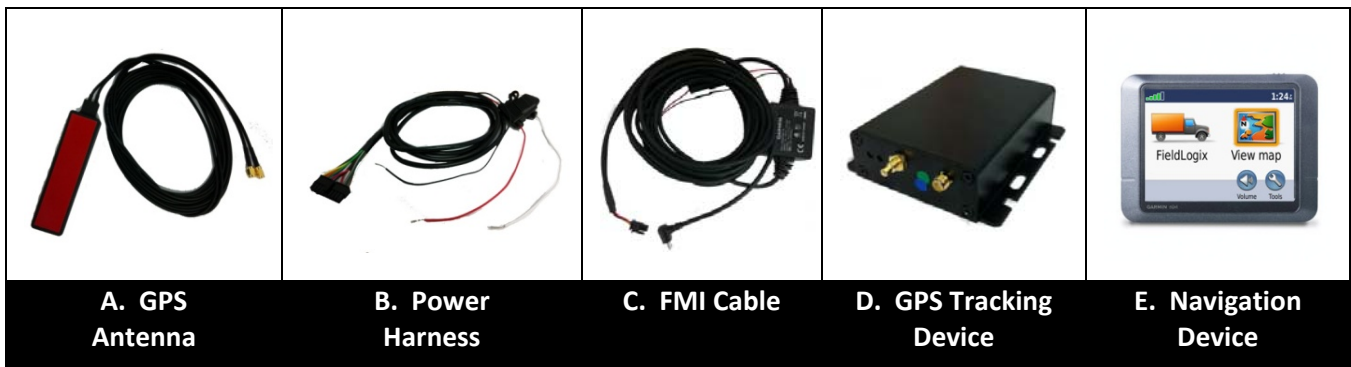


## GPS Device Installation Instructions

You will need the following tools:

- Crimp ring terminal
- Soldering tool and solder
- Torque Seal
- Electrical Tape
- Voltage Meter
- Wire strippers
- Silicone Glue
- Zip Ties
- Wire crimpers

There are 5 components to the GPS device:



The above components must be installed in the following order:

- A. GPS / Cell combo antenna
- B. Power harness
- C. FMI Cable
- D. GPS Tracking Device
- E. Navigation Device

### Table of Contents

Item	Page
GPS / Cell Combo Antenna Installation Procedure	2
Power Harness Installation Procedure	3
GPS Device Installation Procedure	5
Device Testing & Troubleshooting Procedure	7-8
Wiring Schematic	9

## **A. Installing the Combo GPS / Cellular Antenna**



*(Above image displays two possible antennas that may be shipped with the device. A single device should never have two separate antennas)*

Mount the antenna in the specified location (see below) and run the antenna leads to the planned location of the GPS device. The standard location is either on the WINDSHIELD or underneath the dashboard.

### **1. Windshield mounted installation:**

Mount the antenna in a location on the windshield where it will not obstruct the view of the vehicle operator. Be sure to follow the points below.

- The top (side with adhesive tape) of the antenna must be mounted directly onto the windshield facing up toward the sky while the side of antenna labeled “BOTTOM” must face downward.
- The antenna cannot be mounted underneath metal as this will interfere with the GPS signal.
- Make sure that the antenna is not beneath a portion of the windshield that has a metal film or tint as this will block the signal.
- Do not crimp or route antenna cables.
- Use the provided adhesive tape already mounted on the antenna when securing the antenna to the mounting location.

### **2. Under dashboard installation:**

Mount the antenna in a location underneath the dashboard. Be sure to follow the points below:

- The top (side with adhesive tape) of the antenna must face up toward the sky and side of antenna labeled “BOTTOM” must face downward.
- The antenna should be hidden and must have direct line of sight to the sky through the windshield.
- The antenna cannot be mounted underneath metal as this will interfere with the GPS signal.
- Make sure that the antenna is not beneath a portion of the windshield that has a metal film or tint as this will block the signal.
- Do not crimp or route antenna cables.
- Use the provided adhesive tape already mounted on the antenna when securing the antenna to the mounting location.

## **B. Installing the wiring harness:**

This type of harness has five wires. The RED wire is for constant power, the WHITE wire is for ignition, and the BLACK is for ground. The remaining two wires are for PTO (Power Take Off). The GREEN/YELLOW wire is for positive trigger switches and the BLUE wire is for negative trigger switches.

**Do not plug harness into device when making connections!**



### **Searching for Correct Wires:**

In order to find the correct wires, you must first set your multi meter to DCV or DC voltage 12V or 20V, attach the negative (-) probe to the vehicle chassis ground, and then begin probing the wires you suspect of being the constant and ignition power sources.

**Important:** When searching for the correct wires, DO NOT use a test bulb circuit tester. Often, damage to vehicle computers and vehicle air bag restraint systems result from the use of a test bulb causing a short circuit. Ideally, the use of a digital multi meter is the best tool to search for the correct wires.

The appropriate power wires should be found in the vehicle's ignition harness or power distribution area.

### **How to Find Constant Power:**

Locate the wire that you suspect would have constant power. Probe the wire with the meter lead. Turn the vehicle's ignition on and off while metering the wire. This wire should read a constant 12 volts or higher when the ignition is in both the "ON" and "OFF" positions.

Strip the insulation back and connect the red wire from the tracking unit's harness to this constant wire using the hook and wrap technique (See diagram A on the following page). Solder the connection to ensure a quality contact. Refer to Chart A for the most common colors for a constant power connection.

### **How to Find Ignition (switched) power:**

Locate the wire that you suspect to have ignition (Switched) power. Probe the wire with the meter lead.

- With the key in the ignition and turned to the "ON" position (Not starting the vehicle), the wire should meter 12 volts or more.
- With the lead still probing the wire, start the vehicle. When the car is cranking, the wire's voltage should not drop by more than 2 volts.
- Turn the key to the "OFF" position, the voltage should drop down to 0.

Strip the insulation back and connect the white wire from the tracking unit's harness to this ignition wire using the hook and wrap technique (See Diagram A). Solder the connection.

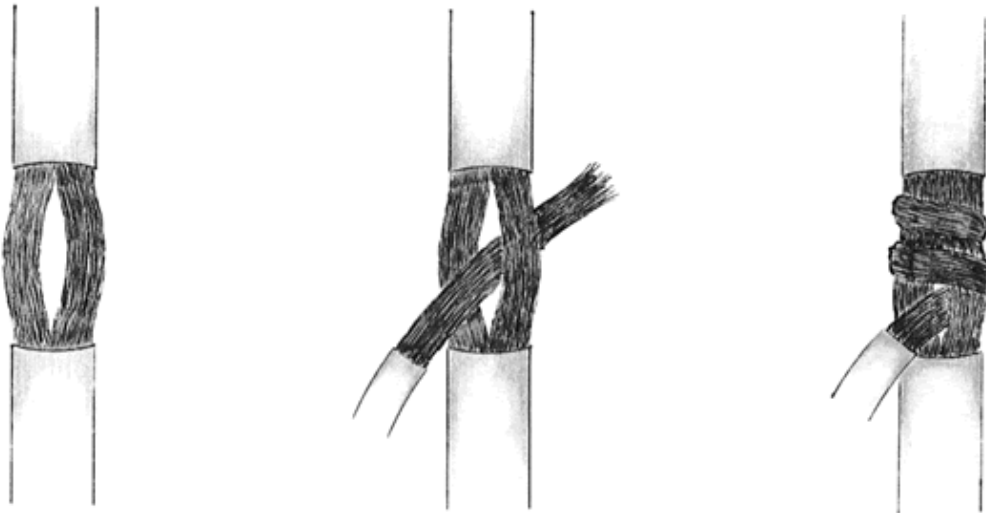
**Connecting to PTO (Power Take Off):**

Locate the wire that you suspect is for the PTO switch. Probe the wire with the meter lead. Locate the PTO primary switch (normally on the dash of the vehicle) and determine if the switch is positive trigger or negative trigger. Positive trigger switches move in voltage from 0 to "Hot" (12 to 30 volts) while Negative trigger switches move from "Hot" to 0 volts. This change in voltage occurs when the PTO switch is set from Off to On.

Strip the insulation back and connect either the green/yellow wire (positive trigger) or blue wire (negative trigger) from the tracking unit's harness to this wire using the hook and wrap technique (See Diagram A). Solder the connection.

**Diagram A**

Hook & Wrap Method



Strip the wire that you will connect the device's wire to and spread the wire apart and insert the device's wire. Wrap the wire and solder the connection. Be sure to use electrical tape to cover the soldered wire. You should also use a zip tie around the electrical tape to ensure that the connection is secure.

**Connecting to Ground:**

Crimp a ring terminal at the end of the black wire coming from the tracking unit's harness. Connect it directly to the vehicle's chassis via an existing bolt or self tapping screw. A common grounding area would be at the driver's kick panel. Scrape off any paint at the point of grounding to ensure a good connection.

Run the wiring harness' plug connector to the GPS device.

### **\*\*\* Hybrid Vehicle Installation\*\*\***

When installing into hybrid vehicles, please make sure to locate a true ignition wire that remains hot the entire time the vehicle is being driven. Hybrid vehicles equipped with EV (Electric Vehicle) Mode have a gas motor that shuts off during operation when the vehicle's power cells are able to power the vehicle alone. What we have encountered with this is ignition wires that read true while the gas motor is on, but loses voltage when the vehicle enters EV mode (gas motor shuts off as the power cells take over). When metering for a true ignition source, please test wires during cranking and while the vehicle switches from Standard mode to EV mode.

## **C. Mounting the Devices**

### **FLX Tracking Unit:**



Find a secure location underneath the dashboard to mount the GPS device. Do not mount device under the hood of the vehicle or in the engine compartment. The heat from any of these locations may cause product failure.

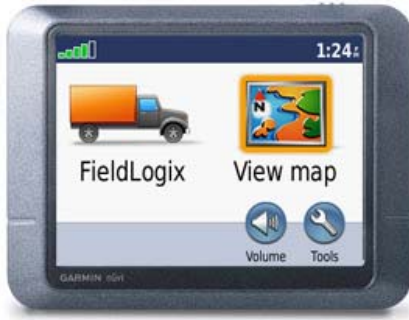
The device's LEDs should be mounted facing the rear of the vehicle so that they are visible for testing purposes. Use zip ties to mount the device to an existing wiring loom or other available location.

Connect the GPS and GSM/Cellular antenna connectors to the device. Use a bead of torque seal around the point of connection to ensure that any future signs of tampering are visible.

Connect the wiring harness plug to the device. The Ground/black wire should be on the far left side of the device, matching the "ground" plug on the device's front panel.

**\*\*Do not power up the device before connecting the GPS and GSM/Cellular antennas first\*\***  
Doing so may result in product failure.

## **Garmin Navigation Unit:**



**Find a location on the top center of the dash that DOES NOT BLOCK the vision of the driver to the road. Safe placement of this device is important as improper placement can create an unsafe blind spot for the vehicle operator (Please see Work Order for specified mounting method).**

**If using the suction cup mount to the windshield, please clean the area of the windshield with the alcohol wipe provided. Moisten suction cup then mount onto windshield.**

**If using dash mount with the double sided tape, please clean the area of the dash with the alcohol wipe provided. Allow cleaned area to dry. Remove mounting tape film and mount onto the dash.**

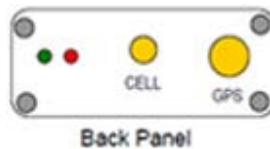
**Once mounted, connect the FMI cable to the Garmin Navigation Device.**

## D. Test the device

In order to test the device, the vehicle must be parked outside in an open area so that it can receive a GPS lock. The device's LEDs will indicate proper operation.

### Device LEDs

The Diagnostic LEDs will indicate if the unit is having issues with communication, GPS fixing and more. It is also recommended that the data server be checked to confirm that report data is arriving.



### Green LED

The unit will power up as the vehicle's ignition is turned on. The Green LED will show solid for approximately 30 seconds (there may be some brief flickers initially while the processor initializes). At no other time should the green LED remain on solid for such a long period. After 30 seconds the green LED will start to flash at the following rates:

- 25 times on-off every 10 seconds when the ignition is on (this is quite rapid)
- 8 times on-off every 10 seconds when the ignition is off (this is quite slow)
- Very short blip once every 3 seconds when in sleep mode

The green LED will also show if there is a PTO (a.k.a. input) active by flashing a number of times corresponding to the PTO (1,2,3,4). For example if PTO 4 is active then there will be 4 short flashes every 3 seconds.

### Red LED

The RED LED flashes 2-digit codes. Roughly speaking the first digit tells you what general area is having a problem (hardware, modem, GPS, end-end service). The second digit gives specific error information. Since there can be more than one error condition the unit rotates through the error codes (for example if GPS is tracking no satellites and the modem is not registered).

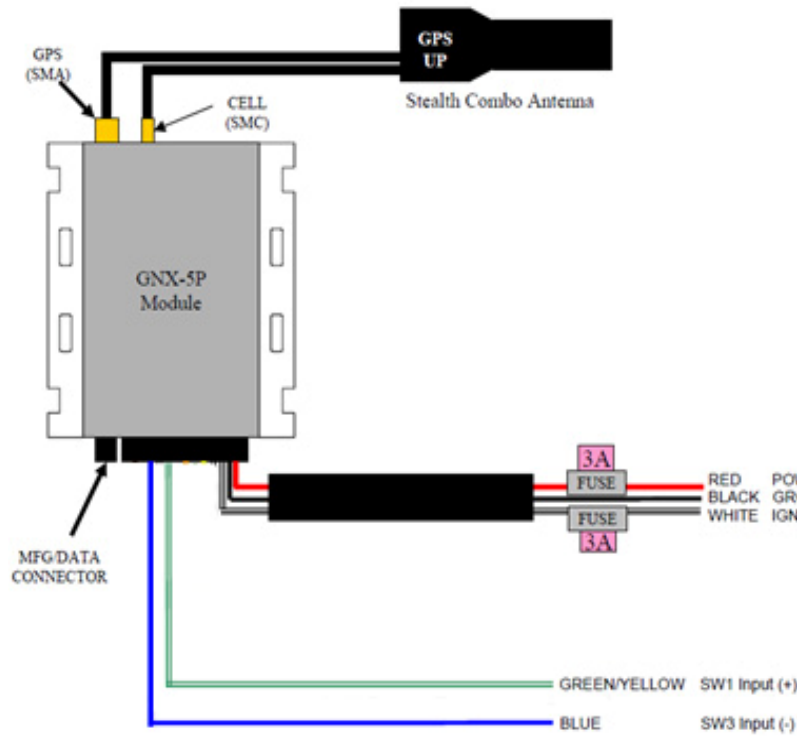
### Red LED Troubleshooting

Error Codes	Error Category	Error
1 - X	Unit Specific	<p>1-1 The unit has an expired license key due to failure to resync. with the FieldLogix configuration server. Contact FieldLogix with the serial number of the device.</p> <p>1-2 Low supply voltage. This could be caused by a true low voltage condition (&lt;8v) or a high impedance supply that dips in voltage when the current draw spikes due to modem transmit.</p>

<p><b>2 - X</b></p>	<p><b>Modem/Cellular Related</b></p>	<p><b>2-1</b> Modem module fault. RMA unit to FieldLogix for failure analysis and repair.</p> <p><b>2-2</b> No SIM inserted. Make sure SIM drawer contains SIM and is correctly seated in the socket. If it is then RMA unit to FieldLogix for failure analysis and repair.</p> <p><b>2-3</b> No signal. Check that the cellular antenna is correctly attached. Try to substitute a known-good cellular antenna to see if the antenna may be broken. If this cures the problem then reinstall new antenna. If not then RMA unit to FieldLogix for failure analysis and repair.</p> <p><b>2-4</b> Network not found. For GSM remove the SIM card and try in a known-good unit. If that unit displays the same problem then the SIM card or account may be the source of the problem.</p> <p>For CDMA check that the account is still active. If it is then RMA the unit and transfer the account to the new ESN.</p> <p><b>2-5</b> Last data session failed. This means that an attempt to establish a data session (GPRS, CDMA1x) failed. This could be because of an account problem, an incorrect APN, username or password, or simply due to network loading, temporary network outage, or poor radio coverage. This failure will occasionally happen in a working unit, but if the problem is persistent then further investigation is required.</p> <p><b>2-6</b> GPRS is not attached, or CDMA 1xRTT data is not available.</p>
<p><b>3 - X</b></p>	<p><b>GPS/Satellite Related</b></p>	<p><b>3-1</b> GPS module fault: RMA the unit to FieldLogix for failure analysis.</p> <p><b>3-2</b> GPS antenna fault: Try replacing the GPS antenna with a known good antenna. If the condition is not corrected (wait 2 minutes for the LED to update) then RMA to FieldLogix for failure analysis.</p> <p><b>3-3</b> GPS not tracking any satellites. Check that the GPS antenna has a clear, unobstructed view of the sky, and has been operating for at least 5 minutes. Check that the GPS antenna is facing the correct way up. If the condition persists RMA to FieldLogix for failure analysis.</p> <p><b>3-4</b> GPS no fix (&lt;3 satellites). If antenna has only partial view of sky due to the position of the vehicle (under a cover, close proximity to a building) then try to move the vehicle to ensure that it will be able to make fixes when standing in the open. If the vehicle has a full view of the sky and the error condition persists then try to reposition the GPS antenna to get less obstructed view of the sky.</p> <p><b>3-5</b> GPS has no time. The GPS receiver sets its internal clock from the satellite signals. If the GPS receiver has no time then it has never seen a single satellite since the unit was last power cycled.</p>



# Wiring Schematic



## POWER CONNECTOR

Pin	Harness Wire Color	Description
1		
2		
3		
4		
5	Blue	Switch 3 Input (-)
6		1-Wire Data
7		Not Used
8	Red (bundle)	Power input (+8 to +30v constant)
9		Backup Battery (12v/24v lead-acid type)
10	Black (bundle)	GND
11		
12		
13		
14		Microphone Input (+) (option)
15	White (bundle)	Ignition Input (+)
16		
17		GND
18	Green/Yellow	Switch 1 Input (+)
19		LED Output (+20mA max)
20		

