
Parker Vehicle System Gateway for Mobile IoT

PVSG-IoT-TP*-4GLTE

User Guide



Parker Hannifin

Motion Systems Group – IoT Solutions

850 Arthur Ave

Elk Grove Village, IL 60007

office +1 800 C-Parker

<http://www.parker.com/iot/mobile>

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Publication History

The following table provides an overview of the changes made to this document throughout its publication history.

Rev	Release Date	Description of Change
1	6-18-2022	First release of this document
2	4-06-2023	Reformatting and additional plan information


Safety

Do not perform the procedures in this manual unless you are experienced in handling electronic equipment. Contact the manufacturer if there is anything you are not sure about or if you have any questions regarding the product and its handling or maintenance. The term "manufacturer" refers to Parker Hannifin Corporation.

Safety symbols

The following symbols are used in this document to indicate potentially hazardous situations:

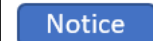
 *Danger! Risk of death or injury.*

 *Notice: Risk of damage to equipment or degradation of signal*

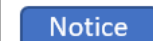
When you see these symbols, follow the instructions carefully and proceed with caution.

General safety regulations

Work on the hydraulics control electronics may only be carried out by trained personnel who are well-acquainted with the control system, the machine, and its safety regulations.

 Follow the manufacturer's regulations when mounting, modifying, repairing, and maintaining equipment. The manufacturer assumes no responsibility for any accidents caused by incorrectly mounted or incorrectly maintained equipment. The manufacturer assumes no responsibility for the system being incorrectly applied, or the system being programmed in a manner that jeopardizes safety.

 Do not use the product if electronic modules, cabling, or connectors are damaged or if the control system shows error functions.

 Electronic control systems in an inappropriate installation and in combination with strong electromagnetic interference fields can, in extreme cases, cause an unintentional change of speed of the output function.

Welding after installation

Complete as much as possible of the welding work on the chassis before the installation of the system. If welding must be done afterward, proceed as follows:

Notice Do not place the welding unit cables near the electrical wires of the control system.

- Disconnect the electrical connections between the system and external equipment.
- Disconnect the negative cable from the battery.
- Disconnect the positive cable from the battery.
- Connect the welder's ground wire as close as possible to the place of the welding.

Construction regulations

The vehicle must be equipped with an emergency stop that disconnects the supply voltage to the control system's electrical units. The emergency stop must be easily accessible to the operator. If possible, the machine must be built so that the supply voltage to the control system's electrical units is disconnected when the operator leaves the operator's station.

Safety during installation

Notice Incorrectly positioned or mounted cabling can be influenced by radio signals, which can interfere with the system's functions.

Safety during start-up

⚠ DANGER Danger! Risk of death or injury. Do not start the machine's engine before the control system is mounted and its electrical functions have been verified. Do not start the machine if anyone is near the machine.

Safety during maintenance and fault diagnosis

Before performing any work on the hydraulics control electronics, ensure that:

- The machine cannot start moving
- Functions are positioned safely
- The machine is turned off
- The hydraulic system is relieved from any pressure.
- Supply voltage to the control electronics is disconnected.

1. PVSG-IoT-TP*-4GLTE Service and Plan Offerings

1.1 Plug & Play Hardware

The main features of the PVSG-IoT-TP*-4GLTE hardware are listed in the following table:

Connectivity	4G NA and 3G EU/AUS/NZL / eSIM included
Environmental	IP67 rating and hardened
Certifications	FCC, ISED RSS, CE, RCM, ICASA, POTRAZ
RAM Memory	512 MB
Flash Memory	8GB storage memory
GPS	GNSS, GLONASS, Galileo (available on CAN)
Real Time Clock	10-year battery life (date and time available on CAN)
PGN Request	Gateway request messages configurable from IoT portal
Sleep Mode	Schedule gateway sleep and wake up cycles
CAN	2 x CAN 2.0B. Support for CAN FD available
Digital Input	2x digital inputs (1 x ignition sense and 1 x discrete input)
Digital Output	1x digital output
Wi-Fi Access Point	Connect a device direct to gateway SSID network
Wi-Fi Client	Connect gateway to Wi-Fi network
Service Tools Mobile App	View internal status LEDs, Update firmware, get gateway logs

1.2 Part Numbers & Accessories

The PVSG-IoT-TP*-4GLTE can be activated with one of three available service plans. The service plans are sold separate, and it is recommended to purchase at the time-of-service activation. Each part number includes specific cellular service, web portal access and OTA capabilities for the duration defined in the description. Service levels are explained in the table below. Customers can order the service level part numbers any time or after service expiration.

1 Ordering Hardware



Hardware
Lite, Standard, Premium

2 Order Service Plan Include whitelisted master tag when ordering service plan

PVSG-IoT-TP1-4GLTE	170099
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3 Activate Service Plan

- Create a machine
- Create a template
- Assign template to machine

4 Renew Service Plan Contract expires



	Lite - *5 Signals including GPS Signals every 2 hours IQAN connections "pay as you go"	Standard - 50MB Flexible signal rates IQAN connections "pay as you go"	Premium - 200MB Flexible signal rates IQAN connections included
1 YR Service Plan	IOT10680121YRLT	IOT10680121YRST	IOT10680121YRPR
2 YR Service Plan	IOT10680132YRLT	IOT10680132YRST	IOT10680132YRPR
3 YR Service Plan	IOT10680143YRLT	IOT10680143YRST	IOT10680143YRPR
5 YR Service Plan		IOT10680165YRST	IOT10680165YRPR

1.2.1 Lite Service Plan – Feature Content

Service	Data Contracts	1YR, 2YR, 3YR Lite service contracts
Fleet Management	Fleet Administration	Organize your fleets and sub fleets in a hierarchical tree structure
	Users Management	Define users in hierarchical organization, customize roles and permissions
	Asset List	Manage a list of machines, with details, alerts and severities
Locate Services	Map Overview	View asset status on the map, with details, alerts and severities
	Geofencing	Set location fences, view and alert machines in or out of fences
Machine Status	Machine Status	View machines status, on, offline, machine critical values on map
	Machine Dashboards	Configurable dashboards with multiple widgets to view machine data
Condition Monitoring	Custom Signals	5 customizable signals, including GPS Latitude and Longitude, captured every 2 hours. GPS signals are captured when offline (*) Overages apply after 10 MB per month per asset
	Signal and DM1 Alerts	Setup signal alert and severities for CAN sensor data, setup service reminders, view history of signal and DM1 alerts
Machine Diagnostics	DM1 Diagnostics	Setup DM1 whitelist and blacklist, up to 5 critical DM1 alerts a day
	Real Time & Remote Diagnostics	Connect to IQAN server for real-time diagnostics Pay per IQAN connection - Data overages apply
	Controller Over-the-Air Updates	Connect to IQAN server for OTA updates Pay per IQAN connection - Data overages apply
	Email Notifications	Setup alert DM1 notifications to user's email boxes
Advanced Analytic Services	ALGO Option	Asset performance management through maintenance task optimization, predictive maintenance, based condition maintenance, process optimization and applied AI/ML applications
Fleet Reports	Gateway Status	Review gateway data usage, contract dates and firmware status
	Fleet Summary	Fleet utilization and service (engine hours, fuel usage and DM1s)
Machine APIs	Fleet Location	Get the last known location of a fleet of asset(s)
	Fleet AEMP2.0	Get the last known AEMP signal values of a fleet of asset(s) - ISO15143-3 compliant
	DM1 Faults	Get diagnostics trouble codes of a fleet of asset(s) - ISO15143-3 compliant
	Machine AEMP+	Get the last known values of your customized machine signals for the fleet of asset(s)

1.2.2 Standard Service Plan – Feature Content

Service	Data Contracts	1YR, 2YR, 3YR, 5YR Standard service contracts
Fleet Management	Fleet Administration	Organize your fleets and sub fleets in a hierarchical tree structure
	Users Management	Define users in hierarchical organization, customize roles and permissions
	Asset List	Manage a list of machines, with details, alerts and severities
Locate Services	Map Overview	View asset status on the map, with details, alerts and severities
	Geofencing	Set location fences, view and alert machines in or out of fences
Machine Status	Machine Status	View machines status, on, offline, machine critical values on map
	Machine Dashboards	Configurable dashboards with multiple widgets to view machine data
	Overview Reports	Instant overview of when and how machines are being used
Condition Monitoring	Custom Signals	Customize any group of machine parameters into collections and templates. Data overages apply after 50MB per month per asset
	Signal and DM1 Alerts	Setup signal alert and severities for CAN sensor data, setup service reminders, view history of signal and DM1 alerts
Machine Diagnostics	DM1 Diagnostics	Retrieve diagnostics information remotely to quickly troubleshoot and diagnose issues
	Real Time & Remote Diagnostics	Connect to IQAN server for real time diagnostics Pay per IQAN connection - Data overages apply
	Controller Over-the-Air Updates	Connect to IQAN server for OTA updates Pay per IQAN connection - Data overages apply
	Email Notifications	Setup alert DM1 notifications to user's email boxes
	SMS Notifications	Setup SMS alerts to both inside and outside of your organization
Advanced Analytic Services	ALGO Option	Asset performance management through maintenance task optimization, predictive maintenance, based condition maintenance, process optimization and applied AI/ML applications
Fleet Reports	Gateway Status	Review gateway data usage, contract dates and firmware status
	Fleet Summary	Fleet utilization and service (engine hours, fuel usage and DM1s)
Machine APIs	Fleet Location	Get the last known location of a fleet of asset(s)
	Fleet AEMP2.0	Get the last known AEMP signal values of a fleet of asset(s) - ISO15143-3 compliant
	DM1 Faults	Get diagnostics trouble codes of a fleet of asset(s) - ISO15143-3 compliant
	Machine AEMP+	Get the last known values of your customized machine signals for the fleet of asset(s)

1.2.3 Premium Service Plan – Feature Content

Service	Data Contracts	1YR, 2YR, 3YR, 5YR Premium service contracts
Fleet Management	Fleet Administration	Organize your fleets and sub fleets in a hierarchical tree structure
	Users Management	Define users in hierarchical organization, customize roles and permissions
	Asset List	Manage a list of machines, with details, alerts and severities
Locate Services	Map Overview	View asset status on the map, with details, alerts and severities
	Geofencing	Set location fences, view and alert machines in or out of fences
Machine Status	Machine Status	View machines status, on, offline, machine critical values on map
	Machine Dashboards	Configurable dashboards with multiple widgets to view machine data
	Overview Reports	Instant overview of when and how machines are being used
Condition Monitoring	Custom Signals	Customize any group of machine parameters into collections and templates. Data overages apply after 200MB per month per asset
	Signal and DM1 Alerts	Setup signal alert and severities for CAN sensor data, setup service reminders, view history of signal and DM1 alerts
Machine Diagnostics	DM1 Diagnostics	Retrieve diagnostics information remotely to quickly troubleshoot and diagnose issues
	Real Time & Remote Diagnostics	Connect to IQAN server for OTA updates to stream real time troubleshooting, data and speed diagnostics
	Controller Over-the-Air Updates	Connect the IQAN server for real time OTA controller updates
	Email Notifications	Setup alert DM1 notifications to user's email boxes
	SMS Notifications	Setup SMS alerts to both inside and outside of your organization
Advanced Analytic Services	ALGO Option	Asset performance management through maintenance task optimization, predictive maintenance, based condition maintenance, process optimization and applied AI/ML applications
Fleet Reports	Gateway Status	Review gateway data usage, contract dates and firmware status
	Fleet Summary	Fleet utilization and service (engine hours, fuel usage and DM1s)
Machine APIs	Fleet Location	Get the last known location of a fleet of asset(s)
	Fleet AEMP2.0	Get the last known AEMP signal values of a fleet of asset(s) - ISO15143-3 compliant
	DM1 Faults	Get diagnostics trouble codes of a fleet of asset(s) - ISO15143-3 compliant
	Machine AEMP+	Get the last known values of your customized machine signals for the fleet of asset(s)

1.3 Service Notes

- 4G modem support North American/Americas Bands in 4G and Europe/Australia/New Zealand/International Bands in 3G. see section 6.2 Modem and Cellular Communications for more information, please contact your Parker Representative for more information.
- **Customers who sell Parker's mobile IoT solution must have a signed SaaS (Software as a Service) agreement in place.** In addition, the customer must have created a EULA (End User License Agreement) and process for flow down to end users
- Billing period begins when customer assigns a machine template to the gateway.
- Service level can be renewed upwards or downwards after the period expires. For example, Lite can be restored to Standard. Standard can be restored to Premium once the current service expires
- Overages and OTA usage fees will be billed to the customer at the end of each quarter
- Gateway replacement part is defined as hardware only part number and can be ordered as such. Master tag marrying is completed in the IoT portal by end user

Once the system confirms connection, the user can use any diagnostic tools as if they were plugged directly into the back of the module.

2. Mounting the PVSG-IoT-TP*-4GLTE to a Machine

The original equipment manufacturer (OEM) or integrator must ensure the product is securely mounted to the vehicle.

2.1 Safety, Reliability, and Accessibility

- Use eye protection when using a drill/performing work that may be hazardous to the eyes
- Use ear protection in noisy work areas.
- Wear appropriate clothing/uniforms and safety shoes.
- Maintain three points of contact when climbing in and out of cab.
- Make sure you know what is behind the area before you drill.
- Install equipment so it will not cause damage to the vehicle or work loose over time.
- Make sure there are no loose components/cables and no unsecured components.
- Use solid mounting surfaces.
- Route all cables away from hot or abrasive areas.
- Choose installation locations where components can be easily serviced.
- Choose installation locations where components are safe from tampering and damage

- Do not locate the product where it obstructs the driver's field of vision, distracts the driver from the driving task, interferes with the driver's operation of controls or displays, or creates as safety hazard. Follow all laws and regulations governing the placement of equipment and mounts.
- Excess cable can be a tripping hazard. Ensure cable is not draped where it will interfere with either the driver or passenger as they move within the cab

2.2 Installation Guidelines

- Gateway can be safely installed on a secured bracket that is robust enough to minimize any vibration and sustain the weight of the product.
- The mounting surface is strong enough to support the mounting hardware.
- The mounting surface is flat.
- It does not block the view of the road or mirrors.
- The surrounding area is clear of dash controls and gauges.
- It does not limit a **passenger's** leg room or block access to any other compartments.
- It does not interfere with anyone entering or exiting the vehicle cab.
- It is not likely to impact the driver or passenger in case of an accident or collision.
- Obstructs the **driver's** field of vision.
- Distracts the driver from the driving task.
- Interferes with the **driver's** operation of controls or shifting.
- Obstructs moving parts of the vehicle, if any.
- Blocks the deployment of an airbag.

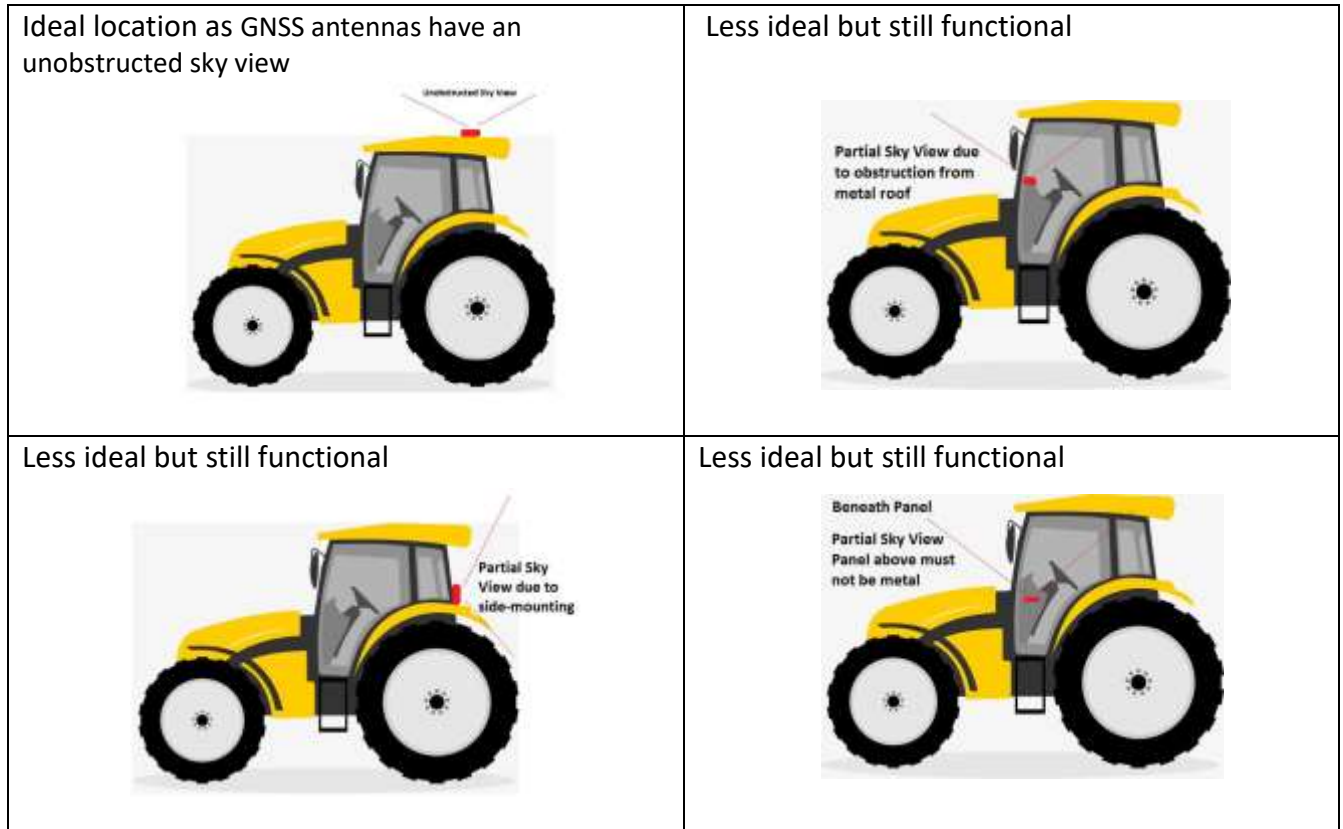
2.3 Additional information for selecting an installation location:

- Installations should not obstruct the driver's field of vision while operating the vehicle, and should comply with all applicable federal and state laws and regulations regarding
- Appropriate installation locations (including restrictions against mounting objects on a **vehicle's** windshield) and driver distraction.
- Consider the owner's preference in selecting the installation location and whether there is a team or a single driver
- Once a suitable location is selected, verify that there is nothing behind the mounting surface that might be damaged by drilling holes

Notice Excess cable can be a tripping hazard. Ensure cable is not draped where it will interfere with either the driver or passenger as they move within the cab

2.5 Suggested Installation Locations

To achieve the best performance on the TP1 product, the following installation considerations are recommended.



2.6 Designing and Connecting the Vehicle Harness

The vehicle manufacturer or integrator is responsible for designing a vehicle harness that mates with the PVSG-IoT-TP*-4GLTE connector(s).

The vehicle harness design depends on the following:

- How the user's inputs, outputs, communication, and power pins are configured.
- Other components on the vehicle and their physical locations.
- The routing of the harness

Details on recommended wire diameters for use with the product connector are covered in the connector manufacturer's **datasheet**. The wire diameters used should be enough for the expected module current.

To use the remote diagnostic features of the PVSG-IOT-TP*-4GLTE gateway, the diagnostic bus of the gateway must be properly connected to the diagnostic bus of the IQAN control system.

Once the vehicle harness is designed, it can be connected to the PVSG-IOT-TP*-4GLTE simply by clicking the mating connectors into the connector ports on the PVSG-IOT-TP*-4GLTE.

Notice *Damage to Equipment!* The technician installing the connector should take special care that the connector is inserted in the correct orientation as power applied to unprotected pins can cause permanent damage to the gateway.

3. Gateway Connections (Pinout)

3.1 Power and Vehicle Communication

3.1.1 Mating Connector

The mating connector for the PVSG-IoT-TP*-4GLTE is a Deutsch DT16, 12 contact connectors key A.

(DT06-12SA or AT06-12SA)



Figure 2: Mating connector

The socket type contacts in the Deutsch DT16 connector are used for power, power control (ignition sense), and CAN communication channels.

Notice *Damage to Equipment!* The technician installing the connector should ensure that the connector is inserted in the correct orientation as power applied to unprotected pins can cause permanent damage to the gateway

3.1.2 Pinout

The following tables show the pinouts for the connectors:



Figure 3: PVSG-IOT-TP*-4GLTE connector

Main Connector Pin-out	
Pin	Function
1	+12V OR +24V VBATT
2	<i>DIGITAL_IN</i>
3	CAN1_H
4	CAN1_L
5	<i>CHASSIS GROUND</i>
6	IGNITION SENSE
7	CANO_H
8	CANO_L
9	<i>CHASSIS GROUND</i>
10	<i>DIGITAL OUT</i>
11	<i>CHASSIS GROUND</i>
12	GROUND

The pins with italicized descriptions are not used in the IQAN Connect solution. It is recommended to plug in the unused pins for the connector.

The pins with **bold** descriptions are required for the device to boot and CAN communication.

3.1.3 CANBUS Module Block Diagram

When utilizing the PVSG-IoT-TP*-4GLTE gateway with an IQAN-based control system, it is very important to connect the diagnostic bus of the gateway to the diagnostic bus of the IQAN Master Controller.

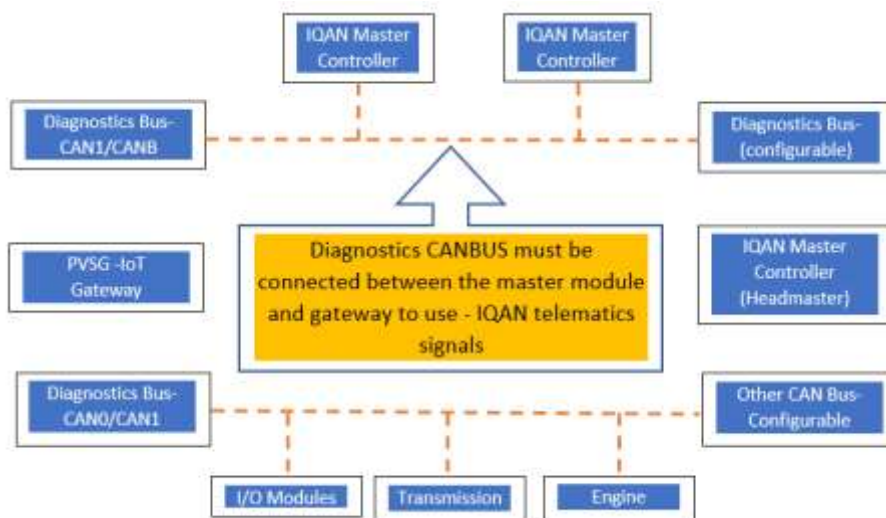


Figure 17. Block diagram of wiring PVSG-IOT-TP*-4GLTE Gateway

4. Pinout

The PVSG-IoT-TP*-4GLTE is powered by a direct battery connection to pin 1, upstream of any main power disconnect switch. The gateway is activated by applying switched power to the ignition sense input pin 6.

The PVSG-IoT-TP*-4GLTE operates in a 12 V or 24 V system and can operate from 6.5 V up to 32 V with over-voltage protection at 36 V.

Requirements	Conditions
Operating Temperature	-30° C to 70° C (-35° F to 158° F)
Operating Voltage	12- or 24-Volts DC
Operating Current	500mA max @ 12V
	250mA max @ 24V
Sleep current	0.6mA max @ 12V

Direct Battery Input (+VBATT)				
Parameter	Min	Nom	Max	Units
Input voltage for normal operation (see note 1)	6.5	-	32	V
Maximum continuous voltage (see note 2)	-	-	36	V
Maximum peak current (see note 3)				
VBATT=6.5 V			3.17	A
VBATT=13.8 V			1.50	A
VBATT=28.0 V			0.74	A
VBATT=32.0 V			0.64	A
Recommended External Fuse	-	3	-	A

Note 1: It is strongly recommended that Pin 1 of the module be connected directly to the vehicle battery source and to utilize Pin 6 (Keyswitch) for activating and deactivating, as well as allowing a safe shut-down sequence of the module.

Note 2: Exposure to maximum voltages for extended periods may affect device reliability.

Note 3: Maximum peak current is a theoretical calculation assuming maximum current draw for each peripheral as specified in datasheets, 85% efficiency for step-down regulators, and peak cellular current during a 1-slot Tx burst at maximum power. Note the burst duration is typically 1 ms or less, thus not affecting recommended fuse ratings.

5. Power Control Input (Ignition Sense)

Notice *Damage to equipment!* Do not connect inputs directly to unprotected inductive loads such as solenoids or relay coils, as these can produce high voltage spikes that may damage the PVSG-IoT-TP*-4GLTE. If an inductive load must be connected to an input, use protective circuitry such as a diode or transorb.

5.1 Power Control input connections

You must be aware of the following when connecting the power control digital input:

- The power control digital input is usually connected to the vehicle ignition, but it can be connected to any power source in a system.
- To protect the harness that connects the PVSG-IoT-TP*-4GLTE to the ignition, it is recommended to place a fuse of 3A in the circuit that feeds the unit
- If your PVSG-IoT-TP*-4GLTE must always be powered, the power control digital input can be directly connected to a fused battery power input (called VBATT), which will provide constant power.
- When battery power (VBATT) is connected, and the power control digital input is inactive, the PVSG-IoT-TP*-4GLTE will deactivate.

The following shows a typical power control digital input connection:

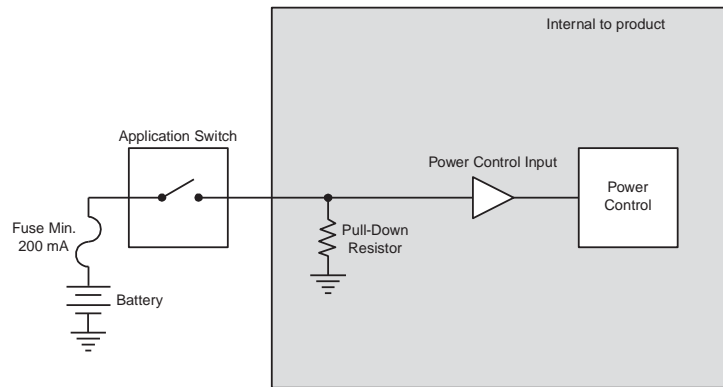


Figure 4: Power control digital input installation connections

5.2 Power for Sleep Mode

The PVSG-IoT-TP*-4GLTE supports sleep mode functionality the wiring must comply per the below diagram to obtain direct power from the battery.

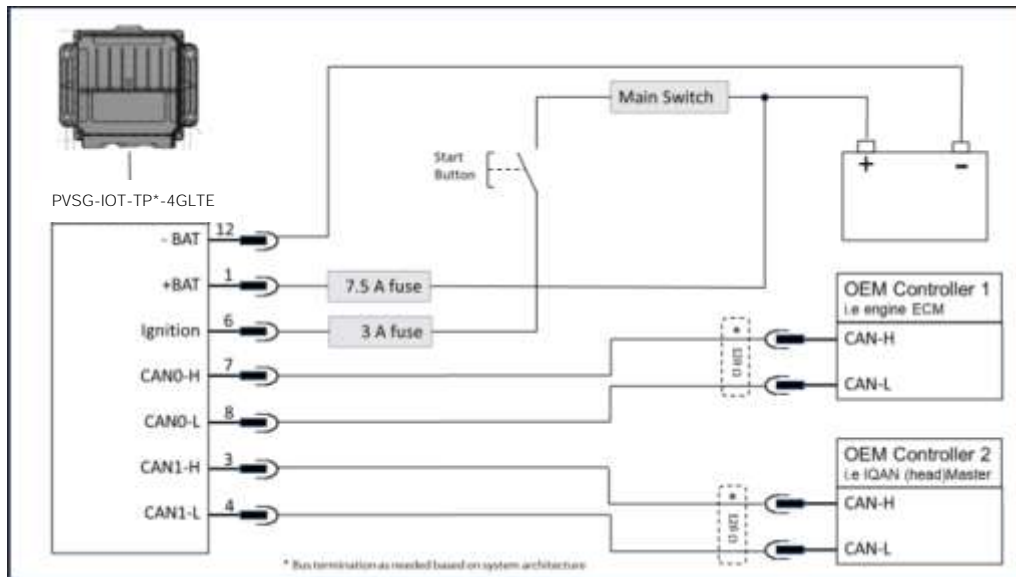


Figure 5: Power control for Sleep Mode function

6. Communication

The types of communication available to the PVSG-IoT-TP*-4GLTE are Controller Area Network (CAN), Ethernet, Modem (GSM), Wi-Fi

6.1 Controller Area Network

The PVSG-IoT-TP*-4GLTE has 2 CAN communication ports available.

The hardware provides controller area network (CAN) communication according to the SAE J1939 specification, making the PVSG-IOT-TP*-4GLTE compatible with CAN based protocol through software.

CAN communication is used to communicate the status of multiple modules that are connected in the same network.

6.1.1 CAN capabilities

CAN 0 and CAN 1 can be configured to 250 kbps (default) or 500 kbps. Lack of regular CAN communication is an indication that there is either a problem with a module in the network, or a problem with the CAN bus.

6.1.2 J1939 CAN Installation Connections

The CAN connection for the PVSG-IoT-TP*-4GLTE should conform to the J1939 standard. The SAE J1939 standard is a robust automotive specification that is a good CAN installation guideline even when the J1939 CAN protocol is not being used.

For a list of J1939 connection considerations, refer to the SAE J1939 specifications available through the Society for Automotive Engineers. SAE J1939-11 covers the **CAN bus's physical aspects**, including cable type, connector type, and cable lengths.

Notice The standard variant of the PVSG-IOT-TP*-4GLTE does not have a CAN termination resistor, which assumes that the CAN bus is terminated in the harness.

The following lists the elements that are required for a J1939 CAN connection:

- **CAN Cable:** A shielded twisted-pair cable should be used when connecting multiple modules to the CAN bus. The cable for the J1939 CAN bus has three wires: CAN - High, CAN - Low, and CAN Shield (which connect to the corresponding CAN_HIGH, CAN_LOW, and CAN_SHIELD pins on the connector). When a module does not have a CAN_SHIELD pin, the CAN Shield should be connected to an available ground terminal attached to the **negative battery**. **The CAN cable must have an impedance of 120 Ω**
- **CAN Connectors:** Industry-approved CAN connectors are manufactured by ITT Cannon and Deutsch and come in either T or Y configurations.
- **CAN Harness:** The CAN harness is the main backbone cable used to connect the CAN network. This cable cannot be longer than 40 meters **and must have a 120 Ω terminating resistor at each end**. **The 120 Ω terminating resistors eliminate bus reflections and ensure proper idle-state voltage levels**.
- The CAN cable is very susceptible to system noise; therefore, CAN shield must be connected as follows:
 - a) Connect CAN Shield to the point of least electrical noise on the CAN bus.
 - b) Connect CAN Shield as close to the center of the CAN bus as possible.
 - c) Use the lowest impedance connection possible.

Notice Ground loops can damage electronic modules. The CAN Shield can only be grounded to one point on the network. If grounded to multiple points, a ground loop may occur.

- **CAN Stubs:** The CAN stubs cannot be longer than 1 meter, and each stub should vary in length to eliminate bus reflections and ensure proper idle state voltage levels.
- **Max Number of Modules in a System:** The CAN bus can handle a maximum of 30 modules in a system at one time

The following shows a typical CAN connection using the SAE J1939 standard:

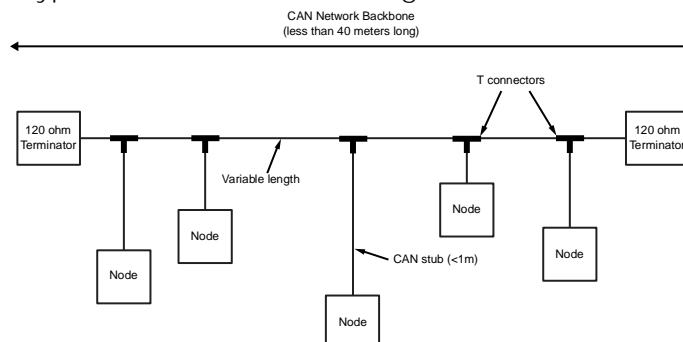


Figure 6: J1939 CAN connection

6.2 Modem and Cellular Communications

6.2.1 Modem Specifications

The main specifications of the PVSG-IOT-TP*-4GLTE cellular modems interface is listed in the following table:

6.2.1.1 North America/ Central/ South America

Cellular Interface America PVSG-IOT-TP*-4GLTE	
Parameter	Description
4G LTE LET FDD Cat 1	Bands 2 ,4, 12
HSPA+ (3G)	Band 1, 2, 4, 5, 8
GSM (2G)	Band 2, 3, 5, 8
Supported antenna	Internal
Certifications	AT&T, US (FCC CFR 47 part 15), Canada (IC ISED RSS), Europe (CE 2014/53/EU), Australia/New Zealand (RCM), South Africa (ICASA), ZIMBAWE (POTRAZ)

6.2.2 SIM Carrier Information

The PVSG-IoT-TP*-4GLTE comes supplied with a SIM card provisioned for AT&T and their partner's global networks. Figure 18 provides a list of countries where the PVSG-IOT-TP*-4GLTE could have service available. *Note: for countries in group B, may require additional approval and country certifications. Gateway will operate if the country's telecommunication networks support any of the 3G or 4G bands stated in section 7.2.1 Modem Specifications. Local authorities and carrier providers could change service coverage and network frequency band support anytime*



Figure 7: Gateway countries of operation

6.3 Wi-Fi

The PVSG-IoT-TP*-4GLTE gateway will support the following Wi-Fi Services



Figure 8: Wi-Fi services

- **Wi-Fi Client:** Setup gateway as a client and connect to existing infrastructure networks
- **Wi-Fi Mule:** Connect PC to gateway access point, extract machine logs and upload the cloud when offline
- **Wi-Fi Local Access Point:** Connect mobile devices (PC, phone, tablet) to gateway access point, perform IQAN real time diagnostic and software OTA updates locally or user the Parker Service Tool.

Access the IoT knowledge base for my information on setting up Wi-Fi service and tools:

www.community.parker.com

The main specifications of the PVSG-IoT-TP*-4GLTE Wi-Fi interface are listed in the following table:
(*Note 1:* Certain governments do not permit operating with all available channels.)

Wi-Fi interface	
Parameter	Description
Standard	802.11 b/g/n (2.4GHz) 802.11 a/n (5 GHz)
Channels	See tables below
Operational modes	APN, Client
Security	WEP64/128 WPA (TKIP, AES) WPA2 (CCMP, AES) WAPI hardware support 64/128 bit AES hardware support
Supported antenna	Internal
Certifications	US (FCC CFR 47 part 15) Canada (IC RSS)

2.4 GHz – IEEE 802.11b/g/n					
20 MHz Channels			40 MHz Channels		
Channel	Frequency	Unit	Channel	Frequency	Unit
1	2 412	MHz	1-5	2 422	MHz
2	2 417	MHz	2-6	2 427	MHz
3	2 422	MHz	3-7	2 432	MHz
4	2 427	MHz	4-8	2 437	MHz
5	2 432	MHz	5-9	2 442	MHz
6	2 437	MHz	6-10	2 447	MHz
7	2 442	MHz	7-11	2 452	MHz
8	2 447	MHz			
9	2 452	MHz			
10	2 457	MHz			
11	2 462	MHz			
12	2 467	MHz			
13	2 472	MHz			

5 GHz – IEEE 802.11a/n					
20 MHz Channels			40 MHz Channels		
Channel	Frequency	Unit	Channel	Frequency	Unit
36	5 180	MHz	36-40	5 190	MHz
40	5 200	MHz	44-48	5 230	MHz
44	5 220	MHz	52-56	5 270	MHz
48	5 240	MHz	60-64	5 310	MHz
52	5 260	MHz			
56	5 280	MHz			
60	5 300	MHz			
64	5 320	MHz			
100	5 500	MHz	100-104	5 510	MHz
104	5 520	MHz	108-112	5 550	MHz
108	5 540	MHz	116-120	5 590	MHz
112	5 560	MHz	124-128	5 630	MHz
116	5 580	MHz	132-136	5 670	MHz
120	5 600	MHz			
124	5 620	MHz			
128	5 640	MHz			
132	5 660	MHz			
136	5 680	MHz			
140	5 700	MHz			

5 GHz – IEEE 802.11a/n					
20 MHz Channels			40 MHz Channels		
Channel	Frequency	Unit	Channel	Frequency	Unit
149	5 745	MHz	149-153	5 755	MHz
153	5 765	MHz	157-161	5 795	MHz
157	5 785	MHz			
161	5 805	MHz			
165	5 825	MHz			

6.4 GPS/GNSS Interface

The PVSG-IoT-TP*-4GLTE has an onboard GPS chip for calculating geolocation information to be used throughout the cloud application.

7. Need Further Assistance?

7.1 Where to find help?

Contact the supplier of the PVSG-IoT-TP*-4GLTE gateway or open a ticket with the Parker Support Help Desk 1-888-915-4357 (help) number when looking for assistance on any of the IoT products and services. Also email phsupport@parker.com for further assistance.

7.2 IoT Community Page

Join the [Parker Mobile IoT community page](#) to access tutorial videos for further assistance with your PVSG-IoT-TP*-4GLTE gateway or the Parker Mobile IoT Portal.

7.3 Parker Mobile IoT Service App

Access mobile IoT services, assets, and gateways through the Mobile IoT Services app. Click the link or use the QR code to download the app.



8. Markings/Approvals

The PVSG-IoT-TP*-4GLTE meets the following regulations.

8.1 FCC Compliance

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

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in an industrial 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 to 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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 28cm between the radiator & your body.

Note: The country code selection is for non-US models only and is not available to all US models. Per FCC regulation, all Wi-Fi products marketed in US must be fixed to US operation channels only.

8.2 IC Compliance

This device complies with ISED's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Caution :

- (i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
- (iv) where applicable, antenna type(s), antenna models(s), and worst-case tilt angle(s) necessary to remain compliant with the E.I.R.P. elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.

Avertissement:

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

- (i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
- (iv) lorsqu'il y a lieu, les types d'antennes (s'il y en a plusieurs), les numéros de modèle de l'antenne et les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la P.I.R.E. applicable au masque d'élévation, énoncée à la section 6.2.2.3, doivent être clairement indiqués

Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated with greater than 28cm between the radiator & your body.

Déclaration d'exposition aux radiations: Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 28 cm entre le radiateur et votre corps.

9. EU Declaration of Conformity



EU Declaration of Conformity

We, **Parker Hannifin Canada, Electronic Motion and Controls Division**
 1305 Clarence Avenue, Winnipeg, MB, Canada, R3T 1T4

Declare under our sole responsibility that the product(s) listed below is (are) in compliance with the Directives listed below when used for its intended purpose.

Part Number	Model/Product Listing
170099	VEO PVSG-IOT-TP1-4GLTE-WIFI MSG

Declaration Item	Declaration Information
Issued in accordance with the following directives	<ul style="list-style-type: none"> • Directive 2014/53/EU - Radio Equipment Directive
Harmonized Standards	<ul style="list-style-type: none"> • EN 55032:2015+AC:2016, Class B • EN 55024:2010 • EN 55024:2010+A1:2015 • EN 301 489-1 V2.2.3 (2019-11) • EN 301 489-17 V3.1.1 (2017-02) • Draft EN 301 489-52 V1.1.0 (2016-11) • Draft EN 301 489-19 V2.2.0 (2020-09) • EN 300 328 V2.2.2 (2019-07) • EN 301 893 V2.1.1 (2017-05) • EN 301 511 V12.5.1 (2017-03) • EN 301 908-1 V11.1.1 (2016-07) • EN 301 908-2 V11.1.2 (2017-08) • EN 303 413 V1.1.1 (2017-06) • EN 62311:2008 • EN 62368-1:2014/AC:2015
Technical Documentation File maintained at	Stored at the address above

 Signature Shawn Hughes Product Sustainability & Improvement Manager	Winnipeg, MB September 6, 2022 Location, Date Executed on
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10. Appendix

10.1 Diagram conventions

The following symbols are used in the schematic diagrams in this document:

Symbol	Meaning
	General input
	General output
	Frequency input
	Analog input
	Frequency sensor
	Pulse sensor
	Resistive sensor
	General sensor
	Application switch
	Load
	Pull-down resistor
	Pull-up resistor
	Battery
	Fuse
	Resistor
	Ground
	Chassis ground

