GV350CEU User Manual

GSM/GPRS/LTE CAT1/GNSS Tracker

TRACGV350CEUUM006

Version: 1.06

Driving Smarter IoT

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0. Revision History

Version	Date	Author	Description of Change
1.00	2021-09-28	Willie Liu	1. Initial.
1.01	2023-07-14	Forrest Cao	1. Added note for using 1-WIRE.
1.02	2023-11-09	Elvin Shen	1. Added description for CAN LED status.
1.03	2023-12-20	Willie Liu	1. Added some notes for using 1-WIRE.
1.04	2024-02-23	Willie Liu	1. Added the wiring scheme.
1.05	2024-05-23	Willie Liu	1. Modified the terms and abbreviations in chapter 1.2.
1.06	2025-02-21	Rita Pan	1. Modified wiring scheme.

1. Introduction

The GV350CEU is a compact GNSS tracker designed for a wide variety of vehicle tracking applications. It has multiple I/O interfaces that can be used for monitoring or controlling external devices. Its built-in GNSS receiver has superior sensitivity and fast time to first fix. Its six-band LTE-FDD in Europe and GSM/GPRS 850/900/1800/1900 MHz allowing the GV350CEU's location to be monitored in real time or periodically tracked by a backend server and mobile devices. Its built-in 3-axis accelerometer allows driving behaviour monitoring, motion detection and extended battery life through sophisticated power management algorithms. It also has built-in CAN Module. System integration is straightforward as complete documentation is provided for the full featured @Track protocol. The @Track protocol supports a wide variety of reports including emergency, geo-fence boundary crossings, driving behaviour, low battery and scheduled GNSS position.

1.1. Reference

Table 1. GV350CEU Protocol Reference

SN	Document Name	Remark
[1]	GV350CEU @Track Air Interface Protocol	The air protocol interface between GV350CEU and backend server.

1.2. Terms and Abbreviations

Table 2. Terms and Abbreviations

Abbreviation	Description
AIN	Analog Input
IGN	Ignition input, positive trigger
/IN	Digital input, negative trigger
DATA-1W	Data for one wire
VDD-1W	VDD for one wire
PWR	External DC power input
OUT	Digital Output
GND	Power and digital ground
RXD	Receive Data
TXD	Transmit Data

2. Product Overview

2.1. Check Parts List

Before starting, check whether all the following items have been included with your GV350CEU. If anything is missing, please contact the supplier.

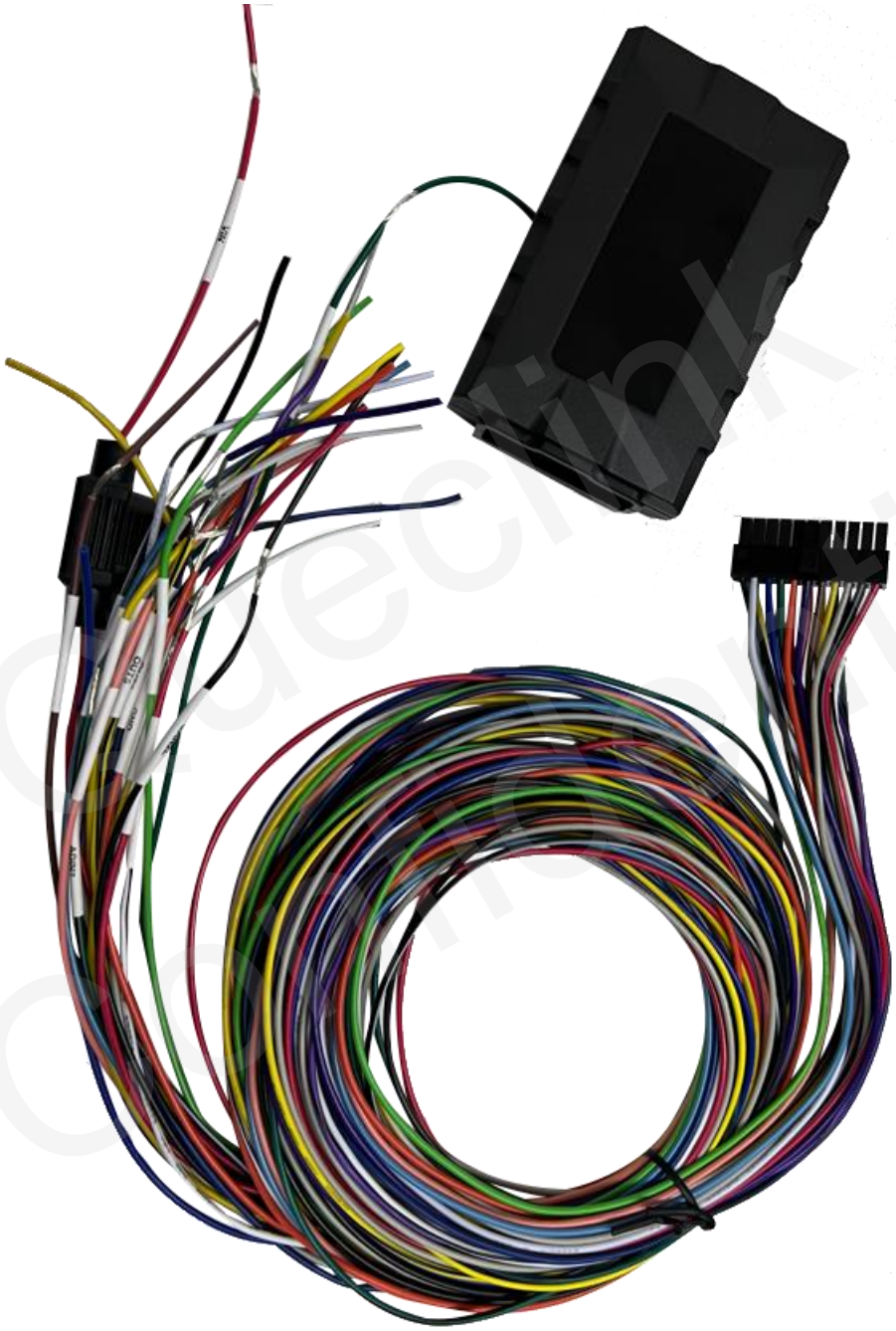
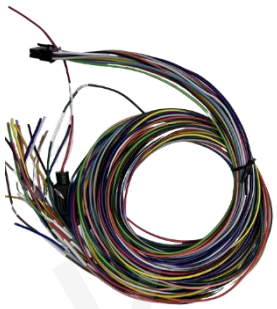


Figure 1. Appearance of GV350CEU

2.2. Parts List

Table 3. Parts List

Name	Picture
GV350CEU Locator	94*58.5*21 mm
User Cable	
DATA_CABLE_W (Optional)	
Power Protection Cable_Kit (Optional)	

2.3. Interface Definition

The GV350CEU has a 22 PIN interface connector which contains the connections for power, I/O, RS232, etc. The sequence and definition of the 22-PIN connector are shown in the following figure:

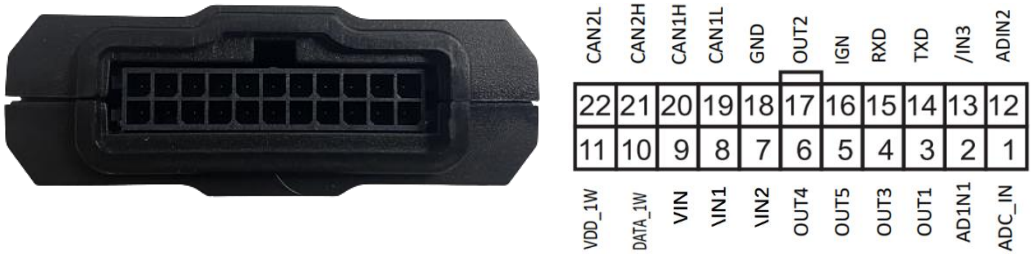
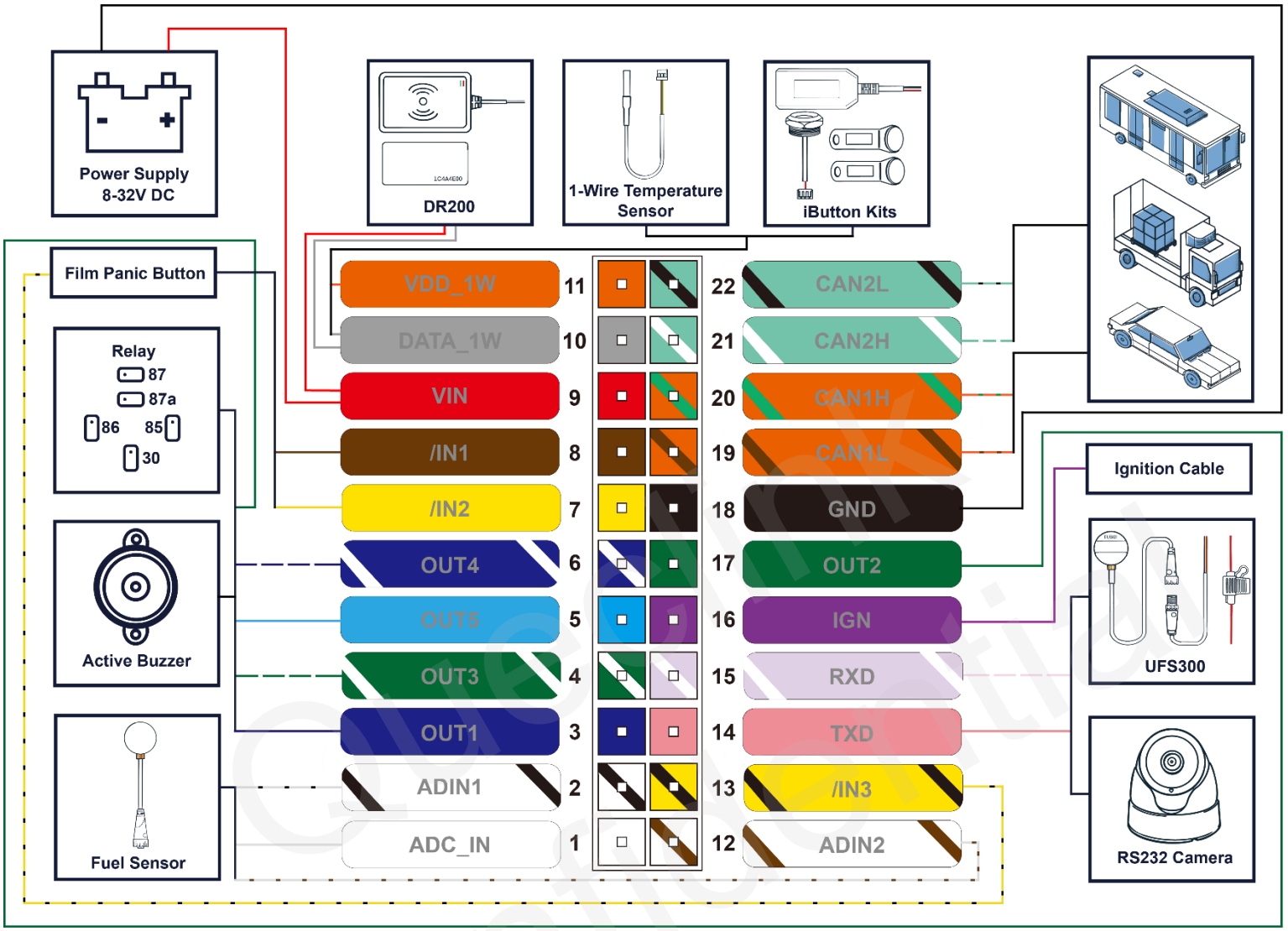


Figure 2. 22-PIN Connector on GV350CEU

Table 4. Description of 22 PIN Connections

Description	PIN Name	PIN No	Cable	PIN No	PIN Name	Description
VDD for one wire	VDD_1W	11		22	CAN2L	CAN 2 negative
Data for one wire	DATA_1W	10		21	CAN2H	CAN 2 positive
External DC power input, 8-32V	VIN	9		20	CAN1H	CAN 1 positive
Digital input, negative trigger	/IN1	8		19	CAN1L	CAN 1 negative
Digital input, negative trigger	/IN2	7		18	GND	Power and digital ground
Digital output	OUT4	6		17	OUT2	Digital output
Digital output	OUT5	5		16	IGN	Ignition input, positive trigger
Digital output	OUT3	4		15	RXD	UART RXD, RS232
Digital output, Open drain, 150 mA max, with latch circuit	OUT1	3		14	TXD	UART TXD, RS232
Analog input (0-16V)	ADIN1	2		13	/IN3	Digital input, Negative trigger
Analog input (0-30V)	ADC_IN	1		12	ADIN2	Analog input (0-16V)

2.4. Wiring Scheme



3. Get Started

3.1. Open the Case

Figure 3. Open the Case

Remove the screws on the four corners with the screwdriver to open the device.

3.2. Close the Case

Figure 4. Close the Case

Tighten the screws on the four corners with the screwdriver to close the device.

3.3. Install a SIM Card

Open the case and ensure the unit is not powered. Slide the holder right to open the SIM card holder. Insert the SIM card into the holder as shown below with the gold-colored contact area facing down. Take care to align the cut mark. Close the SIM card holder. Close the case.

Figure 5. SIM Card Installation

3.4. Install the Internal Backup Battery

Figure 6. Backup Battery Installation

GV350CEU has an internal backup Li-ion battery.

3.5. Power Connection

PWR (PIN9)/GND (PIN18) are the power input pins. The input voltage range for this device is from 8V to 32V. The device is designed to be installed in common vehicles that operate on 12V or 24V systems without the need for external transformers. But it is recommended to use Power Protection Cable Kit if it is installed in a truck with 24V battery.

Figure 7. Typical Power Connection

3.6. Power On

Please pay attention to the following situations when powering on the device:

1. Backup battery is connected to the device:

- The device can be powered on when the USB cable is connected.
- The device can be powered on when the external power supply is connected.

2. Backup battery is not connected to the device:

- The device cannot be powered on when the USB cable is connected only.
- The device can be powered on when the external power supply is connected only.

3.7. Ignition Detection

Table 5. Electrical Characteristics of Ignition Detection

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

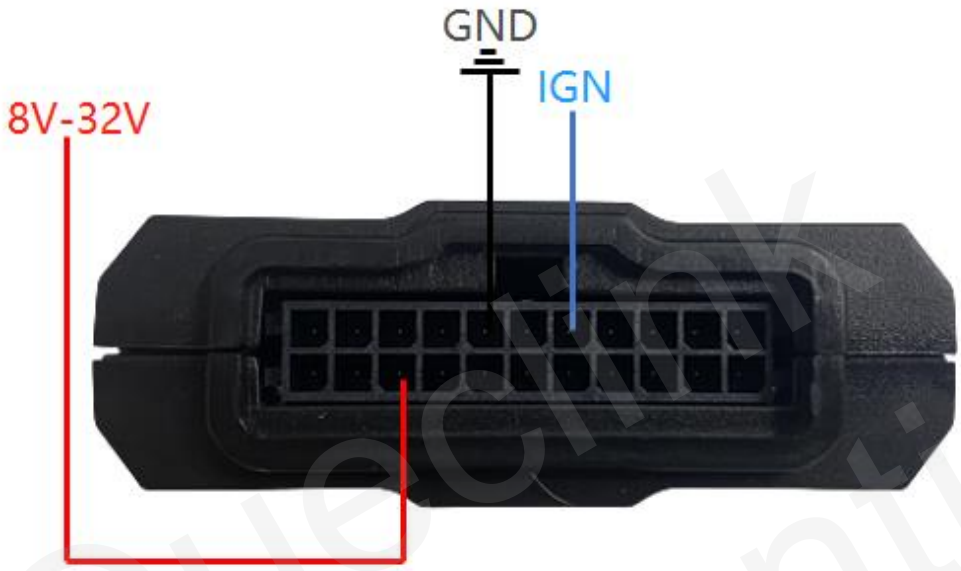


Figure 8. Typical Ignition Detection

IGN (Pin16) is used for ignition detection. It is strongly recommended to connect this pin to ignition key “RUN” position as shown above.

An alternative to connecting 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 start transmitting information to the backend server when ignition is on, and enter the power saving mode when ignition is off.

3.8. Digital Inputs

There are three general purpose digital inputs on GV350CEU. They are all negative triggers.

Table 6. Electrical Characteristics of Digital Inputs

Logical Status	Electrical Characteristics
Active	0V to 0.6V
Inactive	Open

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

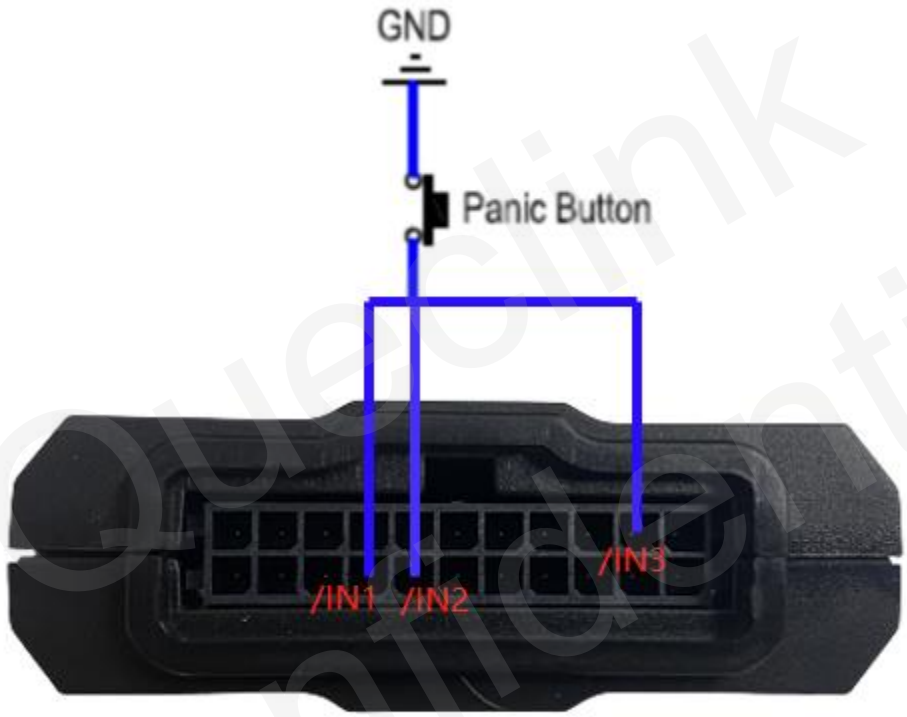


Figure 9. Typical Digital Input Connection

3.9. Analog Inputs

There are three analog inputs on GV350CEU, and the analog input voltage ranges are 0-16V and 0-30V. The following figure shows the recommended connection.

Figure 10. Typical Analog Input Connection

Note:

1. For PIN 12 and PIN2, the voltage range is 0-16V.
2. For PIN 1, the voltage range is 0-30V.

3.10. Digital Outputs

There are five digital outputs on GV350CEU. All five digital outputs are of open drain type and the maximum drain current is 150mA. Each output has the built-in over current PTC resettable fuse.

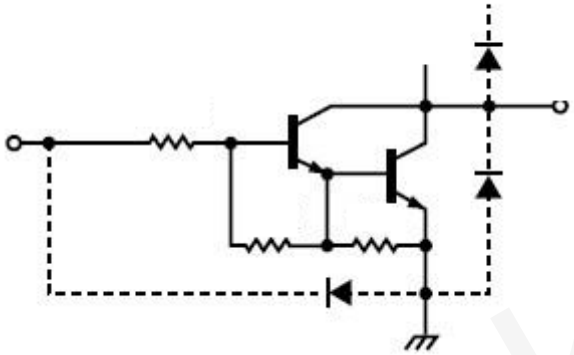


Figure 11. Digital Output Internal Drive Circuit

Table 7. Electrical Characteristics of Digital Outputs

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

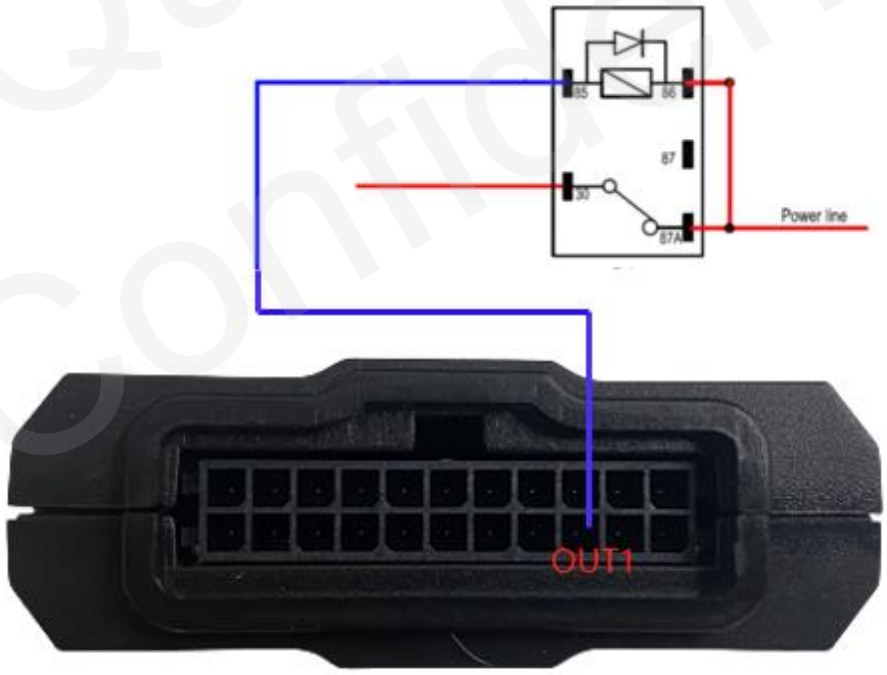


Figure 12. Typical Connection with Relay

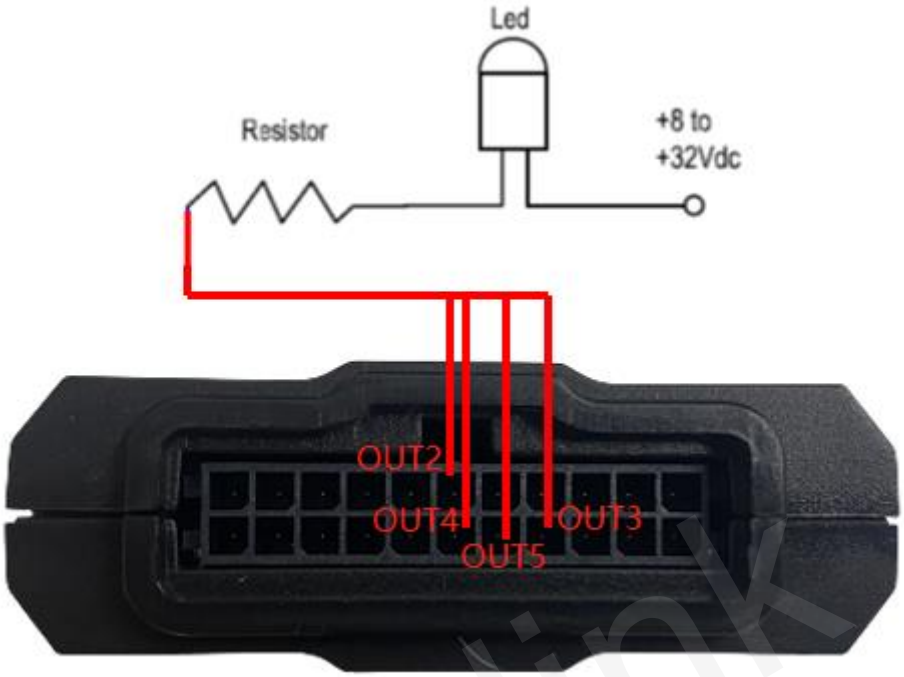


Figure 13. Typical Connection with LED

Note:

1. OUT1 will latch the output state during reset.
2. Many modern relays come with a flyback diode pre-installed internal to the relay itself. If the relay has this diode, please ensure the relay polarity is properly connected. If this diode is not internal, it should be added externally. A common diode such as a 1N4004 will work in most circumstances.

3.11. Device Status LED

Figure 14. GV350CEU LED on the Case

Table 8. Definition of Device Status and LED

LED	Device Status	LED Status
CAN	Operating mode, CAN-bus or J1708 active (only one of those)	The green LED blinks once every second.
	Operating mode, CAN-bus(es) and J1708 sleep or disabled	The green LED blinks once every 4 seconds.
	Operating mode, two buses active (2 CAN-buses, or CAN-bus and J1708)	The green LED blinks twice every second.
	Low power mode (sleep)	OFF
	CAN-bus codes synchronization	The red LED blinks quickly (ca.7times per second).
	CAN-bus codes synchronization finished successfully.	Green ON (after synchronization)
	CAN-bus codes synchronization failed (CAN-bus wires are properly connected, but codes have not been recognized).	Red ON (after synchronization)
	CAN-bus codes synchronization failed (no CAN-bus connection or CAN-bus sleep).	The red LED blinks 0.5s. The green LED blinks 0.5s.
	Invalid configuration (e.g. vehicle not synchronized)	The red LED blinks once every 2 seconds.
	The device failed to power on. Return the device to the producer for diagnosis.	Red ON (after power-on)
GNSS	GNSS chip is powered off.	OFF
	GNSS sends no data or data format error occurs.	Slow flashing
	GNSS chip is searching GNSS information.	Fast flashing
	GNSS chip has gotten GNSS information.	ON

CEL	The device is searching network.	Fast flashing
	The device has been registered on the network.	Slow flashing
	The SIM card needs PIN code to unlock.	ON
PWR	No external power and internal battery voltage is lower than 3.6V.	OFF
	No external power and internal battery voltage is below 3.7V.	Slow flashing
	The external power supply has been connected to the device and the internal battery of the device is charging.	Fast flashing
	The external power supply has been connected to the device and the internal battery of the device is fully charged.	ON

Note:

1. CEL LED, GNSS LED and PWR LED lights can be configured to be turned off after a period time by using the configuration tool.
2. Fast flashing: For CEL LED, it is about 60 Ms ON/780 Ms OFF. For GNSS LED and PWR LED, it is about 100 Ms ON/100 Ms OFF.
3. Slow flashing: For CEL LED, it is about 60 Ms ON/1940 Ms OFF. For GNSS LED and PWR LED, it is about 600 Ms ON/600 Ms OFF.

3.12. Serial Port/UART Interface

There are two lines dedicated to the Serial Port/UART interface (TXD and RXD). TXD/RXD is standard RS232 signal.

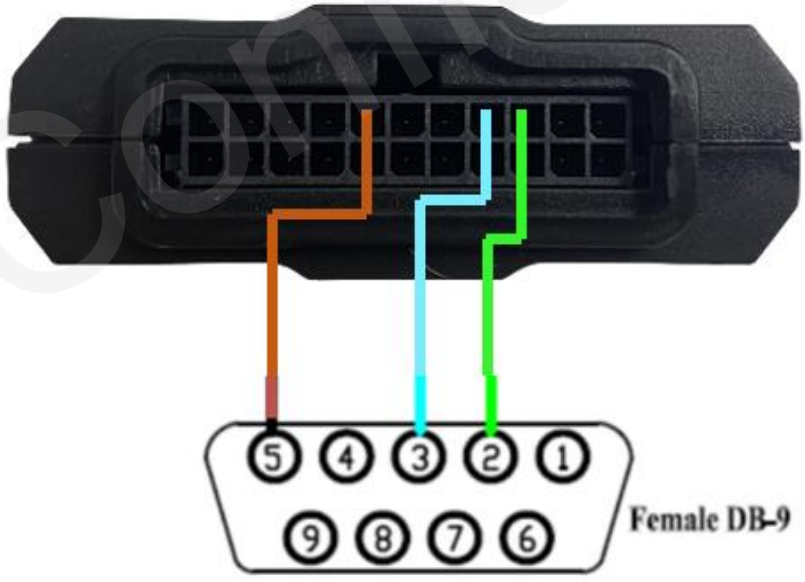


Figure 15. Typical Connection with RS232 Port

3.13. 1-WIRE Interface

There are two lines dedicated to the 1-WIRE, one is VDD-1-WIRE and the other is DATA-1-WIRE. The following diagram shows the recommended connection of 1-wire device.

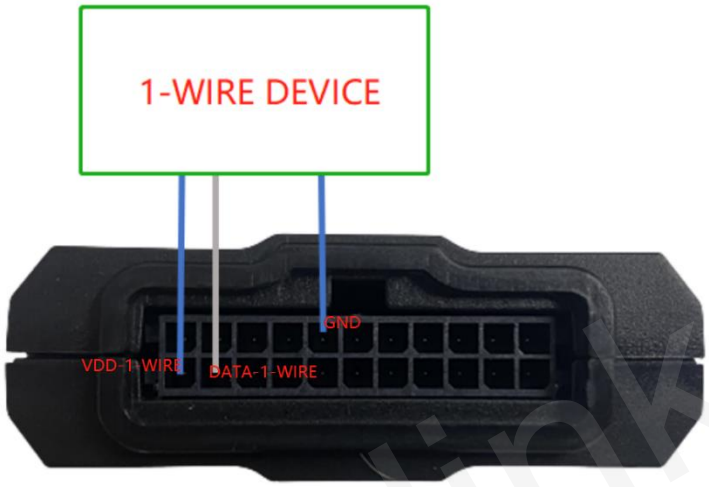


Figure 16. 1-WIRE Interface

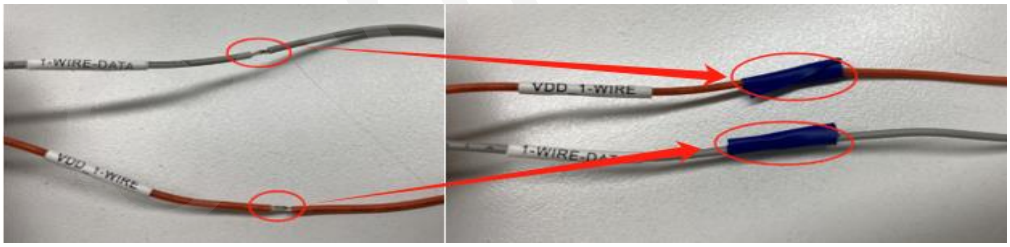
Note:

1. **Before connecting and removing accessories, please power off the device first.**

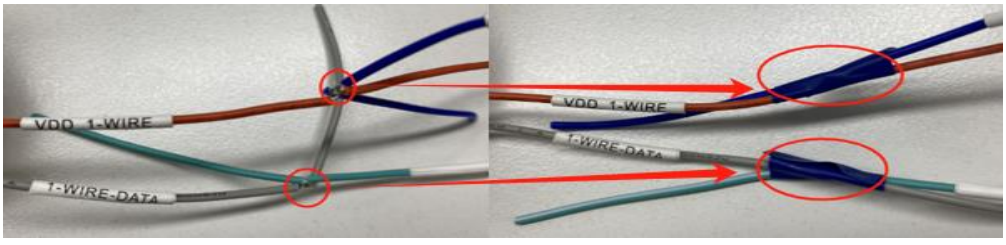
2. Please keep the voltage on the VDD-1-WIRE and DATA-1-WIRE to **no more than 5.5V** when using 1-WIRE.

3. Avoid short circuits in VIN (or high voltage signal cable), GND and VDD_1_WIRE/DATA signal cables. Short circuits may damage the 1-WIRE chip and cause device abnormality.

4. When the 1-WIRE function is not used, please wrap the VDD_1_WIRE/DATA signal cable with insulation tape to avoid contact with other high-voltage signal cables or GND.



5. When using 1-WIRE, please wrap the VDD_1_WIRE/DATA connection with insulation tape.



3.14. Motion Sensor Direction

GV350CEU has an internal 6-axis gyroscope sensor supporting driving behavior monitoring, crash detection and motion detection. The following shows the directions of the motion sensor:

Figure 17. Motion Sensor Direction

Note:

1. The opposite direction of the cable harness is the positive direction of the X-axis.
2. The Z-axis is in positive direction above the label surface.
3. The positive directions of the three axes are perpendicular to each other, as shown in the figure.

4. CAN Installation

4.1. CAN Interface

There are two CAN interfaces, CAN2L/CAN2H, CAN1L/CAN1H. And CAN2 can also be connected to the J1708 interface of the vehicle.

Figure 18. CAN Interface

4.2. Installation Diagram

4.2.1. General Connection Diagram for Passenger Cars

Generally, CAN1 and CAN2 interfaces in GV350CEU can be connected to a passenger car's CAN-bus interface and OBD interface, as shown below.

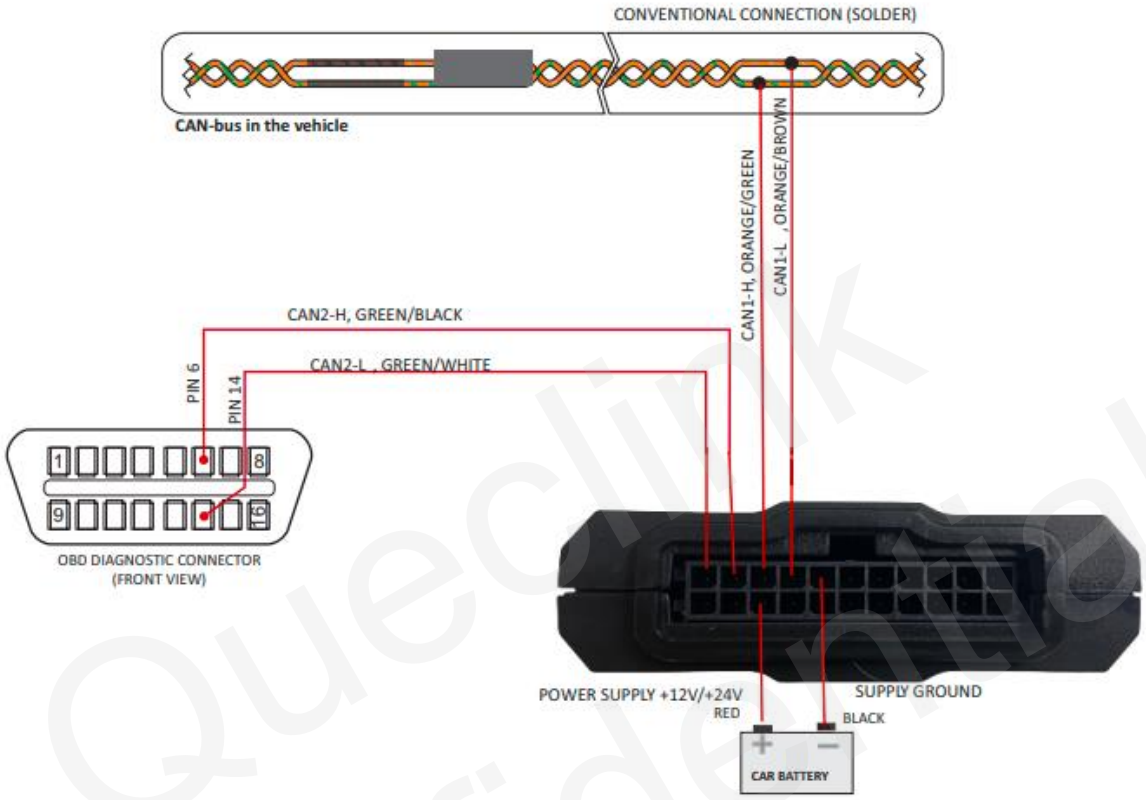


Figure 19. For Passenger Cars

Note:

There is an installation manual for every supported car model. It is crucial to connect CAN1 wires to particular vehicle's CAN-bus. Connecting to invalid CAN-bus may result in partial or total loss of logistic data.

When, due to installation manual of particular car model, CAN1 is to be connected to OBD pins 6&14, connection of CAN2 shall be void.

4.2.2. Connection Diagram for Trucks with J1939 (CAN-bus) and J1708

Generally, J1939 can be connected to CAN1 of GV350CEU, and J1708 can be connected to CAN2 of GV350CEU, as shown below.

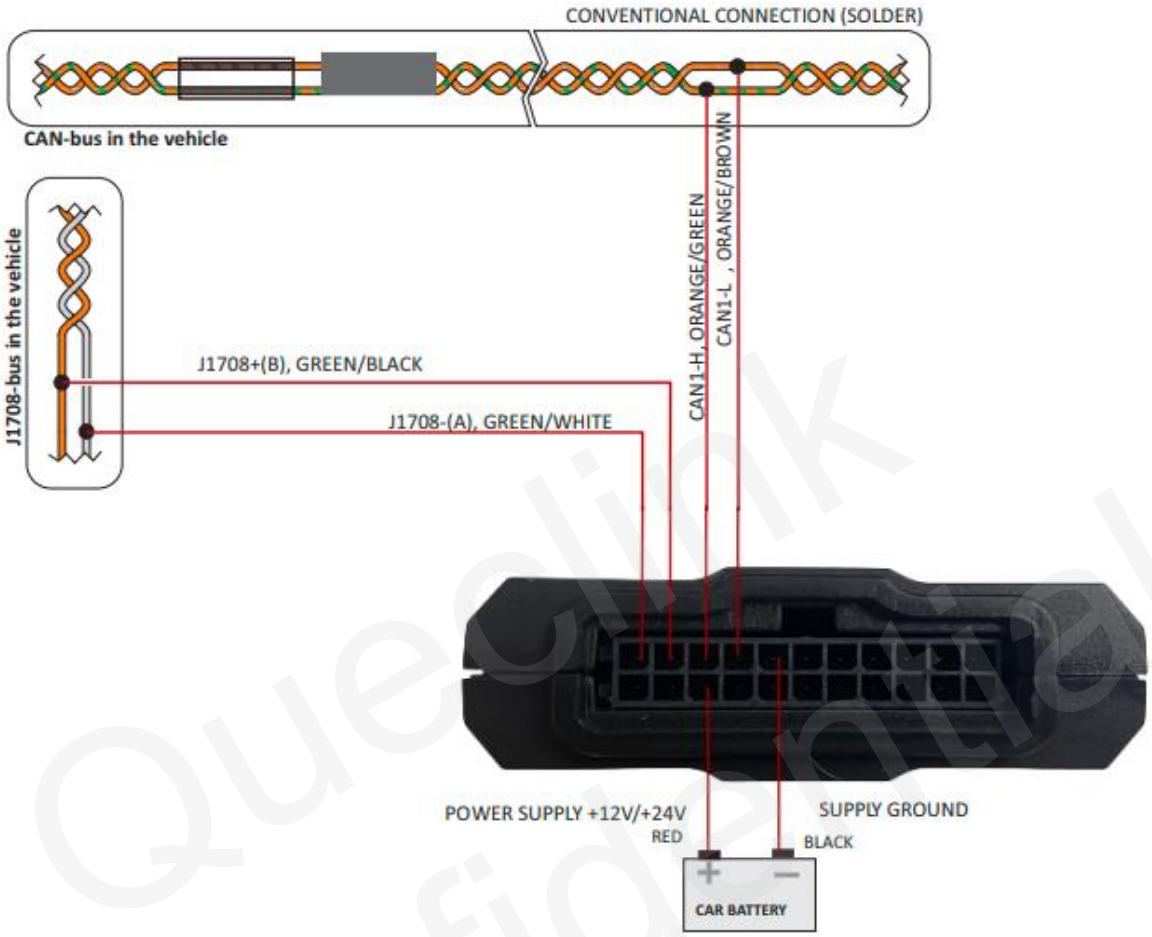


Figure 20. For Trucks with J1939 (CAN-bus) and J1708

Note:

For connection places of CAN and J1708 for particular truck model, please refer to installation manual for particular truck model.

4.2.3. Connection Diagram of FMS Connector for Trucks

Generally, the FMS connector can be connected to CAN1 of GV350CEU.

FMS connector shape and pinout may vary between truck makes and models. The picture is illustrative. For CAN1 connection position, please refer to the installation manual for the particular truck model.

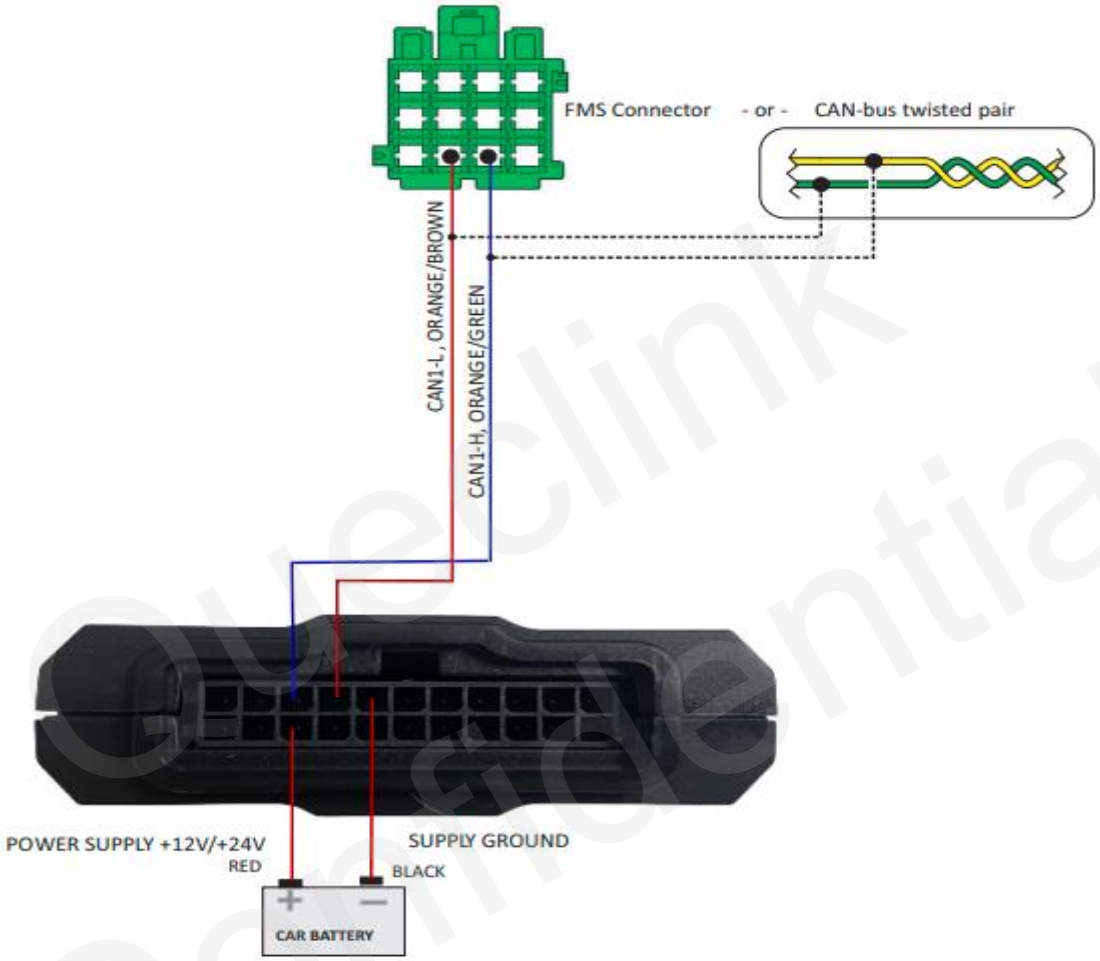


Figure 21. FMS Connector for Trucks

4.2.4. Connection Diagram for J1708-Based Trucks

GV350CEU connects to J1708 based trucks only through CAN2.

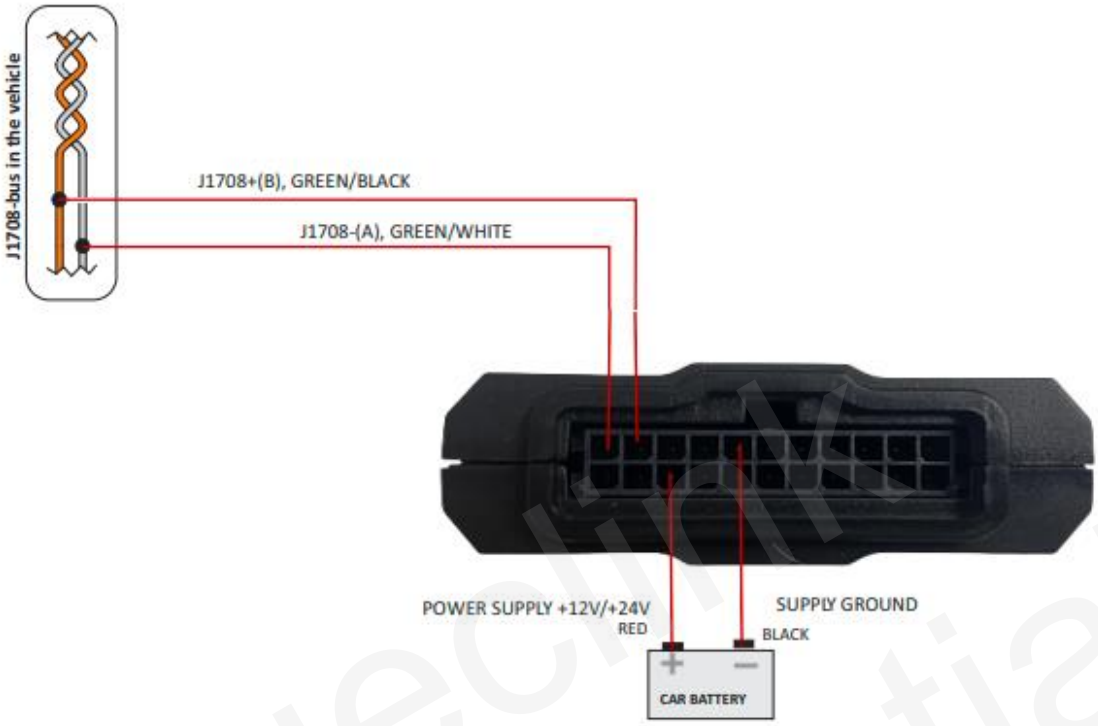


Figure 22. For J1708-Based Trucks

4.3. CAN-bus Synchronization

CAN-bus codes synchronization function allows GV350CEU to detect the vehicle model to which the GV350CEU is connected. Switch vehicle ignition on and send the command **AT+GTRTO=gv350ceu,22,2,,,,,FFFF$** after GV350CEU is installed in the vehicle, and then the synchronization will start. During synchronization, the flashing of the can lamp can be observed. For details, please refer to the commands **AT+GTRTO-22** and **AT+GTRTO-2F**.

4.4. Firmware Upgrade

A file with the firmware / configuration is supplied by the manufacturer. CAN firmware upgrade or CAN configuration upgrade can be set through **AT+GTCFU** or **AT+GTUPD**. For details, please refer to the command **AT+GTCFU** or the document ***GV350CEU @Track Air Interface Protocol***.