



## **Retrofit Automatic Start-Stop Installation Manual**

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### **CAUTION PPE Safety: Follow the safety guidelines listed below**

- Always wear safety glasses during all procedures
- Ensure the work area is clear of trips, slips or fall hazards prior to starting work
- Make sure you are wearing non-conductive shoes prior to working with electrical components
- Do not lift heavy objects by yourself; use a lift cart or 2-person procedures

## Retrofit Automatic Start-Stop Installation

Note: For the Automatic Start-Stop technology to work the Truck Idle Timer needs to be extended to 61 minutes or longer.

**1. Place vehicle in safe condition.**

Park vehicle on flat, safe area and chock the wheels. Remove key from ignition switch and set the Parking Brake. If this is a manual transmission truck, put the truck in neutral.

**2. Place Automatic Start-Stop Base Unit.**

The Automatic Start-Stop Base unit is the black square enclosure located in the Start-Stop Kit. Remove the dash to find an appropriate location to place the Start-Stop Base Unit. This should be near the parking brake line behind the dash. The Base Unit should be close to a flat surface or area for mounting or securing behind the dash. Do not mount or secure the Base Unit until later.



**3. Connect Power to Automatic Start-Stop.**

In the Start-Stop Kit, locate the red and black wires labeled “Ignition Power” with the black 4-pin Molex connector. Plug the black Molex connector into the black 4-pin receptacle on the Start-Stop Base Unit.

Take the un-terminated end of the wires and crimp the included Fuse Tap to the red wire, insert the 2A fuse and plug in fuse tap to a direct 12V power source in the truck fuse panel.

**4. Install Hood Safety Switch.**

In the Start-Stop Kit, locate the cable labeled “Hood Switch” with the white 2-pin Molex connector. Plug the white Molex connector into the white 2-pin receptacle on the Start-Stop Base Unit. Run this wire through the firewall.

To install the Hood Safety Switch, find a mounting location such that when the hood is closed, the Hood Safety Switch is angled downward and wires should be coming out of the bottom on the Start-Stop safety switch. When the hood is fully open, this switch should be angled upward. This switch is usually mounted on a flat surface next to the rear of the driver's side headlight on the hood. Screw the switch to the truck's hood.

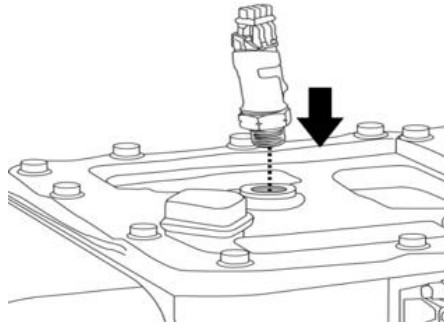
After the safety switch is mounted, connect to the Hood Safety Switch cable making sure that the connector is plugged in and you hear 2 clicks. If this isn't plugged in securely, it could come loose and could cause problems later. When finished, secure wiring to the truck frame.



##### 5. **Install neutral safety switch.**

Manual Transmission: In the Start-Stop Kit, locate the cable labeled "Neutral Switch" with the black 2-pin Molex connector. Plug the black Molex connector into the black 2-pin receptacle on the Start-Stop Base Unit.

Run this cable through the back and bottom of the dash and through the gearshift boot cover. Locate the Neutral Safety Switch plug on top of the transmission housing. This plug position varies with transmission manufacturer but the transmission will say "Neutral Switch" at the correct plug location. Remove the transmission plug and replace it with the provided Start-Stop Neutral Safety Switch. In most cases, both metric and standard threaded switches are provided by Start-Stop to accommodate the installation on various transmissions. Connect the cable to the safety switch.



Automatic Transmission: In the Start-Stop Kit, locate the jumper connector with the black 2-pin Molex connector. Plug the black Molex connector into the black 2-pin receptacle on the Start-Stop Base Unit.

#### 6. **Install the Start-Stop Ignition Plug**

In the Start-Stop Kit, locate the cable labeled “Ignition Switch” with the white 6-pin Molex connector. Plug the white Molex connector into the white 6-pin receptacle on the Start-Stop Base Unit. Run the wire behind the dash towards the ignition switch.

Take the ignition plug out of the Start-Stop Kit and put the plug between the truck’s ignition switch and the OEM black receptacle. Push in hard to get a firm connection on both ends. Plug the 4-pin Molex connector on the Start-Stop ignition plug into the Start-Stop ignition switch cable.

\*Note – if this is a Volvo truck, see attached Volvo appendix file for installation instructions

\*Note – if this is an International or Mack Anthem truck, see attached International appendix file for installation instructions

#### 7. **Connect to the truck’s diagnostic port**

Process to connect to the truck’s diagnostic port:

##### **Run the Inline Y-Cable**

In the Start-Stop Kit, locate the cable labeled “Inline Y-Cable” with the white 4-pin Molex connector and 3-pin connectors. Plug the white Molex connector into the white 4-pin receptacle on the Start-Stop Base Unit. Run the wire behind the dash towards the diagnostic connector (J1939).

##### **Remove Diagnostic Connector (J1939)**

Remove the truck’s diagnostic connector from the dash of the truck. Place it in a location that will allow easy access to the wires that are pinned at the diagnostic connector.

**Connect CanHi (Yellow Wire)**

Use the blue extraction tool (provided in kit) to remove the OEM Yellow Wire from Pin C on the truck's diagnostic connector. This is the CanHi wire (J1939).

Plug the OEM Yellow Wire into Pin A on the 3 plug Amphenol connector included in the Start-Stop Y-cable kit.

Plug the Start-Stop Yellow Wire from the harness into Pin C on the truck's diagnostic connector. This is the CanHi wire connection (J1939).

**Connect CanLo (Green Wire)**

Use the blue extraction tool (provided in kit) to remove the OEM Green Wire from Pin on the truck's diagnostic connector. This is the CanLo wire (J1939).

Plug the OEM Green Wire into Pin B on the 3 plug Amphenol connector included in the Start-Stop Y-cable kit.

Plug the Start-Stop Green Wire from the harness into Pin D on the truck's diagnostic connector. This is the CanLo wire connection (J1939).

**Connect Ground (Black Wire)**

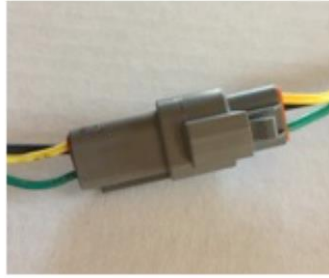
Use the blue extraction tool (provided in kit) to remove the OEM Black Wire from Pin A on the truck's diagnostic connector. This is the Ground wire.

Plug the OEM Black Wire into Pin C on the 3 plug Amphenol connector included in the Start-Stop Y-cable kit.

Plug the Start-Stop Black Wire from the harness into Pin A on the truck's diagnostic connector. This is the Ground wire connection.

**Connect Connectors and Complete Y-Cable Installation**

Plug the green plastic triangle into the Amphenol connector to provide a locked connection. Connect the 3 plug Amphenol connector with the OEM wires to the Start-Stop Inline Y-Cable harness 3 plug connector. Make sure the connectors "click". Have a slight tug on all the wires and connectors to be sure they are firmly connected. Installation is now complete. Plug the truck's diagnostic connector back into the dash of the truck.



#### **8. Install Mechanical On/Off Switch**

Locate the on/off switch (922028) with white 1x4 pin Molex connector. Mount the physical on/off switch on the dash of the truck in an accessible location.

When the location is determined, drill a 0.79" diameter mounting hole (in a flat surface) and run the 1x4" white Molex connector through the mounting hole. Snap the switch into place and then attach the label (127066) around the switch.

#### **9. Install Idle Free Voltage harness**

Connect harness (922013, ring terminal end) under bunk to the UBB battery studs (Red +, Black -) (include picture).

Route other end through floor collar (utilized for the Idle Free System) under truck along frame rail to the engine compartment and through the firewall (alongside hood switch cable) up to the Start-Stop Base Unit in the dash. Connect Molex connector to Base Unit.



Connect IFS harness 922013 to these connection points on the backside of the UBB.



## **10. Installation Run Test**

Attach the Automatic Start-Stop Test Harness (922029) inline between the Idle Free harness (922001) and Start-Stop base unit. The harness will simulate low battery voltage. Turn on the Idle Free system and make sure the Start-Stop switch is turned on (Green LED should be lit). After 10 seconds the Start-Stop should attempt to start the truck and the Idle Free unit should shut off. Note: For truck to start the hood needs to be closed, key in off position, truck in neutral, and parking brake engaged. If batteries are new/charged the Truck should run for 12-15 minutes and then shut off due to detecting full charge. If the batteries are not charged the truck will idle until they are charged (up to 60 minutes). After the truck shuts down the Idle Free unit will turn back on automatically. If everything worked as expected testing is complete and you can remove the inline test harness and plug the Idle Free harness (922013) directly into the base unit.

### **Troubleshooting:**

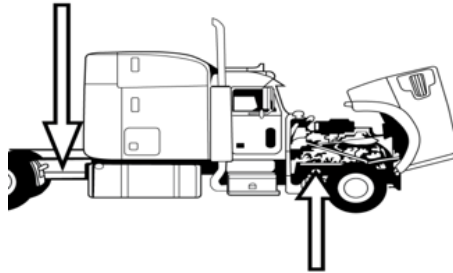
- If the truck shuts down after 5 minutes, the Truck Idle Timer needs to be adjusted to 61 minutes to allow the truck to Idle properly and charge the batteries.
- If the test harness is left inline the truck will restart after 3 minutes as it believes the APU batteries are low.
- To test safeties during Automatic Start-Stop Idle, you can open the hood, truck will shut down, upon closing the hood, the truck will start within 20 seconds.

## **11. Secure Base Unit Inside Dash**

Secure Base Unit within dash preferably to a flat surface with zip ties. Ensure the unit will not excessively vibrate during truck operation or be interfered with by other components or cabling within the compartment. Reassemble dash cover.

## **12. Place Stickers**

Place the four warning stickers provided on each frame rail within the engine compartment and between fuel tanks and tandems. The installation is now complete and Automatic Start-Stop is ready for use.



## Volvo Appendix

### Connect to Volvo's Diagnostic Port

In the Start-Stop Kit, locate the cable with diagnostic connectors and the white 4-pin Molex connector. Begin close to the truck's diagnostic port and run the cable behind the dash to connect the white Molex connector with the white 4-pin receptacle on the Start-Stop Base Unit.

Remove the truck's existing female diagnostic connector from the dash. Secure Start-Stop's male diagnostic connector to the truck's female connector. Insert Start-Stop's female diagnostic connector into the truck's diagnostic connector socket.

### Connect to Volvo's Ignition

#### 1. Step 1: Connect Ignition Plug

Remove the plastic steering column and pull the black plastic Volvo ignition receptacle from the Volvo ignition switch. Slide Start-Stop's ignition plug through the terminals on the Volvo ignition switch. Be sure that the Start-Stop ignition plug is pressed firmly and evenly on the Ignition switch with the 4 wires and connector on the left side of the ignition switch.



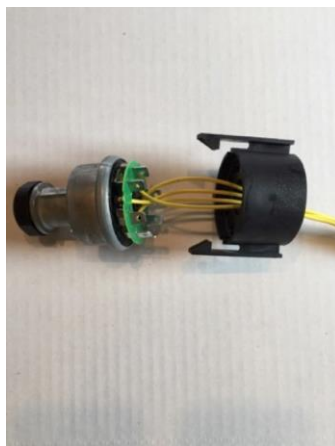
## 2. Step 2: Drill Hole in Receptacle

On the black ignition Volvo receptacle, drill a hole in the center circular area between all the harness wires. This hole should be large enough to fit the 4-pin Molex connector through from the Start-Stop ignition plug. Note: drilling a hole in this plastic plug has been approved by Volvo and does not void any warranties.



## 3. Run Ignition Plug Wires

Place the Start-Stop white 4-pin Molex connector through the hole in the middle of the Volvo ignition plug receptacle. Plug the Start-Stop ignition plug connector into the Start-Stop ignition harness that is connected to the Start-Stop base unit. Secure the Start-Stop harness to the existing Volvo harness to ensure tilting or rotating of the steering wheel does not damage the Start-Stop wires.



## 4. Complete Installation

Plug the Volvo plastic ignition receptacle back into the Volvo ignition plug. The installation should now be complete. The ignition plug should fit exactly as it was before Start-Stop was installed. Put the steering column back and continue to the next steps on the installation guide.

## International and Mack Anthem Appendix

### 1. Run the Ignition Wire

In the Start-Stop Kit, locate the cable labeled “Ignition Switch” with the white 6-pin Molex connector. Plug the white Molex connector into the white 6-pin receptacle on the Start-Stop Base Unit. Run the wire behind the dash towards the ignition switch.

### 2. Connections to the OEM Ignition System

Connect the following Start-Stop wires using the Posi-Tap® connectors provided in the Start-Stop kit to the correct OEM ignition wires:

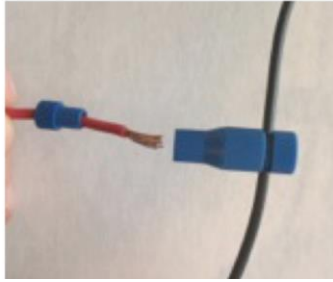
- a. Start-Stop yellow wire to battery 12V+ side wire on ignition switch (BAT)
- b. Start-Stop brown wire to ignition accessories side of switch (ACC)
- c. Start-Stop orange wire to start signal (crank signal) wire (STA)
- d. Start-Stop green wire to ignition power side of switch (IGN)
  - i. Mack Anthem – jump Start-Stop green wire to extra ignition connection also

### 3. Posi-Tap® Instructions

- a. After finding the correct OEM wire, unscrew the end of the Posi-Tap® connector that contains the needle. Put the OEM wire through the plastic cap and screw the cap back on the end with the needle. Screw in tightly.



- b. Find the correct Start-Stop ignition wire and strip off 3/8” to insert into the connector. Do not twist the wire. Unscrew the smaller end of the Posi-Tap® connector and put the Start-Stop wire through the cap. Allow the stripped wires to surround the Posi-Tap® post. Screw the cap back into the connector. Screw in tightly.



- c. After completing the connection, tug on the Posi-Tap<sup>®</sup> connector to make sure it is snug and secure before moving onto the next wires.

