Commercial Vehicle Productivity and Security

The 7301 is a versatile GPS tracking beacon, designed for fleet management needs in all commercial vehicles.

Combined with our commercial mobile monitoring portal, subscribers can manage and view the location of any or all vehicles in a fleet, run a variety of valuable reports, and manage vehicle maintenance alerts.

Kit Contents
- GPS Beacon device with SIM
- GPS and Cellular Antennas
- Wiring harness

Tools and Supplies Required
- Wire cutters, wire strippers
- Voltmeter (multimeter)
- Soldering iron, solder
- Electrical tape
- Plastic cable ties
- Screw drivers, mounting screws
- Wrenches, sockets

Antenna Configuration

The 7301 beacon uses external GPS and cell network antenna modules, connected to the beacon with SMA connectors. The antennas must be positioned in the vehicle with a clear signal path to as much of the sky as possible, without metal obstruction.
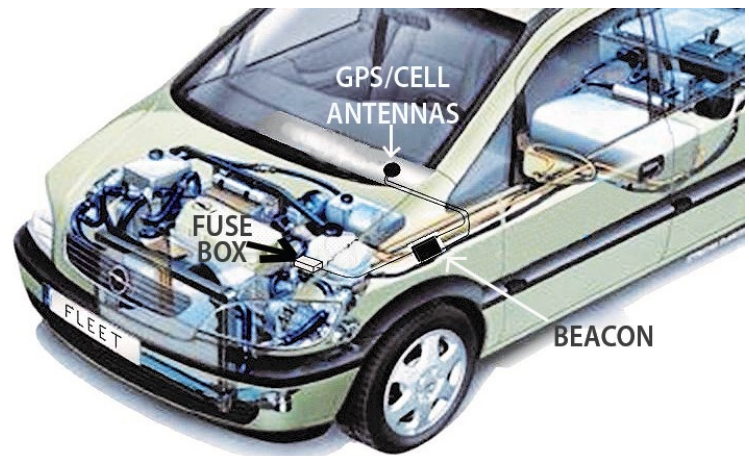
External Antenna Installation

The following antenna models are supported:

Standard Antenas

- Part Numbers:

  730x-ANT-GPS-STD (GPS)
  Dimensions (square) 1.7 x1.7 x 0.5 in (44 x 44 x 12 mm)

  730x-ANT-CELL (Cell)
  Dimensions (paddle) 4.5 x 0.8 x 0.2 in (115 x 21 x 6 mm)

- Black plastic housing
- Mounted with peel-and stick adhesive patch

Weatherproof Drill-through Antenna

- Part Numbers:

  730x-ANT-WPA-DT

- Black plastic housing with rubber weather-seal; approx 2.5 in (64mm) diameter; 0.7 in (18mm) depth (excluding screw post)

- Screw post mount for drill-through applications

Standard Antennas

Drill-through Antenna

Cellular Antenna   GPS Antenna

For best performance, the top of the antenna should face the sky through the area of least signal blockage.

• If the installation is not required to be covert, an ideal location is underneath the front windshield glass. For covert installations, an ideal location is under the dashboard, as close to the front windshield as possible.

• In a car, the antenna can be mounted under the rear window or in a trunk, under the rear deck, as close to the rear window as possible.

Antenna Installation Notes

• Signals will penetrate upholstery, carpet, plastic dashboards, etc., but not metal panels or brackets.

• Signals will penetrate window glass but not metallic tinted windows or painted edges of windows.

• Radio antenna or defrost wires embedded in glass may degrade signals.

Beacon Installation Position

• The beacon is not waterproof or weatherproof and should always be installed in the passenger compartment of the vehicle.

• Determine the best location for the beacon – any spot where the beacon can be fastened in place with plastic cable ties is suitable.

• Under a seat is often a suitable location for beacon installation. Be sure it is not close to any heat sources or areas that experience moisture or vibration. Another good location is under the dashboard.

• It is recommended to secure the beacon in place only after all wiring is complete. Be sure it is not close to any heat sources or areas that experience moisture or vibration.

• Visibility of the indicator LEDs will be useful for testing and troubleshooting.

Connect Power and Ignition Sense

The power harness included in the installation kit contains 20 wires. These wires are used for the basic installation: 10-30V constant power (red – Pin 11), ground (black – Pin 1), and ignition sense (yellow – Pin 15).

Notes

- Connect the wiring harness to the power and ignition source, as well as any I/O sources (if used), before attaching the harness to the beacon.

- If wiring harness wires need to be extended, use the same gauge wire and solder the extension wire on, then insulate with heat shrink tubing or electrical tape.

- Ensure that no wires are routed near heat sources.

Important Notice

When connecting the power harness to the beacon, it is important that the 20-Pin Molex connector is **seated firmly** in the port. When the Molex is fully inserted, the latch in the center will **click** over the pin on the beacon, holding the cable in place. If the lever does not click into place, the power harness may become dislodged. If the power harness needs to be removed for any reason, care should be taken to ensure the individual wires are not damaged by exerting any pressure only on the black plastic of the Molex connector, rather than the wires. **Watch our video here: https://bit.ly/33kfnxY**

Power Connection Instructions

- Connect the black (ground) wire to battery negative or the vehicle chassis – this wire **must** be connected first, before the power or ignition sense wires. Be sure the grounding screw is not painted or coated with an insulating material.

- With the vehicle's ignition turned OFF, use a multimeter to assist in finding a suitable, constant 8-30V power connection point – directly to the vehicle's battery may be best.

- Ensure that any wires in the wiring harness that are not to be connected do not come in contact with power, ground, or any other voltage. Insulate them with electrical tape.

Ignition Sense Connection

- **Important Note:** The ignition sense connection is mandatory. Failure to install the ignition sense correctly will result in erroneous data being reported from the beacon.

- Find a source of 10-30V that is switched on and off with the ignition key in the run position (accessory position is not acceptable). This connection should produce 8-30V when the vehicle ignition is ON and 0 Volts when the vehicle ignition is OFF. Connect the white (ignition sense) wire to this point. Voltage transitions must occur instantly. Gradual or stepped transitions from one voltage to another may not be detected.

Important Notices

The 7301 beacon model is designed to operate from 10 to 30 volts DC. **8V is the minimum voltage at which the device will operate reliably.** The user is responsible for ensuring the voltage supplied to the beacon remains in this voltage range to include transient voltage spikes and load dump voltages. Failure to comply may damage the beacon. The current draw under normal operating conditions is approximately 75mA at 12V.

The beacon should never be connected to the same power source as the vehicle Electronic Control Module (ECM), as this may adversely affect the vehicle electronics.

Failure to install the ignition sense correctly will result in erroneous data being reported from the beacon. This may result in false or incorrect reporting of vehicle starts, stops, ignition on and off.

Vecima 7301 Beacons – Cable Connectors

20-pin Molex Connector – Pin Descriptions

Pin	Pin Name	Description
1	**GND (-)**	**Ground**
2	CAN1L	[not used]
3	1 WIRE POWER	Power supply pin for Dallas 1-Wire® devices
4	DIN 4	Digital input, channel 4 (+)
5	DIN 2	Digital input, channel 2 (+)
6	CAN2L	[not used]
7	AIN2	[not used]
8	DOUT3	Digital output. Open collector output (ground)
9	DOUT2	[not used]
10	AIN3	[not used]
11	**VCC (+)**	**Power supply (+12-24 V DC)**
12	CAN1H	[not used]
13	1 WIRE DATA	Data channel for Dallas 1-Wire® devices
14	DIN 3	Digital input, channel 3 (+)
15	**DIN 1**	**Digital input, channel 1 (+). DEDICATED FOR IGNITION INPUT**
16	CAN2H	[not used]
17	AIN1	[not used]
18	DOUT4/AIN4	[not used]
19	DOUT1	Digital output. Open collector output (ground)
20	K-LINE	[not used]

Auxiliary Input

- The auxiliary inputs can be used to detect and report the opening and/or closing of a circuit. Note that a minimum voltage of 8V is required to trigger the input.

- When using the auxiliary input to measure the state of a vehicle circuit, it is recommended that you use a relay to control the input signal to the device.

- Please note that all Inputs supplied on the 7301 are positive (+). If a negative (-) input is required, a relay may be used to convert the signal.

Output

- The outputs can be used to remotely control vehicle functions such as door lock/unlock and starter disable/enable.

- The outputs can be configured via the web portal to interactively toggle an external circuit between open and closed states, or to pulse the circuit to the closed state for either 1 or 3.2 seconds, then automatically open the circuit.

- To close an external circuit, the beacon output acts as a ground source (or what is referred to as a current sink) to the external circuit. To open an external circuit, the output will be open. Since the output can draw a maximum current of 150mA, it is recommended that you use the output to control a relay and use the relay to manage the external circuit.

Connect and Mount Beacon

- Attach the 20-Pin Molex on the wiring harness to the beacon and ensure that the retaining clip snaps in place.

- Affix the beacon securely to the vehicle. If the beacon is not securely mounted, it may report false Starts and Stops as well as other erroneous events.

- If a suitable panel for affixing the beacon is not available, fastening the beacon to a bracket or wire bundle with plastic cable ties is also adequate. Be sure to secure any loose or extra lengths of wire.

LED Indicators

- The 7301 beacon has two LEDs which indicate the current state of the Cell and GPS connectivity. The location of the LEDs is indicated in the diagram below.

GPS Antenna   Navigation LED   Status LED   Cell Antenna
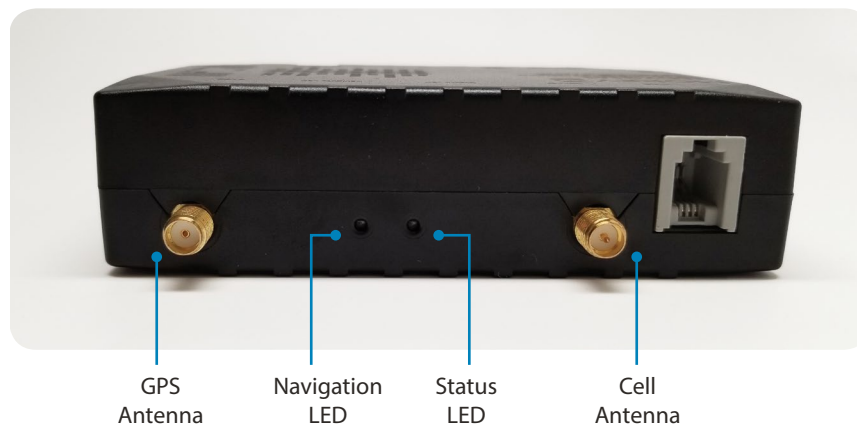
Please refer to the following chart to determine the connectivity state.

Navigation LED	Normal mode, GPS is working	Blinking every second
	No GPS signal received	Permanently switched on
	GPS turned off: Sleep mode or not working	Off
Status LED	Normal mode	Blinking every second
	Sleep mode	Blinking every two seconds
	Modem is active	Blinking fast for a short time
	Device is booting or not working	Off

Warning and Known Issues

- It is important that the 20-Pin Molex connector is installed fully into the beacon connector, and that the device is firmly attached to the vehicle. Excessive vibrations from a loose installation can cause incorrect results.

- The 7301 beacon is not a waterproof or sealed device. Care must be taken to ensure the device is kept away from water or any other liquids, as well as excessive dust.

Addendum A – Temperature Sensor Configuration

The 7301 beacon supports connection to a 1-Wire Temperature Sensor to provide fleet managers with the ability to monitor temperature-sensitive cargo and receive alerts in the portal if configurable temperature thresholds are violated.

This guide describes how to connect the sensor to the 7301 and configure the Temperature Sensor Scenario in the portal.

The recommended 1-Wire Temperature Sensor is manufactured by Embedded Data Systems.

Full specifications for the probe may be found at this link:
https://www.embeddeddatasystems.com/assets/images/supportFiles/manuals/DS18S20.pdf

Connecting the Temperature Sensor to the 7301

Please refer to the 7301 Cable Connectors description on page 4 of this document.

The 1-Wire data connection on the 7301 wiring harness is the Green wire on Pin 13 of the 20-Pin Molex.

- The Light Blue wire on the Temperature Sensor is the 1-Wire data connection for the probe. Connect this wire to the Green wire (Pin 13) on the 7301 wiring harness.
- The Yellow and Orange wires on the Temperature Sensor are both connected to Ground, which is the Black wire (Pin 1) on the 7301 wiring harness.

Temperature Sensor Scenario Setup

In order to receive temperature readings and send notifications, a Temperature Sensor scenario must be configured in the portal.

The Temperature Sensor scenario allows the sensor to be configured with upper and/or lower thresholds that determine when Temperature Alerts are generated in the portal.

- Above Threshold: upper limit that generates an alert when the temperature rises above this value
- Below Threshold: lower limit that generates an alert when the temperature falls below this value
- Threshold duration: this setting is not applicable as the 7301 beacon has a default duration