：The unit is shutdown

🟥：Fault occurred in the unit

Connection button
By clicking location symbol on any unit, a connection window will appear. Click the connection button to directly connect with that unit.

GC4K at vibration machine

6.2 Overview of Remote Monitoring and Control Functions

Through the GenOnCall® APP, users can perform the following functions from a distance:

- Monitor all real-time statuses and measurements of the generator set
- Receive push notifications for fault alarms, engine start or stop, and maintenance reminders
- Obtain WPS location map information.
- Help facilitate remote troubleshooting by examining the Event Log records.
- Execute remote start and stop operations, and set system parameters (only *Operators* have this permission)
- Delete Event Log, reset Engine Running Hours, and KWH meter to zero (only *Owner* has this permission)

⚠WARNING

When GCU-5K is set to "Remote Enable" or "AUTO" mode, the GCU-5K can accept remote control to start the generator. The following instructions must be followed, otherwise, it may lead to personnel injury or death:

1. The generator should be placed in a place with fenced protection.
2. A conspicuous permanent warning sign must be erected to alert people. The content of the warning sign should be "The generator may start at any time".
3. The Engine Start Voice Warning should be enabled and its functionality should be ensured.
4. When maintaining or working around the generator, the remote control function should be turned off and set to STOP mode, or the battery should be disconnected to ensure the safety of the construction personnel.

6.2.1 Introducing Three Connection Methods for GCU-5K

The GCU-5K provides three connection communication interfaces to choose from: Wi-Fi wireless network, 4G/5G wireless Wi-Fi router, and Dynamic IP network. Refer to the comparison table below:

Connection Method	Connection Cost	Connection quality	Wire/Wireless Network	Applicable Environment	Installation and Setting methods	Optional KCU Module	Relevant Section
Wi-Fi network	Low	Good	Wireless	Places covered by Wi-Fi signal	Need to enter Wi-Fi password	Built-in with Wi-Fi network connection	6.3.1
4G/5G wireless Wi-Fi router	High	Good	Wireless	no Wi-Fi or ADSL but 4G/5G signal coverage	You may need to enter Wi-Fi password	N/A	6.3.2
Dynamic IP	Medium	Excellent	Wire (RJ45)	ADSL or fiber optic has been set up	Automatically obtain IP address	Use with Optional KCU-31	6.3.3

NOTICE

An unstable or weak communication network could lead to frequent disconnections between GCU-5K and KUTAI server, hindering the remote monitoring capabilities.   Users should consider setup environment and prudently select a suitable and reliable communication network to ensure stable data transmission.

6.3   Controller Connection to KUTAI Server

GCU-5K
Generator Controller

KUTAI Server
1. Data security verification
2. Connection matchmaking between
   devices

Mobile device
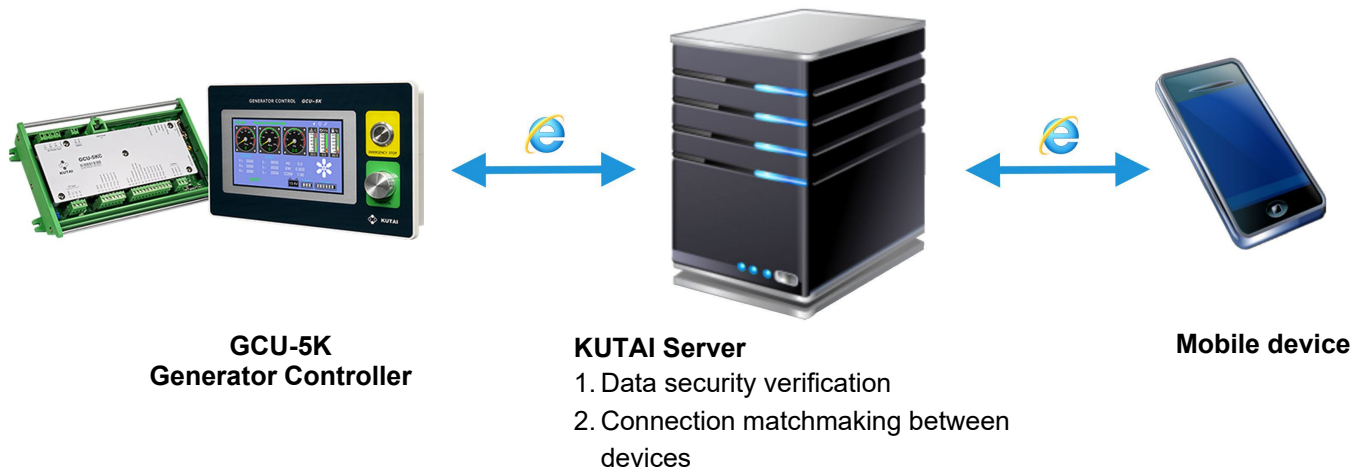
6.3.1   Wi-Fi Connection Setup for GCU-5K

GCU-5K offers the following two modes for executing Wi-Fi network MAC address and SSID setup. If the Wi-Fi router has a WPS button, it is recommended to prioritize using this connection method for setup.

● **WPS Mode:** The Wi-Fi router with a WPS button can automatically pairs to obtain Wi-Fi domain name and password.

● **AP Mode:** If the Wi-Fi router used does not have a WPS auto-pair button, since GCU-5K does not have keyboard to input the Wi-Fi connection password, it is necessary to set up the Wi-Fi connection through the GenOnCall® APP on a mobile phone. This is also suitable for Wi-Fi router without a WPS button.

The setup operation steps are as follows:

6.3.1.1   WPS mode Wi-Fi connection setting

Step 1：

1. Set GCU-5K at **STOP** mode, then press multi-functionn rotary knob
2. Enter Main function menu then click **Other Settiong**

Step 2：
Select **Wi-Fi WPS Setting**
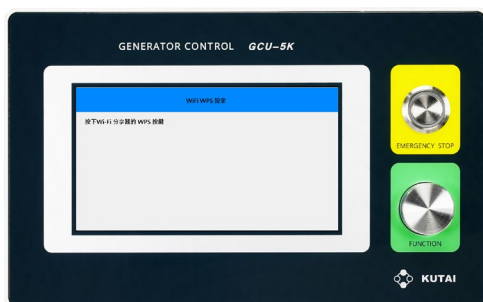
Step 3：
Enter *Wi-Fi WPS Setting* then executes the Wi-Fi router
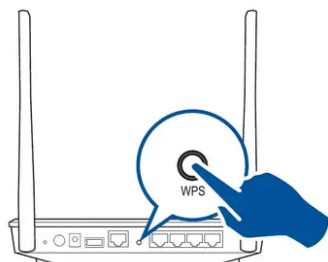
Step 4：
Press WPS button on Wi-Fi router, the system will automatically match the domain name and password.

PS: The position of the WPS button may vary among different brands or models of Wi-Fi router. Refer to the original manufacturer's manual to confirm whether there is a WPS button and its location.

6.3.1.2 AP mode Wi-Fi connection setting

GCU-5K Front Panel Operation:

Step 1：
1. Set GCU-5K at *STOP* mode, then press multi-functionn rotary knob
2. Enter Main function menu then click *Other Setting*

Step 2：
Select *Wi-Fi AP Setting*
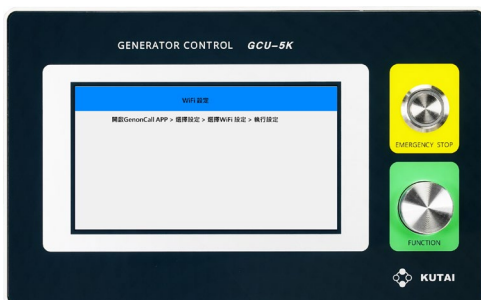
Step 3：
Enter *Wi-Fi Setting*, then executes GenOnCall® APP mobile operation

GenOnCall APP Operation 📱

If iPhone cannot connect to Kutai-xxxxxxxxxxxx, user must enable the local network connection feature of GenOnCall® APP

iPhone set up steps: Enter *Setting* ► Select *GenOnCall* App► Enable local network connection 🟢

Step 1：
1. Login GenOnCall® APP
2. Enter Email Address and Password
3. Click **Login**

Step 2：
Click *Wi-Fi* connection setting

Step 3：
1. Select Wi-Fi network nameed Kutai-xxxxxxxxxxxx (Product Serial Number)

2. Confirm mobile phone Wi-Fi is connected to Kutai-xxxxxxxxxxxx

Step 4:
1. Back to GenOnCall® screen and click on Settings

2. Click **Wi-Fi Setting**

Step 5:
1. A list of surrounding Wi-Fi networks appears on the screen

2. Click the Wi-Fi network that the GCU-5K wants to connect to
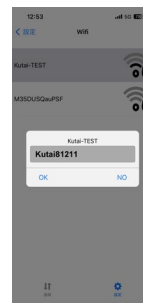
Step 6：
1. Enter Wi-Fi network password
2. Click OK
3. Finish setting up

Once GCU-5K Wi-Fi set up is completed, the information bar on GCU-5K should show 🔗 (connected with KUTAI Server). User can also enter the GCU-5K "About" for details on the eonnected Wi-Fi, ex. MAC SSID and IP information.

NOTICE

Since Kutai-xxxxxxxxxxxx is a local Wi-Fi without internet capabilities, it's solely for setting up Wi-Fi. If a **"No internet connection. Stay connected? "** message appears, click Yes to maintain the connection for setting up Wi-Fi with Kutai-xxxxxxxxxxxx.

6.3.2 Installation of 4G / 5G Wireless Wi-Fi Router 🔲

When the location of Generator lacks Wi-Fi or a dynamic IP network connection, it's essential to acquire a 4G/5G Wireless Wi-Fi router from a local telecom service provider. Please refer to section 6.3.1 for the setup procedures.
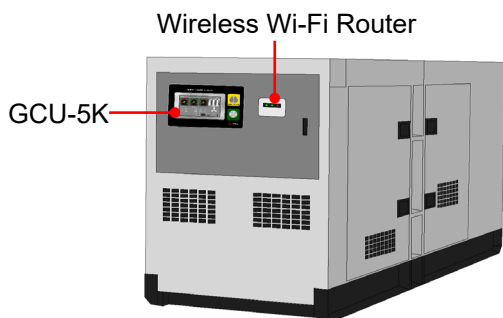
1. Do not install it inside generator canopy to avoid shielding the Wi-Fi signal.
2. The installation location of the Wireless Wi-Fi Router should be close to the GCU-5K
3. Pay attention to waterproof and shockproof measures when installing outdoors.
4. The Wireless Wi-Fi Router should include a 2.4G Wi-Fi frequency band
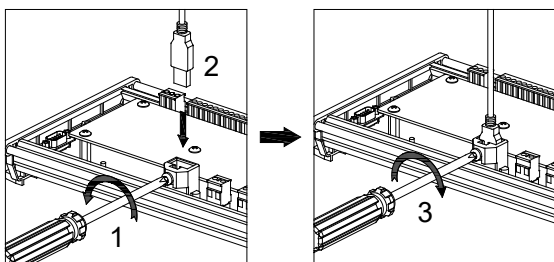
1. The power for the Wireless Wi-Fi share is provided by GCU-5KC. Ensure it is properly installed and fixed according to the steps in left picture
2. The power socket is only for mobile Wi-Fi router used, must not be used as a power source for other electronic equipment.

6.3.3 Dynamic IP (Ethernet) Connection 🔲

Optional KCU-31 remote communication module can achieve a dynamic IP (Ethernet) network connection. When using a Dynamic IP network connection, the firewall function of that communication port must be turned off. The unit will automatically obtain an IP address and connect to KUTAI Server host. A static IP network cannot be directly connected, an IP sharer should be installed to provide dynamic IP network sharing.
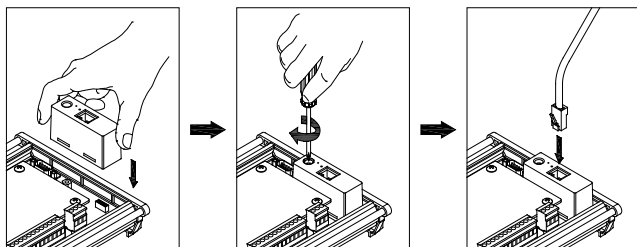
1. Securely install and fasten the KCU-31 and RJ45 network connector as shown in the left image to prevent poor contact due to vibrations, which could cause the GCU-5K to fail to connect to the internet.

2. If a symbol 🔗 appears in the Information Bar of the DP-70G, it indicates that a connection has been established with KUTAI Server.

6.4 Connecting Mobile Device with GCU-5K 📱

All Owners, Operators, and Viewers using remote monitoring function must apply for their personal dedicated connection accounts on KUTAI Server, following the steps below:

1. Owner connection procedure

| Download GenOnCall® App Chapter 6.4.1 | ≫ | Create a Personal Account on KUTAI Server Chapter 6.4.2 | ≫ | Bind to Controller to Become Deice Owner Assign Operator / Viewers Chapter 6.4.3 & 6.4.4 | ≫ | Connect to GCU-5K With GenOnCall® App Chapter 6.4.5 |
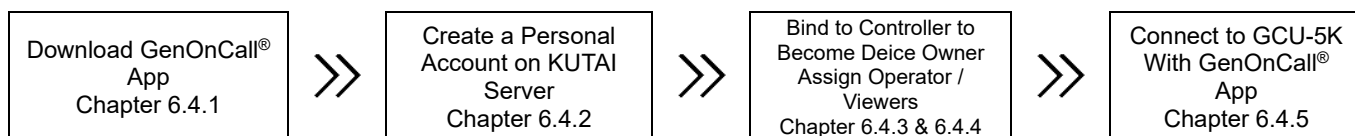
2. Operator and Viewers connection procedure

| Download GenOnCall® App Chapter 6.4.1 | ≫ | Create a Personal Account on KUTAI Server Chapter 6.4.2 | ≫ | Wait for Owner to Assign Operator or Viewer Authority | ≫ | Connect to GCU-5K With GenOnCall® App Chapter 6.4.5 |
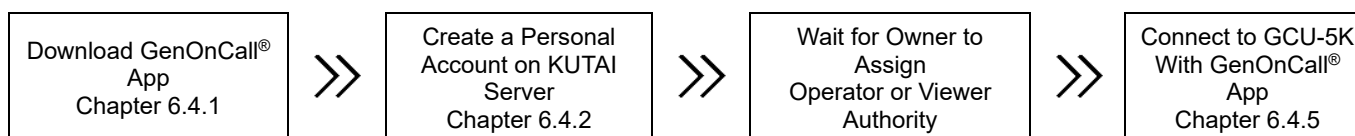
6.4.1   Downloading the GenOnCall® Application 📱

The GenOnCall® APP is available in both iOS and Android versions, both of which have passed the Mobile Application Security Alliance L2 security certification. Users can download the APP based on their mobile device's operating system from the following locations, or scan the QR Code:

1. **Apple iOS system**: Download the GenOnCall® APP from the Apple Store.

2 **Android system:** Download the GenOnCall® APP from Google Play

Apple iOS   Android

NOTICE

The GenOnCall® APP will not be able to support Android operating system services in countries where Google Services are not available, such as in Mainland China, etc.

6.4.2   Account Application

You can apply for a personal dedicated connection account in two ways.

6.4.2.1   Applying for an account from KUTAI website

Go to the KUTAI website www.kutai.com.tw ► Click *Member Center* to enter member system ► Click on CREATE AN ACCOUNT ► Read the *Terms of Services* carefully, then enter the Captcha VX₅8Rⱼ and press `I Agree` ► Fill in the user name, email account and password, enter the Captcha VX₅8Rⱼ and click `submit` ► Log-in to the email account entered and read the mail send by the server ► Click the account activation link ► The account application procedure is complete

6.4.2.2   Applying for an account from GenOnCall® APP 📱

Open **GenOnCall®** APP ► Click `Sign Up` ► Automatically link to the Member System of KUTAI website ► Read the *Terms of Services* carefully, then enter the Captcha VX₅8Rⱼ and press `I Agree` ► Fill in the user name, email account and password, enter the Captcha VX₅8Rⱼ and click `submit` ► Log-in to the email account entered and read the mail send by the server ► Click the account activation link ► The account application procedure is complete

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NOTICE

1. **Upon system review approval, a verification letter will be automatically sent to the email address you provided. The email address must be valid and active.**
2. **Users should complete the account activation process within 30 minutes. After this period, the verification email will automatically expire, and users will need to reapply.**
3. **The Captcha image password is case-insensitive.**

6.4.3   Control Unit Binding 👤⚙️📱

All GCU-5K units to be remotely monitored must first go through the binding process. The account used for binding will be considered the Owner of the device. The device must be actively connected to the server during binding. If the control module is not connected or if the entered product serial number is incorrect, the system will display a device offline message. If the control module has been bound, it must first be unbound before re-binding, otherwise, the system will display a message that the device is already bound.

Apple iOS Operation：

Open and log-in to the **GenOnCall**® App ► Click *Devices* ► Enter *Device Serial Number* or scan the Serial Number on GCU-5K ► Press *Confirm* ►Enter *Device Name* ► Press *Confirm*

Android Operation：

Open and log-in to the **GenOnCall**® App ► Click *(Total) online/offline* ► Enter *product serial number* or press to scan the serial number on GCU-5K ► Press NEXT ►Enter *Device Name* ► Press SAVE

6.4.4 Edit Operator and Viewers

The Owner has the authority to edit the identities of the Operator and Viewer. Unauthorized connections will be refused remote monitoring access by the server. A single device allows up to one operator and seven viewers. The system defaults to the account logged in at the time of binding as the Owner and simultaneously assumes the identity of the Operator and Viewer.

Apple iOS operation：

Open and log-in to the **GenOnCall**® App ► On the device list screen, swipe the name column of the device you want to edit from right to left ► Click ► Enter the Operator and Viewer-1 to Viewer-7 email account in sequence ► Press *Done* and return to device list screen

Android operation：

Open and log-in to the **GenOnCall**® App ► On the device list screen, long press the name column of the device you want to edit ► Click *Edit* ► Enter the Operator and Viewer-1 to Viewer-7 email account in sequence ► Press $<$ to return device list screen

6.4.5 Establishing a connection With the GCU-5K Controller

When all the steps in 6.4.2, 6.4.3 and 6.4.4 are completed, users can open the GenOnCall® APP on their mobile device to establish a connection with the GCU-5K controller.

Select the device name you want to connect and establish a connection.

Symbol Explanation:

 : Operator identity

 : Viewer identity

 : Controller is off line (Gray button indicates that the control unit is currently not connected to the network)

 : Owner of the device

Operator login screen

The AUTO / STOP / START operation buttons will only appear at the bottom of the screen when an Operator logs in and the GCU-5K is set at *Remote Enable.*

6.4.6 Unbinding ⬜ 📱

Once the GCU-5K is bound, it cannot be re-bound by other account unless the unbinding process is performed first. The unbinding can be done by local GCU-5K controller or remotely by Owner's mobile phone through GenOnCall® APP.

Onsite operation：⬜
In the STOP mode ► Press *Owner* button ► Click *Unbind Device*

Apple iOS operation：📱
Open and log-in to the **GenOnCall®** App ► On the device list screen, swipe the name column of the device you want to unbind from left to right ► Click 🗑 ► Enter the Owner's password ► Press *Unbind*

Android operation：📱
Open and log-in to the **GenOnCall®** App ► On the device list screen, long press the name column of the device you want to edit ► Click *Unbind* ► Enter the Owner's password ► Press OK

6.4.7 Editing Push Notification 📱
Apple iOS operation：📱
Open and log-in to the **GenOnCall®** App ► On the device list screen, swipe the name column of the device you want to edit from right to left ► Click 📋 to enter push notification editing
Android operation：📱
Open and log-in to the **GenOnCall®** App ► On the device list screen, long press the name column of the device you want to edit ► Click *Push Notification*
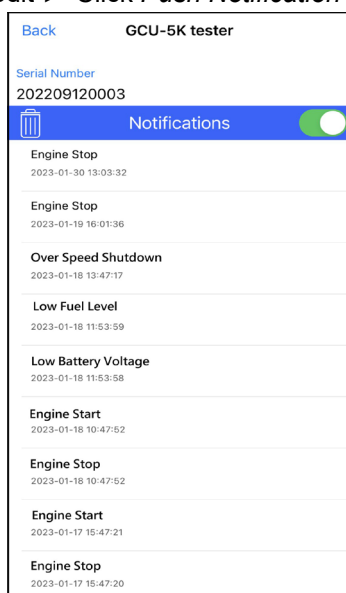
1. Click 🗑 on left side to delete all push notification records at once
2. Click *Notification* 🟢 · to enable or disable push notification funtion
3. To delete individual messages, quickly swipe left on the message row and click *Delete.*
4. Click *Back to* exit push notification edit page

6.4.8 GenOnCall® Settings on Mobile Device 📱
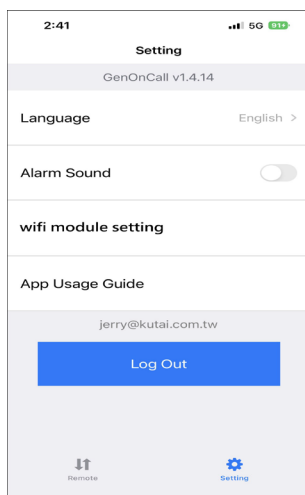
Apple iOS Display Screen

Press ⚙️ Settings to enter option setting screen to make below settings：

1. Language：Set display language to *English* or *繁體中文*
2. Click *Alarm Sound* ⬤ to turn on or off the mobile fault alarm sound.
3. Wi-Fi module setting：Execute Wi-Fi settings on GCU-5K.
4. *App Usage Guide*：Instruction for using the GenOnCall® App
5. Log Out：User account logout
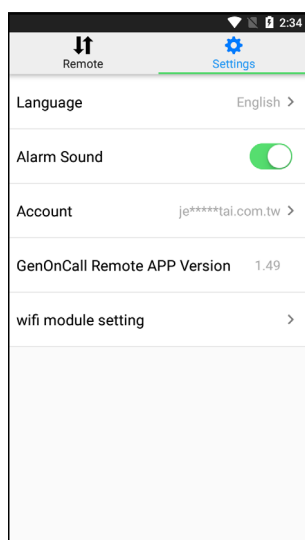
Android Display Screen

Press ⚙️ Settings to enter option setting screen to make below settings：

1. Language：Set display language to *English* or *繁體中文*
2. Click *Alarm Sound* ⬤ to turn on or off the mobile Fault alarm sound
3. Account：User account logout
4. GenOnCall Remote APP version：GenOnCall® App version
5. Wi-Fi module setting：Execute Wi-Fi settings on GCU-5K.

SECTION 7 : REMOTE SYSTEM PARAMETER SETTINGS

7.1 Definitions and Icons Used With GCU-5K

Proprietary Term	Explanation
Owner	The device Owner has the highest authority with the following permissions: 1. Monitor all parameter information of the unit. 2. Modify event log records and operating hours. 3. Edit the identities of Operator and Viewer, and the name of the unit 4. Originally has the authority to remotely operate and change system parameter settings, but this authority will automatically disappear once it is transferred to another account.
Operator	Has the authority to remotely operate the GCU-5K to change system parameter settings, and monitor all information of the Generator. The GCU-5K only allows one operator to log in.
Viewer	Only has the authority to monitor all information of GCU-5K which allow up to seven viewers to log in and monitor simultaneously.
Device Binded	All GCU-5K using remote monitoring must be bound by the device owner (Owner) first, and authorize the identity of the operator and monitor who are allowed to connect. KUTAI server will refuse remote monitoring connection for unbound GCU-5K and unauthorized account. (Refer to Section 6.4.3)
Owner Button	The Owner button is on GCU-5KC. The one who can touch the Owner button is considered the device owner (Refer to Section 2.3).
Onsite	Represents the device at the generator end, i.e., GCU-5KC + DP-70G
Remote	Represents a mobile device of an Operator or Viewer who has installed GenOnCall® APP.
	If this image is shown before a section paragraph, it represents Onsite operation
	If this image is shown before a section paragraph, it represents Remote operation
	If this image is shown before a section paragraph, only the "Owner" account can operate
	This image represents the "Owner" of GCU-5K.
Setting Permission	Italic type represents the text on the display screen

7.2 Remote Parameters Setting

Remote Parameters Setting is only executed by the Operator in *OFF* mode, otherwise, the option will automatically turn gray and not allow the setting operation, but you can still enter to view all parameter contents.

7.2.1 Engine Type

Press ⚙ ► Press *System Setting* ► press *Engine Type* ► click on *Non-Electronic Engine* or *Electronic J1939 Engine*

7.2.2 Voltage Paramaters Settings
7.2.2.1 Phase Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Voltage Setting* ► Press *Phase* ► Press correct option.
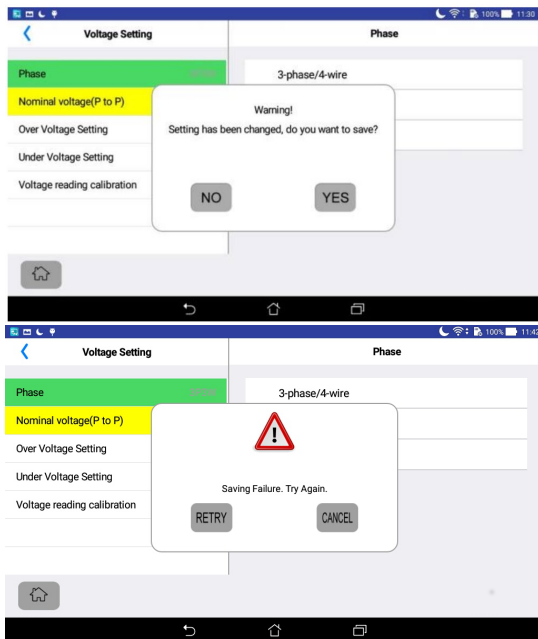
After setting is complete, pressing "<" to return the previous page or pressing 🏠 to return to the Home Page, or choosing any another Setting option, a window will pop up on the screen asking if you want to save the new setting. Press YES to save.

Save Change To Settings Has Failed

Press RETRY to execute save setting again.

Press CANCEL to abandon new setting value. Original setting will not be changed.

7.2.2.2 Nominal Voltage Setting 📱

Press ⚙️ ► *Press System Setting* ► Press *Voltage Setting* ► Press *Nominal Voltage (P to P)* ► Press setting boxes ► Use the keypad to input the voltage ► Press ↵ to enter.
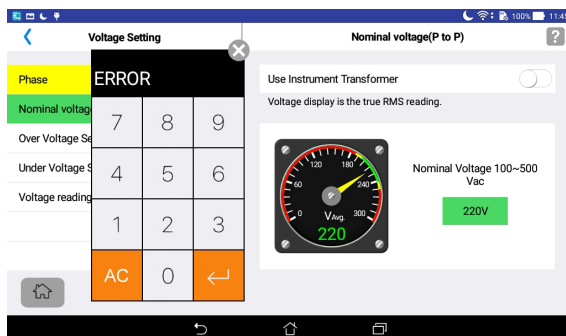
ERROR Warning

For all settings, if an entered value exceeds that allowed range then an "ERROR" warning will appear on the screen. Press AC to clear.

7.2.2.3 Over Voltage Protection Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Voltage Setting* ► Press *Over Voltage Setting* ► Turn ON *Over Voltage Warning* or *Over Voltage Shutdown* 🔘 ► Click on setting boxes ► Use the keypad to input the Over Voltage Protection values ► Press ↵ to enter.

7.2.2.4 Under Voltage Protection Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Voltage Setting* ► Press *Under Voltage Setting* ► Turn ON *Under Voltage Warning* or *Under Voltage Shutdown* 🔘 ► Click on setting boxes ► Use the keypad to input the Under Voltage Protection values ► Press ↵ to enter.

7.2.2.5 Abnormal Voltage Permitted Delay ⬛

Press ⚙️ ► Press *System Setting* ► Press *Voltage Setting* ► Press *Abnormal Voltage Permitted Delay Time* ► Click on setting boxes ► Use the keypad to input the abnormality confirmation time ► Press ⏎ to enter.

7.2.3   Current Parameters Settings
7.2.3.1 Current Transformer (CT) Setting ⬛

Press ⚙️ ► Press *System Setting* ► Press *Current Setting* ► Press *Current Transformer (CT) Setting* ► Turn ON *Current Transformer Installation* 🔛 ► Press the setting boxes ► Scroll to the primary and secondary current values for the current transformer used.
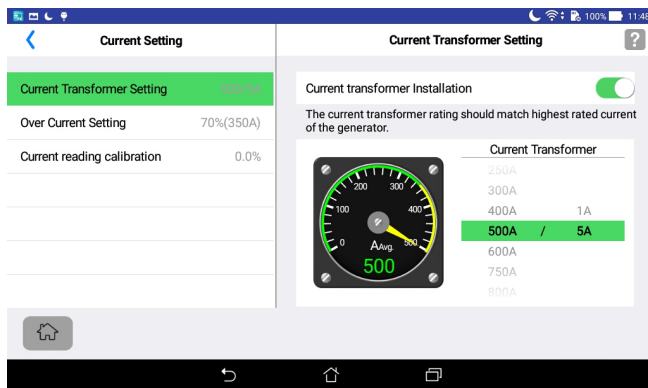
Current Transformer Setting screen

7.2.3.2 Over Current Protection Setting ⬛

Press ⚙️ ► Press *System Setting* ► Press *Current Setting* ► Press *Over Current Setting* ► Turn ON *Over Current Warning* or *Over Current Shutdown* 🔛 ► Press the setting boxes ► Use the keypad to input the Over Current Protection values and Permitted Delay time ► Press ⏎ to enter.

7.2.4   Frequency Parameters Settings
7.2.4.1 Over Speed Protection Setting ⬛

Press ⚙️ ► Press *System Setting* ► Press *Frequency Setting* ► Press *Over Speed Setting* ► Turn ON *Over Speed Warning* or *Over Speed Shutdown* 🔛 ► Press the setting box ► Use the keypad to input the Over Speed Protection values and Permitted Delay time ► Press ⏎ to enter.

7.2.4.2 Under Speed Protection Setting ⬛

Press ⚙️ ► Press *System Setting* ► Press *Frequency Setting* ► Press *Under Speed Setting* ►Turn ON *Under Speed Warning* or *Under Speed Shutdown* 🔛 ► Press setting boxes ► Use the keypad to input the Under Speed Protection values and Permitted Delay time ► Press ⏎ to enter the values.

7.2.4.3 Magnetic Pick-up Unit (MPU) Setting ⬛

Press ⚙️ ► Press *System Setting* ► Press *Frequency Setting* ► Press *Magnetic Pick-Up Setting* ►Turn ON *Use Magnetic Pick-Up* 🔛 ► Press *MPU Failure Warning* or *MPU Failure Shutdown* ► Press setting boxes ► Use the keypad to input the MPU Failure Permitted Delay time and Teeth of Flywheel ► Press ⏎ to enter the values.

7.2.5 Fuel Level Parameter Settings
7.2.5.1 Fuel Level Sender Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Fuel Level Setting* ► Press *Fuel Level Sender* ► Turn ON *Fuel Level Sender* 🟢 ► Select *Fuel Level Sender Failure Warning* or *Fuel Level Sender Failure Shutdown* ► Press setting boxes ► Use the keypad to input the values for *Fuel Level Sender Failure Permitted Delay time, Full Fuel Position Ohm* and *Empty Fuel Position Ohm* ► Press ⏎ to enter the values.

7.2.5.2 Low Fuel Level Protection Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Fuel Level Setting* ► Press *Fuel Level* Response ► Turn ON *Low Fuel Level Warning* or *Low Fuel Level Shutdown* 🟢 ► Press setting boxes ► Use the keypad to input the values for *Low Fuel Level Warming, Low Fuel Level Shutdown* and *Low Fuel Level Permitted Delay* time► Press ⏎ to enter.

7.2.5.3 Fuel Pump Parameters Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Fuel Level Setting* ► Press *Fuel Pump Control Setting* ► Turn ON Fuel Level to Start *Fuel Pump and* Fuel Level to Stop *Fuel Pump* 🟢 ► Press setting boxes ► Use the keypad to input the Fuel Pumpt activation values ► Press ⏎ to enter.

⚠ CAUTION

1. **To use the fuel pump control function, the main fuel tank must be equipped with a fuel level sender and set the User Defind output function.**
2. **When the fuel pump is in action, if the fuel volume of the main fuel tank fails to rise by 2% per minute, the control unit will automatically turn off the fuel pump and display the alarm message "Fuel Pump Failure "**

7.2.6 Temperature Parameter Settings

7.2.6.1 Temperature Sender Malfunction Protection 📱

Press ⚙ ► Press *System Setting* ► Press *Temperature Setting* ► Press *Temperature Sender Malfunction Protection* ► Turn ON *Temperature Sender Malfunction Protection* 🟢 ►Select *Temperature Sender Malfunction Warning* or *Shutdown* 🟢 ► Press setting boxes ► Use the keypad to input Failure Permitted Delay time ► Press ⏎ to enter.

7.2.6.2 Over Temperature Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Temperature Setting* ► Press *Over Temperature Setting* ► Turn ON *Over Temperature Warning* or *Over Temperature Shutdown* 🟢 ► Press setting boxes ► Use the keypad to input Over Temperature Warning or Shuntdown activation values and Permitted Delay time ► Press ⏎ to enter.

7.2.7 Oil Pressure Parameter Settings 📱
7.2.7.1 Oil Pressure Sender Malfunction Protection 📱

Press ⚙ ► Press *System Setting* ► Press *Oil Pressure Setting* ► Press *Oil Pressure Sender Malfunction Protection* ► Turn ON *Oil Pressure Sender Malfunction Protection* 🟢 ► Select Oil Pressure Sender *Malfunction Warning* or *Shutdown* ► Press setting boxes ► Use the keypad to input Permitted Delay time ► Press ⏎ to enter the value.

7.2.7.2 Low Oil Pressure Setting

Press [⚙] ► Press *System Setting* ► Press *Oil Pressure Setting* ► Press *Low Oil Pressure Setting* ► Turn ON *Low Oil Pressure Warning* or *Low Oil Pressure Shutdown* [⬤] ► Press setting boxes ► Use the keypad to input the Low Oil Protection values and Permitted Delay time ► Press [↵] to enter the values.

7.2.8   User Configurable Input and Output Settings
7.2.8.1 User Configurable Input F to K Settings 📱

When the Generator needs GCU-5K to add extra protective switches or monitoring contacts beyond the standard input function, User Configurable Input F to K can be set for use. If the newly added protection or monitoring signal category is not included in the setting selection items, then choose "*Other*". However, the person setting this should clearly indicate what kind of monitoring or fault message "*Other*" represents to avoid confusion for other users. Monitoring signals that are not related to unit protection functions should be set to *"None"* for fault protection mode.

Press [⚙] ► Press *System Setting* ► Press *User Configurable I/O Setting* ► Press *User Configurable Input F (G/H/J/K)* ► Press *Alarm Title* setting box ► Select kind of alarm signal input ► Click the check box [☑] to set *Signal type* and *Failure Action* mode ► Turn ON if *Protection during engine is running* [⬤] ► Press setting boxes ► Use the keypad to input the Permitted Delay time ► Press [↵] to enter the values.
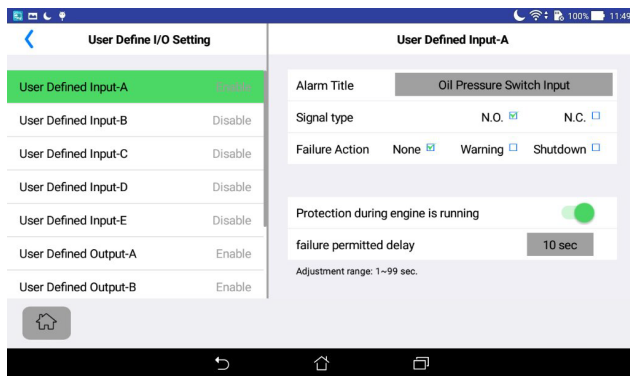
User Configurable Input F setting

7.2.8.2 User Configurable Output A to E Settings 📱

When the Generator requires additional control features beyond the GCU-5K standard output, or when a specific fault alarm signal output is needed from the GCU-5K, the User Congigurable Output A to E can be set for use.

Press [⚙] ► Press *System Setting* ► Press *User Configurable I/O Setting* ► Press *User Configurable Output A (B/C/D/E)* ► Select kind of alarm signal input

The Power Failure Simulation function is primarily used when the onsite ATS (Automatic Transfer Switch) lacks remote operation capabilities. Users can operate an external power failure simulation relay through the GCU-5K, simulating a common power outage to perform load testing of the ATS. However, users need to connect the control loop to the ATS panel themselves. If this function is required, please contact KUTAI Electronics or your supplier for assistance. To use the *Power Failure Simulation* function, the User Specified Output function option must be set to "*Power Failure Simulation*" output, otherwise, this function cannot be executed.

Power Failure Simulation operation:
Press [⚙] ► press Power Failure Simulation ► select Power Failure Simulation

Restoration of Normal Power operation:
Press [⚙] ► press Power Failure Simulation ► select Normal Power Restoration.

7.2.9　Engine Start / Stop Settings
7.2.9.1　Engine Start Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ► Press *Engine Start Setting* ► Press setting boxes ► Use the keypad to input values for *Start Attempts, Cranking Timer*, *Pre-Heat or Crankings Interval Timer* setting► Press ⤶ to enter the value ► Press *Genset Running Reminder* 🟢 ► Press settings boxes ► Use the keypad to input *Genset Running Reminder* time ► Press ⤶ to enter the value.

7.2.9.2　Engine Stop Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ► Press *Engine Stop Setting* ► Select engine stop method *Energized to Stop* or *Energized to Start* ► Press settings boxes ► Use the keypad to input values for engine *Stop Timer* ► Press ⤶ to enter.

7.2.9.3　Idle Running Time Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ►Press *Idle Running Time* ► Press setting box ► Use the keypad to input value for *Idle Timer* ► Press ⤶ to enter.

7.2.9.4　Engine Cool Down Timer Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ► Press *Engine Cool Down Timer* ► Press setting box ► Use the keypad to input value for *Engine Cool Down Timer* ► Press ⤶ to enter.

7.2.9.5　Engine Warming Time Setting 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ►Press *Engine Waring Time* ► Press setting box ► Use the keypad to input value for *Engine Waring Time* ► Press ⤶ to enter.

7.2.9.6　Detect Engine Startup Using Frequency from MPU 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ►Press *Detect Engine Startup Using Frequency from MPU* ► Click on *Yes* or *No*.

7.2.9.7　Detect oil pressure to confirm engine startup 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ► Press *Detect oil pressure to confirm engine startup* ► Turn ON *Detect oil pressure to confirm engine startup* 🟢 ► Press setting box ► Use the keypad to input value for Oil Pressure level to disengage starter motor ► Press ⤶ to enter the value.

NOTICE
Under normal circumstances, the oil pressure value for engine start should be greater than 25PSI, but there are exceptions. Refer to the generator operation manual before setting.

7.2.9.8　Detect Engine Startup Using Oil Pressure Switch 📱

Press ⚙️ ► Press *System Setting* ► Press *Engine Start / Stop Setting* ► Press *Detect Engine Startup Using Oil Pressure Switch* ► Click on *Yes* or *No*.

7.2.10 Battery and Charge Alternator Parameter Settings
7.2.10.1 Battery Voltage Abnormality Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Battery & Charge Alternator Setting* ► Press *Battery Voltage Warning Setting* ► Press settings boxes ► Use the keypad to input values for Battery Under Voltage and Over Voltage Warning ► Press ⤶ to enter【Battery Voltage Warnings are disabled during engine is cranking】.

7.2.10.2 Charge Alternator Malfunction Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Battery & Charge Alternator Setting* ► Press *Charge Alternator Setting* ► Turn ON *Charge Alternator D+ Terminals Minimun Voltage Setting* 🟢 ► Press setting box ► Use the keypad to input minimum Charge Alternator output voltage and permitted delay time ► Press ⤶ to enter ► Select *Warning* or *Shutdown* when Charge Alternator is Malfunction.

7.2.11 Communication Module Setting 📱

Press ⚙ ► Press *System Setting* ► Press *Communication Module* ► Press *Modbus KCU-05* ► Turn ON *Modbus application* 🟢 ► Click on the *Baud Rate* and *Parity Bit* and scroll to find the correct settings ► Press the *Slave Address* Setting box ► Use the keypad to input the module address ► Press ⤶ to enter.

7.2.12 Restore Factory Congiguration 📱

Press ⚙ ► Press *System Setting* ► Press *Restore Factory Congiguration* ► Press YES to restore all factory settings except for voltage and current calibration settings.

7.2.13 Event Log & Running Hours & KWH Meter 👥📱

Only the Owner will display the option for Erase Event log, Reset Running Hours and KWH meter to zero

Press ⚙ ► Press *System Setting* ► Press *Event Log, Running Hours & KWH Meter* ► Press *Erase Event Log*, Running Hours Setting or *Reset KWH Meter* ► Press YES can permanently erase the Event Log or reset Running Hours and KWH meter to zero.

7.2.14 Location Service

When the unit is in an area accessible by Google Wi-Fi location services, its current reference location can automatically be shared with Operator or Viewer. For precise location or in remote areas lacking sufficient Wi-Fi hotspots for Google triangulation, users can manually input the longitude and latitude via the GenOnCall® monitoring program for accurate positioning.

GCU-5K Automatic Location Services Setting: 📱
Press ⚙ ► Press *System Setting* ► Press *Location Service* ► Turn ON *Location Service* 🟢

GCU-5K Manual Location Services Setting: 📱
Press ⚙ ► Press *System Setting* ► Press *Location Service* ► Turn ON *Location Service* 🟢 ► Turn ON *Manually enter coordinates* 🟢 ► Press setting box ► Use the keypad to input Latitude and Longitude coordinates
Finding Longitude and Latitude Coordinates with Google Maps:
Open *Google Maps* Application ► Move *Map* to Find Accurate Installation Location of GCU-5K ► Long Press on the Map at that Position ► Longitude and Latitude Coordinates are displayed at the Top or Bottom of the Screen

Finding Longitude and Latitude Coordinates with Apple Maps:
Open *Apple Maps* Application ► Move *Map* to Find Accurate Installation Location of GCU-5K ► Long Press on the Map at that Position ► Swipe up on the screen to see the display of longitude and latitude coordinates

7.3 About This Unit 📱

Display the name, serial number and firmware version of GCU-5K, also Power Meter firmware version, DP-70G firmware version, and the GenOnCall® APP version for user reference.

7.4 Program Update

KUTAI will aperiodically provide updated firmware programs for GCU-5K or updated versions of the GenOnCall® APP for users to download and upgrade. When a smart device is connected to the GCU-5K, if the firmware update icon ⬇ is displayed in the top information bar, user can click on the firmware update icon ⬇ in STOP mode to remotely execute the local GCU-5K firmware update.

7.5 Remote Monitoring Service Fee
7.5.1 Terms of Use

When GCU-5K is first bound and used with the GenOnCall® APP, the system will automatically provide a 60 days free trial period for connection. After the free trial period, users can pay annual fee to continuous remote monitoring service, user should receive a payment notification through push notification seven days prior to the expiration of the current connection period.

Annual service fee

- 260 USD (7,200 NT) per unit for one year

7.5.2 Payment Methods
7.5.2.1 Payment on KUTAI Website

Open KUTAI website ► Click *Member Center* ► Log in with your member account/password ► Click *Service Payment* ► Click or fill in the *serial number* ► Click *Payment Plan* ► Click *Read and agree to terms of service* ► Click *SUBMIT* ► Select *Country* ► Click *Confirm Payment* ► Link to the third-party payment platform ► Select the payment method ► Complete the online payment operation

7.5.2.2 Payment via GenOnCall® APP

Open and log in to the GenOnCall® APP ► Click *Member Center* ► Log in with your member account/password ► Click *Service Payment* ► Click or fill in the *serial number* ► Click *Payment Plan* ► Click *Read and agree to terms of service* ► Click *SUBMIT* ► Select *Country* ► Click *Confirm Payment* ► Link to the third-party payment platform ► Select the payment method ► Complete the online payment operation

7.5.2.3 Counter Cash Payment

For those unable to make online payments, you may visit the KUTAI company counter in person, and a specialist will assist you with the cash payment process.

SECTION 8 : INTRODUCTION TO GCU-5K

8.1 Product Overview

The GCU-5K provides comprehensive protection for generator, along with functions like remote monitoring, location services, and push notifications for fault message. Users can directly operate from the local end (On-site) or access remote monitor or setting through GenOnCall® App in accordance with the required control conditions and protection functions for Generator. It is suitable for all generator on the market that need to have DC control protection.

8.2 Function and Features

- 7" color LCD panel, screen resolution 800 x 480, waterproof rating IP65.
- Provides 18 power measurement readings displayed in both digital and graphical needle meter mode. The graphical needle meter can be freely specified.
- Display interface options: Traditional Chinese, English, Japanese, Spanish.
- Integrated modular design equipped with emergency stop button saving assembly time and cost
- Built-in Wi-Fi for network connectivity, no additional modules required.
- Loudspeaker for Engine pre-start warming, support 10 languages.
- Supports reading and displaying ECU (SAE J1939) engine parameters.
- Equipped with internal timer to implement screen protection mode, extending the screen's lifespan.
- Automatic fuel supply control between main and reserve tanks.
- 5 user configurable DC outputs and 5 user configurable inputs
- Optional Modbus-RTU / Modbus-TCP/IP / SNMP / Ethernet communication module is available.
- Free iOS and Android GenOnCall® App for user to download
- Allows one operator and up to seven viewers to remotely operate, monitor the status, and adjust all relevant settings for the generator set via network access simultaneously.
- Using WPS, the GenOnCall® app can display the position of the generator set on the map.
- Offer push notifications for Start / Stop / Fault messages and up to 250 event logs for queries.

※ **The blue text indicates remote connection feature. KUTAI offers a 60 days free trial for the remote connection feature, allowing user to monitor the generator set anytime.**

8.3 Color LCD Displayed Contains

- AC power measurement readings – V(RMS), A(RMS), Hz, KW, KWH, KVA, KVAR, RPM & PF
- Running Hours / Maintenance Hours / Battery Voltage
- Coolant Water Temperature (˚C or ˚F), Oil Pressure (Psi or Bar) and Fuel Level (%)
- Records up to 250 events for Engine Start / Stop and all Fault Alarms

8.4 System Protections and Fault Alarms

- Full phase Over Voltage / Under Voltage and lost phase
- Current overload
- High Coolant Water Temperature
- Low Oil Pressure
- Engine Over Speed / Under Speed
- Low Fuel Level
- Low Coolant Water Level
- Charging Alternator failure
- Battery abnormal voltage
- Scheduled Maintenance notification
- Emergency Stop alarm
- Temperature, Oil Pressure and Fuel Level Sender Failure
- User configurable inputs

8.5 Electrical Characteristics

Item	Specification	Item	Specification
DC Power Input	9 – 40 Vdc	Fuel Level Sender	0 – 480 ohms
AC Power Input	15 – 500 Vac (Phase to Phase)	Rated CT Capacity	greater than 2.5VA
AC Power Frequency	50/60 Hz	CT Primary Side Ratio	50 - 3000A
Wi-Fi Protocol	IEEE802.11 b/g/n	CT Secondary Side Ratio	5A / 1A
Engine start signal output	5 Amp @ 12/24 Vdc	Magnetic Pickups (MPU)	2 – 70 Vac 100 – 10K Hz
Engine stop signal output	5 Amp @ 12/24 Vdc	D+ Excitation current	120mA @ 12Vdc
User Configurable Output A	5 Amp @ 12/24 Vdc		240mA @ 24Vdc
User Configurable Output B	5 Amp @ 12/24 Vdc	Static Power Dissipation	GCU-5KC: less than 1W
User Configurable Output C	5 Amp @ 12/24 Vdc		DP-70G: less than 3W
User Configurable Output D	5 Amp @ 12/24 Vdc	Operating Temperature	-20 to +60 ˚C
User Configurable Output E	5 Amp @ 12/24 Vdc	Relative Humidity	Max. 95%
Water Temperature Sender	VDO 0 to 120 ˚C	Maximum Vibration	5.0 Gs @60Hz
Oil Pressure Sender	VDO 0 to 150 PSI		

SECTION 9 : OPTIONAL ACCESSORIES

1.   Modbus-RTU communication module (KCU-05)
2.   SNMP communication module (KCU-06)
3.   Modbus-TCP/IP communication module (KCU-07)
4.   Ethernet (Dynamic IP) communication module (KCU-31)

For installation instructions, refer to the user manual of related KCU communication module.