POWERFLEET®

People Powered AIoT

Version 2.0

Vehicle Gateway S

Installation Guide

Legal Notices

IMPORTANT

1. All legal terms and safety and operating instructions should be read thoroughly before the product accompanying this document is installed and operated.
2. This document should be retained for future reference.
3. Attachments, accessories, or peripheral devices not supplied or recommended in writing by Powerfleet Inc. May be hazardous and/or may cause damage to the product and should not, in any circumstances, be used or combined with the product.

General

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The FCC Wants You to Know

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

a) Reorient or relocate the receiving antenna.

b) Increase the separation between the equipment and receiver.

c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

d) Consult the dealer or an experienced radio/TV technician.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

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Introduction

This installation guide provides essential information for technicians to properly install the Powerfleet VEHICLE GATEWAY S, which is equipped with features such as BLE 4.2, GNSS, LTE (CAT-1) cellular communication, an accelerometer and LED indicators. The VEHICLE GATEWAY S has a compact design, IP65 protection, and includes a built-in, non-removable harness.

This document outlines the steps for installing and verifying the correct functionality of the installation kit elements, either using bare wires or via the OBDII harness.

Document Scope

The installation guide is intended to be used by technical stakeholders whose responsibilities include planning, performing and maintaining the installation of the product.

This document does not deal with the protocols and interfaces between the Powerfleet VEHICLE GATEWAY S device and the SW backend, nor with the low-level algorithms, state machines and logic engine implemented to deliver a complete remote diagnostics and enhanced driver behavior system. These protocols, APIs, algorithms, and state machines are described in separate documentation, as listed in the following sections.

Abbreviations

Abbreviation	Description
GSM	Global System for Mobile Communications
GPS	Global Positioning System
SVR	Stolen Vehicle Recovery

Table 1: Abbreviations

References

#	Reference	Description
1	Cellocator Evaluation Suite Manual	This document explains the unit's evaluation kit set-up.
2	Cello Hardware Installation Guide	This document explains the Cello family variants installation instructions and good practices.
3	Product overview	This document describes the relevant technical aspects of the VEHICLE GATEWAY S.

Table 2: References

System Overview

General

The VEHICLE GATEWAY S is Powerfleet's new IoT Tracking device with GNSS, GSM and Bluetooth connectivity, in short, referred to as "the device".

It is complementary to the CR family and comes equipped with features such as BLE 4.2, GNSS, LTE (CAT-1) cellular communication, accelerometer and LED indicators.

Figure 1 – VEHICLE GATEWAY S

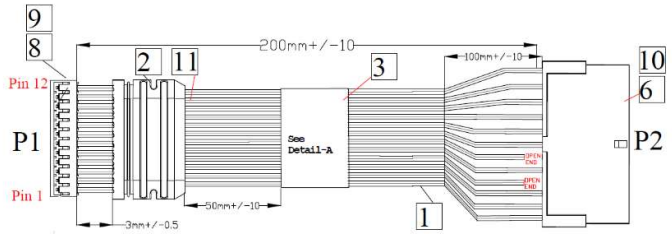
The VEHICLE GATEWAY S includes the following:

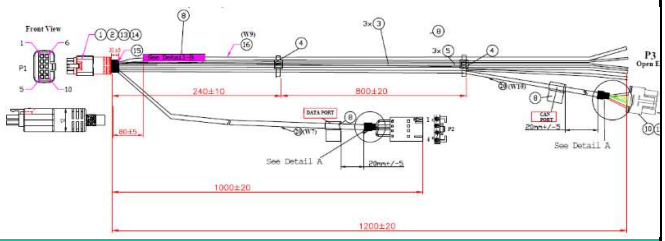
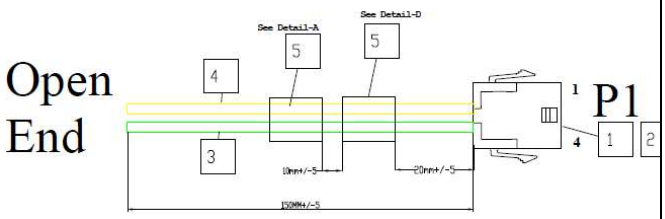
Modem	LTE CAT-1 with 2G fallback (EMEA, APAC, LATAM).
SIM	Nano SIM with eSIM option.
Bluetooth	BLE 4.2 (Android/iOS Apps support API).
GNSS	GPS, BeiDou and Galileo with AGPS capabilities.
Backup Battery	3.7V, 200mAh.
1-wire	Port (Dallas).
Memory	Supporting up to 7300 logged events.

Accelerometer	For the Motion sensor, driver behavior and crash detection.
Ignition	Input/Analog Input (0-90V).
Digital Inputs/Outputs	Two Digital inputs or output.
Analog	Two Multipurpose Analog Inputs (0-30V).
CAN	CAN interface.
TTL	TTL Serial port for maintenance and FW upgrade.
LED	Dual-color LED

Hardware and product variants

The VEHICLE GATEWAY S variant's part numbers as well as the optional harnesses are listed in the table below:

DESCRIPTION	NAME ANAD PART NUMBER	PICTURE
VEHICLE GATEWAY S • Fleet Device (CAT-1 LATAM) • Fleet Device (CAT-1 EMEA)	**PN**: • CT7801220-0XX • CT7801220-050	
See Addendum A for details: Picture of Mating harness **- directly attached to the device** 		

DESCRIPTION	NAME ANAD PART NUMBER	PICTURE
SUPPORTED HARNESSES	**6-wire Global harness with connections for TTL and the CAN contactless adapter.** PN 711-30043 Designed for flexible installations with open wire support for peripherals, and easy plug-and-play for connecting TTL/serial peripherals and the contactless adapter accessory.	See Addendum A for details: Picture of Global harness 
	PN 711-30044 – Works in conjunction with the 711-30043 enabling direct wire-to-wire CAN connection. Allows for direct CAN-H and CAN-L connections to be made, eliminating the risk of causing a short that can be caused by cutting the wires from the contactless adapter port. **Please note that this harness cannot work without the PN 711-30043**	See Addendum A for details: Picture of Adapter harness to CAN PORT 

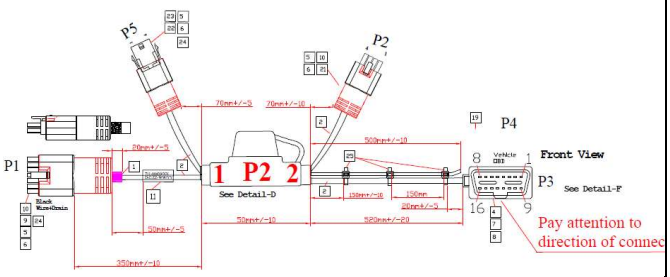
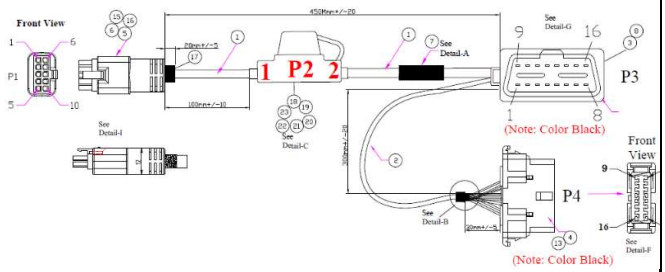
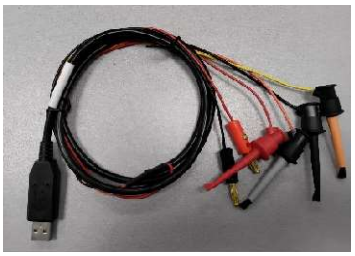
DESCRIPTION	NAME ANAD PART NUMBER	PICTURE
OBD Harness	**OBD harness with connections for the CAN contactless adapter** PN 711-00439 Designed for plug-and-play installations with OBD, and includes connections for ignition, and the contactless adapter accessory. This allows for complex installations where both contactless and OBD connections may be required.	See Addendum A for details: Picture of OBD Harness to 14 Pin for quick installations 
OBDII Y Cable (Optional)	**OBD Y harness** PN 711-30031 Will include a mounting bracket, designed to allow for slick installations behind the dash.	See Addendum A for details: Picture of OBDII Y harness 
Technician Harness (Optional)	**Technician Harness** PN 711-00427 See section Technician/Programmer Harness for details.	

Table 3 – VEHICLE GATEWAY S Components

Technician/Programmer Harness

This harness may be used for programming or troubleshooting the VEHICLE GATEWAY S.

For connecting the harness to the device, power supply and your PC, follow this illustration:

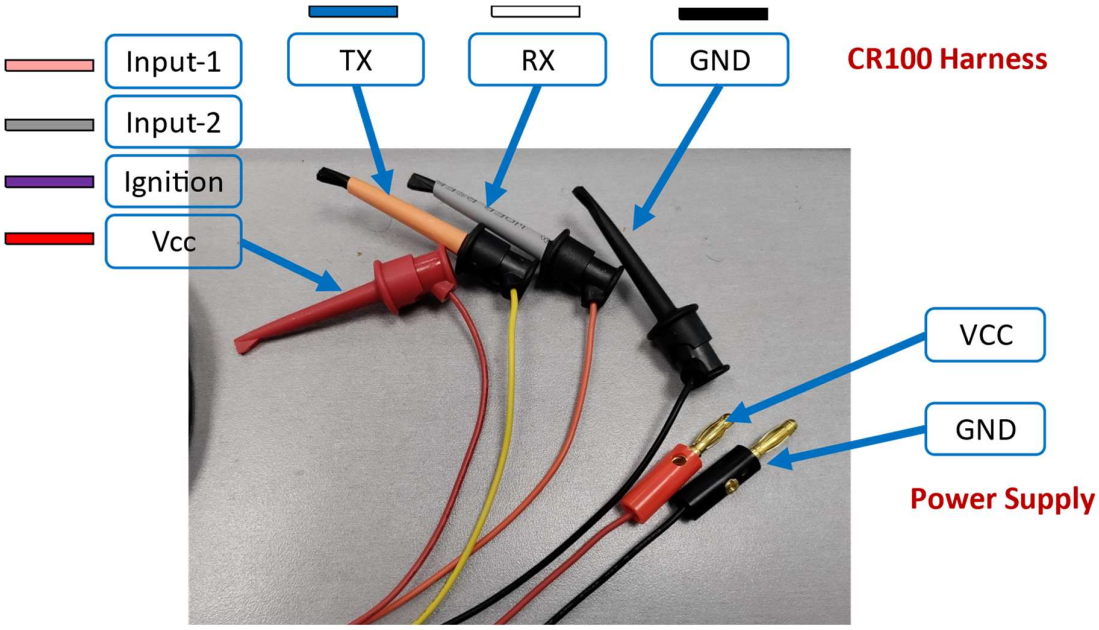


Figure 2: Technician/Programmer Harness

IMPORTANT: Device Fuse Protection.

- The device must be protected by means of a 1A fast blow fuse. The fuse should be installed either between Power Input (Pin 1) and the vehicle protected power line.
- The device must be protected by means of PTC for safety certification compliance. The PTC should support Resettable Fuse 60V and Imax=40A. It should be installed between Power Input (Pin 1) and the vehicle protected power line.
    - Note: The loom supplied, typically PN 711-30043, has the necessary PTC built in
- These means of protection are supported by the by the fuse attached to the harnesses provided by Powerfleet.
- It is the installer's responsibility to provide these means of protection if the fuse provided by Powerfleet is not used.

Inputs and Outputs

The VEHICLE GATEWAY S supports the following I/O's:

1. Two configurable Inputs
    - Analog I/O: 0-30V
    - Discrete Dry I/O: Sink to GND
    - Discrete "Wet" I/O: 0-30V range, configurable threshold
2. Two Configurable Inputs/Outputs:
    - As an output or
    - As an input: Discrete Dry

3. Ignition Switch: Can be used as Analog input, Discrete "Wet" I/O: 0-30V range or ignition Input: 0–90V.
4. CAN2(CAN -H, CAN-L)

The device Inputs and Outputs are shown in the figure below.

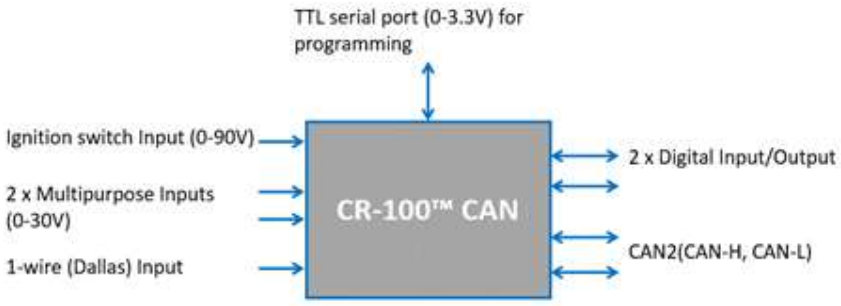


Figure 3: Vehicle gateway S I/O's

Harness Pinout and Functionalities

The harness pinout is as follows:

Pins	Wire	Color	Analog Input	Digital Dry Contact Input	Digital "Wet" Input	Output (sink)
1	Power (VCC)	Red				
2	CAN-L	Yellow				
3	Digital I/O-2	Brown		*		*
4	Ignition	Purple	*			
5	Input-1	Pink	*	*	*	
6	GND	Black				
7	TX+	Blue				
8	RX-	White				
9	CAN-H	Green				
10	1-Wire	Orange				
OPEN	Input-2	Gray	*	*	*	
OPEN	Digital I/O-1	White/Brown		*		*

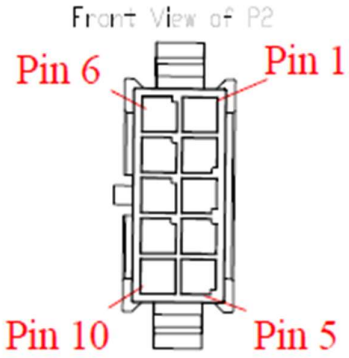


Figure 4 - Harness Pinout and Functionalities

Technical Specifications

Cellular Communication		
Modem	LTE CAT-1 with 2G fallback (EMEA)	LTE CAT-1 with 2G fallback (LATAM/NZ/AU)
Supported Technologies & Bands	• LTE-FDD: B1/ 3/ 5/ 7/ 8/ 20/ 28 • LTE-TDD: B38/ 40/ 41 • GSM(2G): B2/ 3/ 5/ 8	• LTE-FDD: B1/ 2/ 3/ 4/ 5/ 7/ 8/ 28/ 66. • LTE-TDD: B38/ 40/ 41 • GSM(2G): B2/ 3/ 5/ 8
Regulatory	• Europe: CE • Australia/New Zealand: RCM • South Africa: ICASA	• Mexico: Telcel (pending) • Argentina: Claro (pending) • Brazil: Anatel
Data Rates	• LTE-FDD (Mbps): 10 (DL)/ 5 (UL) • LTE-TDD (Mbps): 8.96 (DL)/ 3.1 (UL) • GSM/2G (kbps): 85.6 (DL)/ 85.6 (UL)	
SIM Card Compatibility	Nano SIM and e-SIM (Optional).	
Antenna	Internal	
Packet Data	TCP/IP, UDP/IP	
SMS	PDU	
Local Communication Interfaces		
BLE	BLE 4.2, Wireless Connectivity	
Wi-Fi	2.4 GHz 11b (RX). Wi-Fi Scan only (optional, Used for positioning purposes)	
Serial Communication	TTL for Configuration and firmware upgrades.	
1-Wire™ (Dallas) Input	DS1990A, DS1971 compliant for driver management	
GNSS		
GNSS	GPS, BeiDou and Galileo	
Sensitivity (Tracking)	-160 dBm	
Acquisition Average TTFF	Cold Start: ‹ 30s, Hot Start: ‹ 2s. A-GPS capabilities	
Antenna	Internal	
Inputs and Outputs		
Multipurpose Inputs/Outputs	2	
Digital Inputs	2	
Ignition switch Input	1 (also analog input 9-90V)	
CAN FD	1 (CAN2.0 ISO 11898, J1939, FMS)	
Accelerometer		

Internal	3D, +/- 32g range, 14-bit representation, 1mg resolution
User Interface	
Dual color LED	GNSS, Cellular Connectivity and power status LED.
Power	
Input Voltage (Vehicle Power)	9-90 VDC
Internal Backup Battery	Li-Ion Polymer, 3.7V, 200mAh, rechargeable.
Vehicle Environment Immunity	
Immunity	Compliant with ISO 7637 till test level #4 (In accordance with E-mark directive)
Applicable Environmental Conditions	
Operating Temperature	-30°C to +40°C full performance (External Power)
Storage Temperature	-20°C to +45°C
Humidity	95% non-condensing
Protection	IP65
Climatic, Vibration, Impact	ISO 16750
Vehicle Installation Methods	
Mounting	Tie-Wraps and/or Double-Sided Adhesive Tape
Environmental Protection	
RoHS	Directive 2011/65/EU, including Directive (EU) 2015/863 amendment.
Conflict Minerals Law	Production Conformity with U.S. Conflict Materials provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act, HR 4173, Section 1502 (Conflict Minerals Act).
Dimensions and Weight	
Dimensions	90 x 43.9 x 24.4 mm
Weight	88gr (with harness and battery)

Table 4 - Technical Specifications

Preparing for installation

This section contains important safety information and details the steps you must perform *before* installing the device.

Pre-installation requirements

IMPORTANT:

- You must be a certified technician and qualified to install the VEHICLE GATEWAY S device.
- Please make sure you have the correct documentation for the devices you install. The devices and documentation change frequently, which may impact the installation procedures.
- Make sure you know the installation procedures and restrictions of the vehicle; consult with the dealer or manufacturer to get any specific instructions. These may refer to locations in the vehicle where you can install the device, connections to the electrical system, use of fuses, etc. Not following these instructions and restrictions may create false alarms and malfunctions in the vehicle systems and may even void the vehicle warranty.
- Modern vehicles have many computerized systems that may be sensitive to radio transmissions from the device you install and may also generate interferences to the device. Carefully read the manufacturer's instructions and restrictions regarding these systems.

After installation, verify that no interference is caused to the vehicle's electrical system. Check dashboard warning lights and error messages. Should any error conditions exist, remove the installed unit and contact Powerfleet for assistance.

Safety requirements

WARNING:

- Use protective goggles during the installation.
- Disconnect the vehicle battery during installation. Working on live wires can be dangerous and can, for example, result in airbags inflating or fuses burning out. Some devices (e.g. the radio) may require reprogramming after a power disconnect.
- Do not install any wires (except the fuel sensor wires) near the fuel system or fuel pipes. Make sure you never work near the fuel system with the battery connected.
- Installation in vehicles with computerized systems may have unexpected results. Please consult with your local car dealer before performing any vehicle OEM invasive installation.
- Do not disconnect any connectors in the vehicle while the ignition switch is turned on. This may result in damage to sensitive vehicle subsystems.
- Review the important safety notes in section Harness Power Installation Specifications.

Required tools and equipment

To correctly install the device and accessories, you may need the following equipment and tools:

- A wire cutter
- Pliers (2 sizes may be required)
- Screwdrivers of several sizes
- Professional insulation remover
- Crimping tool for wire lugs
- Digital multi-meter
- Utility (razor) knife
- Flash light or other light source
- Tools to remove the vehicle trims (panel popper, sockets, ratchet etc.)

Additional Materials required

- Soldering wire
- Insulation tape of good quality (which can withstand the high temperatures in a vehicle on a hot summer day)
- Wire lugs with star washers
- Grommets, plastic tubes – as needed

Figure 5 - Materials required

Installation best practices

This section lists the best practices you should follow for installing the device correctly.

- Put protective covers on the front seats before you start the installation, to prevent damage to the upholstery. Use other covers for sensitive areas in the vehicle (LCD display, radio etc.).
- Do not use a cutter to expose the conductor in the wire, use a professional insulation remover that will not damage the delicate copper conductors.
- Use soldering for all of your connections. Do not connect a new wire to an existing wire (without soldering it) to make a connection. These types of connections, as shown in the following picture, are typically of poor quality and sooner or later will disconnect or will make intermittent connections.

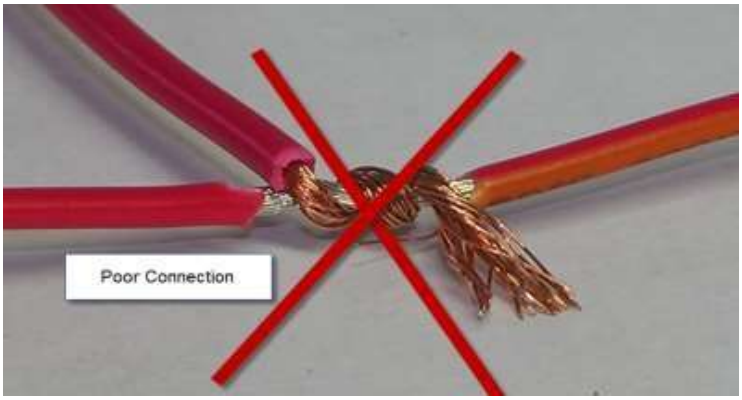


Figure 6 - Poorly soldered connection

A good connection must be properly soldered, as in the picture below:

Figure 7 - correctly soldered connection

- Isolate the connection with a plastic cover or professional insulation tape so that no wires remain exposed.

Figure 8 - Isolate the connection

- Use existing wire ducts, openings and holes to pass wires between different areas in the vehicle. Do not punch or drill new openings or holes to pass wires between different zones in the vehicles, as this will create permanent damage to the vehicle, and other wires or pipes. Make sure the opening is properly protected by a grommet or a plastic sleeve to prevent damage to the wires.

Figure 9 - Preventing damage to the wires

- Use only a voltmeter or LED-based test lamp (that uses a very small current) to test the existence of voltage in a wire or accessory. Do not use a regular test lamp to test the existence of voltage in a wire. These testers take quite a lot of current and may damage the equipment in the vehicle (for example it can trigger an airbag or damage a communication bus).
- When you want to test the voltage on a wire, do not expose the existing wires or use a sharp edge to make an electrical connection to a wire through the insulation sleeve around it. Make the connection at the end of the wire, near the connector.
- Do not insert the multi-meter probe tip into the female pin in the connector. This may widen it and prevent a proper connection when the male connector is plugged in.

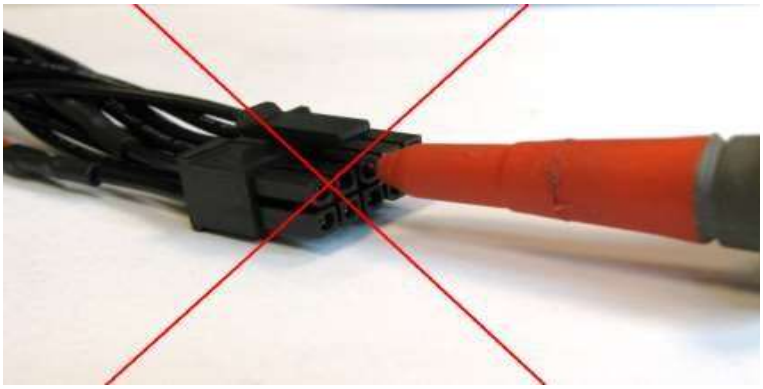


Figure 10 - Incorrect probe insertion

The correct way to connect the probe of a voltmeter or tester to the connector is shown below:

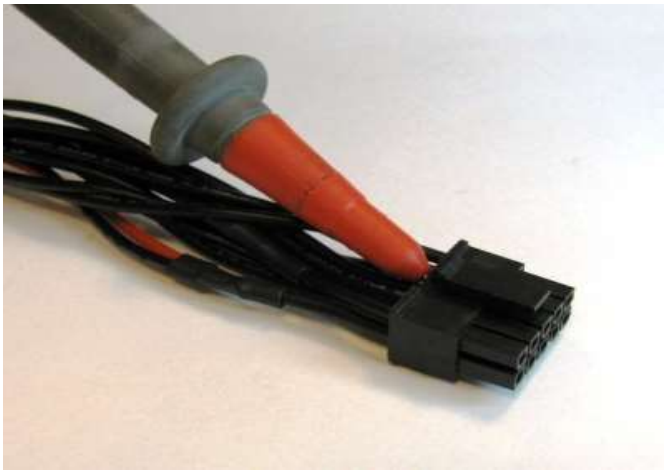


Figure 11 - Correct connection

- To connect the negative power wire of the device, connect a lug properly crimped (or soldered) to the negative wire of the device (pin 3 in the 20-pin connector) and screw it to the chassis using an existing screw. Ensure the connection is good and stable.

Figure 12 - Connecting negative power wire

- After all wires are connected, use plastic straps (cable ties) or insulation tape to secure all the wires and cables to fixed elements in the vehicle (such as existing stable cables, metal parts or other fixed parts of the vehicle, but not parts that are removed during regular vehicle service). Loose cables and wires may cause irritating noises while the vehicle is in motion.
- Do not lay cables and wires on the floor of the vehicle where people can step on them. Always route the cables in areas where they will not be stepped on or otherwise damaged by other activities.
- All wires and cables should be hidden.
- Make sure the device is receiving power with a properly fused connection. The fuse is supplied with the harness.
- To attach the device to its location, use a thick, two-sided, adhesive tape, between the device and the fixed support and then use two plastic straps (cable ties) to secure the device to its location. Make sure the device is well positioned and will not become loose (it may either fall or create irritating noises if not properly secured).
- Ensure correct orientation of the VEHICLE GATEWAY S. GPS Side UP. See figure below:

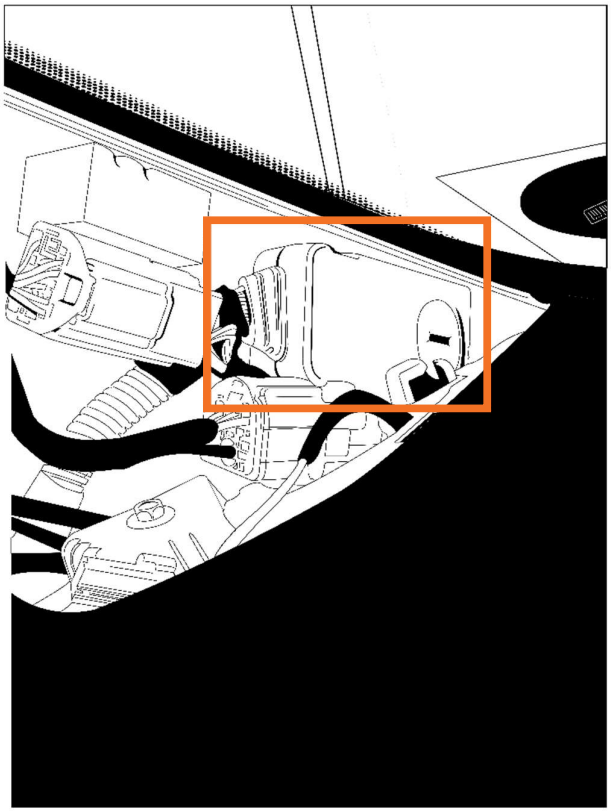


Figure 13 - Attaching the device in the A-pillar with 3M industrial double-sided tape

- When you finish your work, clean the vehicle and return all the items you removed to their original positions, using all the original screws and connectors.
- Test the functioning of all the vehicle systems: they should all perform as is before you installed the device.
- Test the connectivity of the device with the system server to ensure proper operations.

Installation instructions

Warning: *Before installing, please read the Pre-Installation Information and Safety sections.*

General

The following table describes the type of vehicle in which you can install the device, and which vehicles you should NOT install it in.

Install the device in:
• Passenger cars of all types • Light and heavy trucks • Busses • Motorcycles • Snowmobiles – provided battery disconnected or placed on charge when not in use. • Tractors

Do NOT install the device in
• Boats, jet skis and other marine units • The carriage of a semi-trailer or full trailer • Containers and other assets Installation in these environments requires special protection materials and is not covered in this guide.

Table 5 - Compatible and incompatible vehicles

Location of the device in the vehicle

When locating the device in the vehicle please consider the following:

- The device is not weatherproof. It is specified as an IP65 device and thus is not immune to penetration of high pressure water jets. If you need special solutions to special environmental conditions, please consult your customer support or account manager.
- The device receives and transmits radio energy in the GSM frequency bands.
- The device receives radio energy in the GPS frequency band from GPS satellites above.
- In SVR applications it is recommended to conceal the device so that it will not be easy for thieves to find and disconnect it.
- The device will not function well in excessive temperatures (see the specifications for details).
- The device requires minimal maintenance.

The following table describes both the preferred locations for installing the device and a list of locations where the device should NEVER be installed.

Preferred location in vehicle:
• Behind the dashboard. • In or behind the glove compartment. • Anywhere in the front of the passenger compartment under the console and above the leg space. • In a protected area under the driver's seat. • Less preferable: in the trunk of a passenger car (the radio signals penetrate the trunk mostly through the rear window and rear seat: you may have to find the best location and orientation through trial and error).
NEVER install the device:
• Close to airbags. • Inside a metal pocket or box. • Near any radio transmitter or its antenna. • Not near a sound system.

Table 6 - Preferred installation locations

Locating the device in a prohibited location may significantly affect the functionality of the device, will shorten its lifetime and will create malfunctions and expensive service calls.

Note that the space inside the doors is not a very good location. It is more exposed to outside temperatures and will force you to install the device vertically and not horizontally. If you have to install the device there make sure to locate the device in the area that is not exposed to rain and water and has reasonable reception.

Keep at least 30 cm between the device and any computerized system in the vehicles, to avoid mutual interference.

Do not install the device or any wire near a moving or rotating part of the vehicle.

Device orientation

The device uses the internal GPS antenna that should have a good GPS reception and consequently the device direction (orientation) is important. To ensure this, the side marked "This side up" should face upwards/outwards and should have a clear sky view, unobstructed by any metal or shields. Plastic and glass do not usually affect reception.

Modern GPS antennas and GLONAS receivers can be mounted like the illustration below.

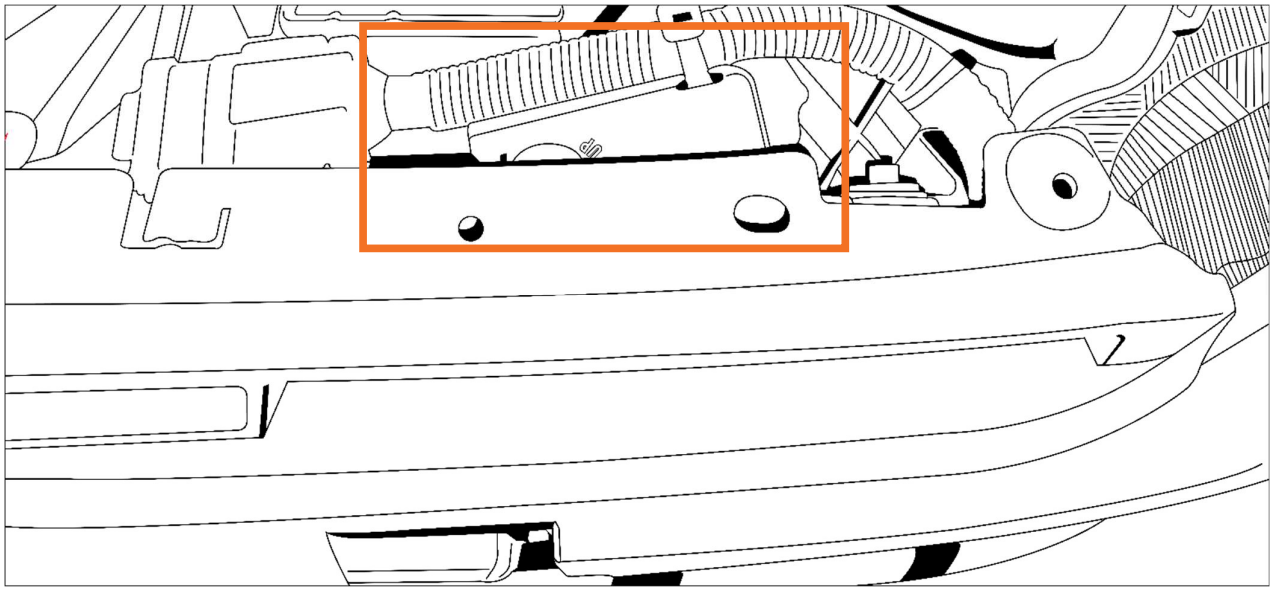


Figure 14 - Device Orientation

The GPS receiver in the device is sensitive enough to allow reasonable reception even in cases where the top side of the device (marked 'This Side Up') deviates up to 60 degrees from the ideal direction.

Installing the SIM card

The VEHICLE GATEWAY S uses a Nano SIM. To install the SIM card, perform the following steps:

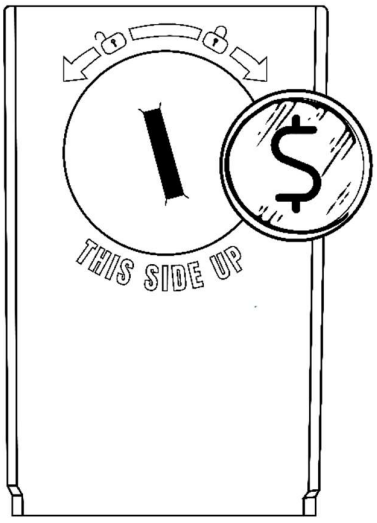
Prepare the SIM Card:

NOTE: Make sure that your SIM card PIN is identical to the PIN programmed in the unit, or disabled. The default value of the unit PIN code is 1234. If the SIM PIN and the unit PIN differ, insert the SIM card into a regular cellular phone and either change its PIN to the unit PIN (1234) or disable it.

SIM PIN protection and value (locking the SIM) can be activated automatically providing PIN synchronization between the SIM and the unit.

1. The SIM is accessible from the back where you see the “This side up” text on the device.

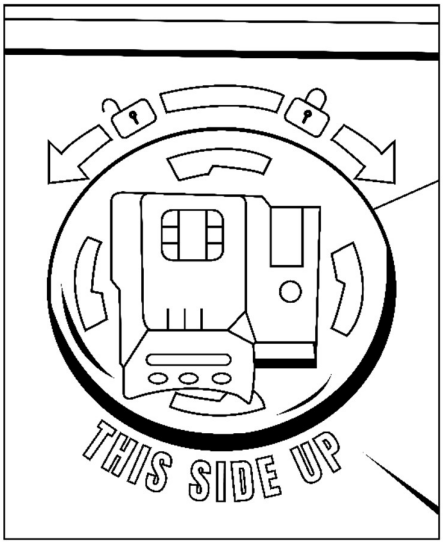
2. Rotate the slot cover towards the unlock symbol (counterclockwise) if it is locked. You need to use a small flat tool or coin to turn it.



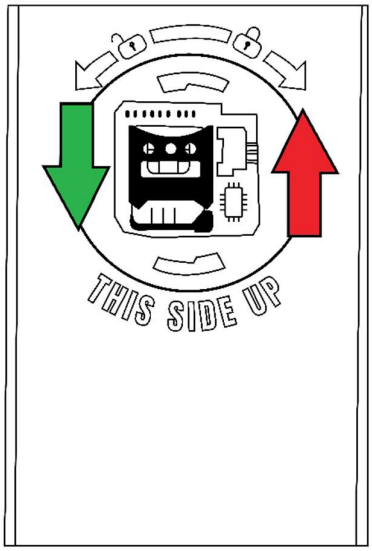
3. Hold the SIM card so that the metal contacts are facing downwards and the cut corner aligns with the slot.

4. Gently slide the SIM card into the slot as shown in the image. Ensure that the metal contacts are properly aligned with the contacts inside the slot.

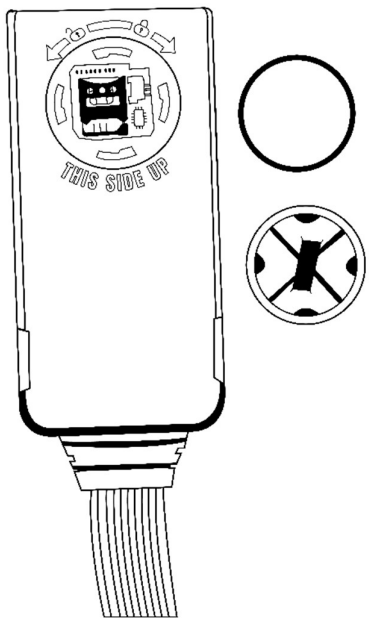
5. The SIM card should fit snugly and securely in the metal holder.



6. Close the metal holder over the SIM card, ensuring that it is firmly in place (as indicated by the red arrow in the diagram on the left).



1. Ensure the sealing O-ring is correctly aligned and not damaged during closure.
2. Insert the slot cover and rotate towards the lock symbol (clockwise) to secure the SIM card in place.
3. Once locked, the SIM card should be securely held in place.



Battery

Please note that this device is ultrasonically sealed and cannot be opened or disassembled, except for the SIM tray access. Do not attempt to open or tamper with any other parts of the device, including the battery, as it is non-removable and sealed for safety and performance reasons. Any unauthorized attempt to open the device may void the warranty and cause irreversible damage.

Harness installation instructions

Connecting and removing the harness

To connect the harness to the unit, attach the harness connector to the unit female connector and validate that the latch is snapped in the correct location. To remove the harness from the unit, press on the latch end and then gently remove the harness connector from the unit.

WARNING: Forcibly removing the harness connector from the unit while the latch is still snapped into the unit connector can damage the unit connector and/or its PCB.

Harness Outputs Installation Specifications

General

The following information is common for all the outputs:

- All Outputs are Open Collector type and can sink up to 300 mA continuous.
- External devices (not OEM) that consume more than 300mA should be powered by a relay. In such cases, the output implementation requires an external relay.
- The outputs can be activated or deactivated from the control center using the OTA command.

Relay Pin-Out

A relay is utilized to serve as an adaptor between the harness output and a device in the vehicle (immobilizer, siren, etc.). The following figure shows the pin-out location of the relay. The pin numbers are also printed on the Relay itself.

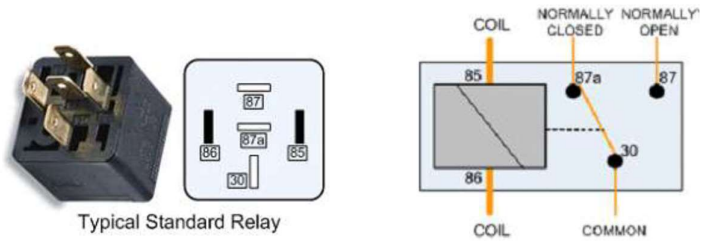


Figure 15 - Relay Pin-Out

The relay figure and the pin numbers are used when describing harness outputs installations.

Internal LED indicator

The LED indicator generates a blinking pattern which provides monitoring status of both GPS and GSM status. The blinking pattern is constructed of repeated cycles of two blinking zones each. The first zone represents GSM functionality and the second zone, GPS functionality.

Each zone lasts for 3 seconds with a 1-second LED off interval between them.

A 5-second LED off interval separates each cycle.

The LED indicator is typically disabled in the device configuration and will only be active for the first xx minutes after power-up. It is then turned off by the software for security reasons so that the flashing LED does not draw attention.

GSM Monitoring zone – 3 seconds	Interval – 1 second	GSM Monitoring zone – 3 seconds	Interval – 5 seconds	GSM Monitoring zone – 3 seconds	Interval – 1 second	GSM Monitoring zone – 3 seconds

The following table displays the LED states:

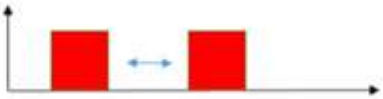
Unit working properly – Cellular network and GNSS are working as expected.	Slow blink: green LED blinks on/off 2 seconds apart: 
Unit not working properly – cellular network and/or GNSS is not working as expected.	Slow blink: red LED blinks on/off 2 seconds apart: 
Unit not working properly – unable to detect SIM card	Fast blink: red LED blinks ¼ seconds apart: 
Unit not working properly – no communication with one or more hardware components such as the modem, accelerometer, memory, etc.	Red LED continuously on: 

Table 7 - LED states

LED does not work in the following conditions:

- VEHICLE GATEWAY S is in Hibernation/Deep hibernation mode.
- VEHICLE GATEWAY S working from the internal battery.
- Disabled by PL

The LED starts working after the following self-test is completed:

- Communication with Modem\Memory\Accelerometer
- Communication test with SIM card.

When activated, the LED indicates the current unit status. If the unit loses Cellular communication, it will indicate accordingly.

GSM Monitoring Zone definition

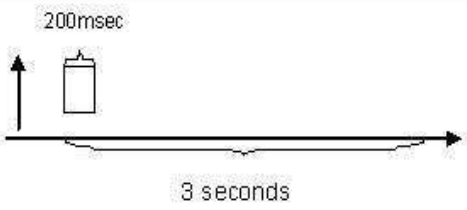
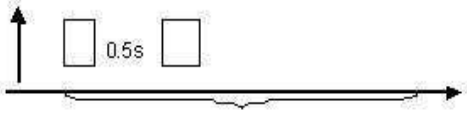
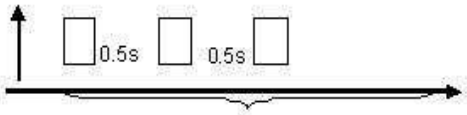
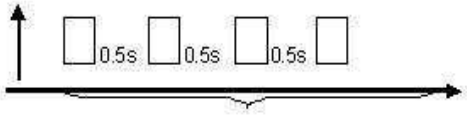
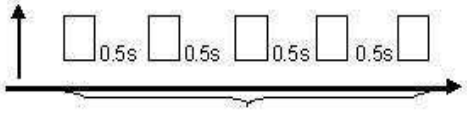
Status	Blinking Pattern
GSM modem off	off
Not registered to GSM / No SIM	
Registered in Home GSM network (not attached to GPRS)	
Registered in Roaming GSM network (not attached to GPRS)	
Attached to GPRS/home	
Attached to GPRS/roaming	

Table 8 - GSM Monitoring

GPS Monitoring Zone definition

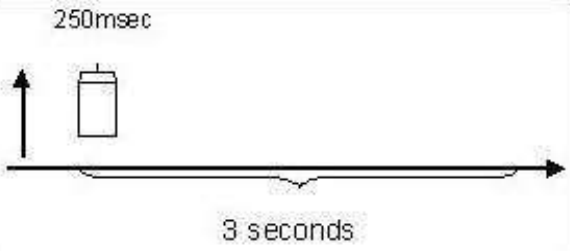
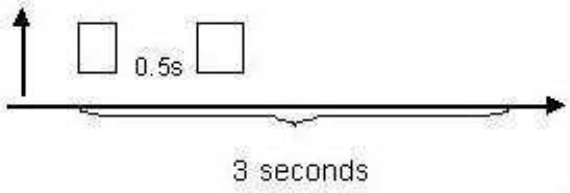
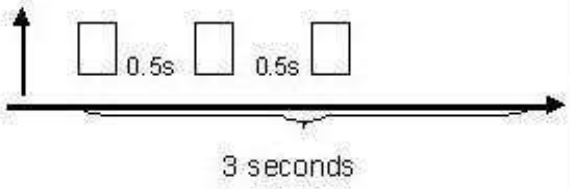
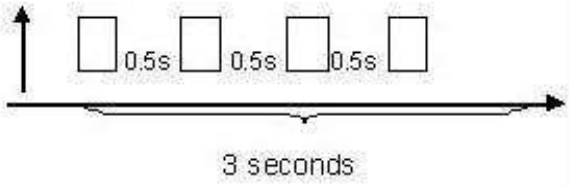
Status	Blinking Pattern
GPS module off	off
GPS is unplugged / faulty	
GPS communicating, but not navigating	
GPS is in navigation mode	
GPS is in GYRO mode	

Table 9 - GPS Monitoring

Digital Input/Output 1 and 2

The harness DIO1 (exBlinkers) white/brown wire is exposed by an open-end wire. If not used in the installation the end should be protected by insulation tape.
The harness DIO2 (exLED) brown wire is connected to the 10-way Molex pin 3
The functionality of the DIO's are defined according to Programming Library parameters (PL).
Options for the DIO are:

- Disabled,
- As an Input or
- as an Output.

Often used as an Outputs, the Mobility Gateway unit uses these outputs as a global output, allowing activation/deactivation of several devices, such as blinkers, parking lights, an additional siren, etc. In this case the output shall be connected to the required device as shown in the following installation diagram.

It can be activated/deactivated by an OTA command from the control center or by parameters configured in the PL. The following illustration provides the Global Output installation.

NOTE: **The original wire must be cut, and the relay connected between the original relay and the vehicle power.**

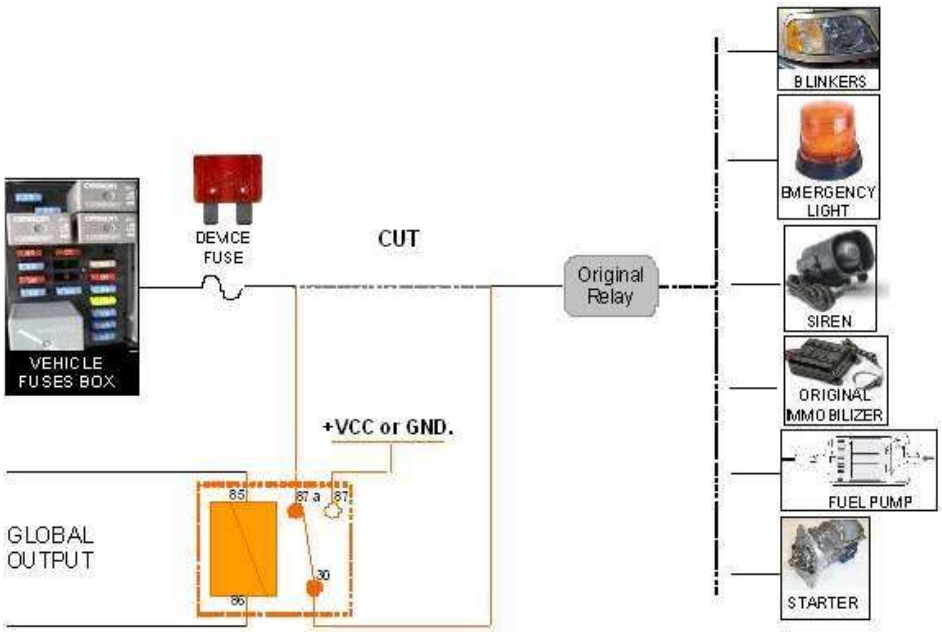


Figure 16 - Global Output Installation diagram

NOTE: **Configuration can be programmed to support Immobilizer functionality on each one of the two outputs.**

Harness Inputs Installation Specifications

General Purpose Inputs

The General-Purpose Input 1 (exDoor), the Pink, wire is connected to the Gateway unit pin no. 5 and used for general purpose digital input.

The General-Purpose Input 2 (exShock) sensor, the grey wire is open ended and used for general purpose digital input.

The behavior of the input can be configured in the PL.
Options are:

- Discreate Dry Contact (with on board pullup)
- Discreate Normal Wet Input
- Analogue Input (0-30V)

Ignition Input

The harness Ignition Input Violet wire is connected to the Gateway unit Molex pin no. 4 and should typically be connected to the ignition switch (in the ON position).

There is an option to change the function of the ignition wire and utilize the input as an additional General-purpose input when setting Start/Stop detection to utilize the internal motion sensor/accelerometer.

Dallas Input

The harness Dallas Input orange wire is connected to the Gateway unit Molex pin no. 5 and is typically used for Driver Identification.

Harness Power Installation Specifications

Main Power

The harness Main Power red wire is connected to the Molex pin no. 1 and should be connected to the car's protected power line (12V / 24V) (refer to Installation Drawing, Section 5.5).

GND

The harness GND black wire is connected to the Moled pin no. 6 and should be connected to vehicle ground (at dedicated points) (refer to Installation Drawing, Section 5.5).

IMPORTANT:

The CR unit must be protected by means of a 1A fast blow fuse. The fuse should be installed between Power Input (Pin 1) and the vehicle power line.

These means of protections are supported by the fuse attached to the harnesses provided by Cellocator.

It is the installer responsibility to provide these means of protection if the fuse provided by Cellocator is not used.

The battery name or battery picture used in this document represents practically the protected power line at the output of the fuse box.

Serial Port Connector

The harness supports a 4-pin connector allowing external devices communication to the CR unit via its serial interface (CR pins 7 and 8). The connector is illustrated in Figure 17.

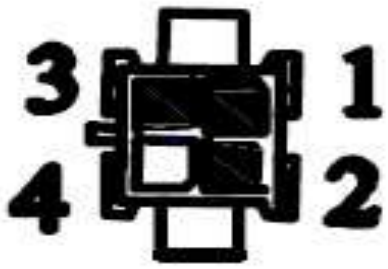


Figure 17 – Serial Port Connector – front view

Figure 21: Serial Port Connector – Front View

The serial port adaptor connector pin out is:

- Pin 2: TX
- Pin 3: RX

IMPORTANT:

The CR serial interface supports TTL level.

You may connect it to PC USB port for programming utilizing the 711-00251 USB Communication adapter.

It is the installer's responsibility to utilize appropriate converter if RS232 levels are required.

Device Installation Diagram

The diagram below should serve as a schematic high-level installation diagram and not as a specific detailed installation diagram per vehicle model.

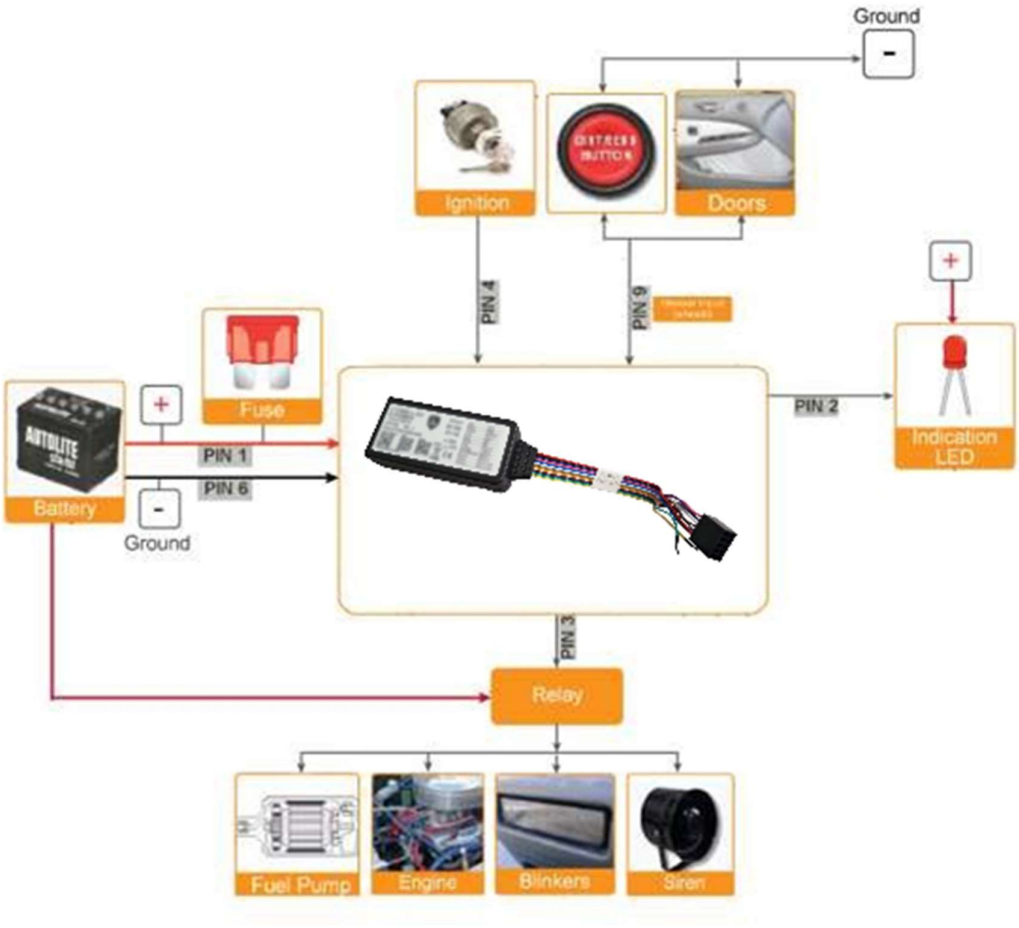


Figure 18 - Device Installation Diagram

Post-Installation

When you have finished installing and testing the device you have to record the relevant details. These details will help you or your colleagues to maintain the device in the future.

The best way to do this is to register all the details in an easily accessible application with a database. This application should be accessible by a PC at the installation location or even via smartphone. A less efficient solution is an Excel file or even handwritten records.

The details that should be recorded are:

- Name of the customer
- ID of the vehicle
- Type of the device installed
- Accessories installed (sensors, harness etc.)
- Cables/Harnesses used
- Location of the device in the vehicle
- Direction and inclination of the device
- Name of the installer
- Location where the installation took place
- Date of installation
- Results of installation test/issues found
- Results of communication test to the server/issues found
- Picture(s) of the installed device, harness and accessories, as installed
- Other comments.

Summary Installation steps

1. Devises shipped to each geographic region will be delivered with a Base Configuration Script or Program Library (PL) loaded. This configuration is sufficient only for basic tracking functions and local network settings.
2. At each region, the stock will be assigned to a specific client and the client specific PL will be assigned to the device in Cellocator+. (C+ Not covered in this guide.)
3. Depending on the region, the device may be shipped to the installer with or without a SIM card fitted. It is vital that an active SIM card be fitted prior to powering up the device for the first time.
4. Use common sense when choosing a good install location in the vehicle. Best combination of Security, GPS signal and low risk of GSM interference.
5. The simplest installation requires only Permanent power and Ground. Follow vehicle specific wiring instructions and Work-Order instructions to wire according to the required functionality of the CR100. Obtain guidance from Tier 3 support if needed.
6. On initial power-up, the Mobility Gateway will connect to C+ and download its client specific Configuration Script.
7. Once the script is downloaded testing and commissioning can begin according to regional operational procedures. Typical tests can include:
    a. Correct location of the device shown on a map with current time
    b. Testing of Inputs and Outputs as fitted.
    c. Correct Driver ID functionality with starter cut when so installed.
8. Log your work and complete the necessary documentation.

Release Package Content

Evaluation Tools

Each firmware release includes a set of software tools (windows), which enable the client to run an initial appraisal and testing process of Powerfleet units, without requiring connection to an actual vehicle during testing.

Our present customers should only upgrade the software on their machines.

After installation is completed, you should be able to explore in the Windows start menu, all the available utilities under the Cellocator folder as depicted below:

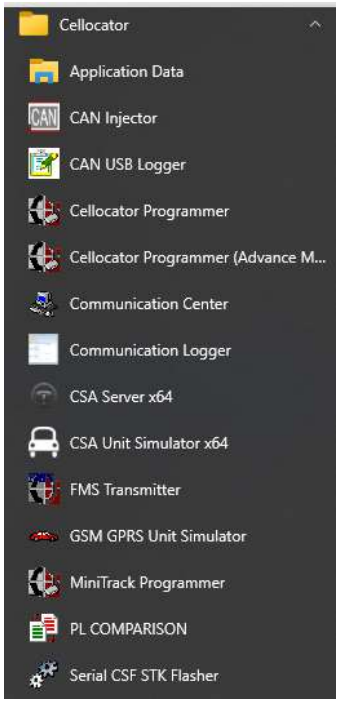


Figure 19 - Cellocator Program Folder (Windows)

The next sections will provide information on two of the applications: the Programmer and the Communication Center.

Cellocator Programmer

The Cellocator Programmer enables you to perform the following:

- Modify a PL file to suit your communication needs.
- Upload and download PL files to Cellocator units via its serial interface.
- Test and debug units using a variety of features, including a platform manifest, the ability to test a unit's inputs and outputs, and the ability to forward data to a wireless channel.

The Cellocator Programmer is mainly used for the initial configuration of a unit, and typically communication settings such as the destination IP address, target port phone, and SMS numbers.

CAN Editor

The CAN Editor is a Cellocator Programmer module that enables the user to select CAN variables, define trigger schemes, and define CAN actions.

The CAN Editor is a graphical tool designed to configure CAN-related information sources with user-defined behavior. It enables the user to select CAN variables and associate them with operators. Operators (which are logical data manipulation functions) manipulate the CAN data and generate events.

Variables and operators are associated by a simple graphical "Click & Drag" action designed to connect the vehicle to the operator.

The CAN Editor enables the following:

a. Definition of the set of monitored sensors.
b. Definition of triggering and reporting rules and conditions
c. Creation and selection of vehicle and/or monitoring configuration templates.
d. Parsing and analysis of incoming CAN-related data.
e. Flexible 'Drag & Drop' CAN Editor GUI tool to configure vehicle data collection and manage the real-time and powerful onboard logic engine.

Upgrades the unit firmware Cellocator+

The Cellocator+ System is a web-based application that enables Powerfleet's devises to perform configuration and firmware updates Over-the-Air.

Each VEHICLE GATEWAY S, upon power-up, will attempt to connect to Cellocator+ and retrieve a customer specific set of configuration parameters. Thereafter the devises typically only attempts a connection once every day.

It is thus imperative that the SIM card be inserted and active prior to first power-up. Failing to follow this process will result in the initial connection to Cellocator+ failing and the device will not collect the correct operating parameters until the next day (24 hours later).

Time will be waisted as the installer will need to contact the operations center and request an agent to re-initialize the device over the air in order for the correct configuration to be loaded so that the installation can be successfully tested.

Addendum A

Picture of Mating harness

711-00456_rev C_CR100 EU CAN PIL.

Picture of Global harness

711-30043_REV A_Global harness for (

Picture of Adapter harness to CAN PORT

711-30044_REV A_Adapter harness to

Picture of OBD Harness to 14 Pin for quick installations

711-00439_REV I_OBD Harness to 14 F

Picture of OBDII Y harness

711-30031(REV C)-OBDII Y Cable to C