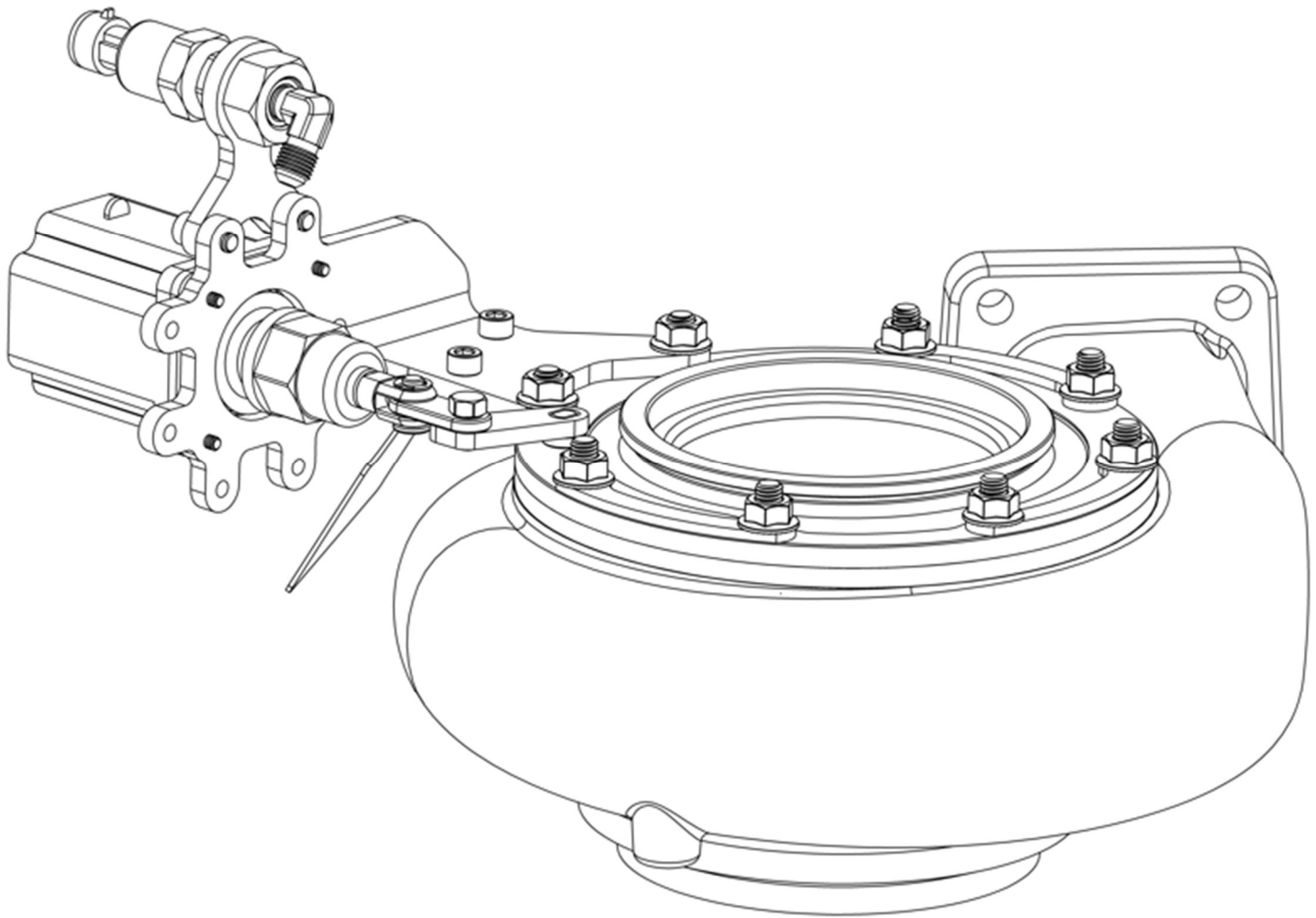# Diesel Power Source SEMI Turbonator® Electronic VGT Installation Instructions

Warning

If the fasteners on the Nozzle Ring Cover are removed or loosened for any reason during installation they **must be torqued to exactly 32 ft-lbs** before operation.

To clock the turbo and the actuator for installation, it may be necessary to remove the fasteners, but they must be precisely torqued to **32 ft-lbs** when reinstalled. Failing to do so will void the warranty and could result in turbo damage during operation.

After installation, drive the truck for approximately 100 miles then, while the truck is warm re-torque the fasteners to **32 ft-lbs.** The bolts sometimes loosen up after being heated and cooled a few times.

Additionally, the recommended maintenance for this turbo is that these fasteners need to be retorqued to the same spec at 300 and 600 miles after initial installation. **Hot torquing to 32 ft-lbs** at each maintenance mileage point is recommended.
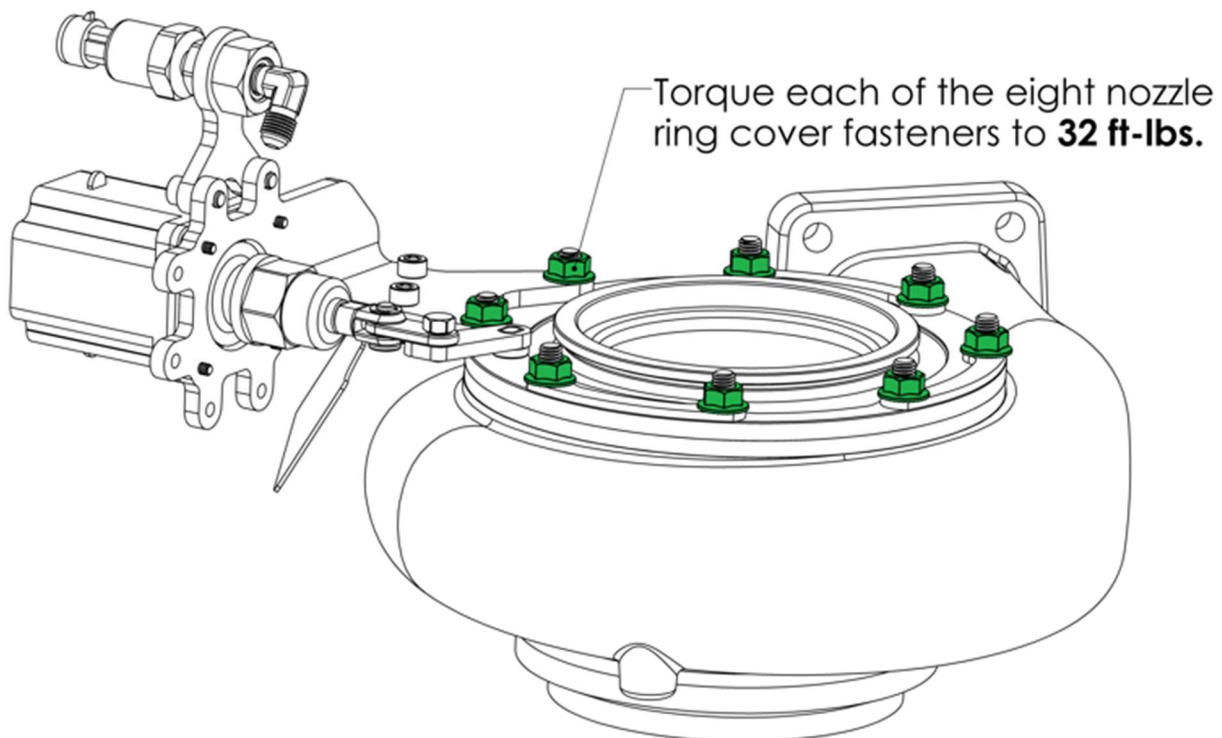

Torque each of the eight nozzle ring cover fasteners to **32 ft-lbs.**

TABLE OF CONTENTS:

Electronic Actuator Clocking and Mounting Instructions:

Pressure Sensor Mounting Instructions:

Wire Harness Installation Instructions:

Wire Harness Schematics & Connector Pinouts:

DPS Datalogger Instructions:

Initial Testing:

Partially Deleted = SEMI using OEM turbo with emissions systems removed.
Fully Deleted = SEMI using aftermarket turbo with emissions systems removed.

HD1 Electronic Actuator Clocking Instructions:

If you purchased a Turbonator® electronic VGT turbo, your turbo will have the HD1 electronic actuator preinstalled and clocked for your specific application. These instructions are intended for customers who upgraded to the electronic actuator or customers who need to change the clocking of their preinstalled electronic actuator to fit their unique application.

Step #1: Remove the custom M6 shoulder bolt from the actuating arm located on your VGT turbine housing using a 10mm wrench.
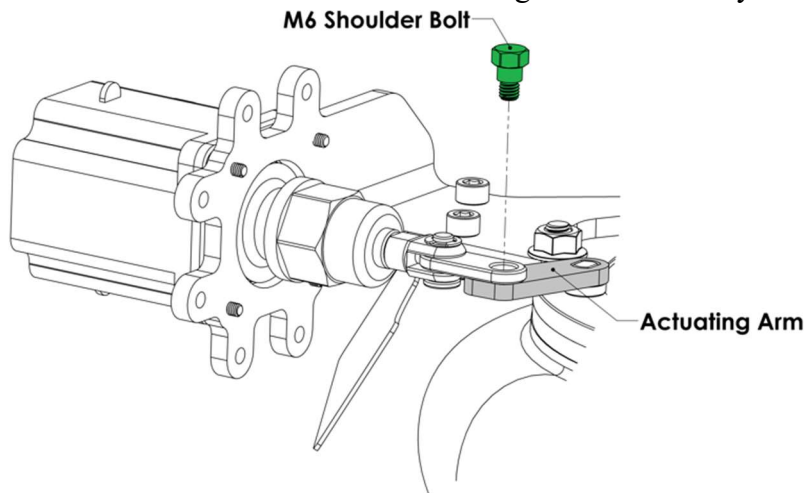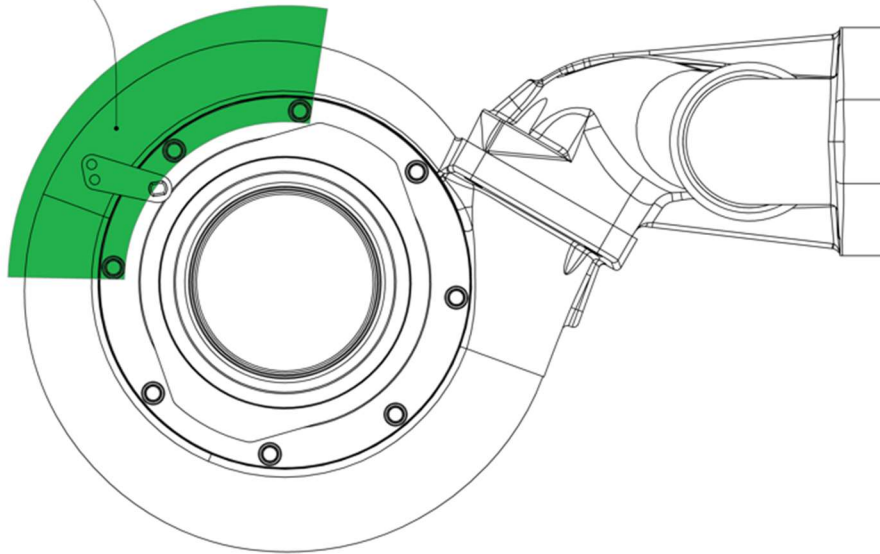

Step #2: Remove all the M8 – 1 x 40mm studs, M8 flange head nuts, washer brackets, and HD1 electronic actuator assembly from your VGT turbine housing. Once removed nothing is holding the nozzle ring assembly in place, be careful and don't let the nozzle ring assembly fall out of the turbine housing.
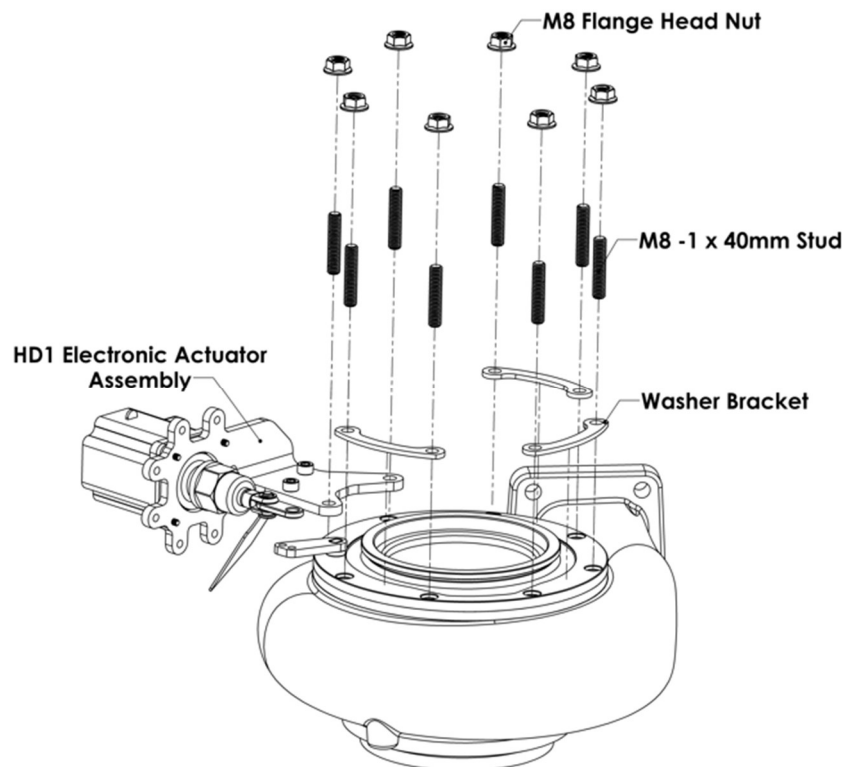
Step #3: Rotate and clock your VGT nozzle ring assembly such that the actuator mounting location *(2 holes clockwise of the actuating arm)* stays within the green actuator clocking region shown below. Do not clock the actuator outside of this region. Doing so will leave your electronic actuator susceptible to excessive heat, while also making it difficult to mount your exhaust pressure sensor and steel tubing as described in the **"Pressure Sensor Mounting Instructions"** section of these instructions.


Step #4: Once your desired actuator clocking location has been determined. Reinstall all the M8 – 1 x 40mm studs, M8 flange head nuts, washer brackets, and HD1 electronic actuator assembly to your VGT turbine housing. Once the flange head nuts are finger tight torque them to **32 ft-lbs.** in a crisscross pattern.
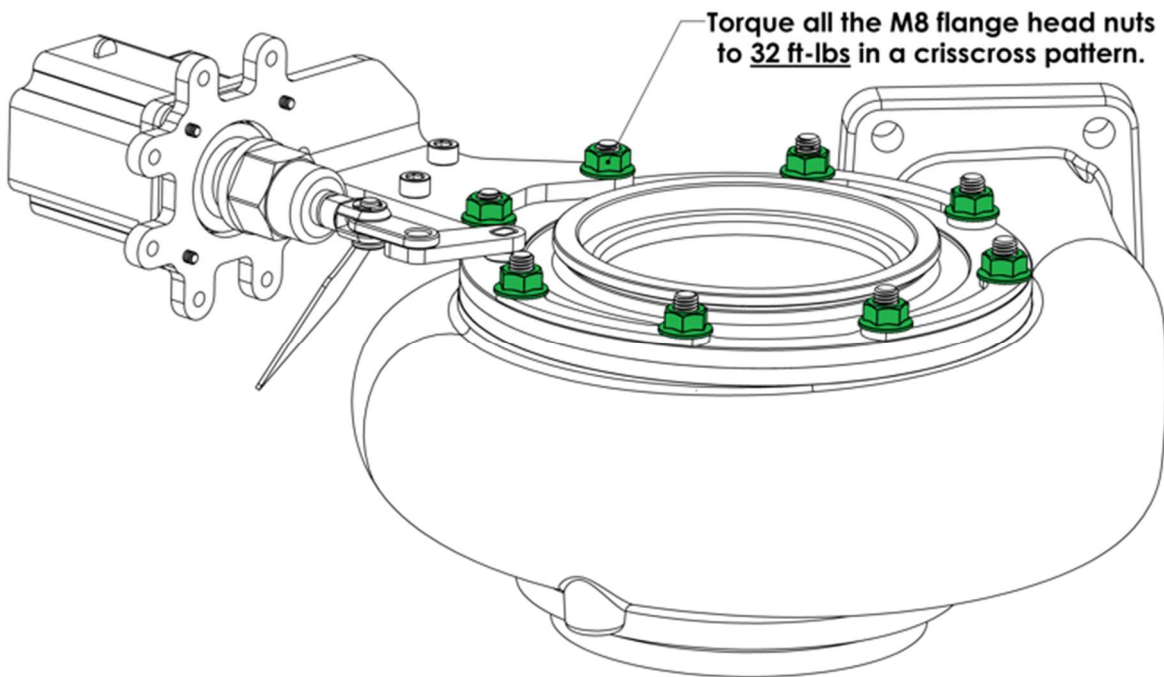
HD1 Electronic Actuator Connecting Instructions:

If the HD1 electronic actuator is not connected to the Turbonator® VGT turbine housing as depicted in the instructions below. It will not self-calibrate correctly and could result in pour performance. Make sure to follow the below instructions very carefully to ensure you connect the actuator to the housing correctly.

Step #1: Tighten the actuator shaft cover and linkage all the way towards the body of the HD1 electronic actuator. The cover and linkage might be tightened together. If they are use a 27mm wrench on the cover, and a 10mm wrench on the linkage to loosen them from each other.
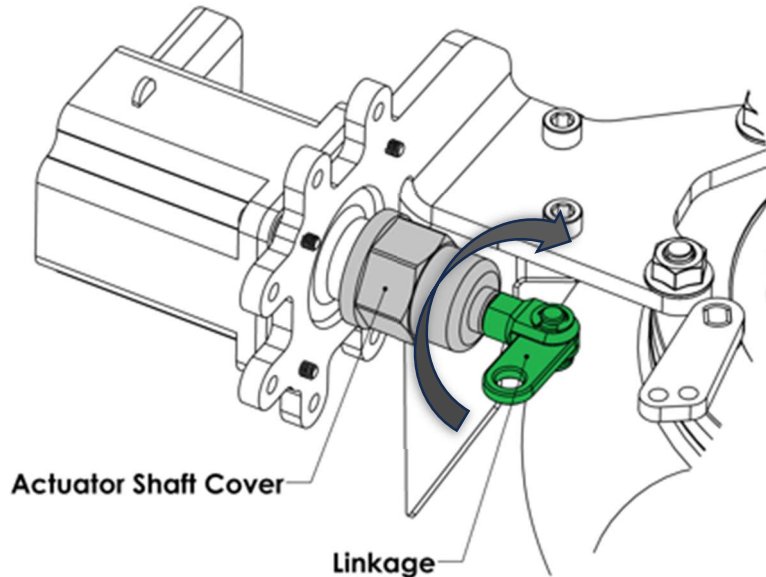

Step #2: With the actuator not yet connected to the wire harness, push the actuator shaft all the way into the body of the actuator until it can't move any further. This is known as your actuators *"zero position"* or *"closed position"*. When the actuator isn't powered, you should be able to push or pull the shaft with your hands.
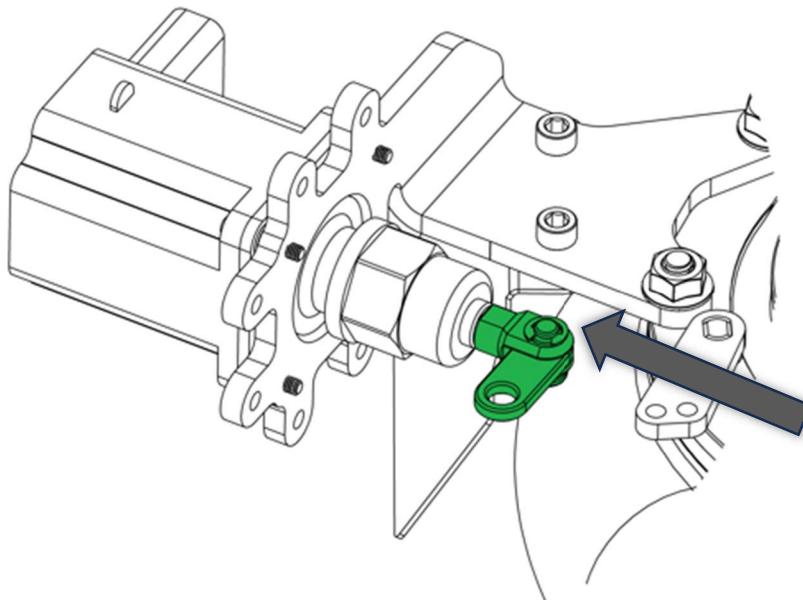
Step #3: Rotate the actuating arm located on your VGT turbine housing in the clockwise direction until it can't rotate any further. This position is known as the housing's **_"zero position"_** or **_"closed position"_** where all the vanes in your housing are closed shut.
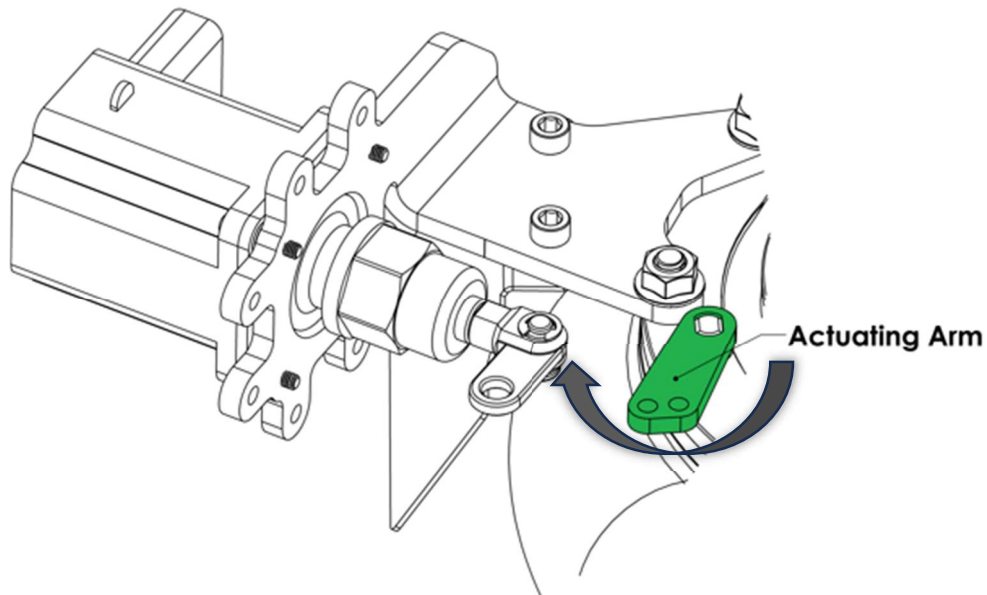
Step #4: With the actuator shaft and actuating arm both in their zero positions. Loosen the linkage away from the body of the actuator a half turn at a time until the linkage hole touches the inner threaded actuating arm hole *(threaded hole with the smallest radius to the actuating arms center of rotation)* as shown in the image below.
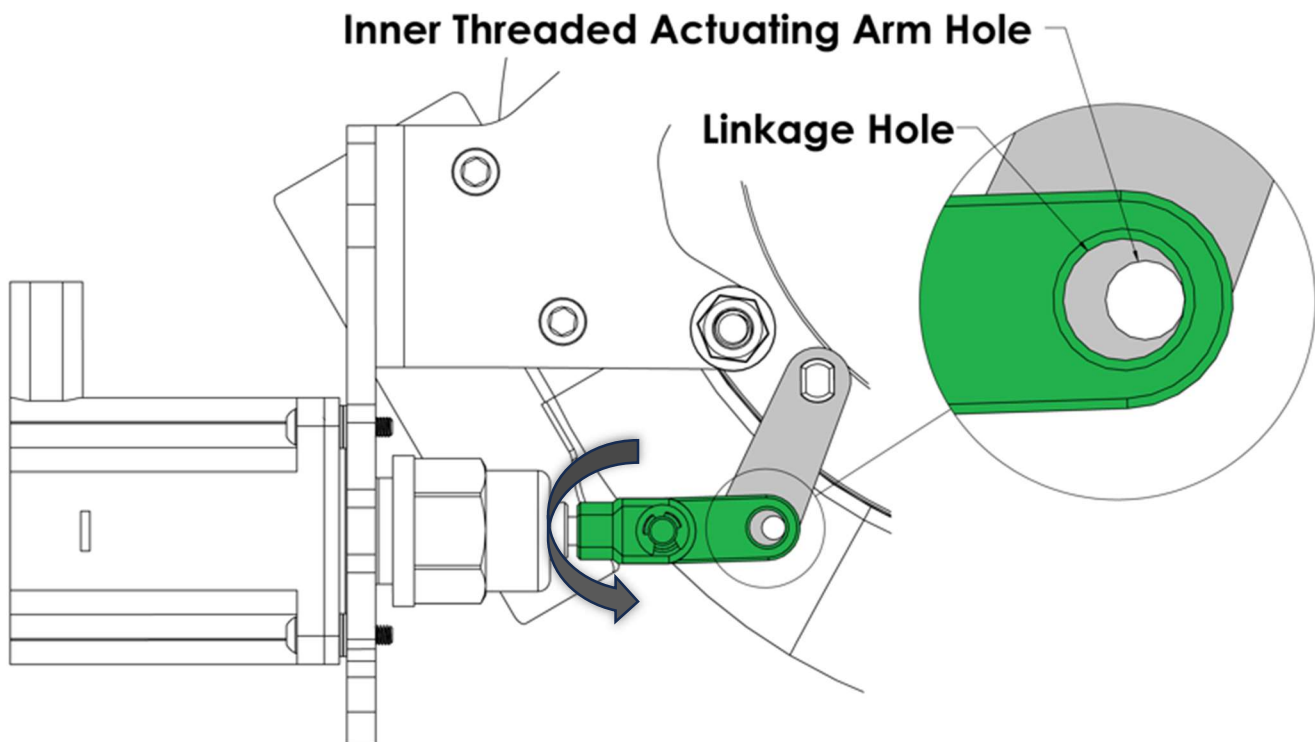
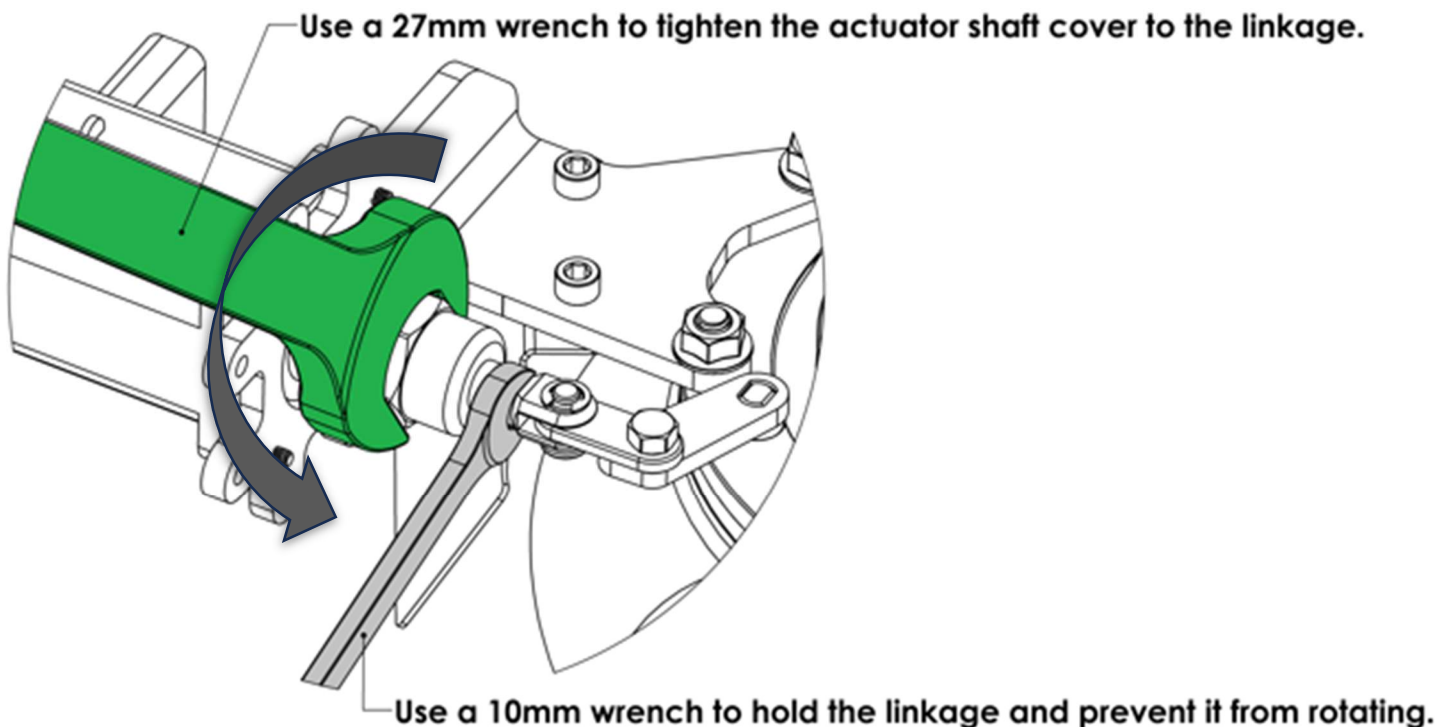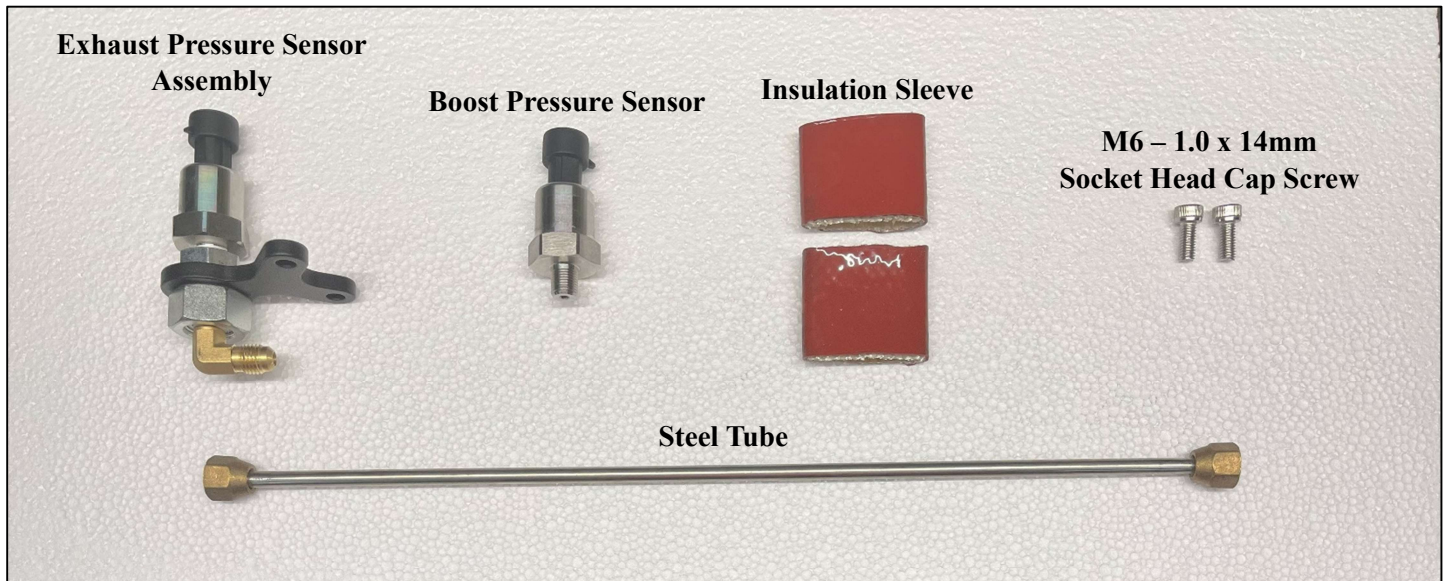**Step#5:** Once aligned like the image above. Apply a small amount of blue Loctite to the threads of the custom M6 shoulder bolt. Then thread the shoulder bolt through the linkage and into the inner threaded hole of the actuating arm. Once finger tight torque it to **170 in-lbs** using a 10mm socket.

M6 Shoulder Bolt

Torque the M6 Shoulder Bolt to 170 in-lbs.
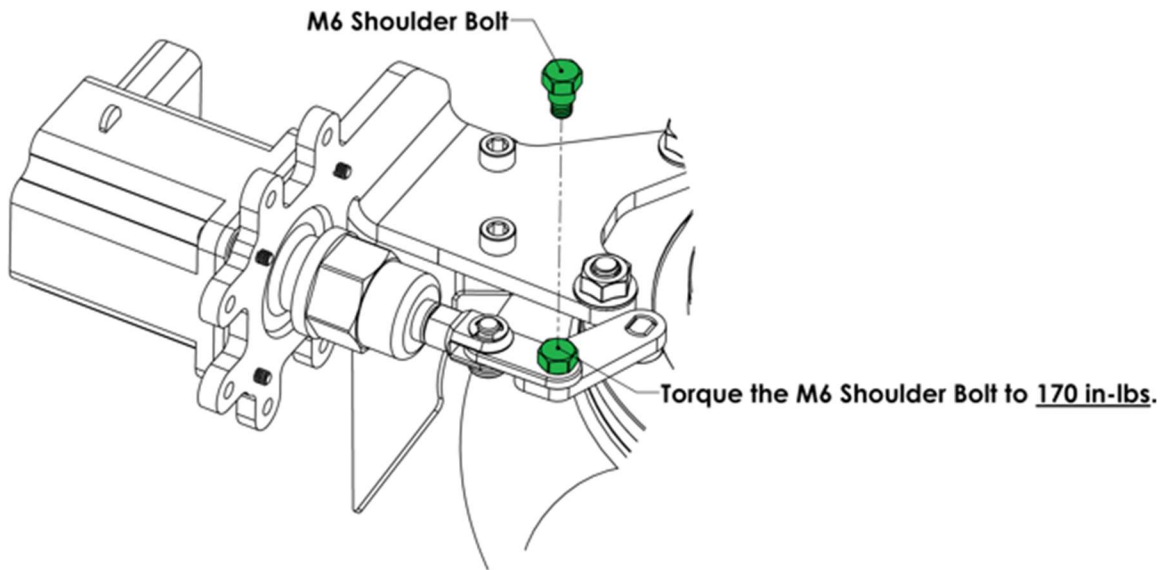
Step#6: Loosen the actuator shaft cover away from the body of the actuator until it tightens against the linkage. Use a 10mm wrench on the linkage to hold it from rotating. Then use a 27mm wrench on the cover to snug it up against the linkage. Do not over tighten the cover, it is made from aluminum and will strip easily.


Use a 27mm wrench to tighten the actuator shaft cover to the linkage.

Use a 10mm wrench to hold the linkage and prevent it from rotating.

Pressure Sensor Mounting Instructions:

Exhaust Pressure Sensor Assembly

Boost Pressure Sensor

Insulation Sleeve

M6 – 1.0 x 14mm Socket Head Cap Screw

Steel Tube

Step #1: Fasten the **boost pressure sensor with "BLUE" zip tie identifier** into the compressor outlet aluminum elbow, use Teflon tape on the threads of the sensor to ensure a proper seal. If your aluminum elbow does not have a port for this sensor, you may need to drill out and tap a 1/8" NPT port into your compressor housing. Once installed, place the pressure sensor insulation sleeve over the pressure sensor.

Insulation Sleeve

Boost Pressure Sensor with "BLUE" Zip Tie

Compressor Outlet Aluminum Elbow
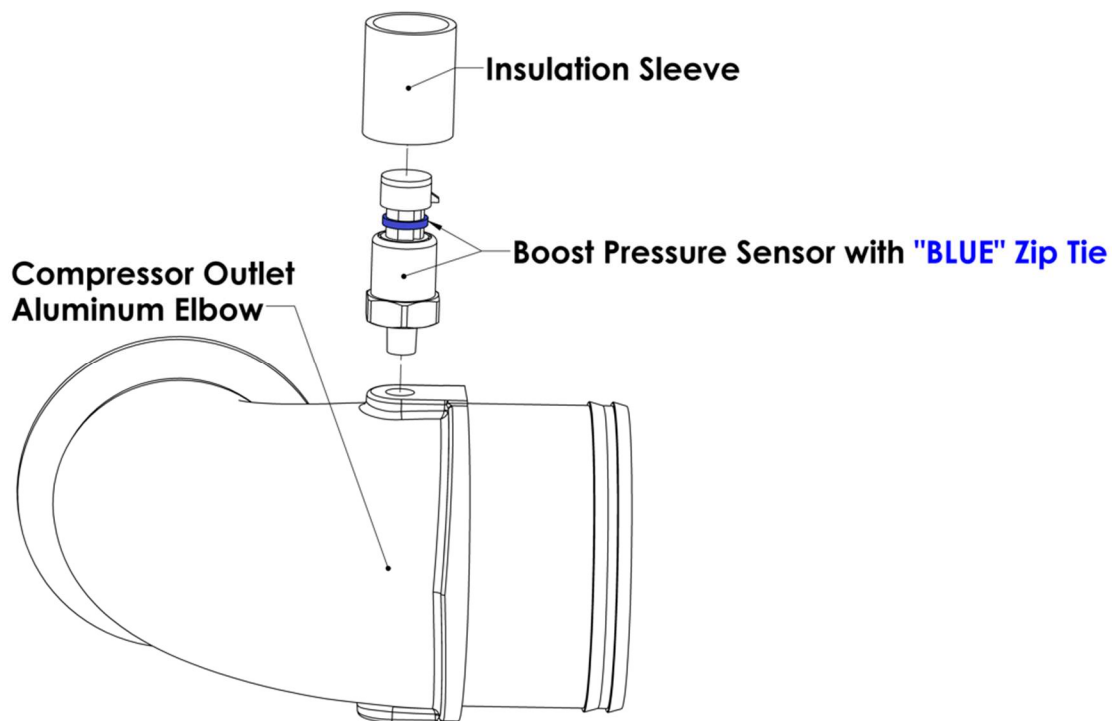
Step #2: Fasten the <u>**exhaust pressure sensor assembly with "RED" zip tie identifier**</u> to the Turbonator® electronic actuator bracket using the provided M6 – 1 x 14mm socket head cap screws. There are 5 possible mounting locations. Try mounting the assembly in location #1 first, if it does not clear surrounding components then try the next mounting location until you find the location that works on your application. Once installed, place the pressure sensor insulation sleeve over the pressure sensor.
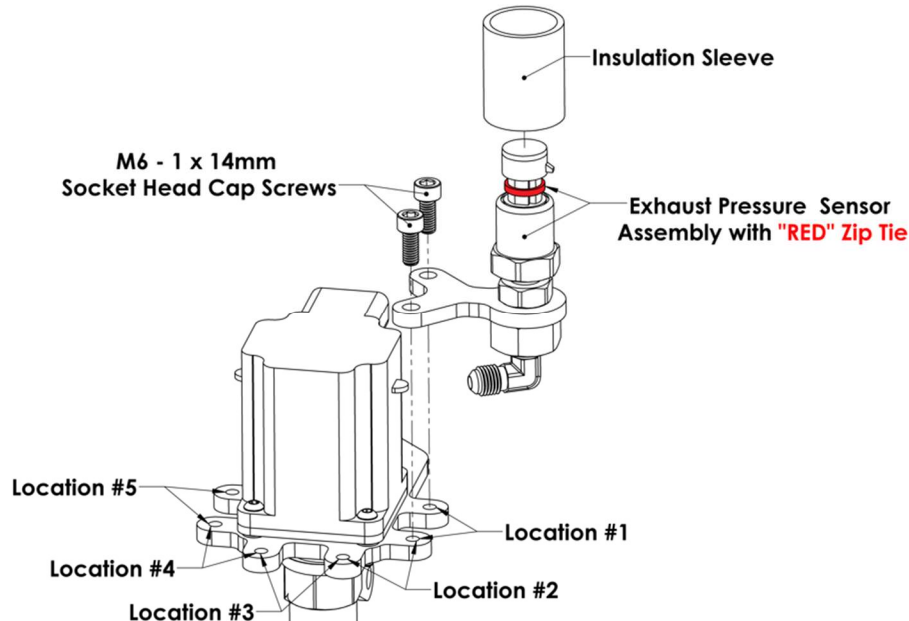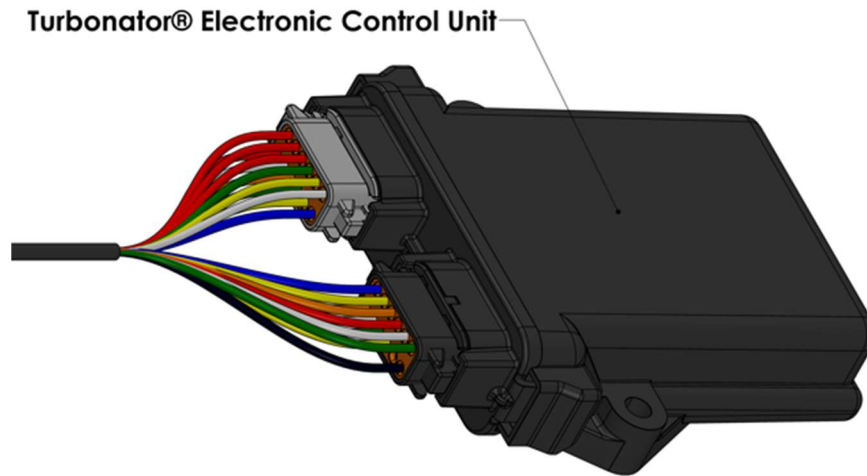

Step #3: Route the steel tubing from the exhaust pressure sensor assembly to the Turbonator® housing. Ensure the steel tube runs down from the pressure sensor to the turbine housing fitting. Condensation can accumulate in the tube, and it must drain away from the exhaust pressure sensor. If condensation accumulates in the exhaust pressure sensor the sensor can be permanently damaged. Make sure there is plenty of space between the steel tube and the electronic actuator.
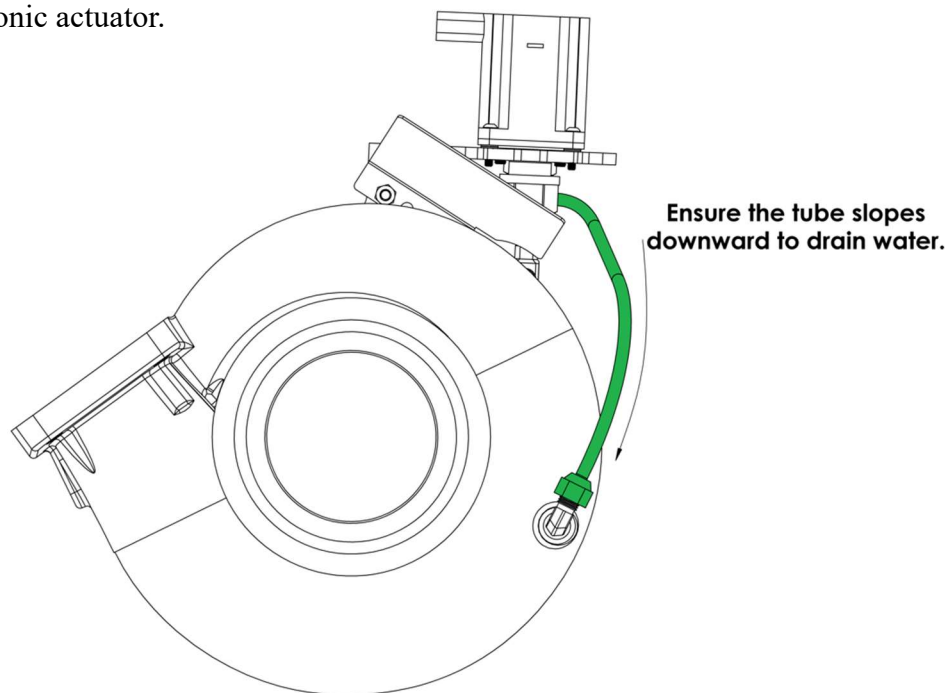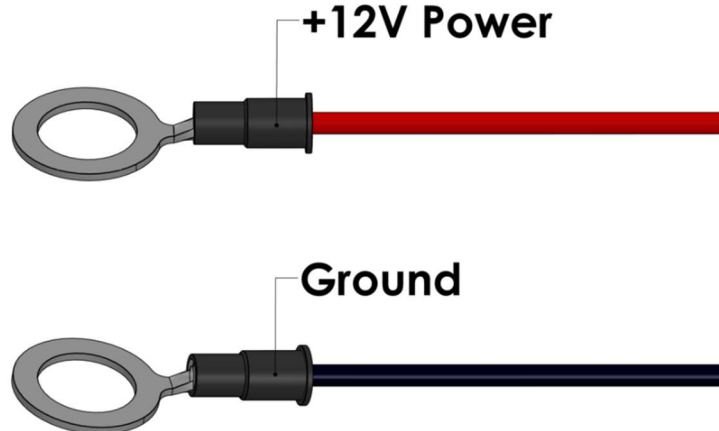
Emissions Compliant / Partially Deleted Cummins ISX15/X15:

Partially Deleted = SEMI using OEM turbo with emissions systems removed.

Step #1: Mount the Turbonator® electronic control unit on the driver's side of the engine bay away from the engine block against the firewall.

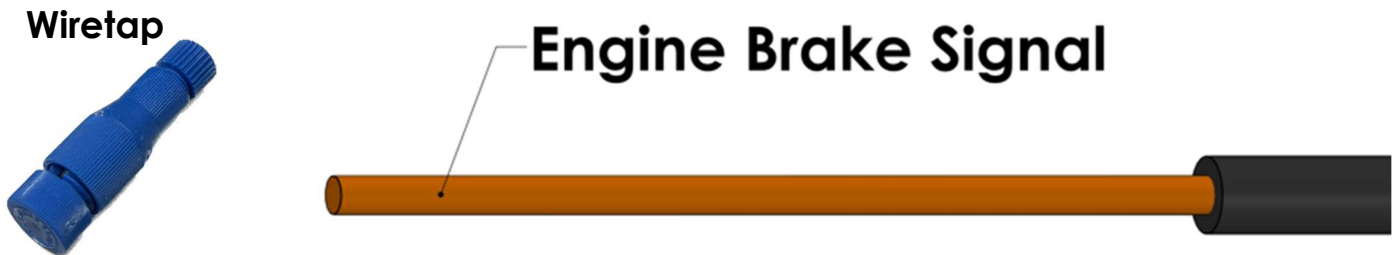Turbonator® Electronic Control Unit

Step #2: Connect the wire harness **red** +12V power wire, and **black** ground wire to either your truck's alternator, or one of its +12V batteries. (**WARNING:** The Turbonator® electronic control requires +12V power to function properly. Double check the voltage of your power supply with a multimeter before you make these connections.)
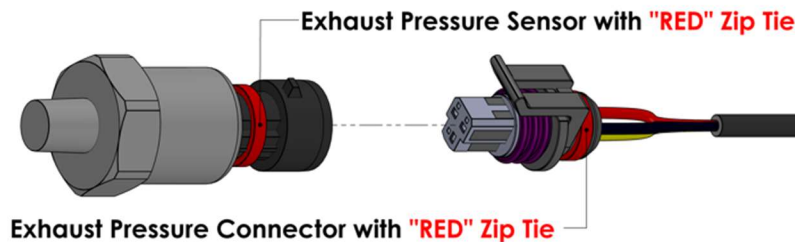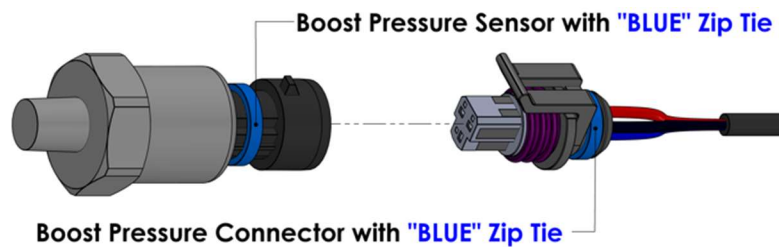

+12V Power

Ground

Step #3: Attach the wire harness **white** ignition/accessory power wire into any of your trucks +12V ignition-controlled wires.
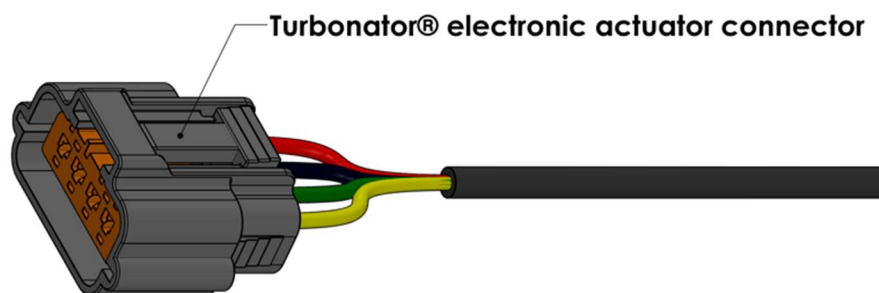

Ignition/Accessory Power

Step #4: Using the wiretap provided in your kit. Tap the wire harness **orange** engine brake signal wire into the +12V side of your truck's engine brake solenoid #1.

Wiretap

Engine Brake Signal

Step #5: Connect the wire harness **boost pressure connector with "BLUE" zip tie identifier** to the previously mounted **boost pressure sensor with "BLUE" zip tie identifier** (the sensor mounted to the compressor housing.) Then connect the wire harness **exhaust pressure connector with "RED" zip tie identifier** to the previously mounted **exhaust pressure sensor with "RED" zip tie identifier** (the sensor mounted to the actuator bracket.) (**WARNING:** Double check that the right connector and sensor are connected as stated above!!! The Turbonator® electronic control software requires that this connection be made correctly to operate properly!!!)

Boost Pressure Sensor with "BLUE" Zip Tie

Boost Pressure Connector with "BLUE" Zip Tie

Exhaust Pressure Sensor with "RED" Zip Tie

Exhaust Pressure Connector with "RED" Zip Tie

Step #6: Connect the wire harness **Turbonator® electronic actuator connector** to the HD1 electronic actuator.

Turbonator® electronic actuator connector

Step #7: Connect the wire harness **OEM electronic actuator connector** into your truck's OEM wire harness in place of the OEM electronic actuator. All harnesses come with the OEM HE400VG turbo electronic actuator connector. If your truck had a HE561VE or HE451VE turbo, you would receive a preinstalled adapter cable with the appropriate OEM electronic actuator connector for your truck.
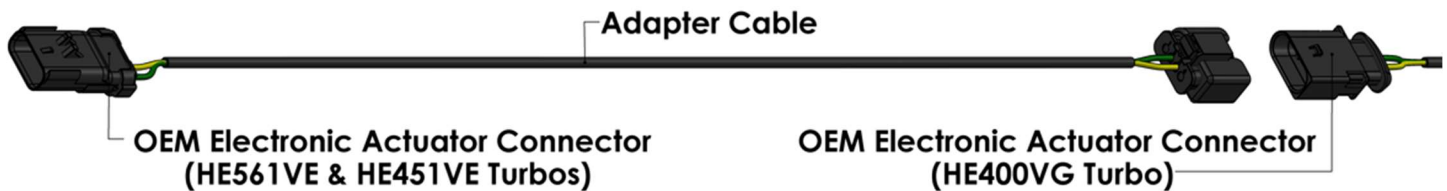
Step #8: Connect the wire harness **OEM turbo speed sensor connector** into your truck's OEM wire harness in place of the OEM turbo speed sensor. All harnesses come with the OEM HE400VG turbo speed sensor connector. If your truck had a HE561VE or HE451VE turbo, you would receive a preinstalled adapter cable with the appropriate OEM turbo speed sensor connector for your truck.
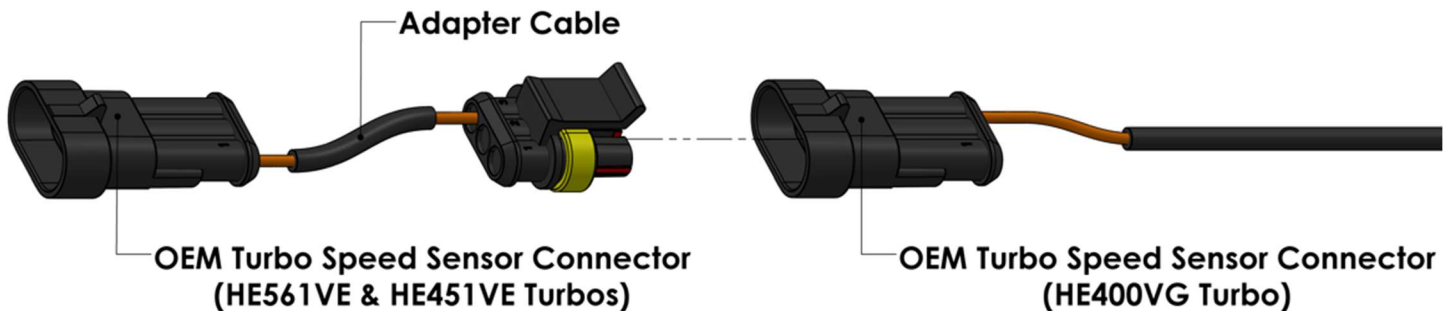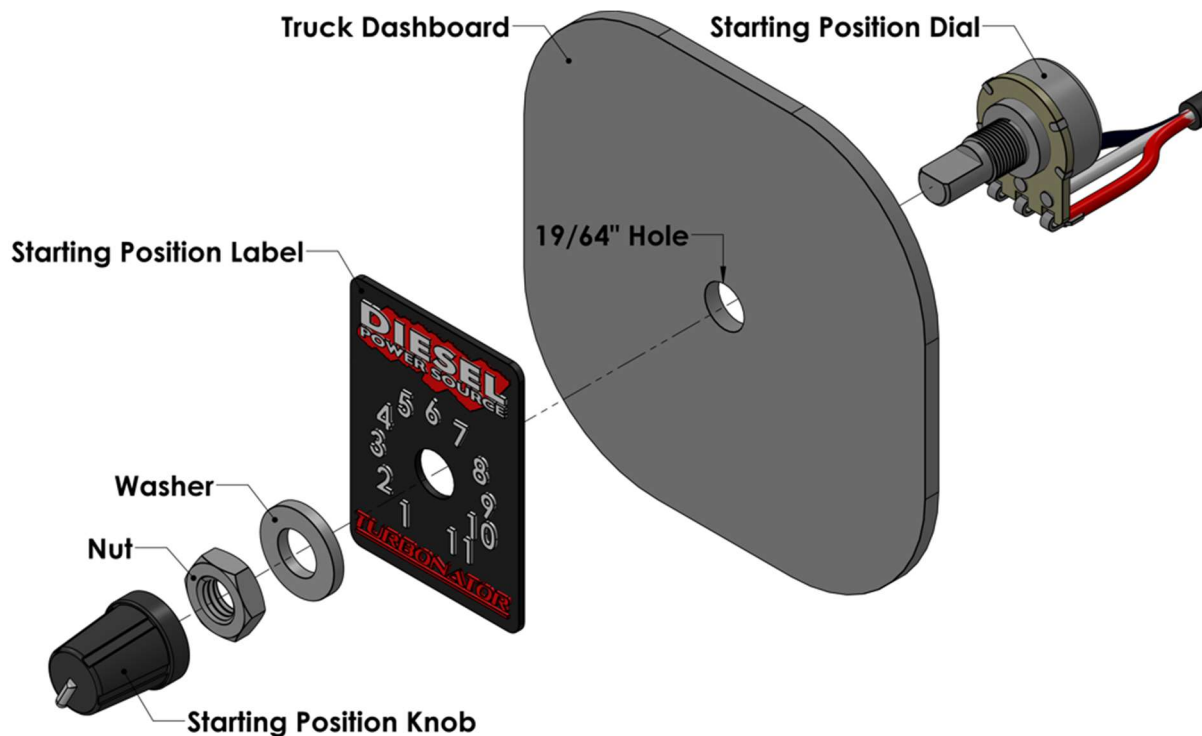

Step #9: Remove the starting position cable with dial from the main harness.
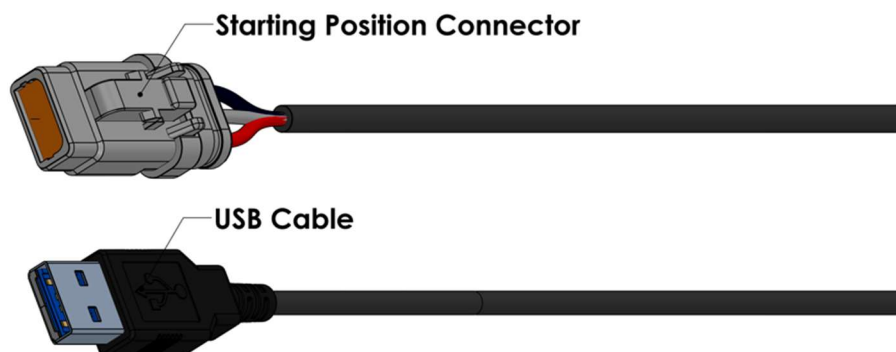
Step #10: Using the starting position label as a guide. Choose a location on the dashboard of your truck where you would like to mount the starting position dial for easy access while driving. Once a location has been determined use a 19/64" drill bit to drill a hole for the dial to be mounted through. Clean up the hole and stick the label over the previously drilled hole. Pass the starting position dial through the hole, and use the provided washer, and nut to secure the dial to the dashboard. Put the knob on the dial and rotate it all the way to the left. Once the dial stops rotating, you're in starting position #1. At this point make sure the dial is pointing to position #1 on the label. If it is not you may need to rotate the dial to align properly with the label. (**WARNING:** When tightening the dial to the dashboard do not hold the wires / terminals of the dial to prevent it from turning but hold the body of the dial. Holding the wires during this process could stress and break the wires / terminals from the body of the dial!!!)

Step #11: Pass the wire harness starting position connector, and USB cable through the driver's side firewall and into the cab of your truck.

Step #12: Connect the wire harness **starting position connector** that was previously passed through the firewall of your truck to the starting position cable. Route the wires behind the dash of your truck and to the location where you mounted the starting position cable with the dial.

Starting Position Connector

Starting Position Cable
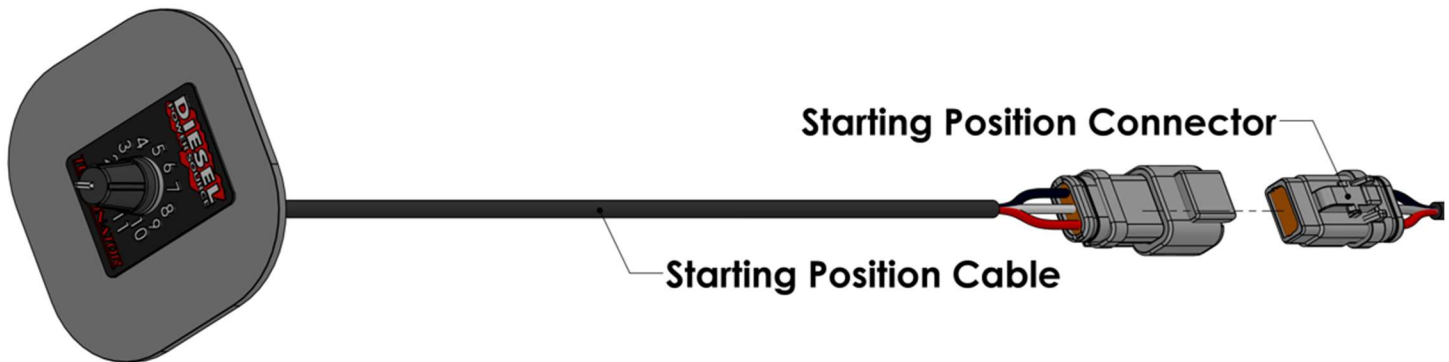
Step #13: Keep the USB cable out for easy access. It will be used for initial testing once the installation of your kit is complete. After testing is done you can either tuck the USB cable behind your dash or keep it out for easy access while driving.
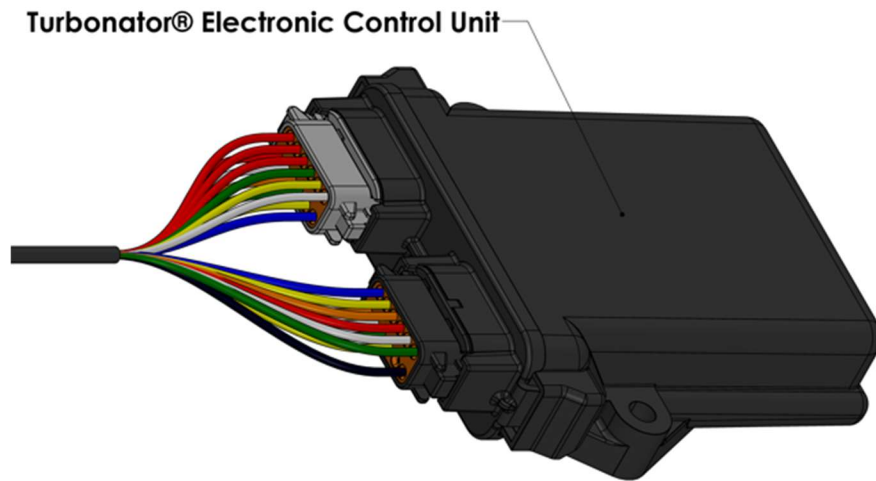

USB Cable

Step #14: Use zip ties to secure any loose wires. Make sure none of the wires are near hot surfaces or any snag points. Improper installation of the harness will void warranty.
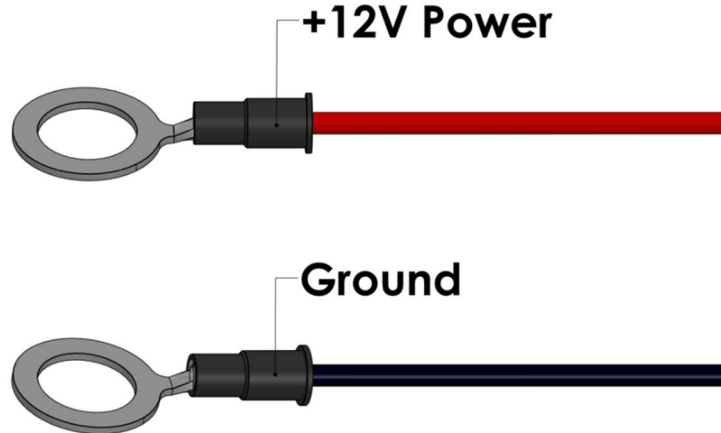
Non-Emissions SEMI's / Fully Deleted Cummins ISX15/X15:

Step #1: Mount the Turbonator® electronic control unit on the driver's side of the engine bay away from the engine block against the firewall.
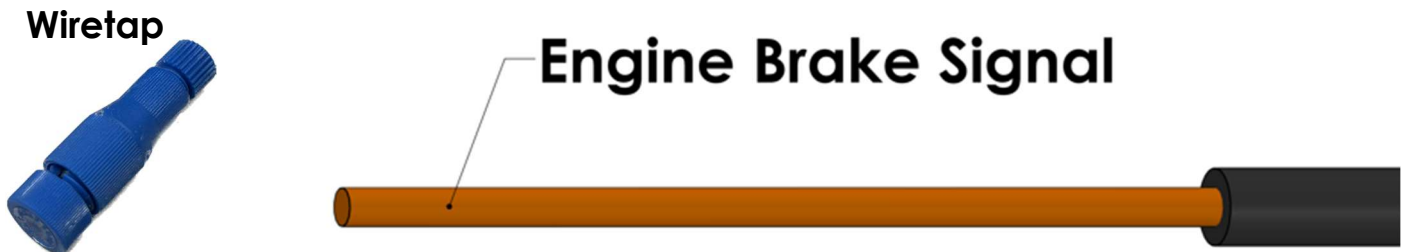
Turbonator® Electronic Control Unit

Step #2: Connect the wire harness **red** +12V power wire, and **black** ground wire to either your truck's alternator, or one of its +12V batteries. (**WARNING:** The Turbonator® electronic control requires +12V power to function properly. Double check the voltage of your power supply with a multimeter before you make these connections.)
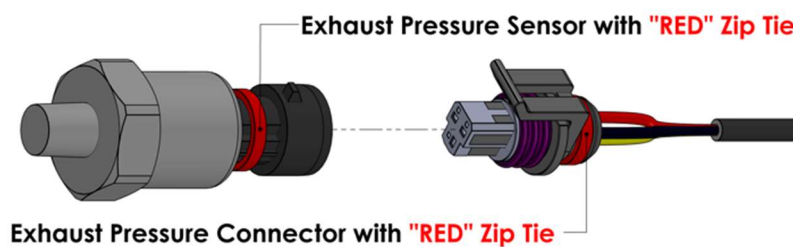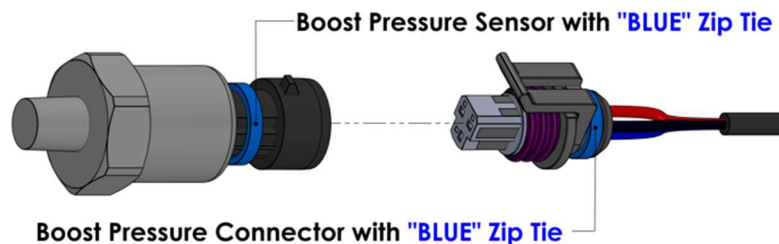
+12V Power

Ground

Step #3: Attach the wire harness **white** ignition/accessory power wire into any of your trucks +12V ignition-controlled wires.
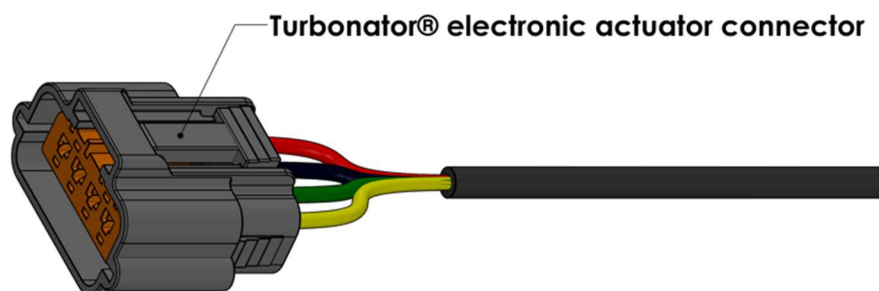
Ignition/Accessory Power

Step #4: Using the wiretap provided in your kit. Tap the wire harness **<u>orange</u>** engine brake signal wire into the +12V side of your truck's engine brake solenoid #1.

Wiretap

Engine Brake Signal

Connect the wire harness **<u>boost pressure connector</u> with <u>"BLUE" zip tie identifier</u>** to the previously mounted **<u>boost pressure sensor</u> with <u>"BLUE" zip tie identifier</u>** (the sensor mounted to the compressor housing.) Then connect the wire harness **<u>exhaust pressure connector</u> with <u>"RED" zip tie identifier</u>** to the previously mounted **<u>exhaust pressure sensor</u> with <u>"RED" zip tie identifier</u>** (the sensor mounted to the actuator bracket.) (**<u>WARNING:</u>** Double check that the right connector and sensor are connected as stated above!!! The Turbonator® electronic control software requires that this connection be made correctly to operate properly!!!)

Boost Pressure Sensor with "BLUE" Zip Tie
Boost Pressure Connector with "BLUE" Zip Tie

Exhaust Pressure Sensor with "RED" Zip Tie
Exhaust Pressure Connector with "RED" Zip Tie

Step #6: Connect the wire harness **<u>Turbonator® electronic actuator connector</u>** to the HD1 electronic actuator.

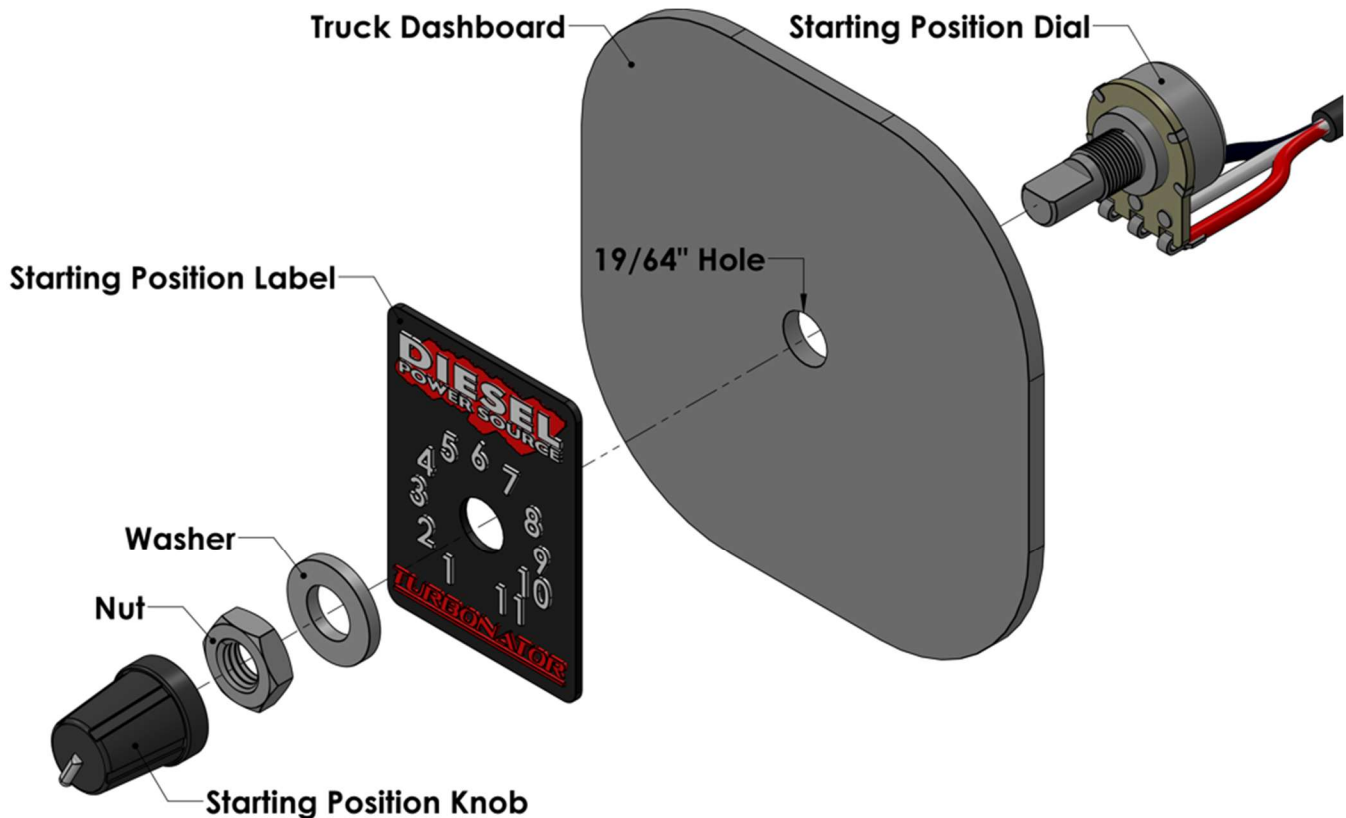Turbonator® electronic actuator connector

Step #7: Remove the starting position cable with dial from the main harness.


Step #8: Using the starting position label as a guide. Choose a location on the dashboard of your truck where you would like to mount the starting position dial for easy access while driving. Once a location has been determined use a 19/64" drill bit to drill a hole for the dial to be mounted through. Clean up the hole and stick the label over the previously drilled hole. Pass the starting position dial through the hole, and use the provided washer, and nut to secure the dial to the dashboard. Put the knob on the dial and rotate it all the way to the left. Once the dial stops rotating, you're in starting position #1. At this point make sure the dial is pointing to position #1 on the label. If it is not you may need to rotate the dial to align properly with the label. (**WARNING:** When tightening the dial to the dashboard do not hold the wires / terminals of the dial to prevent it from turning but hold the body of the dial. Holding the wires during this process could stress and break the wires / terminals from the body of the dial!!!)

Step #9: Pass the wire harness starting position connector, and USB cable through the driver's side firewall and into the cab of your truck.
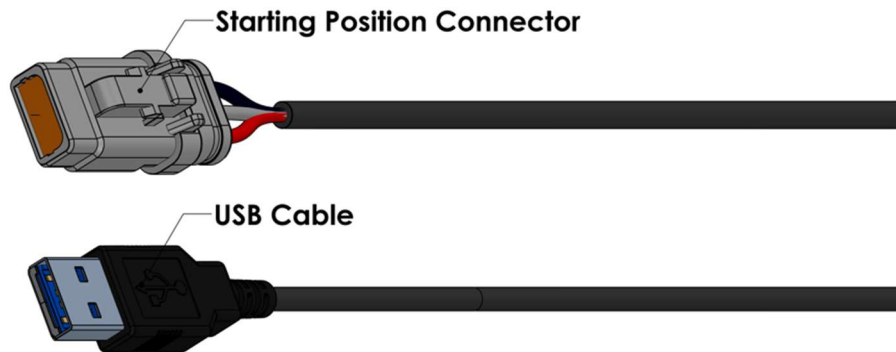
Step #10: Connect the wire harness **starting position connector** that was previously passed through the firewall of your truck to the starting position cable. Route the wires behind the dash of your truck and to the location where you mounted the starting position cable with the dial.
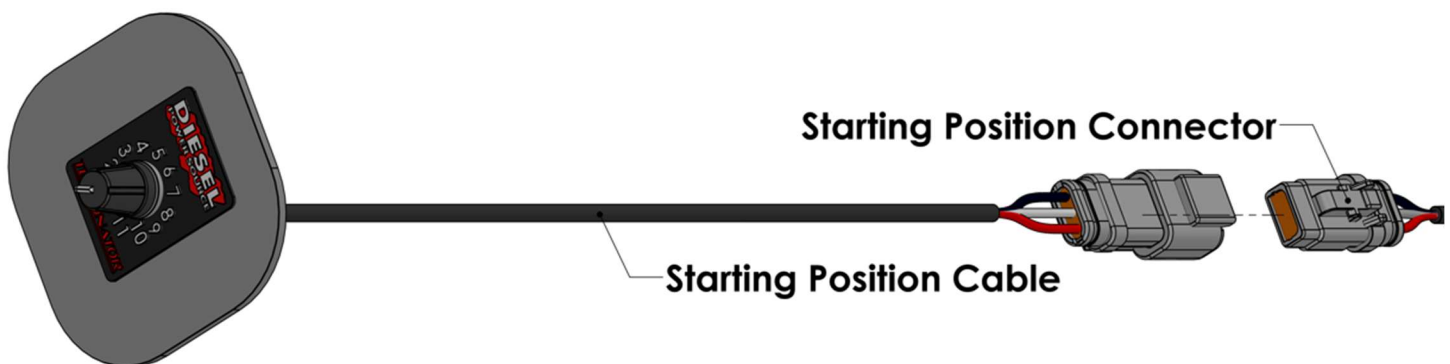

Step #11: Keep the USB cable out for easy access. It will be used for initial testing once the installation of your kit is complete. After testing is done you can either tuck the USB cable behind your dash or keep it out for easy access while driving.
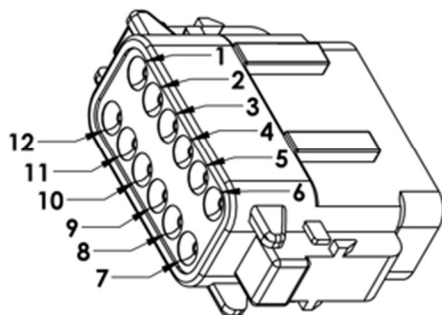

Step #12: Use zip ties to secure any loose wires. Make sure none of the wires are near hot surfaces or any snag points. Improper installation of the harness will void warranty.
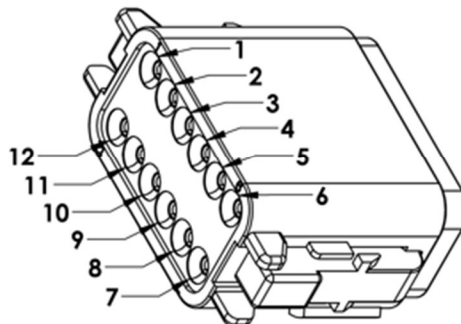
Main Wire Harness Schematic:
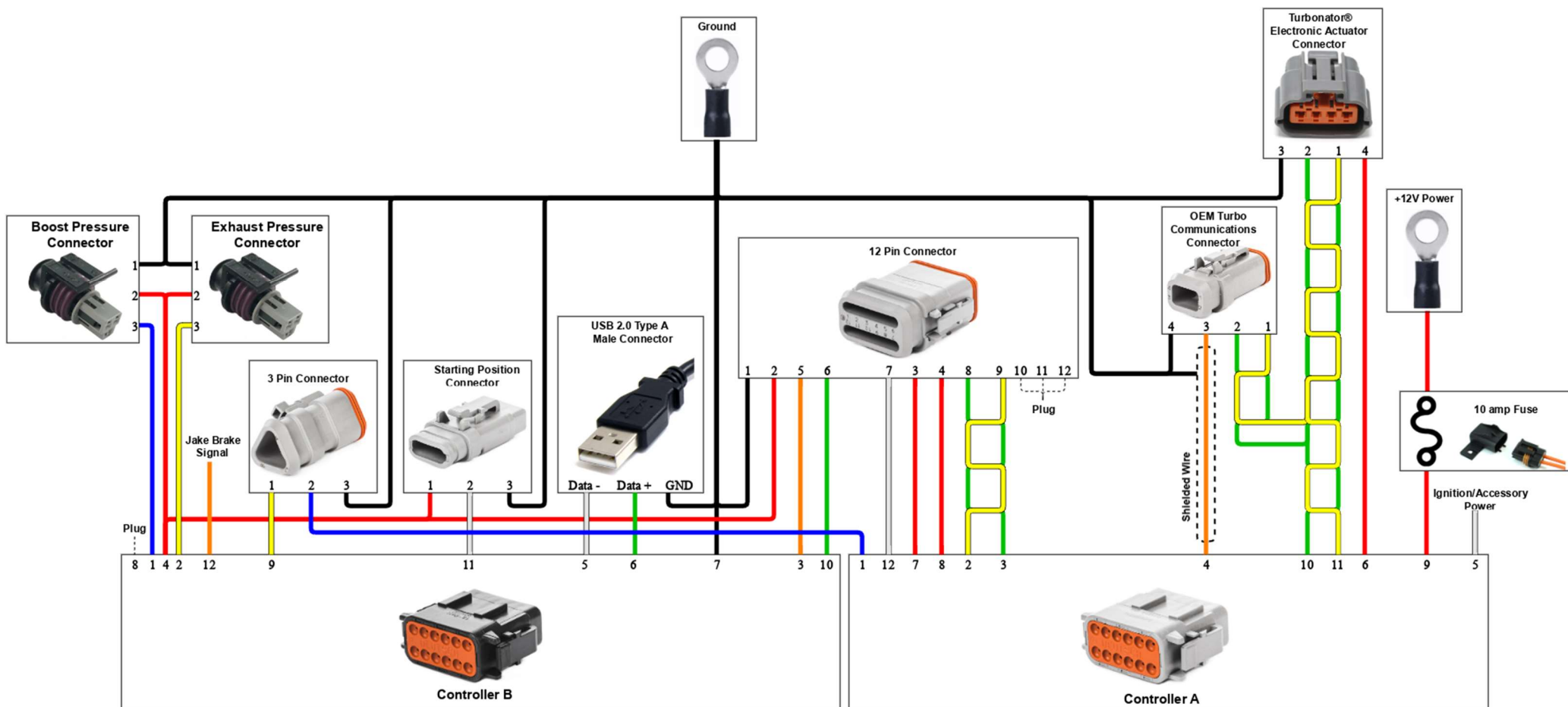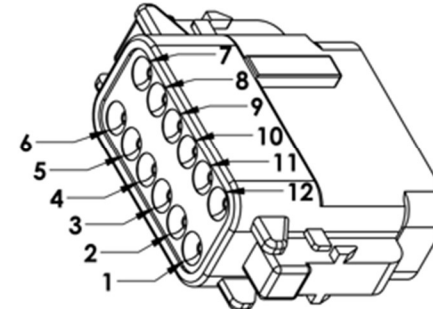
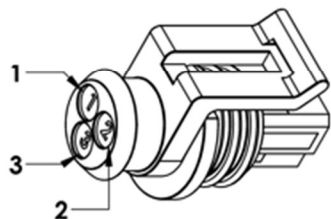# Main Wire Harness Connector Pinout:

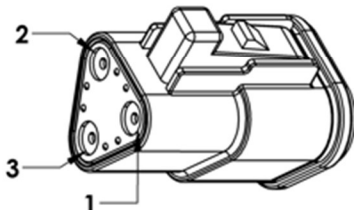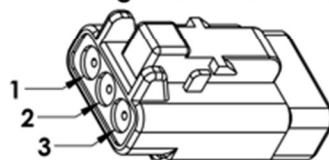
Controller B Connector

12 Pin Connector

Controller A Connector

Pressure Sensor Connector

3 Pin Connector

Starting Position Connector

OEM Turbo Communications Connector
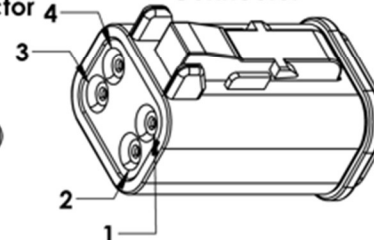
Turbonator® Electronic Actuator Connector
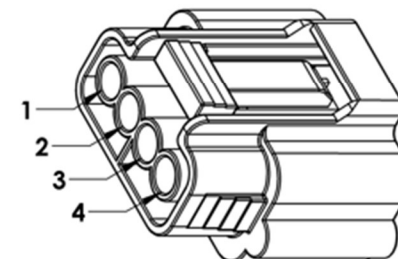
OEM Turbo Communications Cable Schematic & Connector Pinouts:

OEM Turbo Speed Sensor Connector (HE400VG Turbo)

1 --- Plug
2 --- Plug
3

Shielded Wire

OEM Electronic Actuator Connector (HE400VG Turbo)

1 --- Plug
2
3
4 --- Plug

OEM Turbo Communications Connector

4
3
2
1

OEM Electronic Actuator Connector (He400VG Turbo)

4
3
2
1

OEM Turbo Speed Sensor Connector (HE400VG Turbo)

1
2
3

OEM Turbo Communications Connector

1
2
3
4
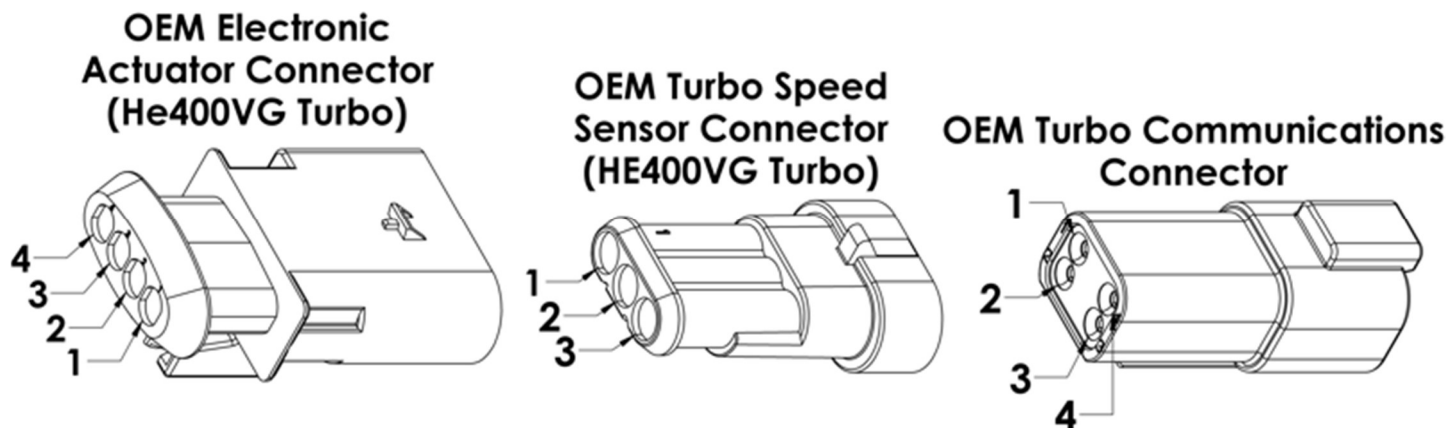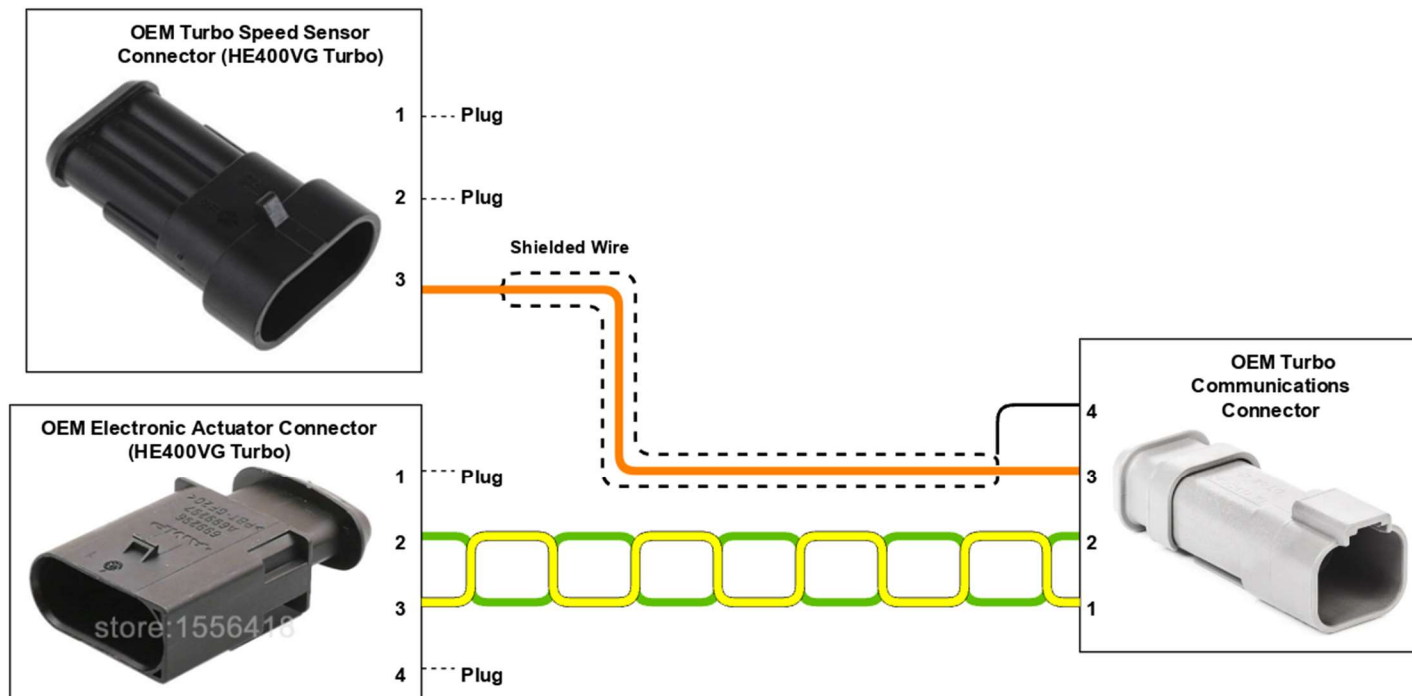
OEM Electronic Actuator Adapter Cable Schematic & Connector Pinouts:

OEM Electronic Actuator Connector (HE561VE & HE451VE Turbos)

1 --- Plug
2 --- Plug
3
4

Plug --- 4
3
2
Plug --- 1
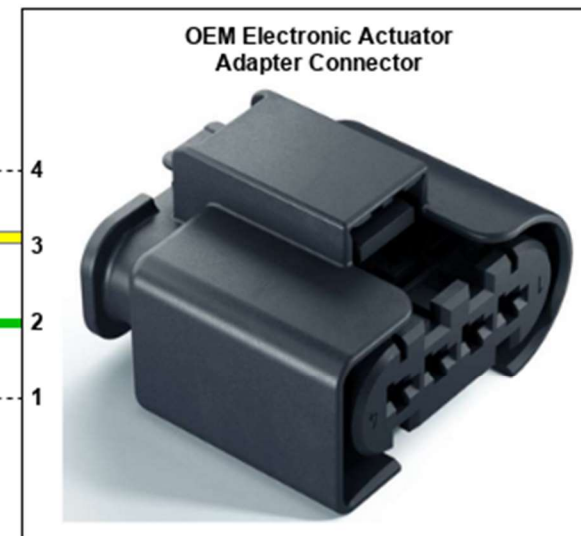
OEM Electronic Actuator Adapter Connector
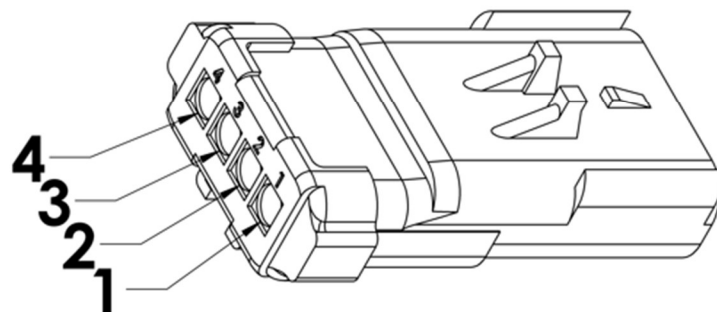
OEM Electronic Actuator Connector (HE561VE & HE451VE Turbos)
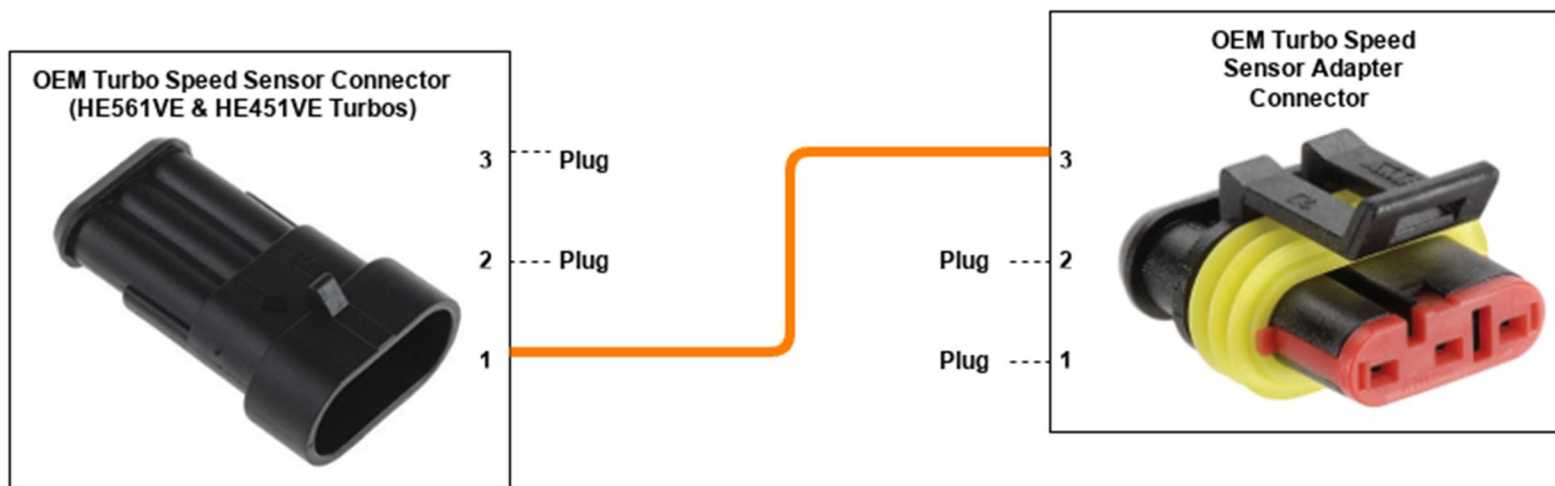
4
3
2
1

OEM Electronic Actuator Adapter Connector

1
2
3
4

OEM Turbo Speed Sensor Adapter Cable Schematic & Connector Pinouts:

OEM Turbo Speed Sensor Connector
(HE561VE & HE451VE Turbos)

3 ---- Plug
2 ---- Plug
1

OEM Turbo Speed Sensor Adapter Connector

3
Plug ---- 2
Plug ---- 1

OEM Turbo Speed Sensor Connector
(HE561VE & HE451VE Turbos)

1
2
3

OEM Turbo Speed Sensor Adapter Connector

3
2
1
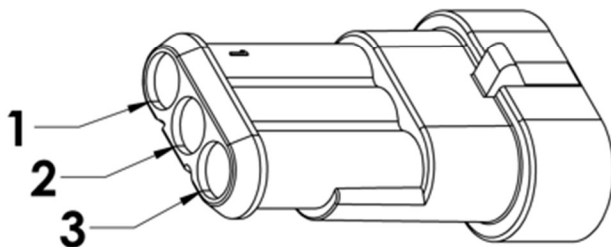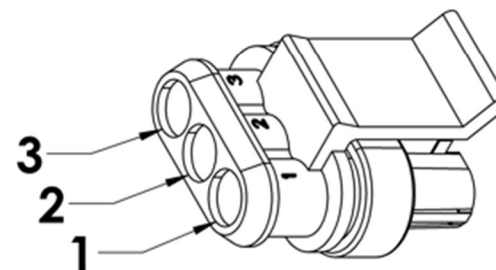
Starting Position Cable Schematic & Connector Pinouts:

Starting Position Dial

Starting Position Connector
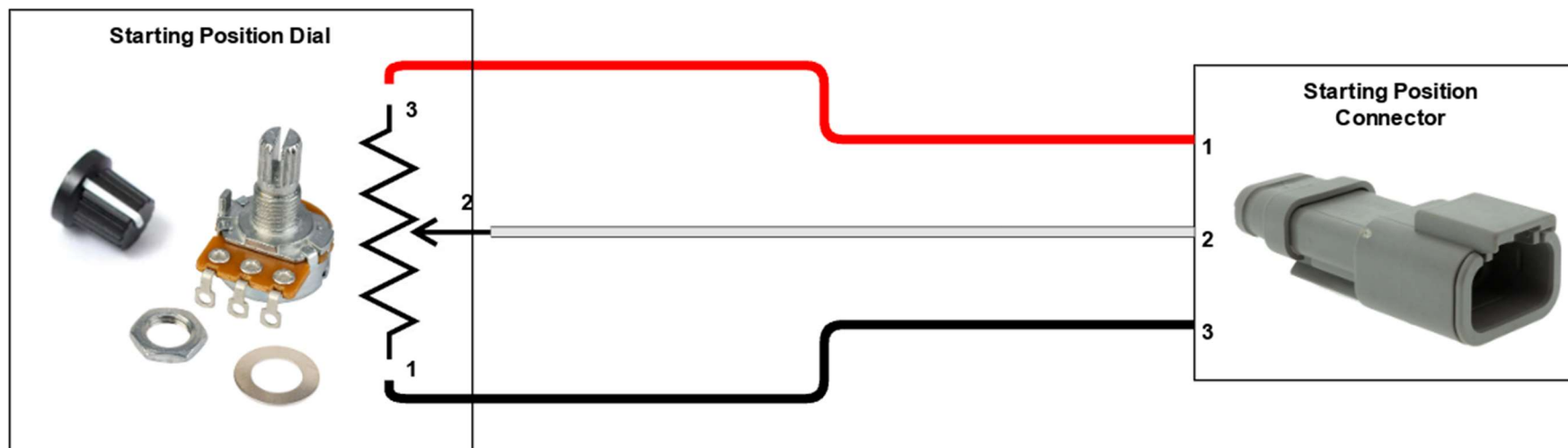
Starting Position Dial
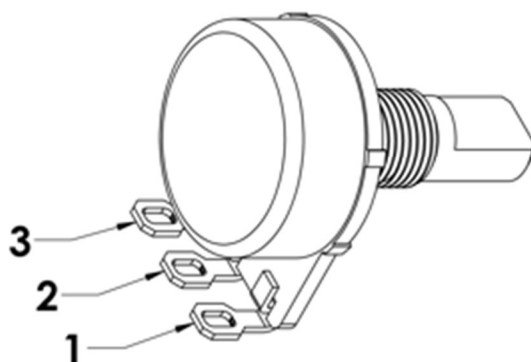
Starting Position Connector
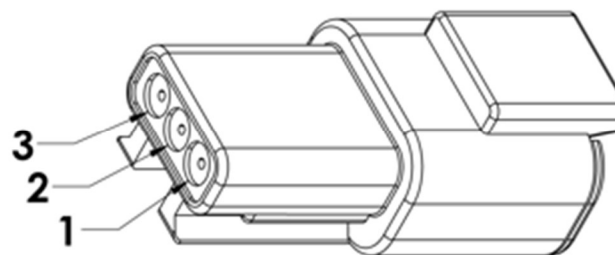
Windows 10 or 11 DPS Data Logger Download Instructions:

Step #1: Using a web browser follow the link listed below to the Diesel Power Source *"Install Instructions | Product Support"* webpage.

https://www.dieselpowersource.com/install-instructions-product-support/

Step #2: Scroll down the *"Install Instructions | Product Support"* webpage to the *"DPS Logger"* section. Under this section there will be two links to download the data logger. Make sure to select the *"DPS Logger (Windows)"* link. If you select the other link for MAC operating systems, it will not work with your windows computer. Once selected a *"DPS_Logger Windows"* compressed .zip folder will download to your computer.

DPS LOGGER

- DPS Logger (MAC)

- DPS Logger (Windows)

DPS_Logger Windows.zip
Completed — 36.6 MB

Show all downloads
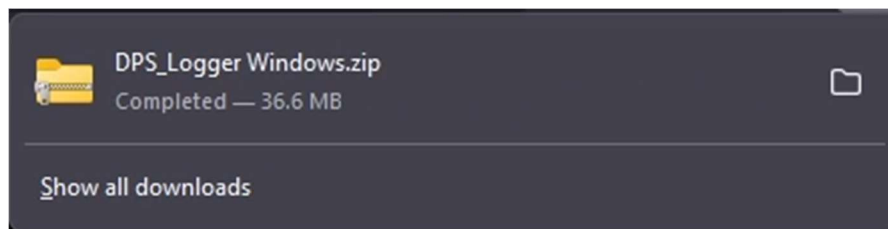
Step #3: Once the DPS data logger has been downloaded from the website. Locate the *"DPS_Logger Windows"* compressed .zip file in your computer's download folder. Once located *"right click"* on the *"DPS_Logger Windows"* file and select *"Extract All…"*. You will now select the file path where you would like the data logger to be saved on your computer. Select *"Browse…"* and choose the location where you would like to save the datalogger. Make sure to remember your chosen file location to locate it in the next step. Once the file location has been chosen select *"Extract"*. At this time the data logger will be extracted and placed into the file location you previously chose.
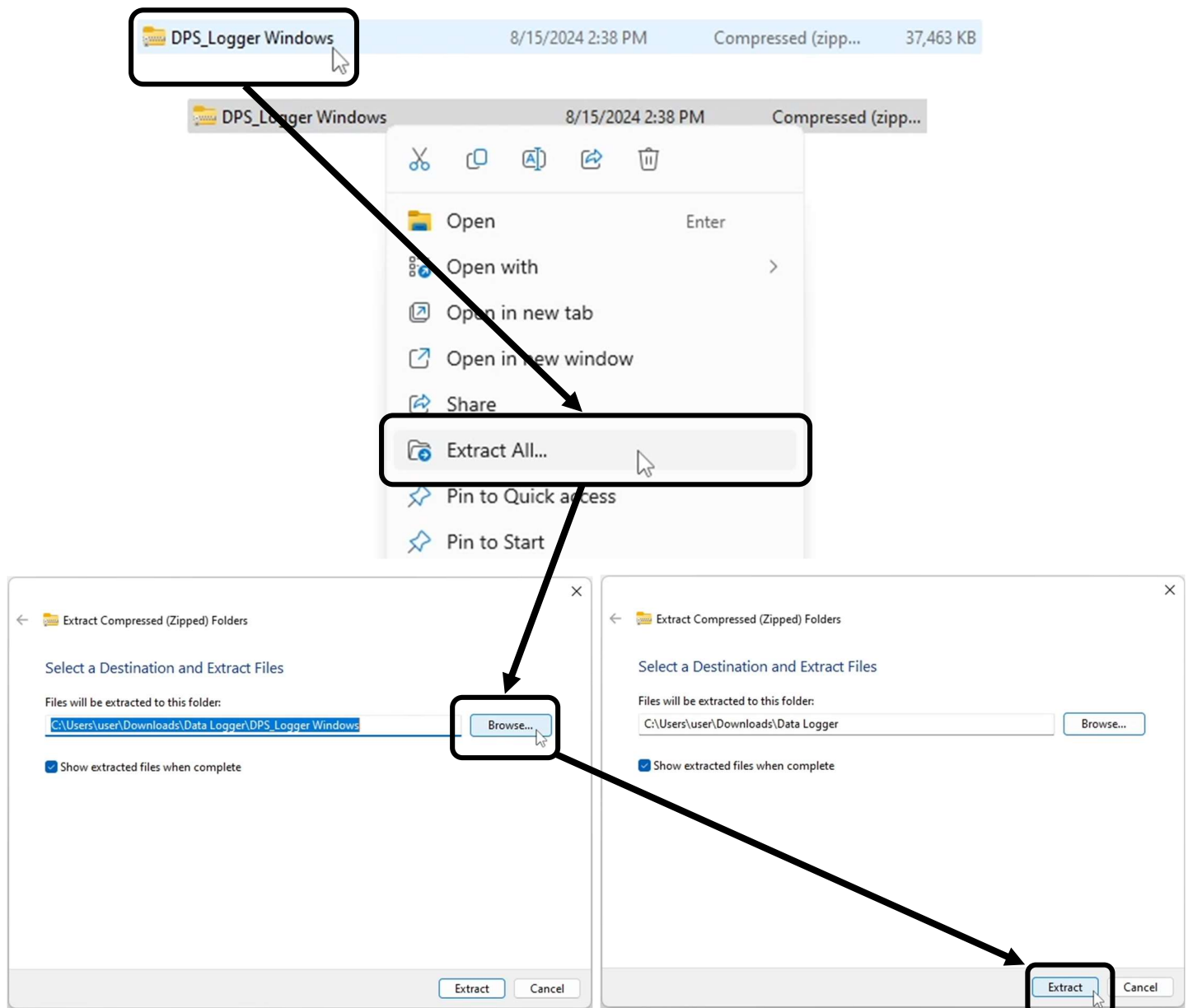
Step #4: Locate and open the extracted *"DPS_Logger Windows"* folder within the file location you chose in the previous step. Now open the *"DPS Logger"* folder, once the folder is open *"right click"* on the *"DPS Logger"* application and select *"Show more options"*. Then select *"Send to"* and lastly select *"Desktop"*. The data logger can now be seen on your computer's desktop with the Diesel Power Source logo.
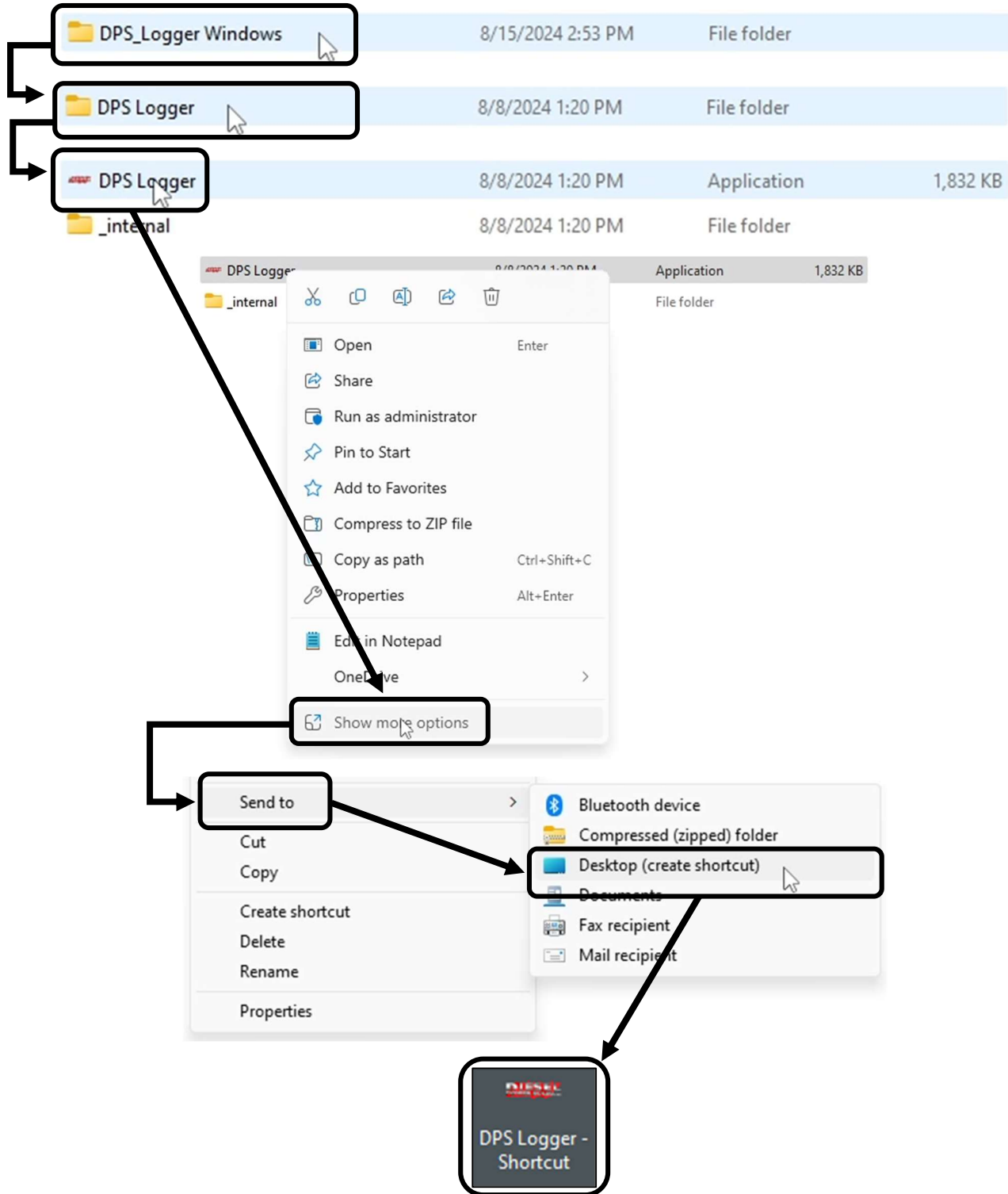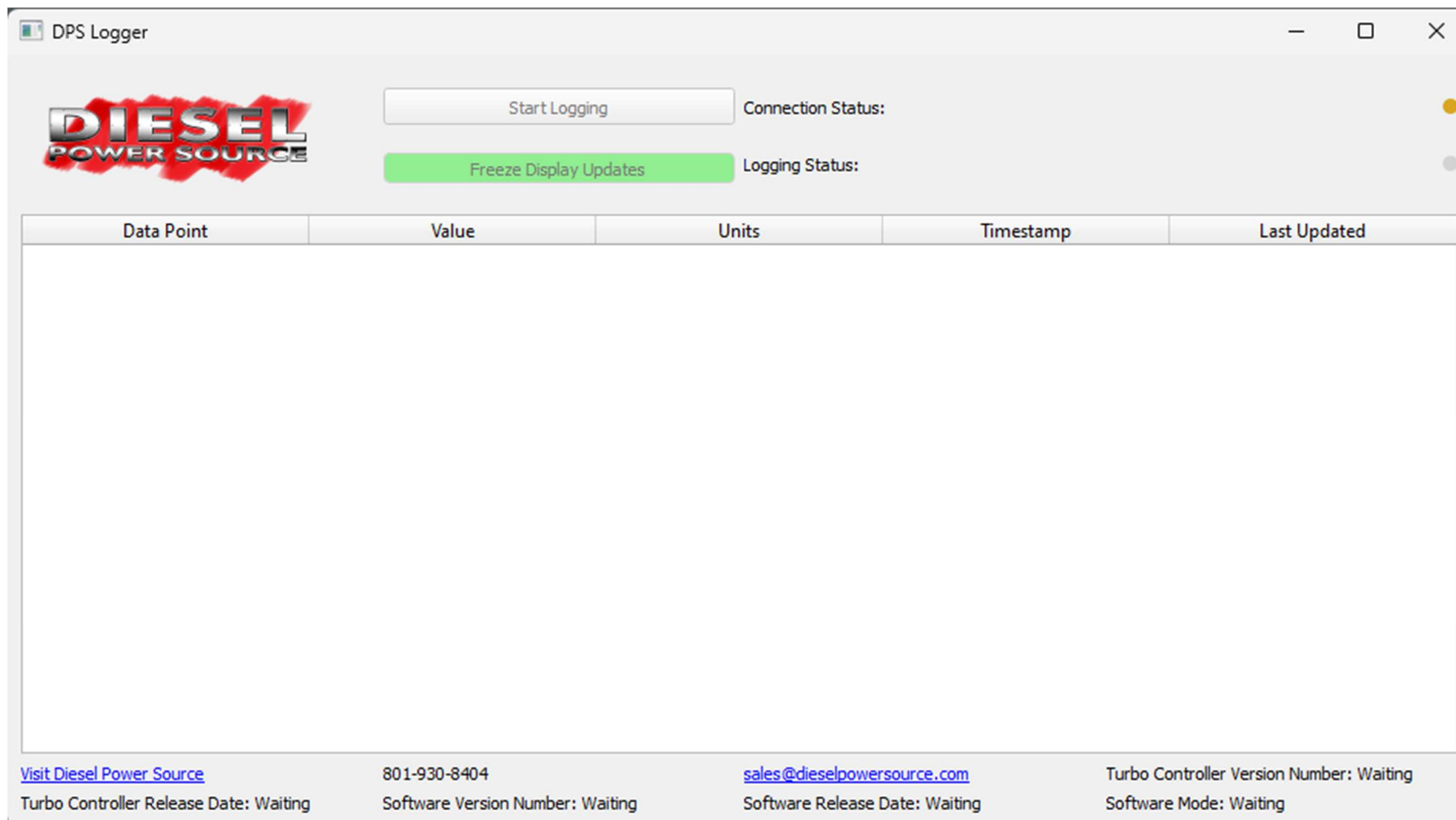
Step #5: Locate the DPS Logger application on your computer's desktop and open the application. When you open the application for the first time your computer may open a window saying, *"Windows protected your PC"*. If this window appears select *"More info"*, and then select *"Run anyway"*. At this time the data longer has been downloaded to your computer and it should appear on your computer screen.
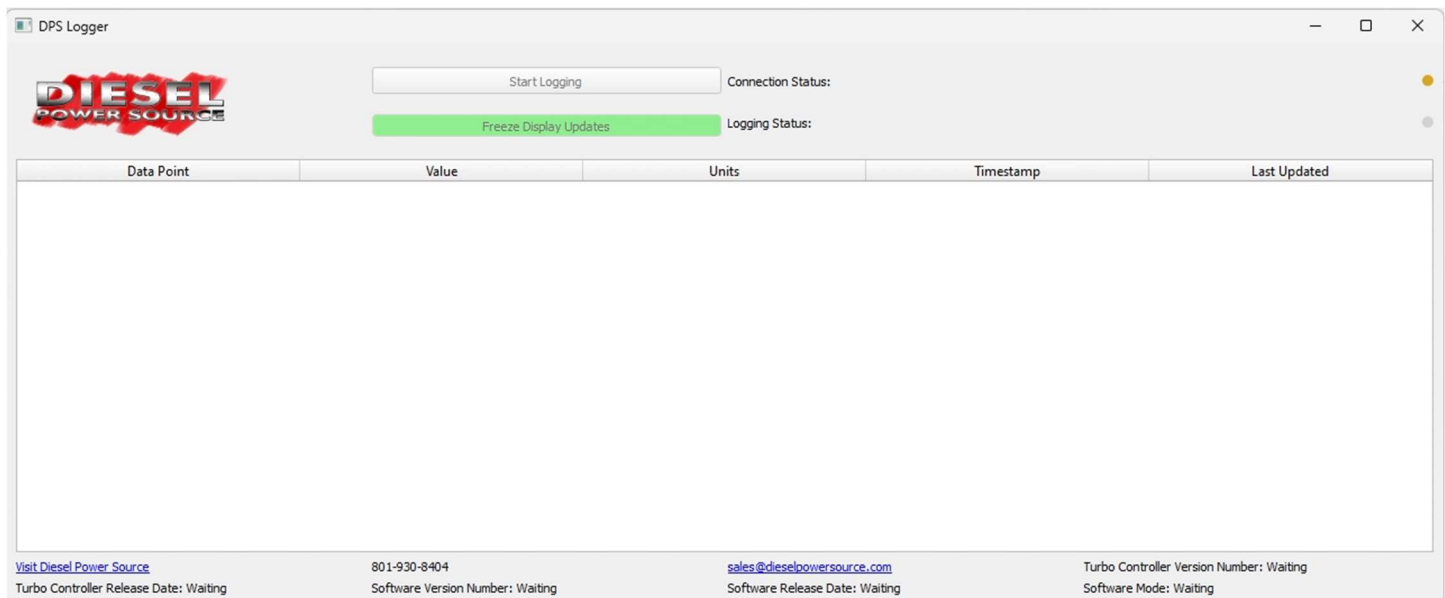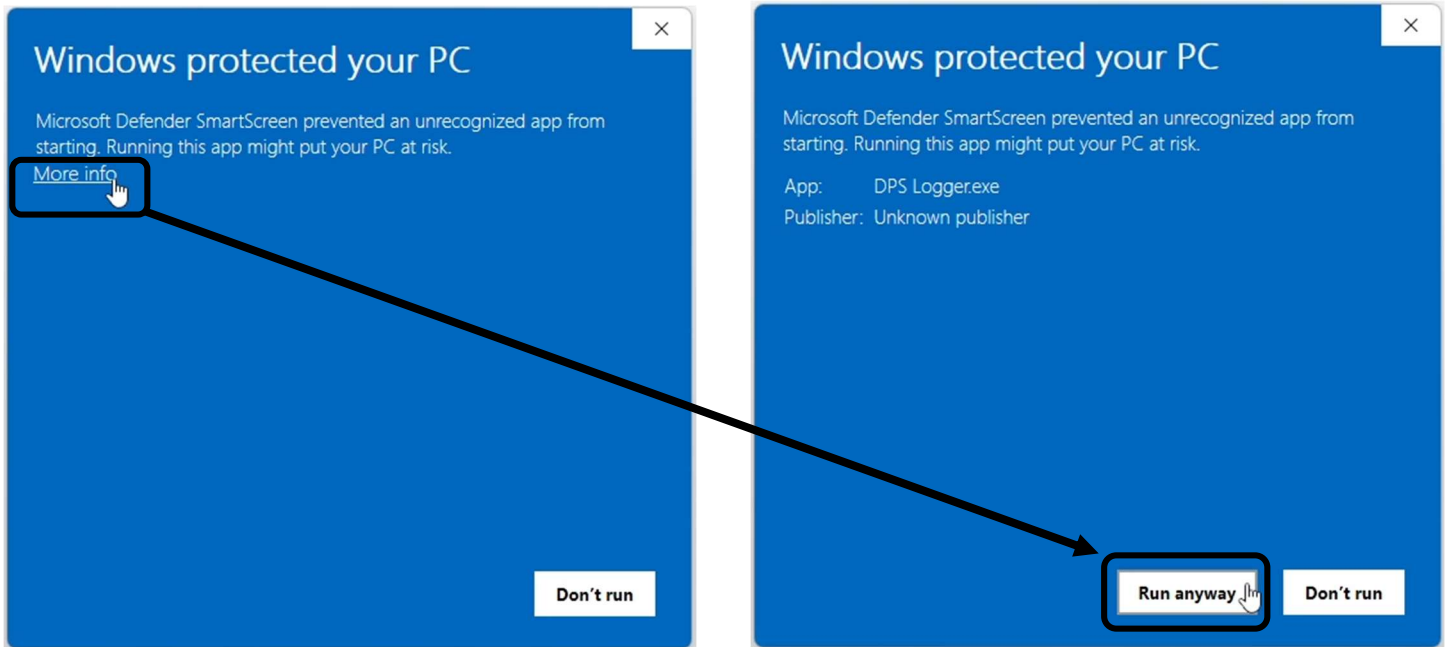
DPS Data Logger Users Guide:

The DPS data logger is used to capture and log live data from your Turbonator VGT electronic control unit. The data logger can be used as you are driving to monitor live data, while also logging the data to a .CSV file format for later inspection. If you suspect any problems with your electronic VGT turbo Diesel Power Source requires a copy of any data logs that were recorded while the problem was present. This will allow our team to quickly and easily diagnose the problem. Please follow the information below to become familiar with the DPS data logger.

- To open and start viewing live data through the DPS data logger you must follow the procedure. **1st:** Open the data logger by clicking on the desktop icon that you installed in the previous steps. The data logger will first appear in a minimized screen but can be expanded to fill your computer screen. **2nd:** Connect the wire harness USB cable to your computer. **3rd:** Turn your truck on. The data logger will automatically detect and connect to your electronic control unit and start displaying live data. (**WARNIN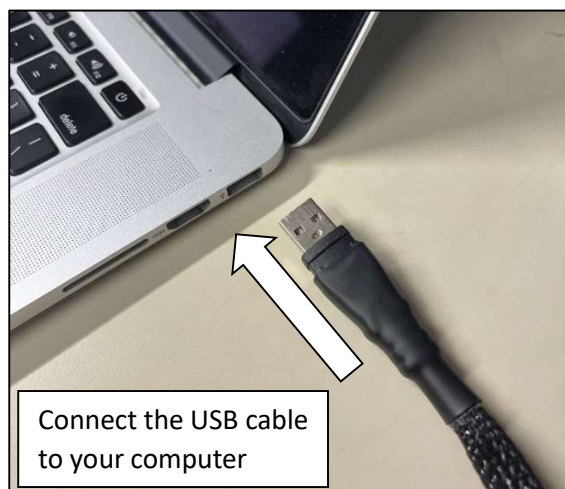G:** Never connect the USB cable to your computer or open the data logger while your truck is running. Doing so will reset your controller and throw codes. Always follow the procedure presented above when connecting, opening, and using the data logger.)

DPS Logger - Shortcut

Connect the USB cable to your computer

Turn your truck on
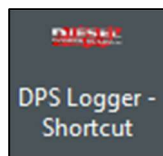
- Once your **truck is turned on** and the **USB cable is connected** the "*Connection Status:*" indicator at the top of the data logger will start blinking green meaning the electronic control unit is connected. If the data logger does not detect the electronic control unit, the connection status indicator will not blink and remain yellow.

Electronic Control Unit Connected = Blinking Green Indicator

Connection Status: ●

Electronic Control Unit Not Connected = Yellow Indicator

Connection Status: ●

- If the Connection Status indicator shows that your electronic control unit is connected live data will be displayed in the center of the screen and will be separated into the following columns: ***Data Point, Value, Units, Timestamp,*** and ***Last Update***. The image below shows how the live data will appear. (**Note:** Your controller may display different data points than what is pictured in the image below, the image is just a reference.)

	Data Point	Value	Units	Timestamp	Last Updated
1	Boost Pressure	0.01	PSI	2024-08-09 14:59:01	Just now
2	Exhaust Pressure	0.01	PSI	2024-08-09 14:59:01	Just now
3	Boost Voltage	0.00	V	2024-08-09 14:59:01	Just now
4	Exhaust Voltage	0.00	V	2024-08-09 14:59:01	Just now
5	HD1 Actuator Commanded Position	7.50	%	2024-08-09 14:59:01	Just now
6	HD1 Actuator Feedback	7.50	%	2024-08-09 14:59:01	Just now
7	HD1 Actuator Load	2	%	2024-08-09 14:59:01	Just now
8	Simulated Turbo Speed	18000	RPM	2024-08-09 14:59:01	Just now
9	Engine Brake	0.00	V	2024-08-09 14:59:01	Just now
10	Engine Brake State	OFF		2024-08-09 14:59:01	Just now
11	Starting Position	1		2024-08-09 14:59:01	Just now
12	Power Cycles	0		2024-08-09 14:59:01	Just now

- If you wish to freeze the live data being displayed you can select the green ***"Freeze Display Updates"*** button at the top of the screen. Once selected the live data will be frozen and the button will turn red and change to the ***"Unfreeze Display Updates"*** button. To start displaying the live data once again select the red ***"Unfreeze Display Updates"*** button.

Freeze Display Updates

Unfreeze Display Updates

- To start a data log, select the **"Start Logging"** button at the top of the screen. A window will appear where you will choose the file name and location where the data log will be saved on your computer. Once you select **"Save"** the data logger will start recording the live data into a .CSV file format. At this point the **"Logging Status:"** indicator will start blinking red meaning that you are currently recording a data log. To stop the data log, select the **"Stop Logging"** button at the top of the screen. A window will appear warning you that you are about to stop logging. It will also show you the file location of your recorded data log. If you want to stop logging, select **"OK."** Once you stop logging the **"Logging Status:"** indicator will stop blinking and won't display any color.

Start Logging

Logging Status: ●

Stop Logging

Logging Status: ○

Logging Stopped ✕

ℹ Logging has been stopped. Data saved to:
C:/Users/user/Downloads/Data Log.csv

OK
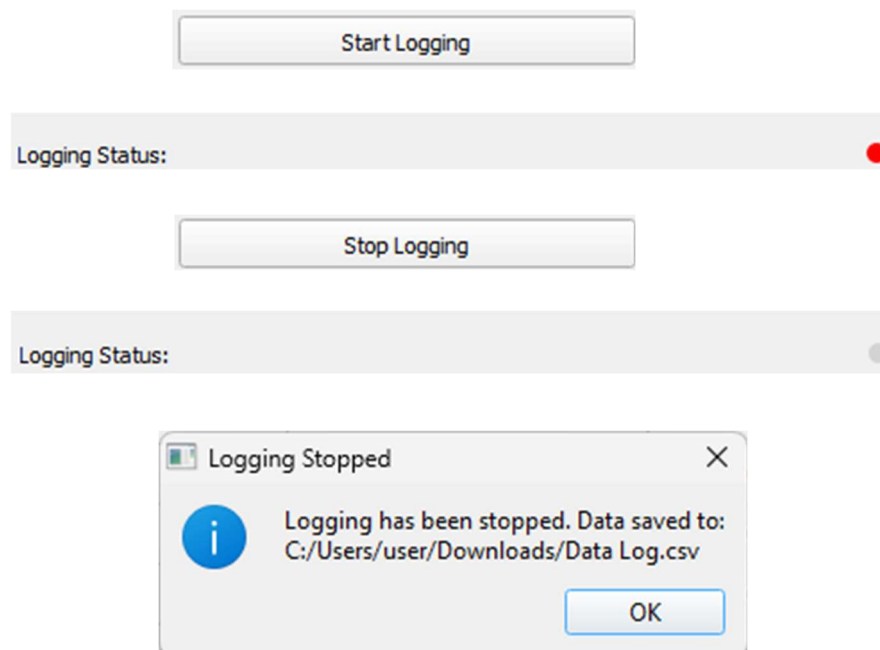
- At the bottom of the data logger there is a link to the Diesel Power Source website, phone number, and email address. These can be used to quickly contact our team if any issues arise during the logging process. You will also see your specific Turbo Controller Version Number, Turbo Controller Release Date, Software Version Number, Software Release Date, and Software Mode. This information can be used to help identify what electronic control unit and software you received with your order.

| Visit Diesel Power Source | 801-930-8404 | sales@dieselpowersource.com | Turbo Controller Version Number: Waiting |
| Turbo Controller Release Date: Waiting | Software Version Number: Waiting | Software Release Date: Waiting | Software Mode: Waiting |

Starting Position Dial Test:

The starting position dial that is mounted in the cab of your truck allows you to make changes to the performance of your Turbonator® VGT housing while driving. You have 11 dial positions to choose from. Each dial position changes the starting position (VGT vane location with no pressure readings) and operation (how the VGT vanes open with pressure readings). As you increase the dial position you will increase the starting position of the VGT vanes. Also increasing the dial position increases how quickly the vanes open during normal operation. You the driver get to determine which starting position is best for your specific set up and driving style.

Step #1: 1st: Open the DPS data logger application. **2nd:** connect the USB to your computer. **3rd:** turn your truck power on. (**WARNING:** Never connect the USB cable to your computer or open the data logger while your truck is running. Doing so will reset your controller and throw codes. Always follow the procedure presented above when connecting, opening, and using the data logger.)

DPS Logger - Shortcut

Connect the USB cable to your computer

Turn your truck on
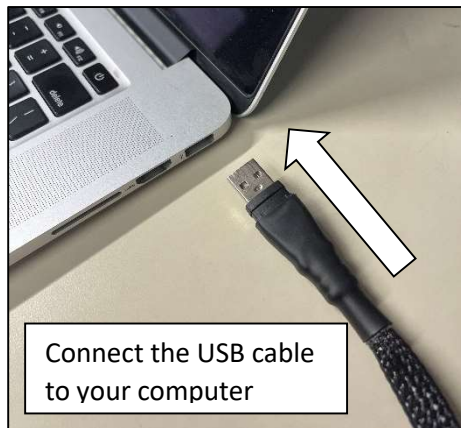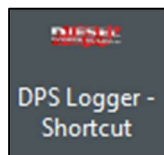
Step #2: Locate the *"Starting Position"* variable within the data logger. This variable displays the state of the starting position dial located in the cab of your truck. Test that this variable changes from 1 to 11 as you change the position of the dial.
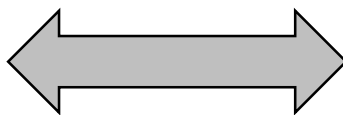
Starting Position	1

Starting Position	11

Step #3: Locate the *"HD1 Actuator Commanded Position"* variable within the data logger. *"HD1 Actuator Commanded Position"* shows the % open position being commanded to the actuator by the electronic control unit. Test that this variable increases in value as you increase the position of the dial. (**Note:** The commanded actuator positions shown below might be different for your application and are just for reference.)
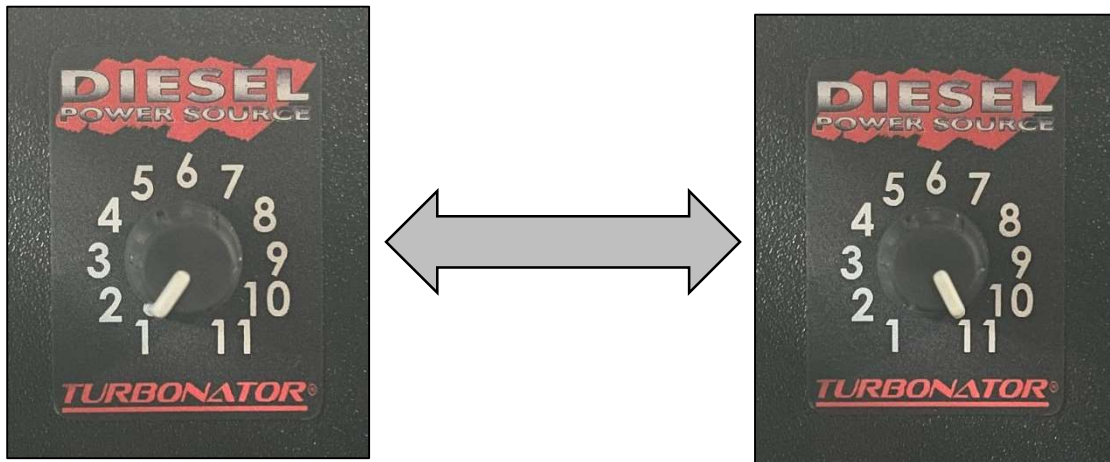
HD1 Actuator Commanded Position	7.50	%

HD1 Actuator Commanded Position	37.50	%

Step #4: Now that you have tested your starting position dial with the data logger. Take your truck for a test drive, during the test drive try accelerating from a stopped position while changing the starting position between runs. This will help you to determine which dial position gives your truck the best spool up. Next take your truck on the highway and test different dial positions. You might use a different dial position depending on the type of driving you're doing.

Step #5: If the starting position dial isn't behaving as described above. Send us a data log of the issue so our team can diagnose the problem and resolve the issue.

Engine Brake Test:

The Diesel Power Source electronic control unit uses your truck's existing signals to engage engine braking within the Turbonator® VGT housing. This means you can use your truck's existing controls for engine braking 1, 2, and 3 to control the Turbonator® VGT housing without the need for an external switch.

Step #1: 1st: Open the DPS data logger application. **2nd:** connect the USB to your computer. **3rd:** turn your truck power on. (**WARNING:** Never connect the USB cable to your computer or open the data logger while your truck is running. Doing so will reset your controller and throw codes. Always follow the procedure presented above when connecting, opening, and using the data logger.)

Connect the USB cable to your computer

Turn your truck on
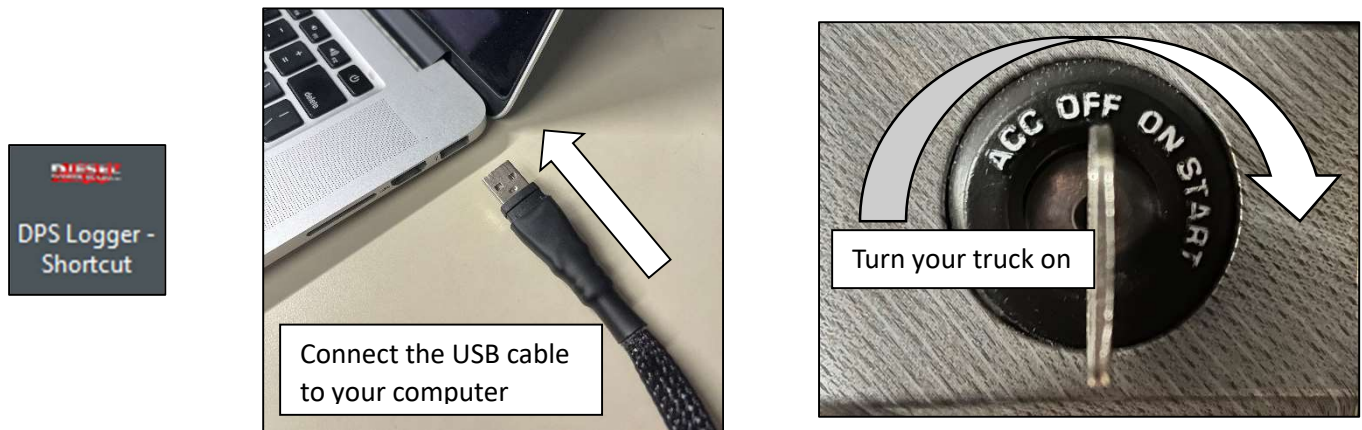
Step #2: Locate the *"Engine Brake Voltage"* and *"Engine Brake State"* variables within the data logger. The *"Engine Brake Voltage"* shows the engine brake solenoid #1 voltage as seen by the electronic control unit. The *"Engine Brake State"* shows whether the engine brake is turned on or off.

Step #3: Take your truck for a test drive on a route where you regularly use engine braking. During your test drive start with your engine brake turned off and watch the data logger. The *"Engine Brake Voltage"* variable should be *"0.00V"* and the *"Engine Brake State"* should display *"OFF."* When you are ready to test engine braking turn on your truck's engine brake switch. When your truck commands the engine brake the *"Engine Brake Voltage"* variable should read a value close to *"12.00V"* and the *"Engine Brake State"* should display *"ON".* At this point the VGT housing is performing its engine braking sequence.

Engine Brake Voltage	0.00	V
Engine Brake State	OFF	

Engine Brake Voltage	11.90	V
Engine Brake State	ON	

Step #4: If engine braking isn't behaving as described above. Send us a data log of the issue so our team can diagnose the problem and resolve the issue.