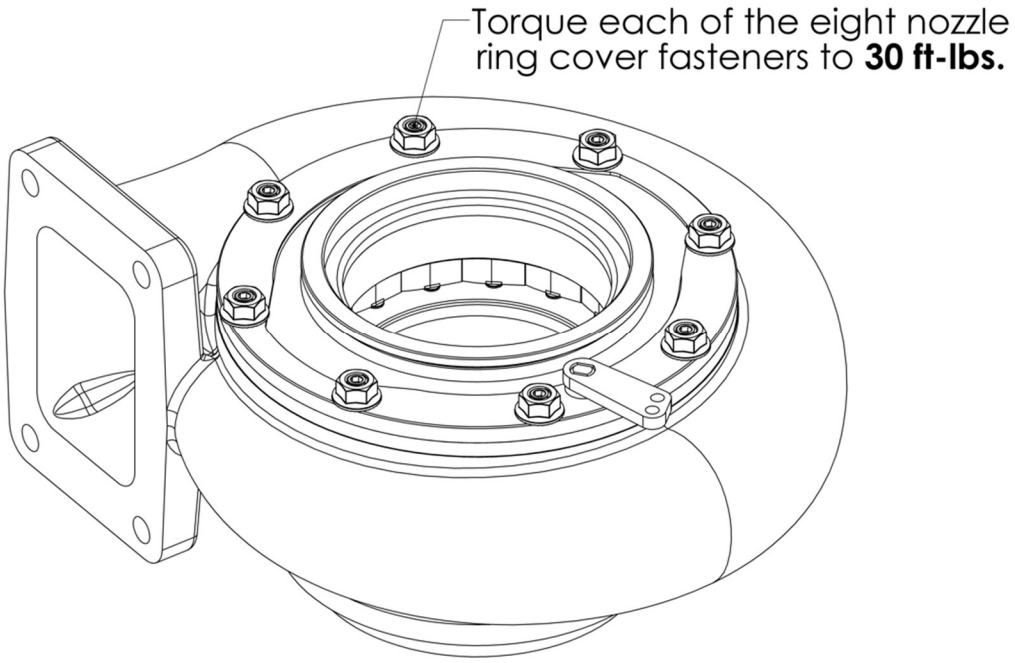
CAT Turbonator® INT Installation Instructions

Warning

If the fasteners on the Nozzle Ring Cover are removed or loosened for any reason during installation they **must be torqued to exactly 30 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 **30 ft-lbs** when reinstalled. Failing to do so will void the warranty and could result in turbo damage during operation.

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 **30 ft-lbs** at each maintenance mileage point is recommended.



*IMPORTANT *

- **DO NOT CLOCK OR LOOSEN ACTUATOR, IT HAS BEEN CLOCKED AND PRE-CALIBRATED FOR YOUR SPECIFIC APPLICATION. DOING SO WILL MAKE YOUR VEHICLE RUN POORLY!**

- **PNEUMATIC SOLENOID AND AIR REGULATOR MUST NOT BE PLACED ON TOP OF OR ABOVE THE TURBO OR EXHAUST MANIFOLD! HEAT RISES AND CAN RUIN THE SOLENOID ASSEMBLY!**

- **ALL FITTINGS AND PLUGS LOCATED ON THE HYBRID ACTUATOR AND 3-STAGE ACTUATOR NEED TO BE AIRTIGHT. IF LEAKS ARE PRESENT HOT EXHAUST GAS CAN FLOW THROUGH THE SYSTEM AND DAMAGE THE ACTUATOR.**

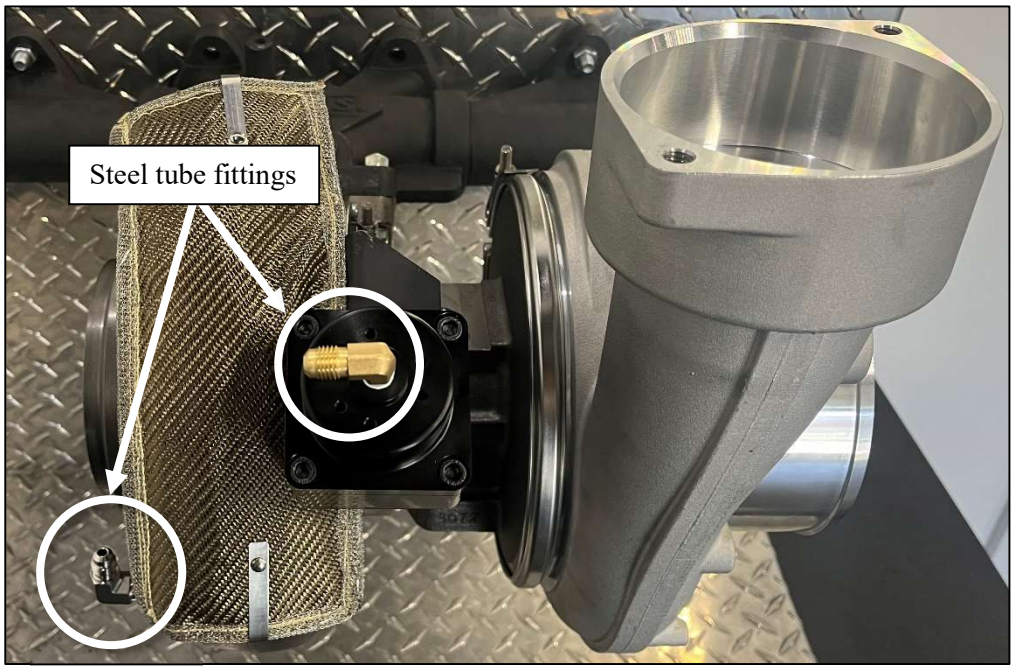
- **THE MAX BRAKING SYSTEM USES EXISTING ON-BOARD AIR PRESSURE OF 100-150 PSI.**

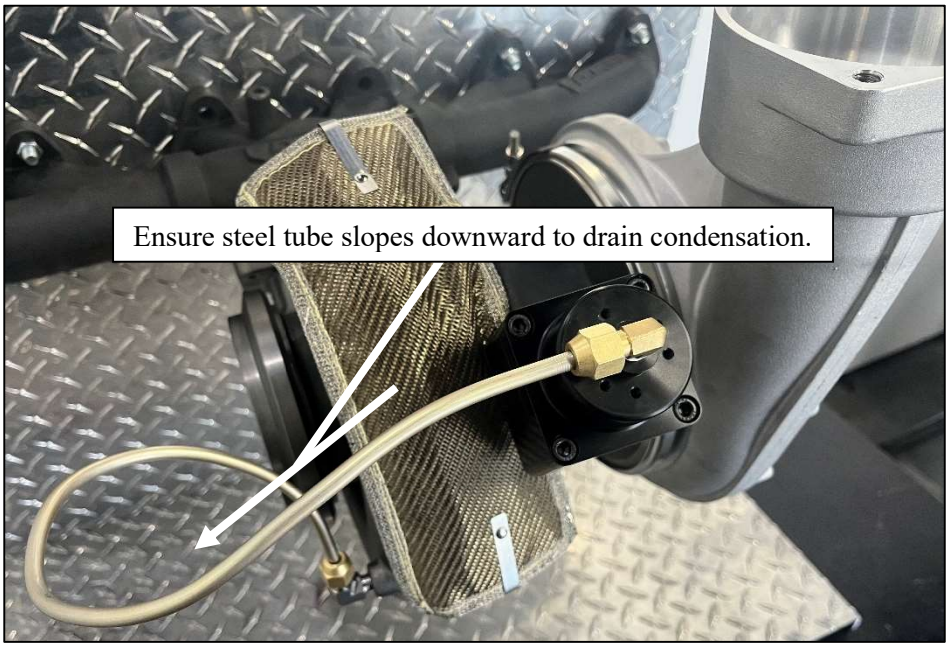
Table of Contents

Standard Braking Pneumatic Installation Instructions

Before installing the pneumatic system, the Turbonator INT turbo needs to be installed on your semi.

Step #1: Attach the included steel tube to the fitting located at the top of the 3-stage actuator. Bend the tube and attach it to the fitting located on the Turbonator INT housing. Ensure the steel tube slopes downward from the actuator to the turbine housing. Condensation can occur in the tube, and it must be routed downward to drain the water away from the actuator. (**Important:** Do not cut or shorten the length of the steel tube. Install it with the length received.)

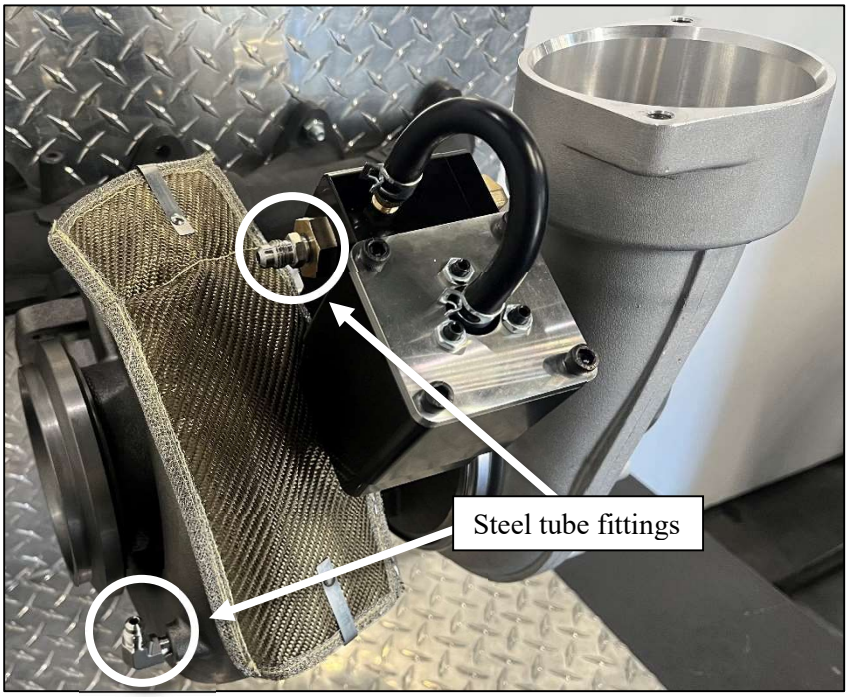




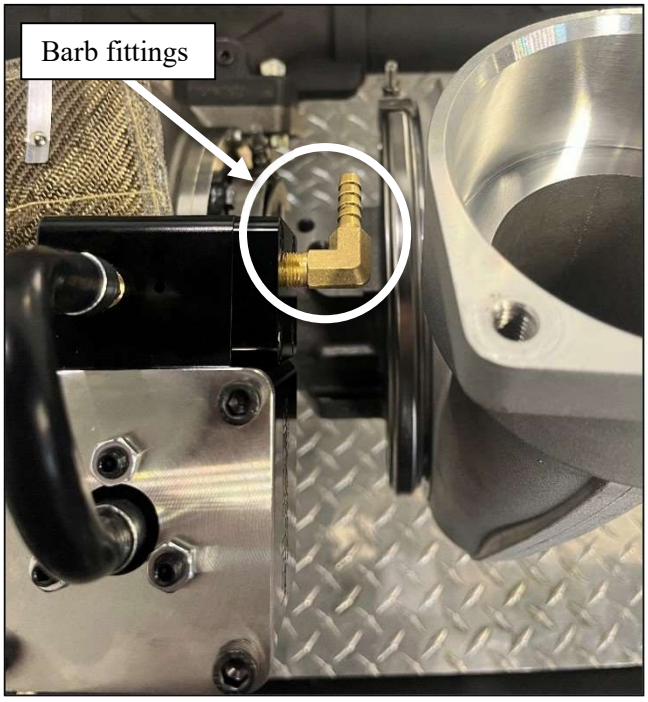
Max Braking Pneumatic Installation Instructions

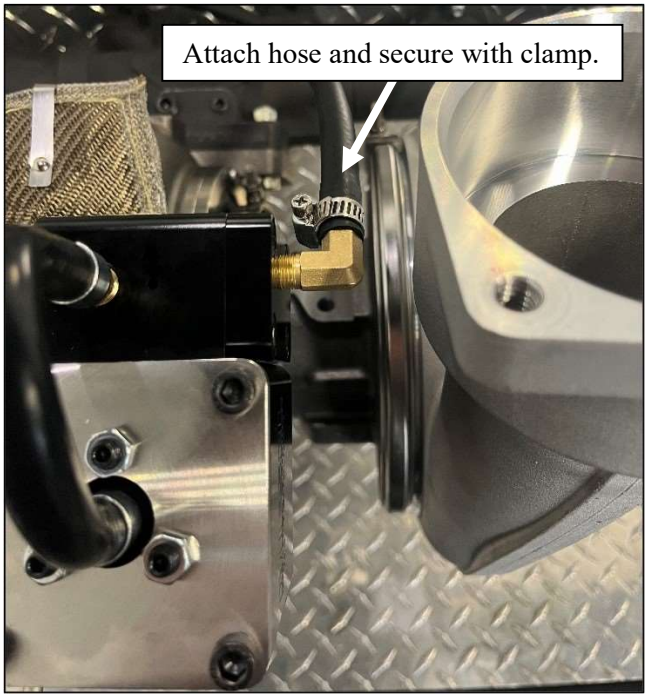
Before installing the pneumatic system, the Turbonator INT turbo needs to be installed on your semi.

Step #1: Attach the steel tube to the fitting located on the back side of the hybrid actuator. Bend the tube and attach it to the fitting located on the Turbonator INT housing. Ensure the steel tubing slopes downward from the actuator to the turbine housing. Condensation can occur in the tube, and it must be routed downward to drain the water away from the actuator. (**Important:** Do not cut or shorten the length of the steel tube. Install it with the length received.)

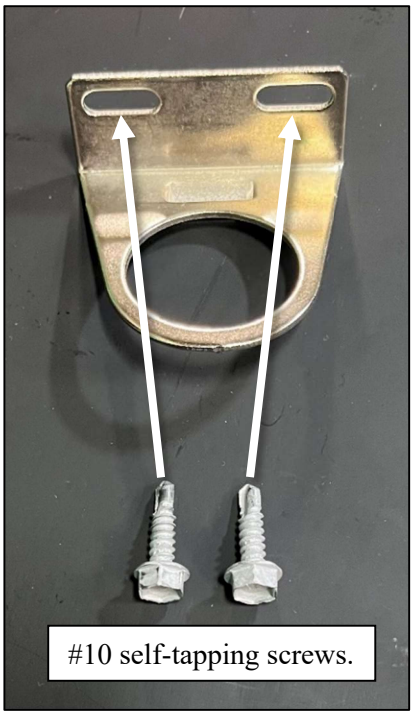


Step #2: Attach the 10-foot segment of the included hose to the barb fitting located on the front side of the hybrid actuator. Use one of the clamps to tighten the hose to the fitting.

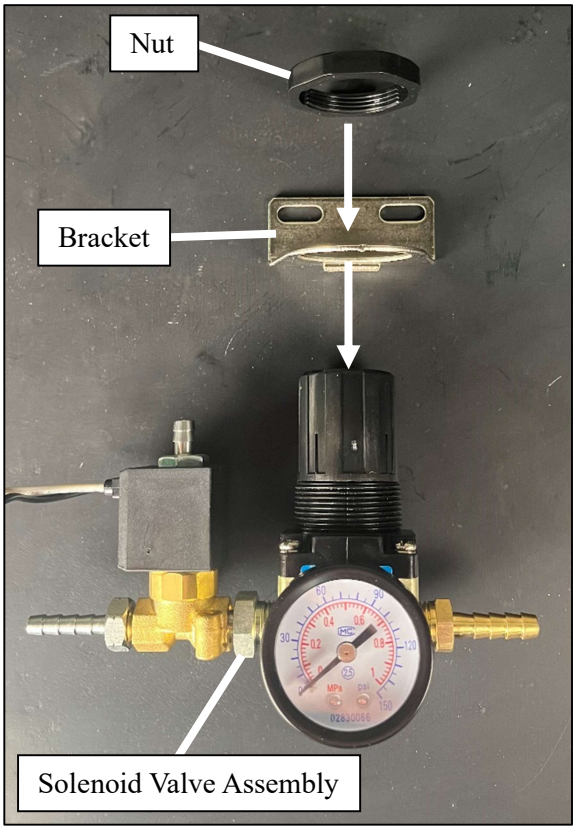


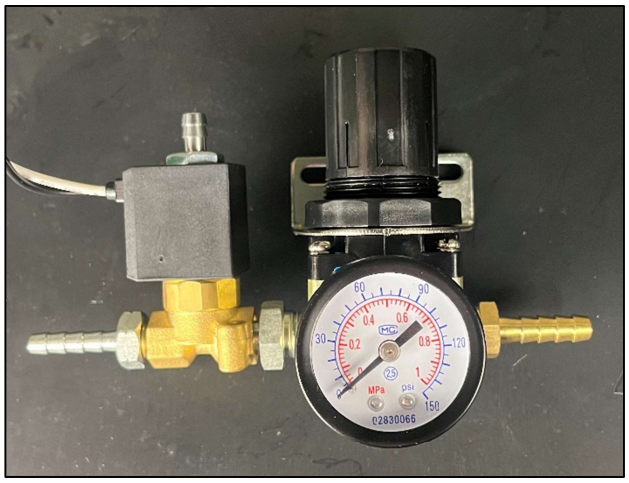


Step #3: Fasten the solenoid valve / regulator assembly bracket to the frame of the truck using the #10 self-tapping screws. Before you fasten the bracket to the frame. Ensure the previously installed 10-foot length of hose can reach the desired location of the bracket and ensure the bracket is within 3 feet of a port that can supply compressed air. Do not mount the bracket near the Turbonator housing or exhaust manifold, excess heat can ruin the solenoid valve.

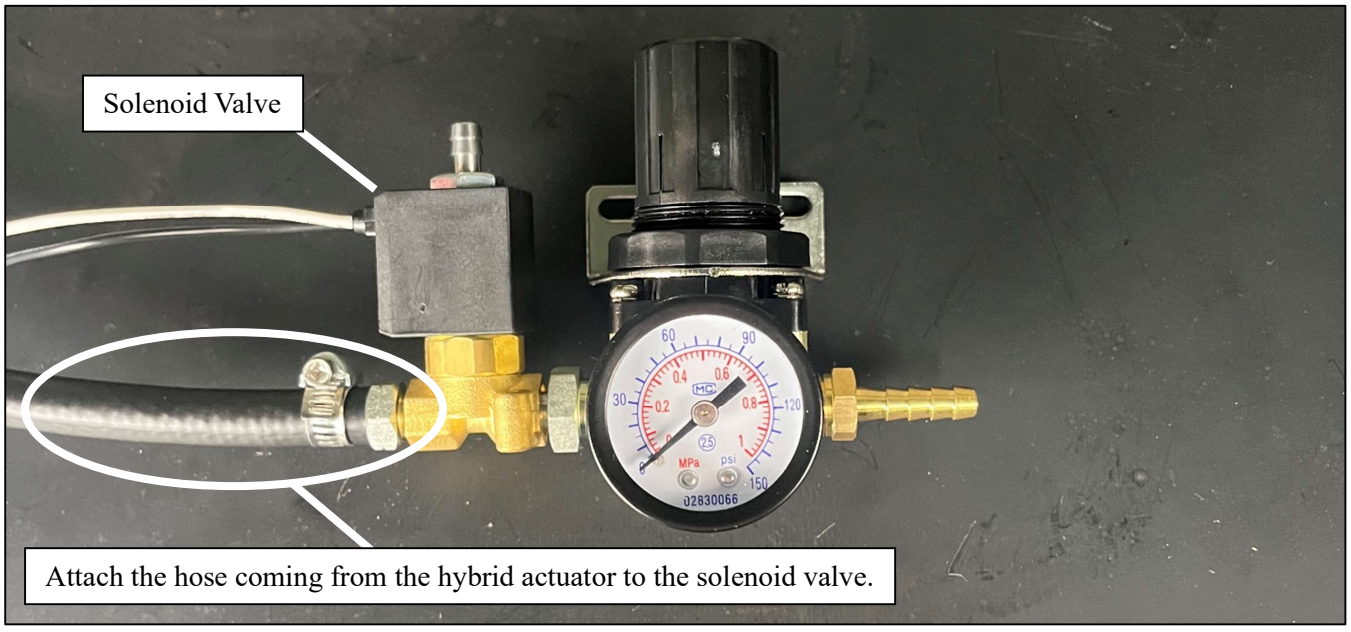


Step #4: Attach the solenoid valve / regulator assembly to the previously installed bracket. Use the nut that is threaded to the knob of the regulator to fasten the assembly to the bracket.



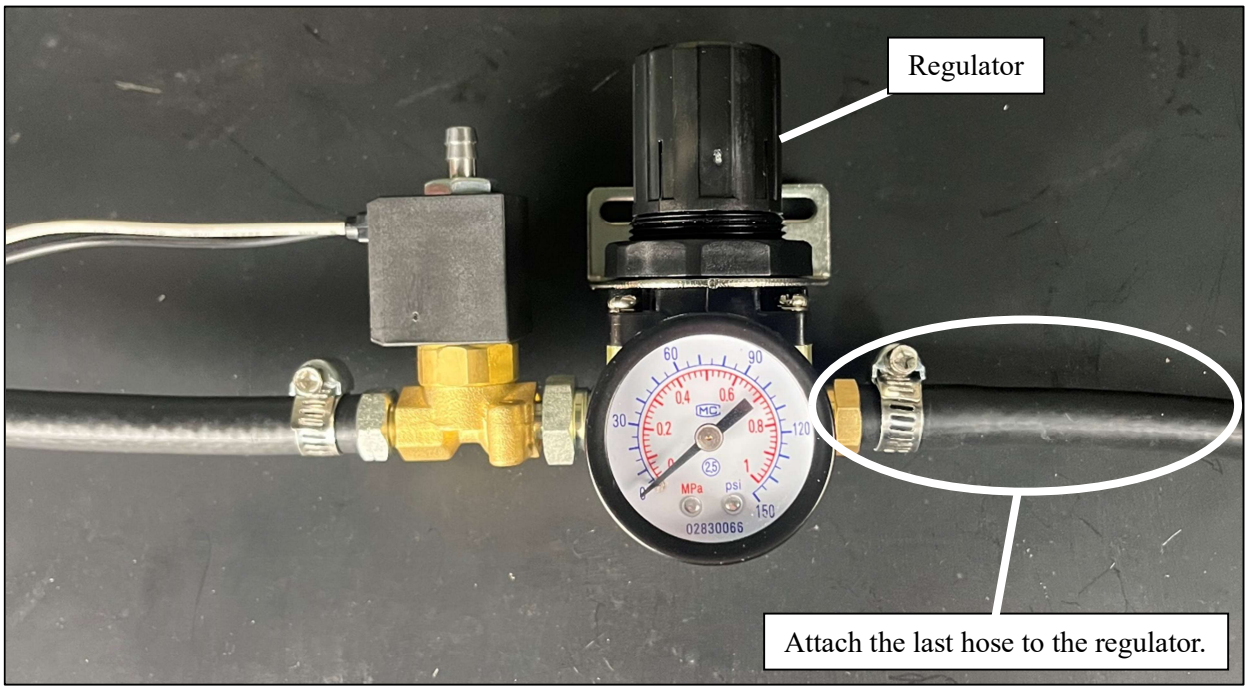


Step #5: Attach the other side of the 10-foot hose that was previously installed to the hybrid actuator to the barb fitting connected to the solenoid valve. Use one of the clamps to tighten the hose to the fitting.

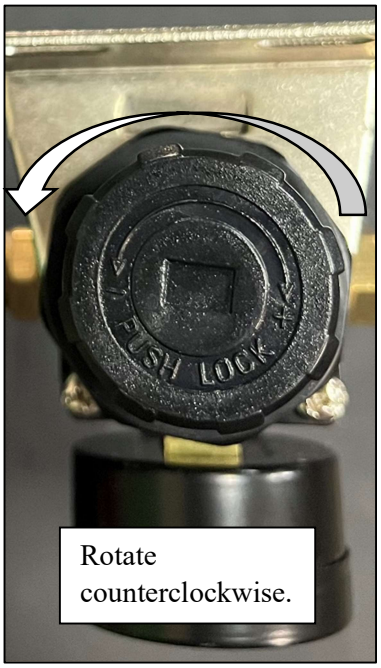


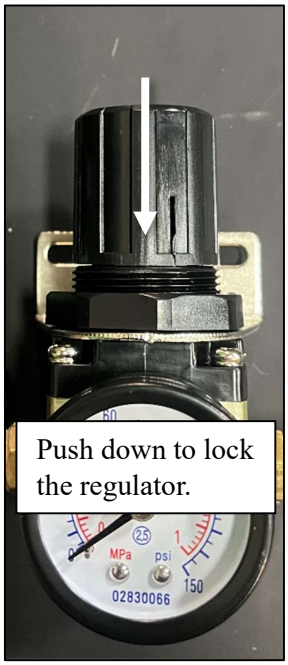
Step #6: Turn off your onboard air compressor and drain the air tank.

Step #7: Attach the remaining 3-foot segment of the included hose to the barb fitting connected to the regulator and route it to a port that supplies compressed air. Use the remaining clamps to tighten the hose to your air supply and regulator.



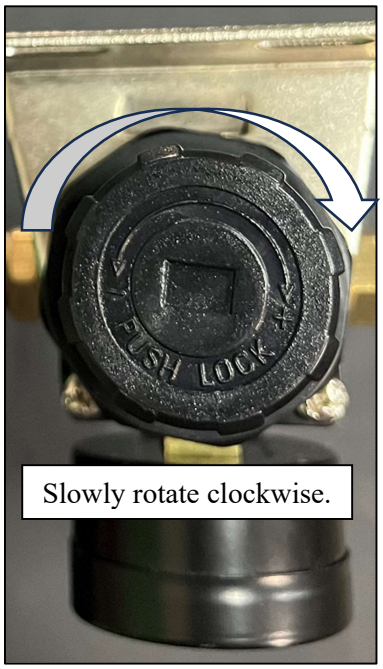
Step #8: Unlock the regulator by pulling up on the knob. Turn the knob counterclockwise until it stops rotating and lock the regulator by pushing down on the knob. This will help to set the regulator in later steps.

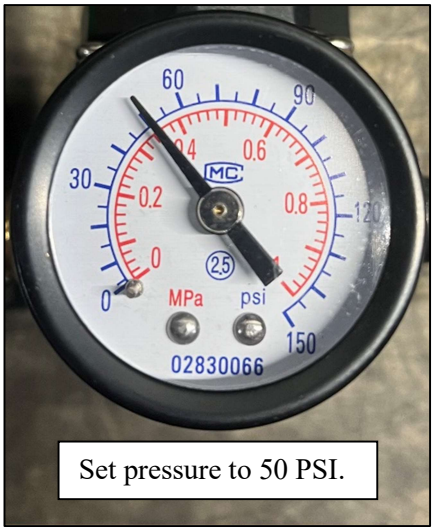


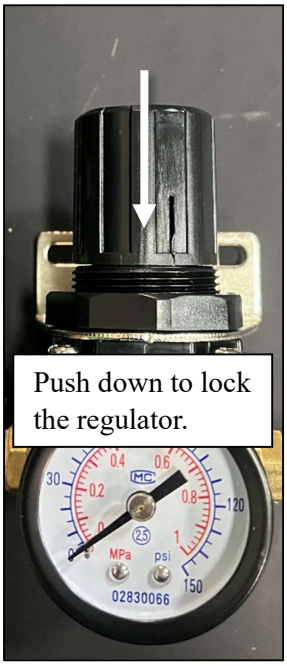


Step #9: Turn on your onboard compressor and let it run until the onboard air tank is filled.

Step #10: Set the regulator pressure. Unlocking the regulator by pulling up on the knob. Turn the knob clockwise slowly until the gauge reads 50 PSI. Once the pressure is set lock the regulator by pushing down on the knob. If the regulator is set to below 40 PSI, the exhaust brake will not actuate properly. If the regulator is set to above 60 PSI, the actuator can be damaged.

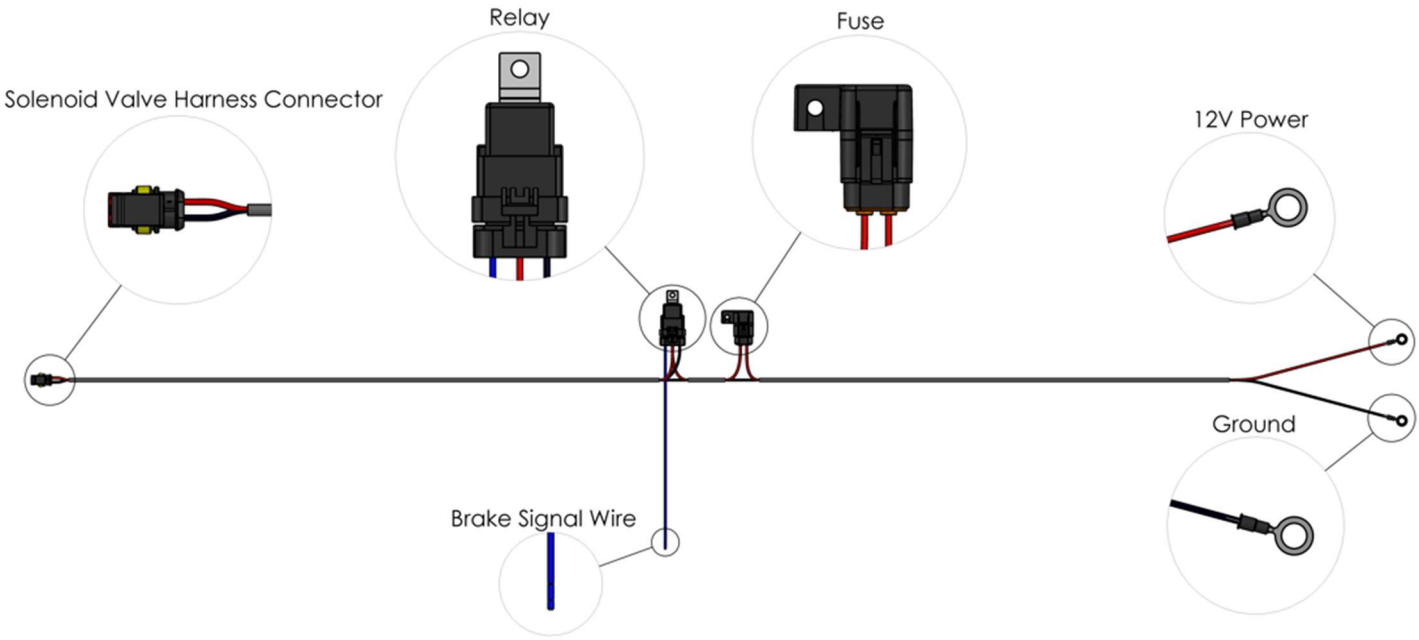




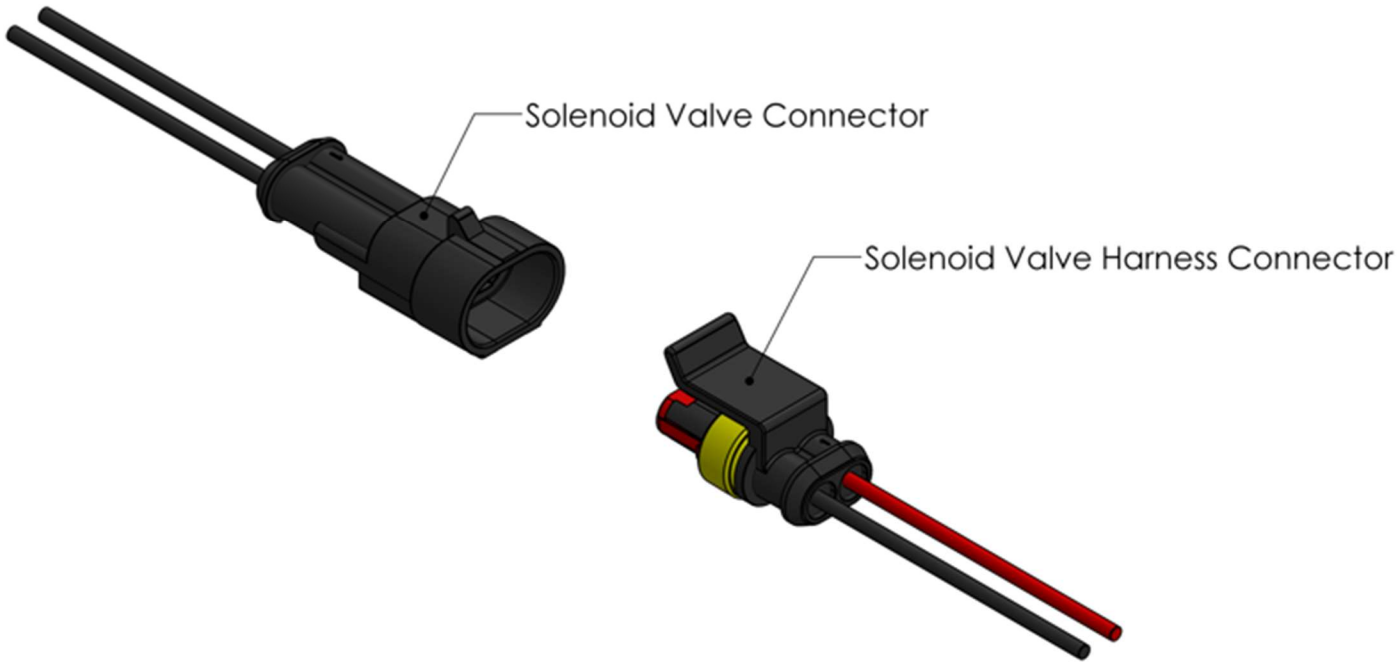


Step #11: Ensure the pneumatic hose is positioned away from any hot surfaces such as the exhaust manifold or Turbonator housing. Direct exposure to hot surfaces could cause a leak in the hose. Use zip ties to secure loose hose.

Max Braking Wire Harness Installation Instructions



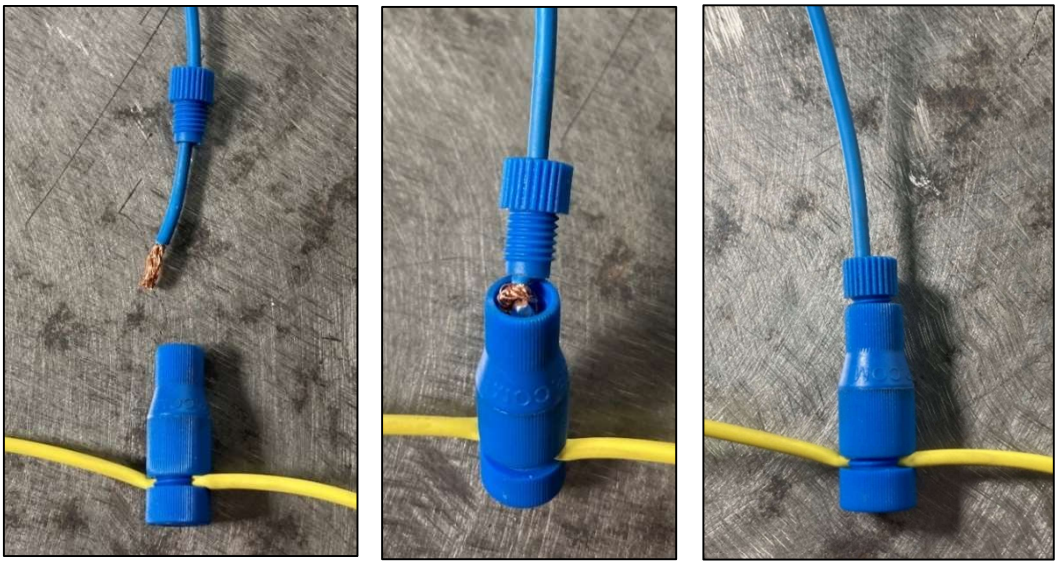
Step #1: Connect the solenoid valve harness connector to the electrical connector attached to the previously installed solenoid valve assembly.



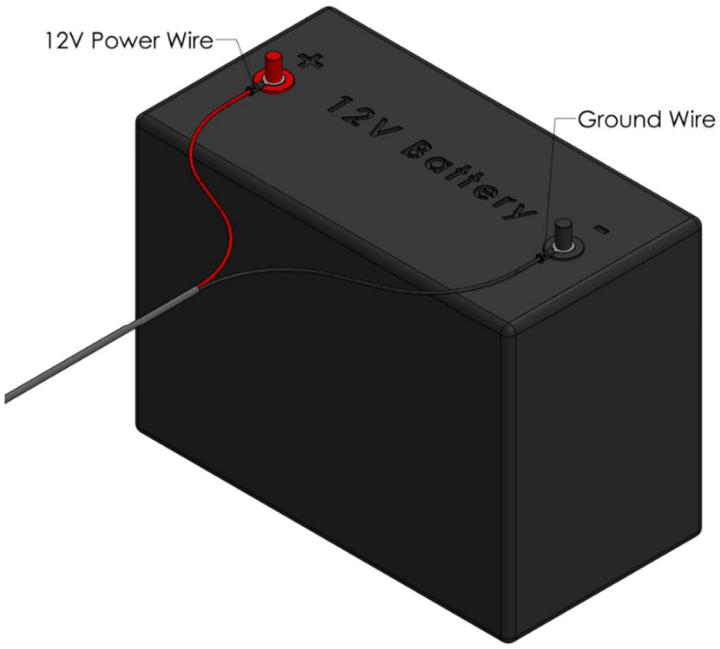
Step #2: Locate the stage 1 Jake brake 12V signal wire. This wire will be located on the drives side of the truck at the top of the engine block. There might be 2 to 3 wires supporting the Jake brake and its different stages, ensure you locate the wire associated with stage 1 of Jake braking. (**NOTE:** Ensure that the wire you tap produces +12V when the Jake brake is engaged.)

Step #3: Once the stage 1 Jake brake wire has been located tap it using the provided wiretap. Ensure the pointed tip of the wiretap pierces the wire to create a secure electrical connection.

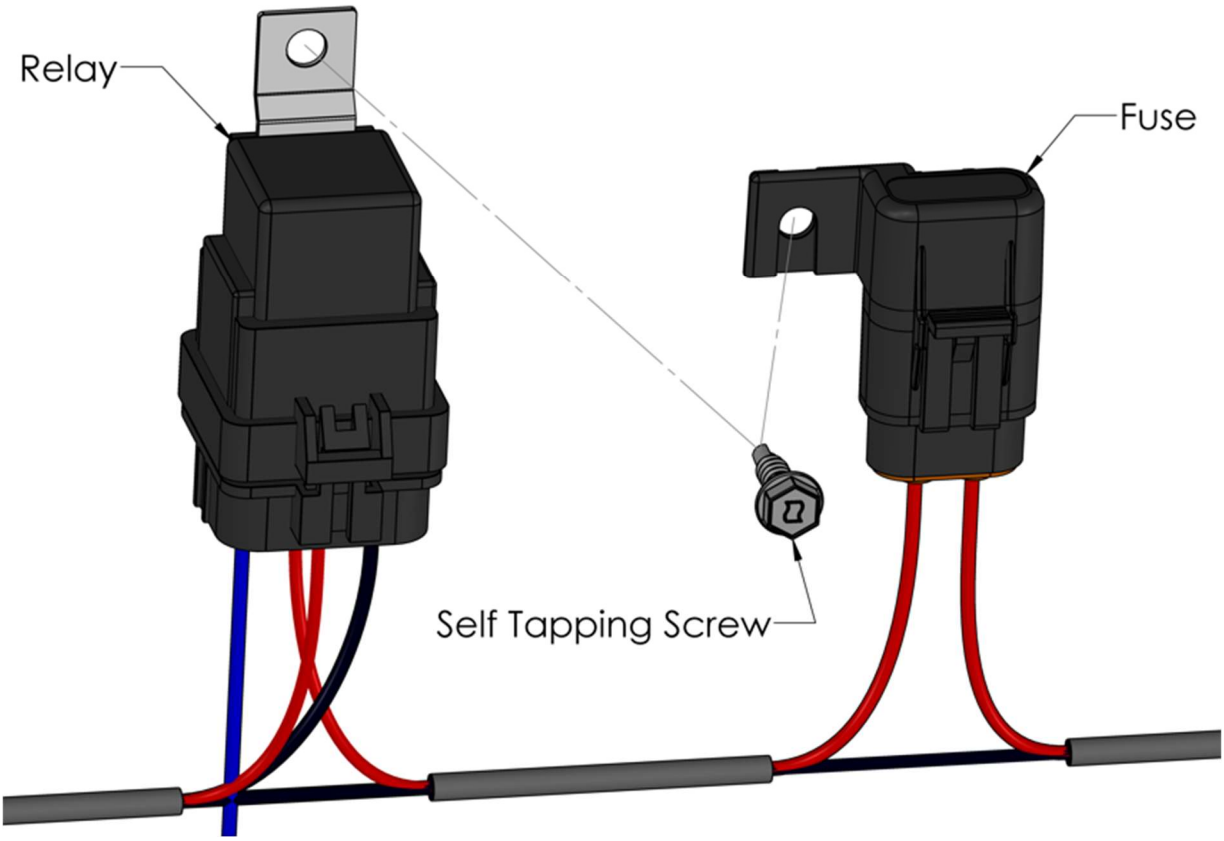
Step #4: Strip the blue brake signal wire. Remove the cap from the wiretap and push the brake signal wire through the cap. Place the stripped portion of the brake signal wire into the top of the wiretap. Finally screw the wiretap cap back on, ensuring the brake signal wire does not get pulled out in the process. Once you are done pull on the brake signal wire to ensure it does not separate from the wiretap.



Step #5: Route the 12V power and ground wires to the battery box. Connect the black battery ground wire to the negative battery ground post. Then connect the red battery 12V power wire to the positive battery power post. (**NOTE:** Ensure that you are connecting the 12V power and ground wires to a battery that supplies 12V by checking the battery posts with a multimeter. A battery that supplies less than 12V will not actuate the solenoid valve properly and a battery that supplies more than 12V might damage the solenoid valve.)



Step #6: Attach the wire harness relay and fuse to the semi firewall using the self-tapping screw provided in your kit. Position the relay and fuse near the top of the engine block.

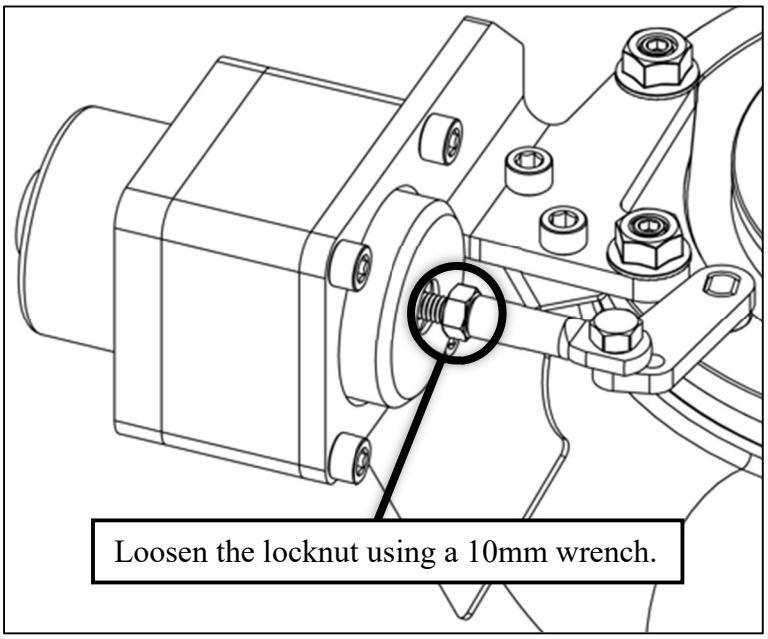


Step #7: Go through and secure all the wires with zip ties. Ensure none of the wires are in direct contact with hot surfaces or snag points.

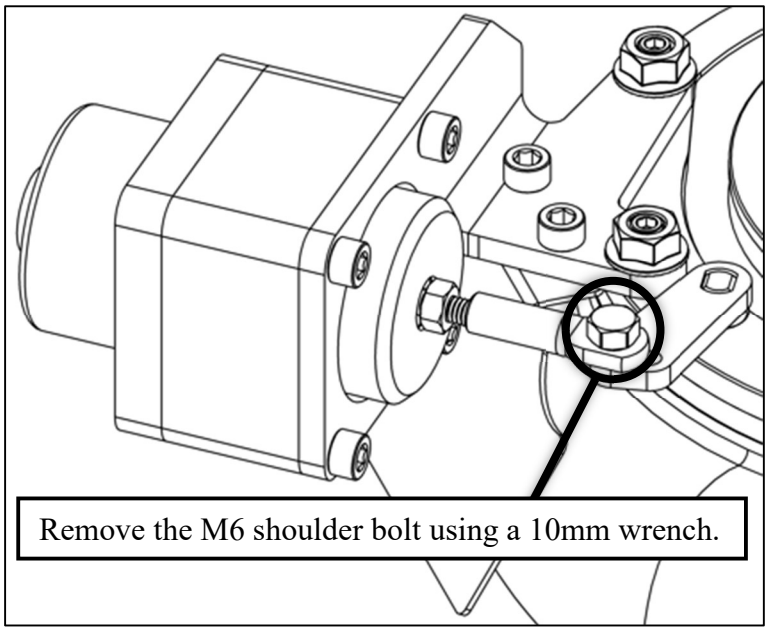
Starting Position Calibration Instructions

Your 3-stage and Hybrid actuator are pre-calibrated for your specific application based on testing done by Diesel Power Source. The following instructions show how to calibrate the actuator.

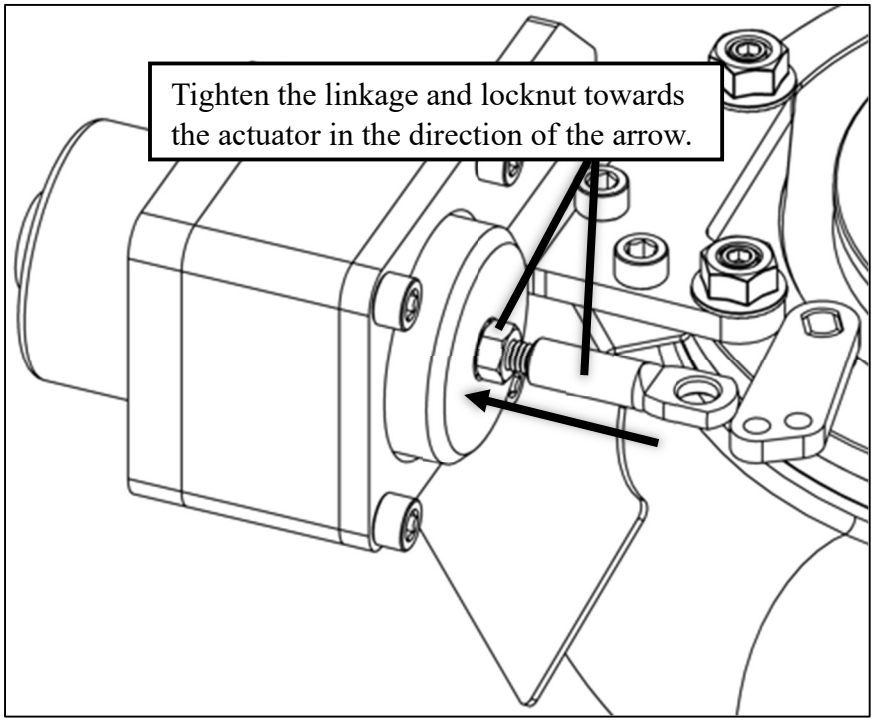
Step #1: Using a 10mm wrench, loosen the locknut that is fastened to the actuator linkage.



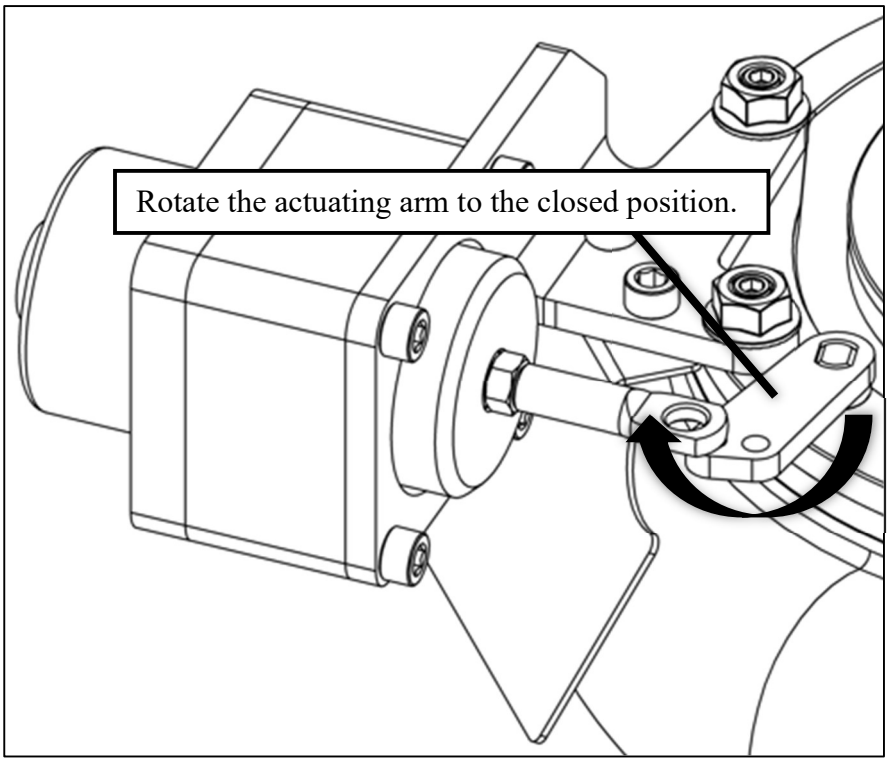
Step #2: Using a 10mm wrench, remove the M6 shoulder bolt fastening the actuator linkage to the actuating arm.



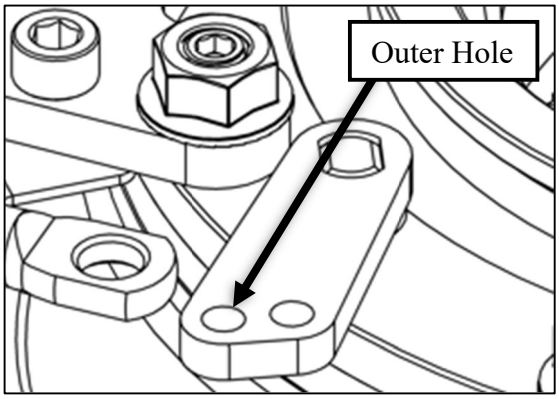
Step #3: Tighten the actuator linkage and locknut all the way towards the actuator.

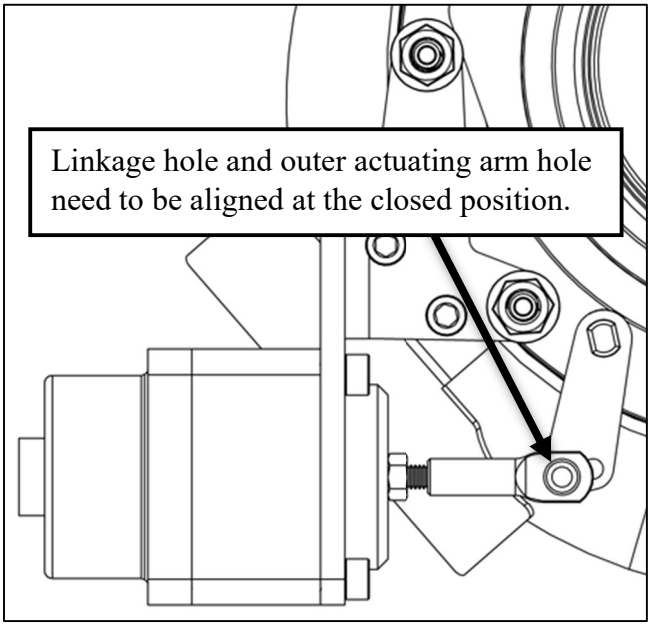


Step #4: Rotate the Turbonator INT actuating arm all the way to its closed position in the clockwise direction.

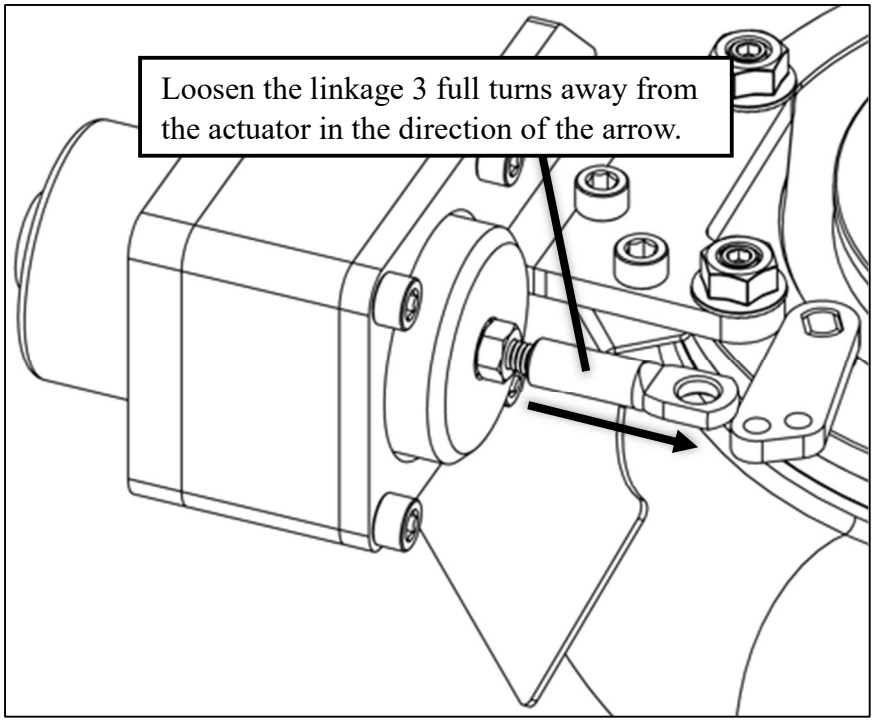


Step #5: With the actuating arm in the closed position, loosen the actuator linkage away from the actuator until the linkage hole aligns with the outer hole of the actuating arm.

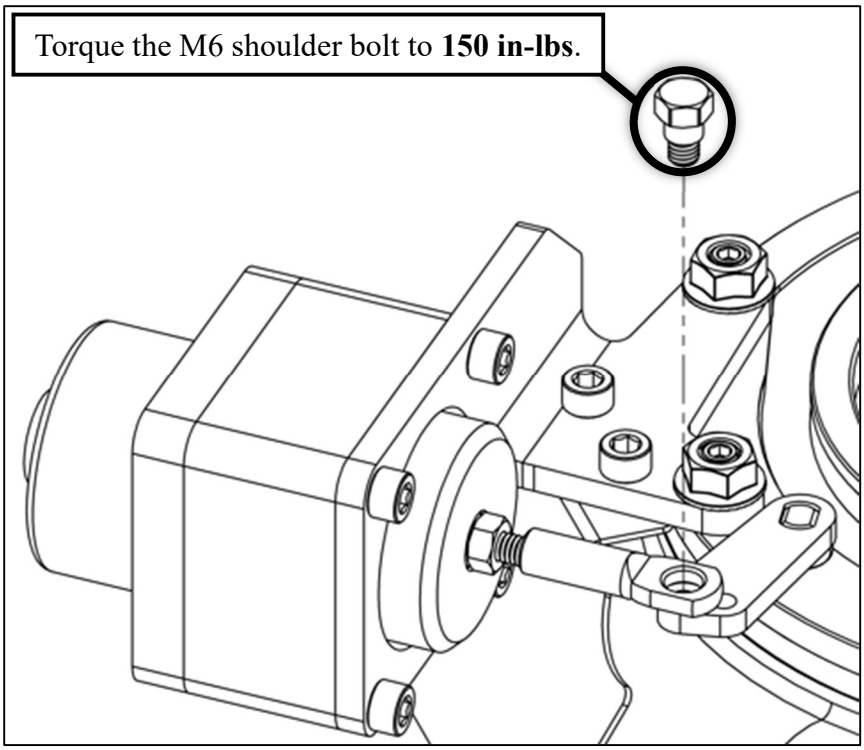




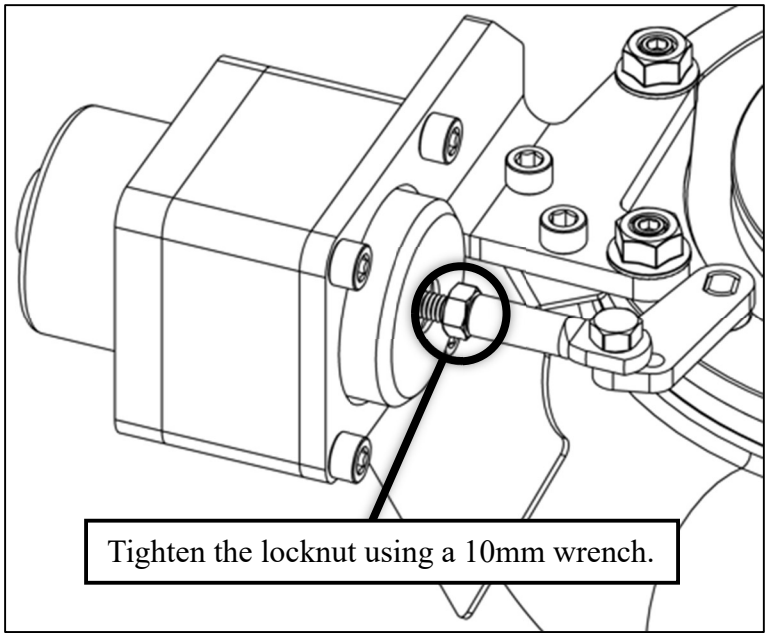
Step #6: Now rotate the actuating arm away from the actuator linkage in the counterclockwise direction. Loosen the linkage **3 full turns** away from the actuator. This will set the starting position of your Turbonator INT housing. Realign the linkage hole with the outer hole of the actuating arm.



Step #7: Thread the M6 shoulder bolt into the aligned holes. Once finger tight torque the M6 shoulder bolt to **150 in-lbs**. (**WARNING:** Do not over torque the shoulder bolt. Doing so will void the warranty and could result in turbo damage during operation.)



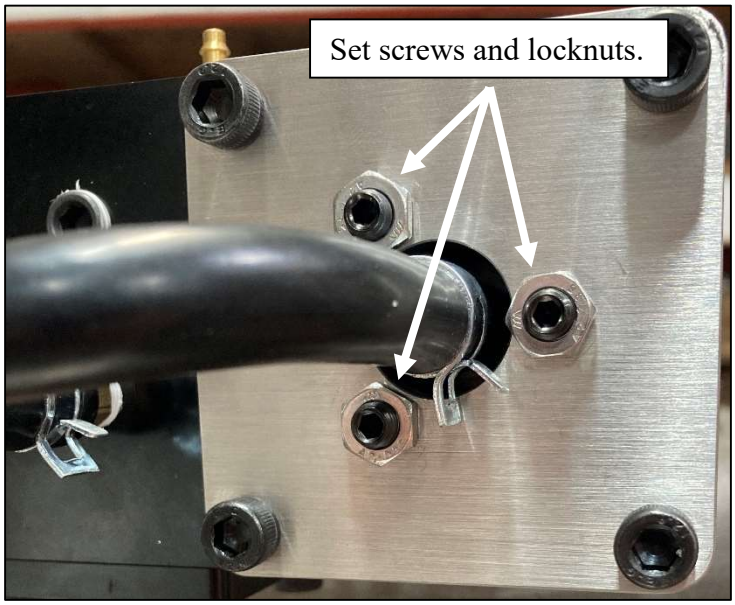
Step #8: Using a 10mm wrench tighten the locknut to the actuator linkage.



Step #9: Take the truck on a test drive to determine the performance of the spool up. The calibration can be adjusted by loosening the linkage away from the actuator. If the turbo isn't spooling fast enough, the linkage needs to be loosened away from the actuator. We recommend loosening the linkage a half turn at a time and test driving between each adjustment until the best spool up is achieved. A small change can make a big difference. You should never loosen the linkage more than 3 full turns after you have done the initial 3 full turn calibration in step #6.

Max Braking Calibration Instructions

Step #1: Located on the top of your hybrid actuator are 3 extended tip set screws with locknuts. These determine how far back the actuator is pulled back to optimize engine braking. With the jam nuts loosened, lightly thread the 3 set screws down into the actuator using a 3mm Allen key until they bottom out.



Step #2: Once the set screws have bottomed out, loosen each of the 3 set screws by one full turn. Then tighten their associated locknuts using a 10mm wrench while ensuring that the set screws do not rotate using a 3mm Allen key.

Step #3: Take the truck on a test drive to determine the performance of the engine braking. The calibration can be adjusted by loosening the 3 set screws. We recommend loosening the set screws a half turn at a time and test driving between each adjustment until the best engine braking is achieved. A small change can make a big difference. You should never loosen the set screws more than 2 full turns after you have done the initial 1 full turn calibration in step #2.