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Solution Overview

The TVG 670 can be installed as a standalone device with vehicle diagnostics or installed in conjunction with a FieldMaster Logs solution. If the TVG 670 is installed as part a Field Master Logs solution it will be combined with a TDI 600 tablet to deliver the Trimble FieldMaster Logs Driver Logs (HOS) and Driver Vehicle Inspection Reports (DVIR).
Trimble TVG 670 GPS devices contain:

- GPS, Communication and Vehicle Diagnostics capture.
- Firmware
- On and functional whenever the vehicle is on

*NOTE* - A vehicle diagnostics cable must be connected to this device for it to track properly.

The TVG 670 is available in two variations:

1. **JPOD** for heavy duty vehicle types (J1939 and J1708) which has a **Female** DB-15 port for Vehicle Diagnostics
2. **VPOD** for light duty vehicle types (OBDII) which has a **Male** DB-15 port for Vehicle Diagnostics
Vehicle Diagnostics Port and Status LED

Antenna Connection

GPS

GPS Status LED

AUX1 (not used)

AUX2

COM Status LED

COMM

Antenna Connection
TVG 670 Rear Panel Connections

Power Connection        I/O Connection
TVG 670 Default Hardware

TVG 670 Default Hardware:
- Option T Combination Antenna (P/N: 901-5663-000)
- 9’ Four Wire Power Cable (P/N: 907-5420-100)
- Installation Parts Kit (P/N: 908-0030-000)
- **NOTE** – the TVG 670 must be installed with a connection to vehicle diagnostics using the appropriate cables shown in this guide
Remove one of the device’s serial number labels that is affixed to the top of the device and adhere it in the driver’s side doorjamb in the vicinity of the VIN label. The second copy is to be left affixed on the top of the device.
OBDII Light Duty for VPOD Devices

For TVG 670 VPOD devices the Light Duty Vehicle Diagnostics cable that is shipped for vehicles that have a OBDII port will be:

Standard OBDII Diagnostic cable - (P/N: 907-1076-000)
OBDII Cable Installation

Step #1
- Locate Factory OBDII Connector
- Connect TVG 670 OBDII Adaptor cable to the front of the factory port

Step #2
- Connect the remaining connector of the OBDII adaptor cable to the matching port of the TVG 670
- Ensure that there are no harsh bends or anything that may put excessive stress on the vehicle diagnostics connector when connecting the cable to the device. This may lead to a potential failure of the device.
- Ensure that the thumb screws are tightened

NOTE: Since the OBDII connection cable is **NOT** a Y-Cable, please ensure that the customer knows that they will need to verify and ensure that the cable has been plugged back into OBDII port after service event or smog check.
As a first step of the installation, connect the vehicle diagnostics cable to the port on the vehicle and then plug it into the port on the TVG 670. When connected, the device should power up and illuminate and flash the GPS (green) and Cellular LED (amber) LEDs. This is an indication that the device is properly being powered off the bus. If the device does not power up cycle the key in the ignition, it that doesn’t resolve this issue check the fuse that powers this vehicle diagnostics circuit and replace as required.
If the vehicle diagnostic cable is connected properly and receiving information off the bus the RED status LED will light or flash with the vehicle running once the bus is set using the FM Logs Installer Ap.
Heavy Duty Vehicle Diagnostics Cables for JPOD Devices

There are multiple cable options available for the TVG 670 JPOD device so that it can be connected to various heavy duty vehicle port types (J1708 and J1939), they are:

A. GRAY 6 PIN Flange Mount (P/N: 907-1072-000)
B. BLACK 9 PIN Flange Mount (P/N: 907-1073-000)
C. BLACK Bulkhead Mount (Screw Type) (P/N: 9071073-200)
D. GREEN 9 PIN Flange Mount (P/N: 907-1080-400)
E. GREEN Bulkhead Mount (Screw Type) (P/N: 907-1080-300)
F. Mack Mid Backbone (P/N: 907-1084-000)
G. Volvo Mid Backbone (P/N: 907-1074-000)
H. Hino OBDII Style Y-Cable (P/N: 907-1088-000)
Heavy Duty J1708

The Heavy Duty Vehicle Diagnostics cable that is shipped for vehicles that have a GRAY Flange Mounted 6 PIN port will be:

6 PIN J1708 Vehicle Diagnostic Y-Cable - (P/N: 907-1072-000)
Heavy Duty J1939/Flange Mount

The Heavy Duty Vehicle Diagnostics cable that is shipped for vehicles that have a BLACK Flange Mounted 9 PIN port will be:

9 PIN Flange Mount J1939 Y-Cable  (P/N: 907-1073-000)
Heavy Duty J1939 Type 2/Flange Mount

The Heavy Duty Vehicle Diagnostics cable that is shipped for vehicles that have a GREEN Flange Mounted 9 PIN port will be:

9 PIN J1939 Type 2 Y-Cable (P/N: 907-1080-400)
Flange Mount Y-Cable Installation

Vehicle Diagnostics Flange Mount Y- Cables will be installed by following the below instructions:

1. **Locate** the Deutsch plug mounted in the dash on the driver’s side of vehicle

   * It is common for the plug to be found under the dash on the driver’s side of the vehicle

2. **Remove** plug from it’s mounting location
Flange Mount Y-Cable Installation

With the plug removed:

3. **Connect** the **Y Cable** to the removed **factory port**, use the locking ring to ensure a tight connection

4. **Replace** the factory connector with the remaining Deutsch plug of the **Y-Cable**, using the factory mounting hardware
Heavy Duty Bulkhead Mount

The Heavy Duty Vehicle Diagnostics cable that is shipped for vehicles that have a either a BLACK or GREEN Bulkhead Mount (screw type) 9 PIN Deutsch for both Type 1 and Type 2 J1939 will be:

**9 PIN J1939 Black Bulkhead mount Y-Cable**
(P/N: 907-1073-200)

**9 PIN J1939 Green Bulkhead mount Y-Cable**
(P/N: 907-1080-300)

The Bulkhead style port is typically found on the lower portion or under dash on the driver’s side of the vehicle secured to the dash by a large nut.

It is commonly covered with a cap as shown here.
Heavy Duty/2013+ Mack Mid Backbone

The Heavy Duty Vehicle Diagnostics cable that is shipped for 2013+ Mack vehicles will be:

Mack Vehicle Diagnostic Cable (P/N: 907-1084-000)
The Heavy Duty Vehicle Diagnostics cable that is shipped for 2013 + Volvo vehicles will be:

Volvo Vehicle Diagnostic Cable (P/N: 907-1074-000)
Mack Mid Backbone Cable Installation

Mack Mid Backbone Cable will be installed by following the below instructions:

1. **Locate** the triangular panel at the top of the dash, **Remove** Torx head one-way screws and **Remove** panel.

2. With the vehicle’s engine off **Locate and unplug** terminating resistor, commonly found to the right of the fuse panel.
Mack Mid Backbone Cable Installation

3. **Connect mid backbone** into the matching open connector and **Insert** terminating resistor into matching port at the end of the cable.

4. **Connect** the ring terminal of **RED** wire to the **Constant Power** terminal and the ring terminal of the **Black** wire to the **Ground** terminal locations on the bus bar.

*Note* – the 2014+ Volvo Mid Backbone cable (P/N: 907-1074-000) has the same requirements in that the **Power** and **Ground** ring terminals in the cable must be connected correctly as detailed above in **Step #4**.
The Volvo Mid Backbone cable will be installed into the vehicle at the terminating resistor which is commonly found near the top of the fuse box.

The terminating resistor will be removed from the bus so that the Volvo Mid Backbone cable can be inserted inline.

Remember to insert the terminating resistor into the matching port on the Volvo Mid Backbone cable before starting the vehicle.

*Note – the Volvo Mid Backbone cable (P/N: 907-1074-000) has the same requirements in that the Power and Ground ring terminals as the Mack Mid Backbone.
Hino Cable

The Heavy Duty Vehicle Diagnostics cable that is shipped for Hino vehicles with an OBDII style trapezoidal port will be:

**Hino Vehicle Diagnostic Y-Cable** (P/N: 907-1088-000)
As a first step of the installation, connect the vehicle diagnostics cable to the port on the vehicle and then plug it into the port on the TVG 670. When connected, the device should power up and illuminate and flash the GPS (green) and Cellular LED (amber) LEDs. This is an indication that the device is properly being powered off the bus. If the device does not power up cycle the key in the ignition, it that doesn’t resolve this issue check the fuse that powers this vehicle diagnostics circuit and replace as required.
Vehicle Diagnostics Key Points

1. All cabling must be installed and secured throughout the vehicle in a manner that will not interfere with the safe operation of the vehicle.

2. Ensure that the thumb screws of the vehicle diagnostics cable are properly hand tightened to ensure a secure connection to the device.

3. It is important to ensure that there are no harsh bends or anything that may put excessive stress on the vehicle diagnostics connector when connecting the cable to the device. This may lead to a potential failure of the device.

4. Ensure that the device is receiving power off the bus through the vehicle diagnostics cable by viewing the GPS and Cellular LED.

5. Verify that the vehicle diagnostic cable is connected properly and receiving information off the bus the RED status LED will light or flash with the vehicle running once the bus is set using the FM Logs Installer Ap.
Installation Parts Kit

Installation Parts kit (Trimble P/N 908-0030-000) includes:

- Six 8” Wire Ties
- One 16” Tie Wire Tie
- One #8 X ½” Self-tapping screw
- Four #6 X ½” Self-tapping screws
- One Ring # 10 Terminal
- One Star (Ground) washer
- Two Tamper Proof Stickers

NOTE: Torque Seal tamper proof lacquer is no longer included in the installation parts kits and must be ordered separately through a van stock request.

To complete each installation additional consumable supplies, not supplied by Trimble, will be needed. These supplies are detailed on the required tool list.
Fuse Holder Preparation

1. Apply tamper resistant sticker to the side of each fuse holder

2. Secure both fuses together with one wire tie
Power Harness Connections

The Trimble GPS system requires three connections to the vehicle’s electrical system:

1. The **RED wire** = **Constant** power (+12 to 24 VDC)
   - Refers to a power source that always supplies power no matter the position of the key

2. The **WHITE wire** = **Ignition power** (+12 to 24 VDC)
   - Refers to a **key controlled** power source that has power in both the Run and Start positions
   - Key controlled “Accessory Position” is never to be used

3. The **BLACK wire** = **chassis Ground**
   - Connection is sourced using the supplied ring terminal, star washer and a ½-inch self tapping screw

4. The **Green wire** = future development
Trimble requires that a digital multi-meter is used when testing for a power source in a vehicle as this device will not cause electrical damage on computer equipped vehicles.

Test Lights ARE NOT approved for use during Trimble installations as they create current draws that could very easily damage the vehicle which could result in a possible hazardous situation.
Poke and Wrap Power Wire Connection Method

Constant and ignition power connection wire to wire

1. Identify the ignition harness, following the main harness for the vehicle’s key
   - Use a digital multi-meter to verify the correct wires

2. Remove insulation from the correct factory ignition wires using wire strippers
   - Use a pick or multi-meter probe to carefully separate the strands
3. Strip about 1½ inch of insulation from each of the fuse leads
   - Feed the exposed fuse lead through the hole in the factory wire

4. Pinch the factory wire back together
   - Wrap the fuse lead around source wire at least 3 times
5. If required by the customer, apply solder to the connection.

6. Insulate each power connection individually
   - Use a quality electrical tape (i.e. 3M Super 33+)
   - Minimum ½ on either side past the exposed wires
Poke and Wrap Power Wire Connection Method

7. Apply a wire tie over the tape at the connection point

8. Apply torque seal to the wire tie

9. Repeat steps 2 through 8 for the second power connection
Ground Wire Connection Method

Approved grounding methods

1. Find a suitable surface
   - Non-painted metal surface
   - Dash bracket

2. Strip the Black wire of the harness and crimp ring terminal and prepare self tapping screw and star washer in the order shown
Ground Wire Connection Method

3. Drill the assembly into the grounding location
   - Do not over tighten

4. Ensure a secure connection by pushing on the assembly
5. Apply orange Torque seal to ensure a tamper resistant connection

NOTE

Trimble does not approve connecting to factory grounds, all grounds must be sourced using the method outlined
Once all power connections have been made secure the fuse holders to the ignition harness with wire ties and apply torque seal to each tie wraps and the wire tie that secures the fuse holder lids, as shown.

**Note:** It is recommended to tamperproof as a last step, **only after** the device passes the installation self test.
Ring Terminal Method

- Trimble does approve “bus bar” connection method

- Trimble does not supply ring terminals

- Trimble recommends using water resistant, heat shrink ring terminals

- It is recommended that the ground is sourced using the included ring terminal, screw and star washer
Power Connection Dos

Dos:

- Connect:
  - wire to wire
  - ring terminal (buss bar)
- Fuse within 8” of the power source
- Use a digital multi meter for testing
- Insulate all power connections
- Use only known wires
- Use the included grounding hardware
- Route the harness safely to the device
Power Connections Don’ts

Do Not:

- Use mechanical, crimp over wire connection types, as shown on the right
  - Scotch Locks
  - T-Taps
  - Like connectors
Power Connection Key Points

1. Proper power cable preparation, as detailed, is required to ensure installation consistently.

2. Power connections must be made either wire to wire or to the bus bar ONLY; mechanical type power connections are not allowed.

3. Ground connections must be made using the included ring terminal, star washer and self-tapping screw; factory grounds must NOT be used.

4. Connect to only known power and ignition sources.

5. Use a digital multi-meter ONLY to test power source wires in the vehicle.
Antenna Installation
Antenna Installation

For the Trimble GPS system to track and report effectively the antenna must be properly installed in the optimal location in the vehicle.

Before installing the antenna consider the following:

The antenna must:

1. Be installed at least 18” from any active antennas
2. Be installed at least 20 centimeters, 8 inches, from anyone in the vehicle
3. Have a clear view of the sky
4. Route cable safely throughout the vehicle
Option T Antenna

The **standard default TVG 670 antenna** is the **Option T antenna.** (P/N: 901-5663-000)

**Please Note:** the antenna must be installed in the proper orientation with the adhesive side facing the sky.
Under Dash Mounting:

- Antenna must be installed away from metallic and dense objects
- Proper surface preparation is mandatory, please clean the mounting surface prior to adhering antenna
- The antenna must be secured in all cases with the double sided tape side UP.
- Avoid potential pinch points when routing

Best Practice
In colder climates, prior to installation it is recommended to run the vehicle’s defroster to warm the windshield and the adhesive of the antenna.
Optional Option T Antenna Installation

Windshield Mounting:

- Proper surface preparation is mandatory, please clean the glass prior to adhering antenna.

- Antenna should be mounting in either the lower corner of the windshield.
Optional Roof Mounted Antenna

T Roof Mounted antenna is orderable by the customer request (PN: 901-5664-000)

The Roof Mounted antenna option requires that a ¾” hole is drilled into the roof of the vehicle.

The antenna is secured to the roof of the vehicle with a nut which is threaded onto the base of the antenna from inside of the vehicle as shown.

**NOTE:** as a best practice, before installing this antenna option be sure that the customer is made aware that a hole will be drilled into the roof of their vehicle.
Roof Mount Antenna Installation

Roof Mount Installation:

1. Remove headliner

2. Before cutting the hole in the roof of the vehicle, inspect the roof for:
   - Double metal roof lines, Interior bracing, Factory wire harnesses etc.

3. Cut ¾” hole in the roof of the vehicle, in a location which:
   - is 18” from any other active roof mounted antenna
   - will allow the antenna to have a clear view of sky, away from metallic objects, overhangs, booms

4. Once the hole is cut in the roof, clean the roof and interior
   - Dirt, Metal shavings as a result of cutting the hole
Roof Mount Antenna Installation

Roof Mount Installation (continued):

5. Carefully **route antenna leads**, through the hole cut in the roof

6. **Secure the antenna** from the inside of the vehicle with the nut

7. **Seal the base of the antenna** with a bead of **clear** Silicone sealant or RTV

8. **Route the cable leads** to the device mounting location, avoiding pinch points

9. **Reinstall** headliner and factory panels
TVG 670 Antenna Connections

Antenna connections to the device must be made to the correct locations.

GPS Antenna Connection

COMM Antenna Connection
Antenna Mounting - Dos

“Do” mount the antenna:

1. Install the antenna in the proper orientation with the side labeled “This side faces the sky” is facing up.
2. At least 18” from any active antennas
3. At least 8” (20 centimeters) from any persons in the vehicle
4. So that it has a clear view of the sky
5. To a clean surface prior to mounting
6. Route the cable(s) safely throughout the vehicle
   - Avoid pinch points
   - Ensure the cable routing does not interfere with the vehicle safety features such as airbag deployment
Antenna Mounting Don'ts

“Do Not” mount the antenna:

1. Route the antenna cable(s) where it will interfere with the vehicle safety features such as airbag deployment

2. Install the antenna under dense or metallic dashboards.
**Device Mounting – Included Hardware/Fasteners**

**“Do” mount the device:**

1. Securely using the included:
   a. the mounting bracket and #6 Self Tapping screws
   
   or
   
   b. with the bracket and 16" Tie wrap

2. In a location that will not interfere with the safe operation of the vehicle

3. At least 18" away from any transmitting antenna (e.g., radio)

---

**a. Bracket with Mounting Screws**

**b. 16" Wire Tie**
Proper Mounting (Don’ts)

“Do Not” mount the device:

1. To air lines or any vehicle cabling
2. In direct exposure to the elements
   - Excessive dust
   - Water (the device is not waterproof)
3. In excessive heat and cold areas
   - Refrigeration units
   - Exhaust manifolds
4. In high vibration areas
   - Engine compartments
   - Transmission
5. Near corrosive fluids and gases
2017 Mack Granite
Mounting Location

- To the vent behind the instrument cluster

Secured

- Quick release bracket with four #6 X ½” Self-tapping screws
2017 Freightliner M112

Mounting Location

• To the vent behind the instrument cluster

Secured

• Quick release bracket with four #6 X ½” Self-tapping screws
2011 Hino 268
Mounting Location

- Behind passenger side dashboard panel

Secured

- Quick release bracket with four #6 X ½” Self-tapping screws
Mounting Location

- To a vent in the center of the dash

Secured

- With the included 16” wire tie
I/O PTO Connection
I/O PTO Connection

The TVG670 can monitor up to 4 inputs to the device using the optional I/O PTO harness. (P/N: 907-1075-000)

Each of the TVG670 inputs that are connected to the device must be a **Positive Trigger** event.

The four positive inputs to the harness are as follows:
- Input #1 = Blue Wire
- Input #2 = Orange Wire
- Input #3 = Violet Wire
- Input #4 = Gray Wire if PTO is connected
I/O PTO Connection

When installing Statsensor to monitor the activity of PTO ON and OFF on the TVG the inputs provided must see a **positive Trigger** event.

In most cases the output of many of the switches in the vehicle are a positive DC output, but in some cases the wire’s output may be negative DC. If this is the case, the technician will be required to supply a common DC relay. This assembly will aid in inverting the switches negative polarity to a positive input. The below diagram can be referred to aid in the proper way to wire of the relay.

![Diagram](image)

If there is any questions on the above information please contact your FOM immediately.
The **FieldMaster Logs Installer app** is what will be used to document the installation of the TVG 670 hardware. The app can be launched and run directly through an Android based tablet or run off a hard mounted TDI tablet when installing FieldMaster logs.

Please refer to the FM Installer App guide for detailed instructions.
Tamper Proofing

Tamper proofing is **required**
- For warranty purposes
- Guarantee reliable installation
- Installation is not altered
  - Seal each termination; device and power connections
- **MUST** be ordered through Trimble directly by submitting a Van Stock order
- Dries brittle, shatters if disturbed
- Extra tubes must be accounted for and retained
Final Step: Tamper Proofing

“Torque Seal” is applied to

- All source power connections
  - Constant and ignition connection
  - Ground screw
  - All wire ties
- Device terminations
  - All antennas
  - VD port/AUX2
- Black Molex of power harness
- Required per Trimble Hardware Warranty
Installation and Customer Support
Global Customer Support:

For Technical Support please utilize any one of the options based on your location:

North America: 1-877-428-7623 (option 1)
Europe: +44 (0) 1332 267 600
Australia: 1 300 255 477