



GV600 Series User Manual

EGPRS/LTE Cat-M1/LTE NB1/GNSS Tracker

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0. Revision History

Version	Date	Author	Description of Change
1.00	2016-12-02	Rayne Wu	Initial
1.01	2017-05-12	Louis Wang	Updating
1.02	2018-03-16	Arry Wang	Delete cargo sensor
1.03	2018-08-22	Arry Wang	Add 4G Product (GV600MA/ME)
1.04	2018-10-09	Arry Wang	Add function description
1.05	2019-02-14	Arry Wang	Modified contents
1.06	2019-04-01	Arry Wang	Modified contents

1. Introduction

The GV600 is a series of compact waterproof GPS trackers designed for a wide variety of vehicle tracking applications. They have multiple I/O interfaces that can be used for monitoring or controlling external devices, including a 1-wire interface used for temperature monitoring. Bluetooth 4.2 is supported (only for GV600M with the hardware version V1.02 or above). Virtual ignition detection and i-Button function are both supported by GV600 Series and GV600M Series. Their built-in GPS receiver has superior sensitivity and fast initial positioning. Different models allow the GV600 Series' location to be monitored in real time or periodically tracked by a backend server and mobile devices. System integration is straightforward as complete documentation is provided for the full featured @Track protocol. The @Track protocol supports a wide variety of reports such as emergency, geo-fence boundary crossings, and external power supply monitoring and scheduled GPS position reports.

1.1. Reference

Table 1. GV600 Series Protocol Reference

SN	Document Name	Remark
[1]	GV600 Series @Track Air Interface Protocol	The air protocol interface between GV600 Series and backend server. (This air protocol is only applicable to GV608/GV628W/GV648W).
[2]	GV600M Series @Track Air Interface Protocol	The air protocol interface between GV600M Series and backend server. (This air protocol is only applicable to GV600MA/GV600ME).

1.2. Terms and Abbreviations

Table 2. Terms and Abbreviations

Abbreviation	Description
AGND	Analogue Ground
AIN	Analogue Input
DIN	Digital Input
DOUT	Digital Output
GND	Ground
RXD	Receive Data
TXD	Transmit Data

2. Product Overview

2.1. GV600 Series Products

Table 3. Product Model

Model No.	Region	Technology	Operating Band (MHz)
GV608	Worldwide	GSM	GSM/GPRS: 850/900/1800/1900
GV628W	North America	HSPA/UMTS/GSM	GSM/GPRS: 850/1900 HSPA/UMTS: 850(B5)/1900(B2)
GV648W	Worldwide	HSPA/UMTS/GSM	GSM/GPRS: 850/900/1800/1900 HSPA/UMTS: 850(B5)/900(B8)/1900(B2)/2100(B1)
GV600MA	North America	LTE	LTE: B2/B4/B5/B12/B13
GV600ME	Europe	GSM/LTE	GSM/GPRS: 900/1800 LTE: B3/B8/B20

2.2. Parts List

Table 4. Parts List

Name	Description
GV600 Series Locator	135*62*38 mm
User Cable	GV600 Series standard cable
USB Configure Cable	USB to TTL serial port (optional accessory)
Power & GND Cable	Optional accessory
Temperature Sensor	Optional accessory
Fuel level sensor	Optional accessory

2.3. Interface Definition

The GV600 Series Tracker has an 18-pin interface connector which contains the connections for power, I/O, TTL, etc. The sequence and definition of the 18-pin connector are shown in the following figure:



Figure 1. The 18-pin Connector on the GV600 Series

Table 5. Description of 18-pin Connections

Index	Description	Comment
1	PWR1	Primary Power 8-32V
2	PWR2	Secondary Power 8-32V
3	AGND	Primary Analogue Ground
4	AGND	Secondary Analogue Ground
5	IGN	Ignition Detection Input, Positive Trigger
6	ADIN1	Analogue Input 0-32V
7	OUT_3V3	External Accessory Power 400mA Max
8	GND	External Accessory Ground
9	1_WIRE	Temperature Sensor Input
10	NC	NC
11	OUT/IN1	Negative trigger input1 for normal use or Open drain output1 150mA max drive current
12	OUT/IN2	Negative trigger input2 for normal use or Open drain output2 150mA max drive current
13	OUT/IN3	Negative trigger input3 for normal use or Open drain output3 150mA max drive current
14	OUT/IN4	Negative trigger input4 for normal use or Open drain output4 150mA max drive current
15	EX_RX	UART RXD RS232
16	EX_TX	UART TXD RS232
17	RXD	UART RXD TTL
18	TXD	UART TXD TTL

2.4. GV600 Series Standard Cable Color

Table 6. GV600 Series Standard Cable Color Definition

Definition	Color	Pin No.	Connector	Pin No.	Color	Definition
PWR1	Red	1		2	Red/Green	RWR2
AGNG	Black	3		4	Black	AGNG
IGN	White	5		6	Green	ADIN1
OUT-3V3	Red/White	7		8	Black/White	GND
1-WIRE	Gray	9		10	NC	NC
OUT/IN1	Blue	11		12	Yellow	OUT/IN2
OUT/IN3	Brown	13		14	Orange	OUT/IN4
EX_RX	Purple	15		16	Purple/White	EX_TX
RXD	Pink	17		18	White/Black	TXD

Note:

The main color of the dual color cable is the first color, for example, Black/White means black is the main color, and white is the secondary color.

3. Getting Started

3.1. Open and Close the Case



Figure 2. Open the Case

To open: Use a cross screwdriver to loosen the four screws and then lift the top case gently.

To close: Align the top case with the bottom case and then tighten the four screws.

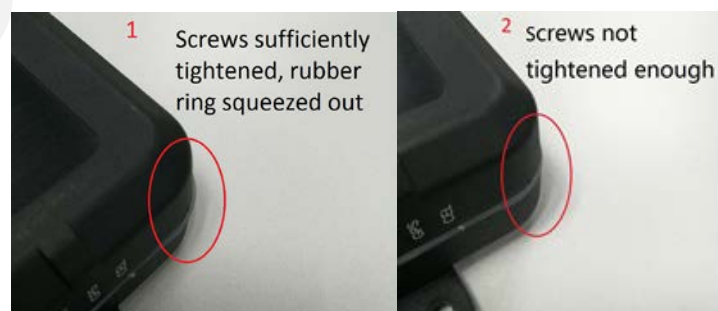
Note:

Pay attention to the following details to close the case. Otherwise, the waterproof capability of the device may be deteriorated.

1. The positioning poles (total 11) on the top cover must be inserted into the holes of the rubber ring as shown below.



2. Tighten the screws sufficiently until the rubber ring is squeezed out as shown in the following figure 1.



3.2. Install a SIM Card

Open the case and ensure the unit is powered off (unplug the 18-pin cable and switch the internal battery to the OFF position). Insert the SIM card into the holder. Take care to align the cut mark and ensure the SIM card is pushed into the SIM holder completely. Close the case.



Figure 3. SIM Card Installation

3.3. Install the Internal Backup Battery

GV600 Series has an internal backup Li-ion battery (5200mAH).



Figure 4. Backup Battery Installation

3.4. Power Supply Connection

PWR (pin 1 or pin 2)/GND (pin 3 or pin 4) are the power input pins. The input voltage range is from 8V to 32V. The device is designed to be installed in vehicles that operate on 12V or 24V systems without the need of external transformers.

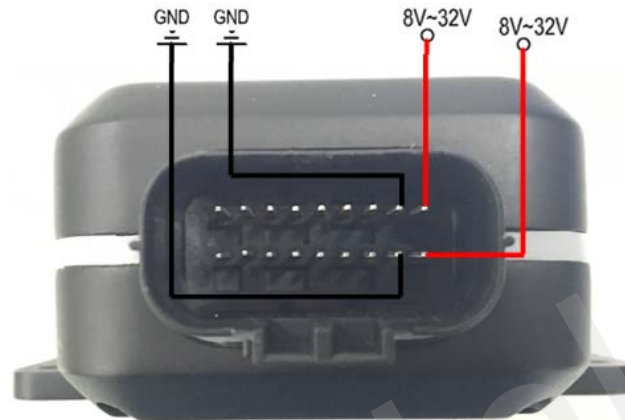


Figure 5. External Power Supply Connection

3.5. Ignition Detection

Table 7. Electrical Characteristics of Ignition Detection

Logical Status	Electrical Characteristics
Active	5.0V to 32V
Inactive	0V to 3V or open loop

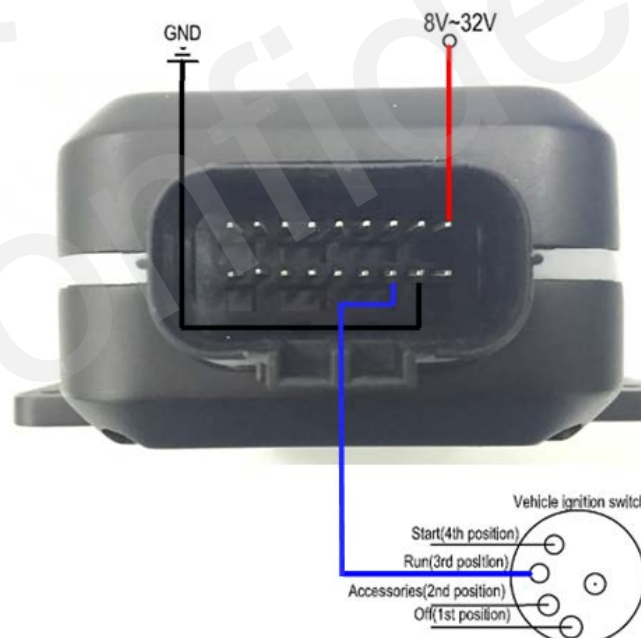


Figure 6. Typical Ignition Detection

IGN (pin 5) is used for ignition detection. It is recommended to connect this pin to the “RUN”

position of the vehicle ignition switch as shown above.

An alternative to connect to the ignition switch is to find a non-permanent power source that is only available when the vehicle is running, for example, the power source for the FM radio.

IGN signal can be configured to transmit information to the backend server when ignition is on and enter the power saving mode when ignition is off.

3.6. Digital Inputs

There are four general purpose digital inputs on GV600. They all are negative triggers.

Table 8. Electrical Characteristics of the Digital Inputs

Logical Status	Electrical Characteristics
Active	0V to 0.8V
Inactive	Open loop

The following picture shows the recommended connection of a digital input.

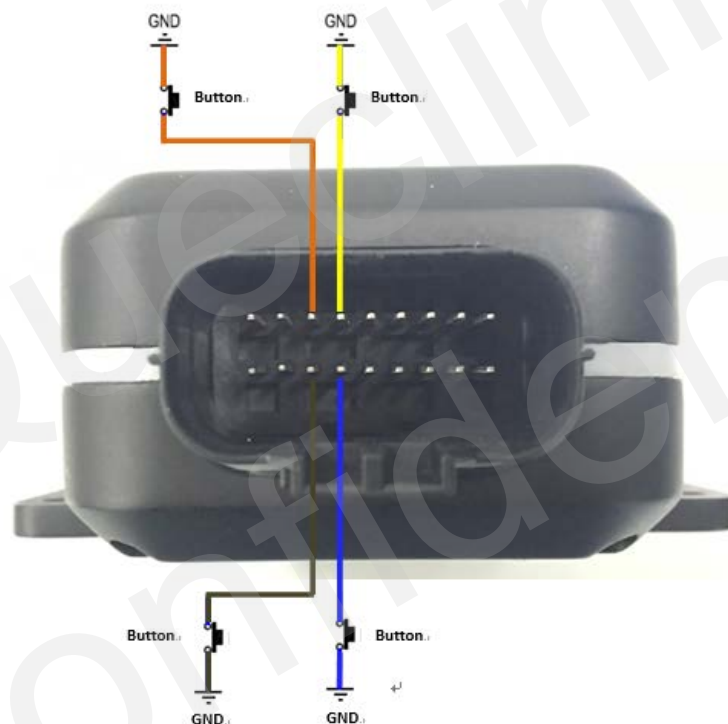


Figure 7. Typical Digital Input Connection

3.7. Analogue Inputs

There is one analogue input on GV600 Series, and the analogue input voltage range is from 0 to 32V. The following picture shows the recommended connection.

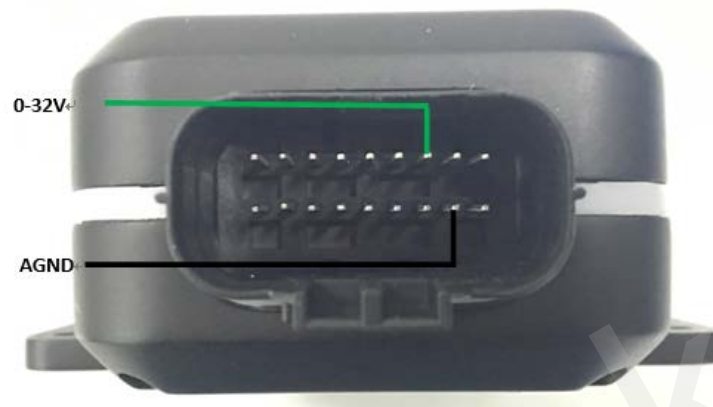


Figure 8. Typical Analogue Input Connection

Note:

Pin 6 is a multifunction pin: it can be configured as an analogue input.

3.8. Digital Outputs

There are four digital outputs on GV600 Series. All are of open drain type and the maximum drain current is 150 mA. Each output has a built-in over current PTC resettable fuse.

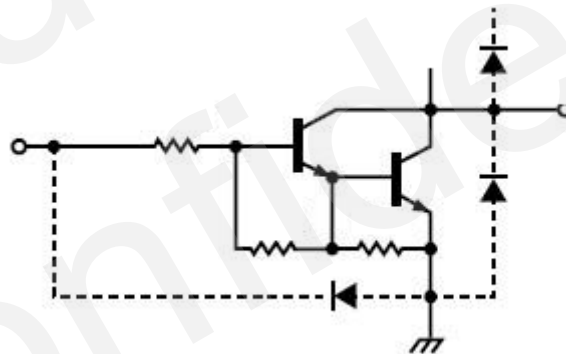


Figure 9. Digital Output Internal Drive Circuit

Table 9. Electrical Characteristics of Digital Outputs

Logical Status	Electrical Characteristics
Enable	<1.5V @150 mA
Disable	Open drain

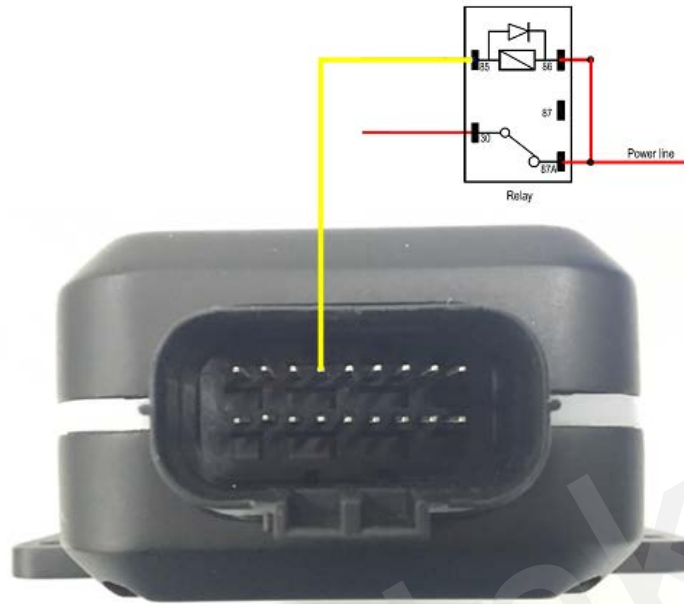


Figure 10. Typical Connection with a Relay



Figure 11. Typical Connection with a LED

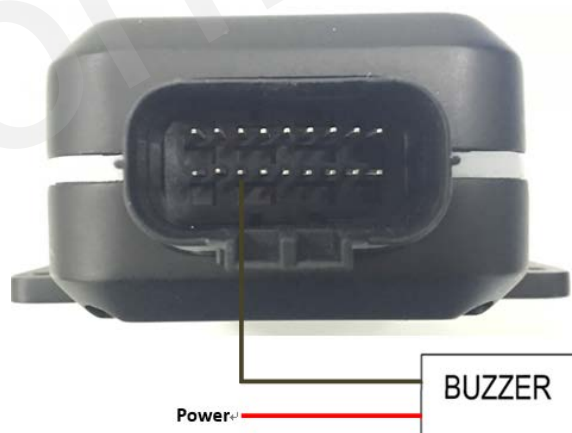


Figure 12. Typical Connection with a Buzzer

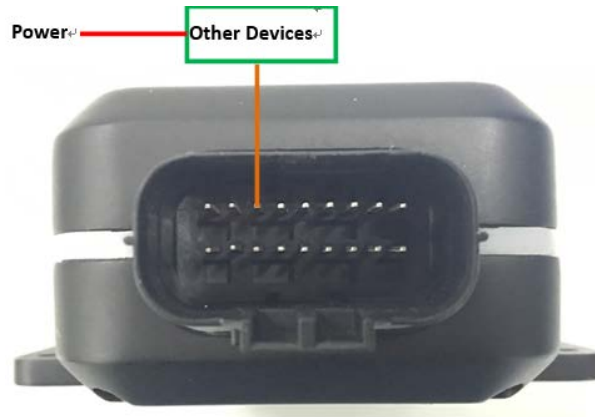


Figure 13. Typical Connection with Other Devices

Note:

Pay attention to the polarity of the relay if it is pre-installed with an internal flyback diode during connection. Install an additional diode externally if there is no pre-installed internal diode. A common diode such as a 1N4004 one will work in most circumstances.

3.9. Device Status and LED

Table 10. Definition of Device Status and LED

LED	Device Status	LED Status
CELL (Note 1)	Device is searching CELL network.	Fast flashing (Note 3)
	Device has registered to CELL network.	Slow flashing(Note 4)
	Device goes into sleep mode.	OFF
	SIM card needs pin code to unlock.	ON
GPS (Note 2)	GPS chip is powered off.	OFF
	GPS sends no data or data format error occurs.	Slow flashing
	GPS chip is searching GPS info.	Fast flashing
	GPS chip has gotten GPS info.	ON
PWR (Note 2)	No external power and internal battery voltage is lower than 3.46V.	OFF
	No external power and internal battery voltage is below 3.6V.	Slow flashing
	External power in and internal battery is charging.	Fast flashing
	External power in and internal battery is fully charged.	ON



Figure 14. GV600 Series LEDs on the Case

Note:

1. CELL LED cannot be configured.
2. GPS LED and PWR LED can be configured to turn off by using the configuration tool.
3. Fast flashing: for CELL LED is about 100ms ON/800ms OFF; for GPS LED and PWR LED is about 100ms ON/100ms OFF.
4. Slow flashing: for CELL LED is about 100ms ON/2000ms OFF; for GPS LED and PWR LED is about 600ms ON/600ms OFF.

3.10. Temperature Sensor Interface

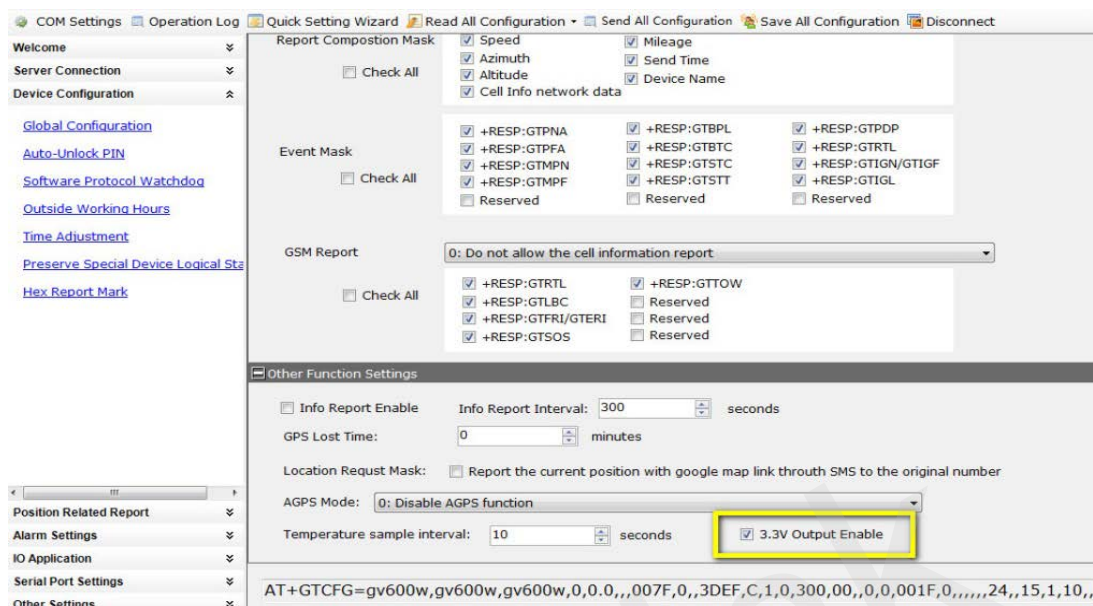
- If the cable of temperature sensor has three wires, connect the temperature sensor to GV600 following the diagram and table as below:



GV600	18-pin Cable Color	Description	Temp Sensor DS18B20
OUT_3V3	Red/White (pin 7)	Connect the red wire of temperature sensor to pin 7 of GV600	1-Wire power (RED)
GND	Black/White (pin 8)	Connect the green wire of temperature sensor to pin 8 of GV600	1-Wire ground (GREEN)
1_WIRE	Gray (pin 9)	Connect the yellow wire of temperature sensor to pin 9 of GV600	1-Wire data (YELLOW)

Note:

Please make sure to enable the “3.3V Output Enable” first in the Global Configuration in Manage Tool of GV600 Series devices (refer to the images captured below), then this pin (pin 7) can output the corresponding voltage.



- If the cable of temperature sensor has two wires, connect the temperature sensor to GV600 following the diagram and table as below:

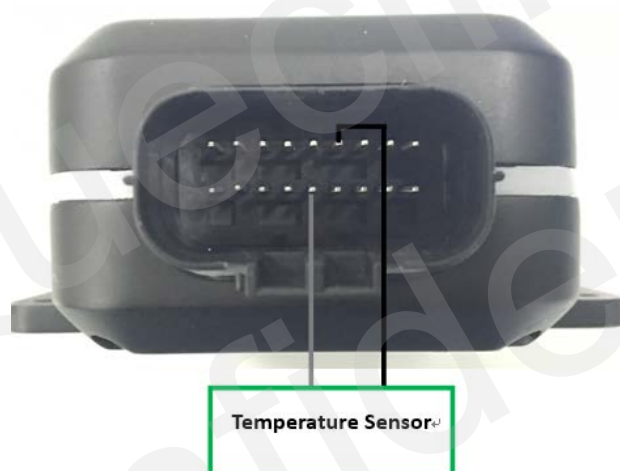


Figure 15. Typical Connection with a Temperature Sensor

GV600	18-Pin Cable Color	Description	Temp Sensor
GND	Black/White (pin 8)	Connect the ground wire of temp sensor to pin 8 of GV600	1-Wire ground (Green)
1_WIRE	Gray (pin 9)	Connect the data wire of temp sensor to pin 9 of GV600	1-Wire data (Yellow)

3.11. Serial Port/UART Interface

There are two lines dedicated to the Serial Port/UART interface (TXD and RXD). TXD and RXD are standard TTL signal.

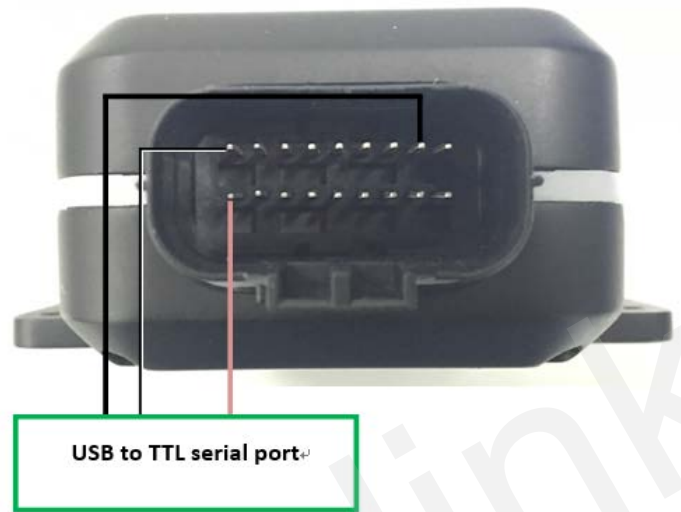


Figure 16. Typical Connection with USB to TTL Serial Port

4. Supported Peripheral List

Name	Description
Temperature Sensor	1-Wire temperature sensor DS18B20
Fuel level Sensor	Digital RS232 (DUT-E COM Protocol) Ultrasonic fuel level sensor UFS300
Bluetooth Sensor	BLE 4.2 protocol supported
iButton	Supported (should be used with iButton reader)

5. GV600 Series Certification



5.1. FCC Certification

GV600 Series has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

This device complies with part 15B, part 22 and part 24 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; (2) this device must accept any interference, including interference that may cause undesired operation.

Power output is ERP for part 22 and EIRP for part 24. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions to satisfy RF exposure compliance.

GV628W FCC IDENTIFIER: 2AJCR-GV628W

5.2. European CE

GV600 Series has been manufactured in accordance with the European R&TTE directive. This product complies with the European CE/LVD (Low-Voltage Directive; 2006/95/EC) standard (IEC 60950-1: 2005 (2nd Edition)+A1: 2009; EN 60950-1: 2006+A11: 2009+A1: 2010).