Vehicle Productivity, Security, and ELD Compliance

The 66xxH family of beacons includes the following models:

- 6600H – 3G with external antenna
- 6601H – 3G with internal antenna
- 6650H – 4G (LTE) with external antenna
- 6651H – 4G (LTE) with internal antenna

These versatile GPS tracking beacons are designed for fleet management needs in all commercial vehicles. The "H" designation in the model number is used to indicate beacons that are hard wired when installed in the vehicle.

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
- Combined GPS/Cell Network antenna (if required)
- Wiring harness

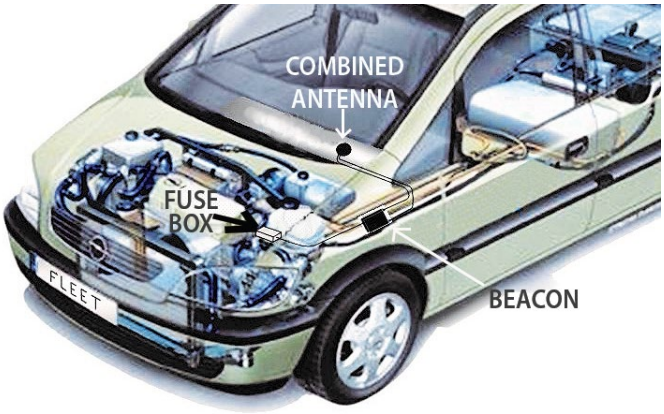
Tools and Supplies Required

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

Antenna Configuration

The 66xxH beacons have a combined GPS/cell network antenna module. The 6600H and 6650H models use an external antenna attached with FAKRA connectors, while the 6601H and 6651H are equipped with an internal antenna housed within the beacon.

For either configuration, the antenna must be positioned in the vehicle so that it has a clear signal path to as much of the sky as possible, without metal obstruction. For internal antennas, the beacon itself must be positioned properly for good signal reception.



External Antenna Installation (6600H and 6650H only)

The following antenna models are supported:

Standard Antenna

- Part Number: 6xx0-ANT-STD
- Black plastic housing; approx. 2.5 in (64 mm) diameter; 0.4 in (10 mm) depth
- Mounted with peel-and-stick adhesive patch

Weatherproof Drill-through Antenna

- Part Number: 6xx0-ANT-WPA-DT
- Black plastic housing with rubber weather-seal; approx. 2.5 in (64 mm) diameter; 0.7 in (18 mm) depth (excluding screw post)
- Screw post mount for drill-through applications

Standard Antenna

Drill-through 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. It is recommended to secure the beacon in place only after all wiring is complete.
- For models with an external antenna, 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.
- For models with an internal antenna, it is important that the top face of the beacon (the side with the large label) is facing the sky with no metallic obstruction. These models are ideally located under the dashboard, and the same guidelines for installing an external antenna (described above) are applicable.
- 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 14 wires, 3 of which are bundled together. The bundle contains the 8-30V constant power (red), ground (black), and ignition sense (white) wires.

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.

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. **Important Note:** The red (power) cable is configured with an in-line 3-amp fuse. This fuse must be installed as close as possible to the primary power source connection.
- 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 8-30V 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

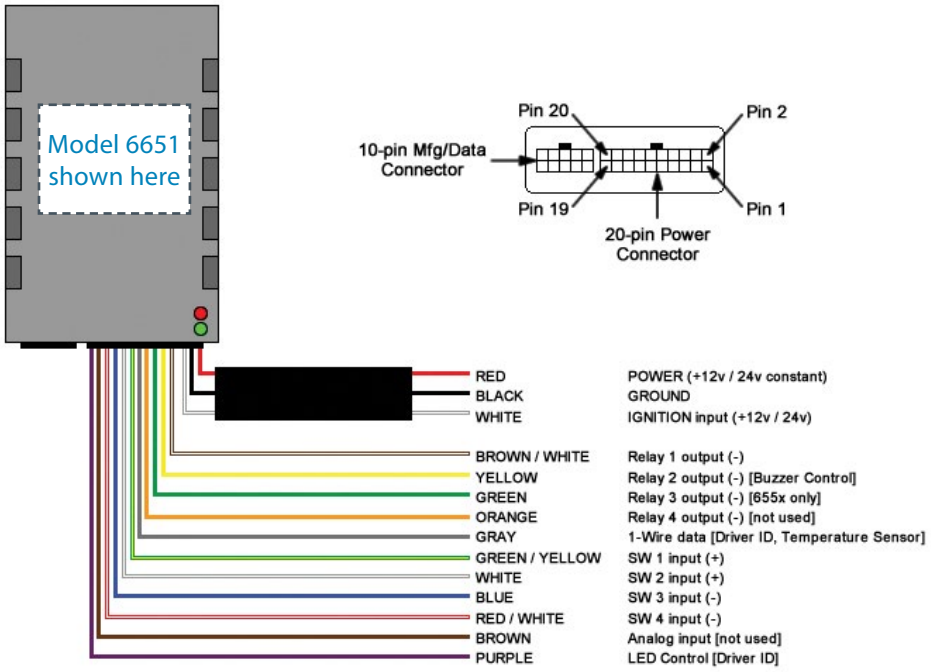
The 66xxH beacon models are designed to operate from 8 to 30 volts DC. **8V is the minimum voltage at which the device will operate reliably.** The user is responsible for ensuring the voltage supplied to the beacon remains in this voltage range to include transient voltage spikes and load dump voltages. Failure to comply may damage the beacon. The current draw under normal operating conditions is approximately 100mA 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 use the proper 3-amp fuse or to install the fuse in the recommended location could cause a vehicle fire hazard. The fuse provides overload protection for the power cable and the beacon. The wiring installed between the fuse and primary vehicle power is not protected from overheating if a short should occur.

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.

Nero 66xxH Beacons – Cable Connectors



20-pin Molex Connector – Pin Descriptions

Pin	Wire Color	Description	Pin	Wire Color	Description
1	Black	GND	11	White	Switch 2 input (+)
2	Yellow	Relay 2 output (-) [Buzzer Control]	12		CAN/J1939 Hi [not used]
3	Green	J1708- [not used]	13	Red/White	Switch 4 input (-)
4	Orange	J1708+ [not used]	14		CAN/J1939 Lo [not used]
5	Blue	Switch 3 input (-)	15	White (bundle)	Ignition input (+)
6	Gray	1-Wire data [Driver ID, Sensor]	16	Brown/White	Relay 1 output (-)
7		Cable ID [not used]	17		[not used]
8	Red (bundle)	Power input (+8 to +30v constant)	18	Green/Yellow	Switch 1 input (+)
9		[not used]	19	Purple	LED Control [Driver ID]
10	Black (bundle)	Ground	20	Brown	Analog input (0 – 16v) [not used]

Auxiliary Input

- The auxiliary inputs can be used to detect and report the opening and/or closing of a circuit. There are four auxiliary inputs available on the 66xxH beacon models, as indicated in the wiring diagram on the previous page. Note that a minimum voltage of 8V is required to trigger any input.
- Auxiliary inputs 1 and 2 are considered to be closed when connected to a vehicle power source and are considered to be open when connected to ground or an open circuit. Auxiliary inputs 3 and 4 are considered to be closed when connected to ground and are considered to be open when connected to a vehicle power source or an open circuit.
- When using auxiliary inputs to measure the state of vehicle circuits, it is recommended that you use a relay to control the input signal to the device.

Output

- Outputs can be used to remotely control vehicle functions such as door lock/unlock and starter disable/enable. There are two outputs available on the 66xxH beacon models, as indicated in the wiring diagram on the previous page. Output 2 is reserved for the buzzer output, while Output 1 is configurable for general use.
- Output 1 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

- For model 6600H and 6650H, connect the two antenna cables to the beacon using the corresponding FAKRA connectors, ensuring a firm, positive connection is made. Note that the connectors on the antenna wires and the beacon will have matching color.
- Attach the wiring harness to the beacon and ensure that the retaining clip snaps in place.
- Affix the beacon securely to the vehicle using the mounting slots found on either side of the case. If the beacon is not securely mounted, it may report false Start, Stop or Arm Where Parked (AWP) 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 66xxH has two LEDs on the top of the device which provide feedback about the current state.

- When the ignition is first turned on the Green indicator will show solid for about 30 seconds. After this initial setup period, the **Green** LED will blink slowly (8 times in 10 seconds) when the Ignition is turned off, and rapidly (25 times in 10 seconds) when the Ignition is turned ON.
- The **Red** LED is used to indicate error conditions by flashing a 2-digit code. The first digit indicates the general error type (1=hardware, 2=modem, 3=GPS, 4=end-to-end service) and the second digit indicates a more specific error described in the table below. Note that if multiple error conditions exist, the **Red** LED will cycle through all current error conditions.

RED LED Error Codes

1st Digit	2nd Digit	Error Condition
1	1	**License key has expired.** Please contact **Vecima Support.**
1	2	**Low supply voltage.** Ensure that the vehicle battery is supplying adequate voltage. Contact **Vecima Support** if the error persists.
1	3	**Data usage exceeded.** Please contact **Vecima Support.**
2	1	**Modem module fault.** Please contact **Vecima Support.**
2	2	**No SIM inserted.** Please contact **Vecima Support.**
2	3	No cellular signal. *
2	4	**Network not found**. Please contact **Vecima Support** to verify the SIM activation.
2	5	Last data session failed. *
2	6	**GPRS not attached.** Please verify beacon activation.
3	1	**GPS module fault.** Please contact **Vecima Support**
3	2	GPS antenna fault. *
3	3	GPS not tracking any satellites. *
3	4	GPS no fix (< 3 satellites). *
3	5	GPS has no time. *
4	2	Data transfer failed. *

* These issues may be caused by an incorrectly positioned beacon. If the device is connected properly and has an unobstructed view of the sky, and the error persists, please contact Vecima Support at telematics.support@vecima.com.

Warning and Known Issues

- It is important that the Molex connector is installed fully onto the diagnostics port, and that the device is firmly attached to the vehicle. Excessive vibrations from a loose installation can cause incorrect results.
- The 66xxH beacons are not waterproof or sealed devices. Care must be taken to ensure the device is kept away from water or any other liquids, as well as excessive dust.
- The 66xxH beacons may be incompatible with certain models of vehicles. For more information please contact Nero Global Tracking.
- The older external antennas that were previously shipped with the 3G beacons are not compatible with the newer 4G devices. If you are upgrading a 3G beacon to a 6650H (4G) model, then the external antenna must also be upgraded to one of the models described in this document.