

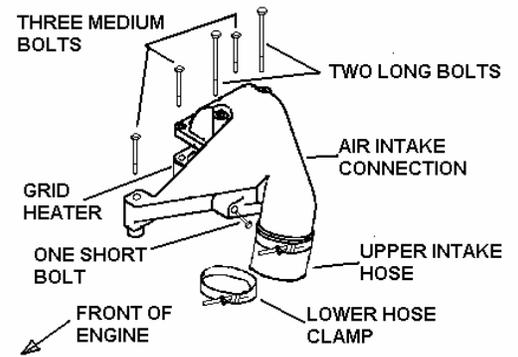
# TST POWER KIT INSTALLATION INSTRUCTIONS

Insure you have the tools/items listed below before disabling vehicle

## TST Power Kit

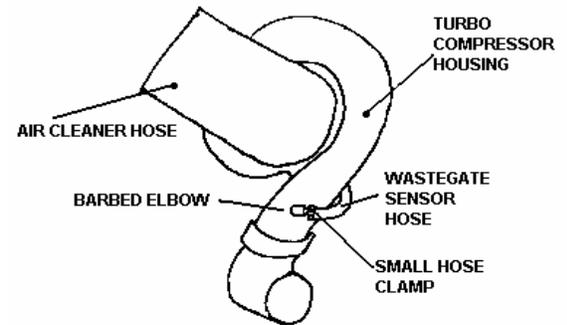
Fender covers to protect paint  
 7/16 inch deep barrel socket 3/8" drive with ratchet  
 10 mm six point socket, 3/8" drive with 3" extension  
 Tape or clean towels to cover openings  
 7 mm and 1/4 inch six point sockets, 1/4 drive with 3" extension  
 19mm socket, 3/8" drive or 1/2 drive  
 Center punch 8-10 inches long  
 Hammer to strike punch and hand impact tool  
 Hand impact tool, 3/8" or 1/2 drive  
 T15 & T20 TORX bits 1/4" drive with 1/4" extension 6" long  
 1/4 to 3/8" and or 1/2 adapter to hand impact tool  
 8mm 6point 1/4" drive socket  
 Large standard screw driver bit with 6" adapter for impact tool  
 Large screwdriver or small pry bar  
 Pliers  
 7/16 inch open end wrench  
 5/8 inch open end wrench  
 Torque wrench capable of at least 30 pound-feet  
 RTV silicon sealant  
 8 mm allen wrench

1. Park vehicle in a suitable work location, set parking brake, place automatic transmissions in park, manual transmissions in neutral, and open hood.
2. Disconnect both battery negative battery cables.
3. Clean engine if necessary to keep debris and foreign objects from entering engine
4. Place fender cover or protective covering to protect paint and batteries.
5. Using a 7/16 inch deep barrel socket, loosen lower clamp on upper intake connection hose and slide lower clamp off of hose and down the steel tube out of the way. (FIGURE 1)
6. Remove the six bolts holding the air intake connection and dipstick tube in place using a 10 mm 6 point socket. **NOTE:** Observe that these bolts are of different lengths so they can be installed in correct location during assembly. (FIGURE 1)
7. Remove intake manifold connection and hose as a unit, taking care not to damage gasket. This gasket can normally be reused however if it is torn, replace with a new gasket, Cummins part number 3913352. **NOTE:** Hold electrical grid heater in place while lifting the air connection so that the gasket joint under the grid heater is not disturbed.
8. Cover the air tube and manifold openings with tape or towels to keep foreign objects out.
9. Determine where your vehicle obtains its wastegate pressure signal. Some vehicles pick up this signal at an elbow on the front of the turbo as shown in FIGURE 2 while others get this signal at a tee connected to the rear of the injection pump as shown in FIGURES 3 & 4. If your vehicle is like FIGURE 2 proceed to step 11 below. If your vehicle gets the wastegate signal from the tee at the rear of the injection pump, loosen the hose clamps on the AFC housing to turbo wastegate tube air hose using a 7 mm socket. Disconnect the hose from the barbed fitting on the top of the fuel pump Air Fuel Control (AFC) housing. Slide the hose as far as possible onto the steel turbo wastegate tube.
10. Remove the barbed fitting from the AFC housing using a 7/16 inch deep barrel socket. **NOTE:** Save this fitting in case you want to convert your engine back to stock, this fitting is not used with the Power Kit.
11. Remove injection pump fuel supply tube banjo bolt using a 19 mm socket. **NOTE:** A few ounces of fuel will drain out which could wash the sealing washers away. Take care **NOT** to loose sealing washers as they are reused. If lost or damaged replace with Cummins part number 3918192. **NOTE:** The fuel supply tube is not removed, loosening it on the injection pump end allows access to get to the AFC housing screws. **OPTIONAL:** You can avoid removing the banjo bolt if you bend the fuel supply line slightly so as to make access to the break off screw. (See FIGURE 4) This option saves some time, eliminates breaking into the fuel line, and make engine restart more quickly.
12. Next remove front passenger side AFC housing break off screw. **NOTE:** This screw is a factory break off screw with rounded head and no screw driver, allen head or TORX slot. Use a hand impact tool with a 6 inch long 1/4" extension and a T15 TORX bit to remove this screw. A center punch may be required to start a hole in the center of this screw. Set the hand impact tool in the removal position (counter clockwise) and use light hammer taps on the impact tool to loosen this screw. Tap progressively harder on the impact tool until the screw loosens. This method of removal forms a TORX shape into the screw allowing it to be reinstalled later with the T15 TORX bit. In some cases the hole in the top of this screw is too large for the T15 bit thus use the T20 TORX bit. There is usually a lock washer and flat washer under each of these screws. **OPTIONAL:** A sharp chisel can be used to remove the break off screw by making a notch in the outside diameter of the head, then applying a tangential force with light blows to the chisel counterclockwise to remove the screw.
13. Use hand impact tool and a 8mm socket to remove the two driver side AFC screws.
14. Use the hand impact tool with large standard screw driver bit to remove the rear passenger side AFC screw.
15. Pry the fuel shutdown solenoid bracket away from the AFC housing using a larger screwdriver in the pry slot shown in FIGURE 4. This bracket only needs to move about 3/8" for clearance.



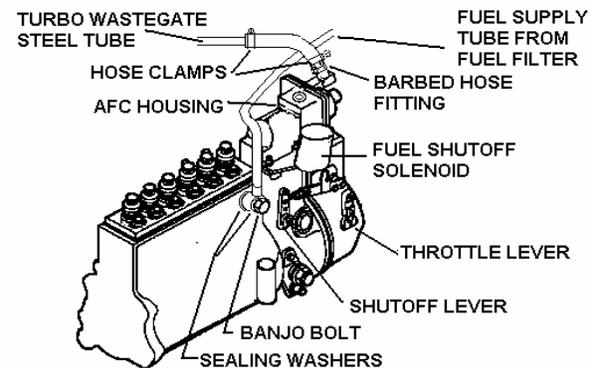
DRIVE SIDE VIEW OF INTAKE CONNECTION

FIGURE 1



FRONT VIEW OF TURBOCHARGER

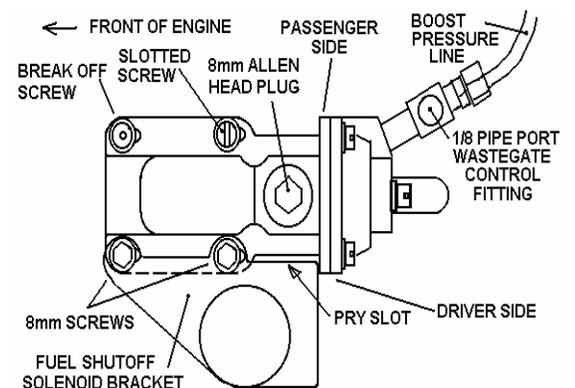
FIGURE 2



FRONT OF ENGINE

DRIVER SIDE VIEW OF INJECTION PUMP

FIGURE 3



TOP VIEW OF AFC HOUSING

FIGURE 4

16. Lift AFC housing, moving it out of the way toward the rear of the engine. The boost pressure line need not be disconnected. **NOTE:** Some engines have a metal rather than a plastic boost line between the engine intake to the AFC housing, in this case the boost line should be disconnected.
17. Place the installation guide provided with the Power Kit over the torque curve plate as shown in FIGURES 5 and 6. This guide plate prevents objects from entering the open fuel pump and it helps position the new torque curve plate. **NOTE:** The installation guide only fits one way, if it appears not to fit, flip it over and try again.
18. Leave one of the torque plate screws tight while removing the other screw using the hand impact tool with a large screw driver bit. Move the removed screw and reinstall it to one corner of the guide plate. Slide the installation guide as far as possible toward the rear of the engine so that there is zero clearance between the front edge of the torque curve plate flange and the installation guide, as shown in FIGURE 6. Once zero clearance is achieved, hand tighten the screw so that the guide does **NOT** move in the next four steps.
19. Remove the other torque plate screw and install it in another corner to help hold the guide in place.
20. Remove the stock torque curve plate using pliers or a magnet. Save the stock torque curve plate to permit converting the engine back to the stock rating in the future.
21. Place the new Power Kit torque curve plate in the same position the stock plate formerly occupied, sliding the torque curve plate as far forward as possible so that there is near zero clearance left between the front of the torque plate and the installation guide.
22. Install one of the two torque plate screws and hand tighten as tight as possible with a normal large screw driver. Install the 2<sup>nd</sup> screw. Using the hand impact tool and a large standard bit, tighten each screw another 1/8 to 1/4 turn.
23. Remove installation guide, save guide in case you want to convert the engine back to the stock.
24. Be sure that the AFC housing seal is in its groove (it may require a dab of grease or silicon sealant to hold it in place) then carefully reinstall the AFC housing. Do **NOT** force the housing into place, rather insure that the tang on the bottom of the housing fits in the slot in the torque curve plate. Wiring harnesses, hoses, and the solenoid bracket may need to be moved to get the housing to drop into its proper location.
25. Move the shutoff solenoid bracket back to its original position so that the AFC housing mounting screws will pass through the proper holes in the bracket and housing.
26. Install the AFC housing hold down screws loosely in their original locations, see FIGURE 4. A new break off screw is included in the Power Kit if you want to replace the original break off screw. **NOTE** that the AFC housing mounting holes are slotted, slide the housing as far toward the front of the engine as the slots allow.
27. Tighten three of the AFC mounting screws (not the break off screw) as tight as possible with a normal screw driver, then use the hand impact tool to turn each screw and additional 1/8 to 1/4 turn. It is suggested that you successfully complete the test drive before breaking off the head of the break off screw, only tighten it slightly to keep it from falling out during the test drive. You can reuse the original break off screw by installing with a TORX bit.
28. Install the turbo boost control (the small brass elbow supplied with the Power Kit) into the 1/8 pipe port for wastegate control fitting (see FIGURE 4) in place of the barbed hose fitting removed in step 10. If your vehicle senses manifold pressure at the turbo as shown in FIGURE 2, remove the crimp type clamp with pliers, remove the stock elbow and install the boost control elbow from the Power Kit in its place. Do **NOT** disturb the allen head set screw in the brass elbow as it will affect boost levels. Lightly tighten this fitting using a 7/16 inch open end wrench, then continue to tighten until the barbed end aligns with the turbo wastegate tube.
29. Install the hose removed in step 9 onto the brass barb of the turbo boost control. The AFC housing to boost pressure line fitting may need to be loosened slightly using a 5/8 inch open end wrench for good alignment of the hose. Tighten the two hose clamps loosened in step 8 using a 7 mm socket. If your vehicle appears as in FIGURE 2, use the new hose clamp supplied in the Power Kit, reattach the hose and tighten clamp using 1/4 inch socket. **NOTE:** Reinstall the boost pressure line if it was removed in step 16.
30. Install the injection pump fuel supply tube banjo bolt if removed in step 11. Be sure that a sealing washer is placed on both side of the banjo fitting, one between the bolt head and banjo, and the other between the banjo and injection pump. Tighten the banjo bolt to 24 lb-ft using a 19 mm socket and suitable torque wrench.
31. Remove the duct tape or towels from the previously covered openings, reinstall the air connection gasket and the air intake connection, starting the rubber hose on the air intake tube first, then rotating the connection into position.
32. Clean debris from threads of air connection bolts, then place a small amount of RTV sealer sparsely on the first 3/4 inch of threads, reinstall bolts to their original position and tighten to 18 lb-ft using a 10mm six point socket and suitable torque wrench.
33. Reinstall lower air connection hose clamp and tighten hand tight, do **NOT** strip threads on clamp bolt. Check the other seven air circuit clamps at this time to insure the four hoses and eight clamps are not leaking air
34. Remove fender and battery cover, lights, tools etc. , and reconnect battery cables.
35. Start Engine and check for leaks. Since the fuel drained from the injection pump fuel supply tube, it will take several seconds of cranking before the engine will start. Don't panic, this is normal. Depress the throttle to about half throttle position and crank engine no more than 30 seconds. Let starter motor cool for 2 minutes before attempting to crank for another 30 seconds. The engine will normally start during the first 10 seconds of cranking. If after four 30 second attempts the engine has not started, check to make sure the fuel shutoff solenoid) and shutoff lever are moving when the key is turned from off to run. When engine starts let throttle back to idle position and check under hood for leaks. Repair leaks as necessary.

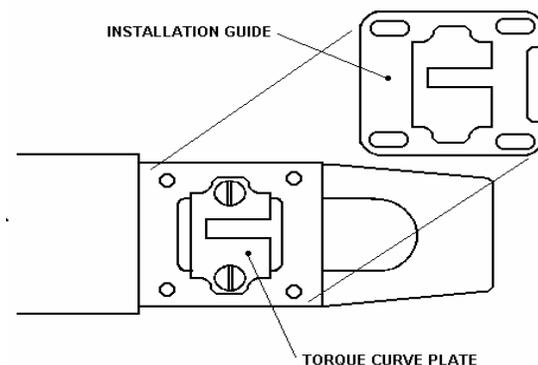


FIGURE 5

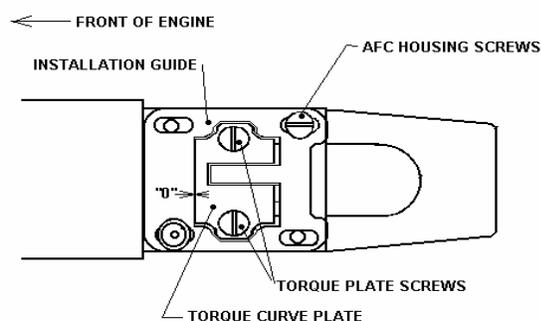


FIGURE 6

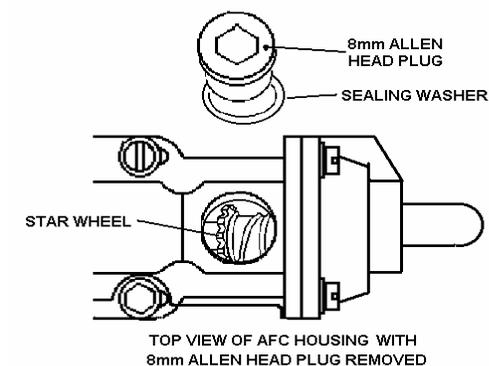


FIGURE 7

36. Test drive the vehicle. It should now have much more power and quicker acceleration. Observe acceleration rate and smoke. If vehicle is still slow to accelerate or has too much smoke, adjust the AFC setting as required. To adjust, remove the large plug on top of the AFC housing (see FIGURE 7) using an 8 mm allen wrench. Take care not to loose the sealing washer under the plug. Removing the plug exposes a star wheel which changes the quickness of fueling response to boost. If acceleration is weak with minimal smoke, rotate top of the star wheel toward the engine a few revolutions. If vehicle has heavy black smoke on initial acceleration, rotate top of star wheel away from engine a few revolutions. Reinstall large plug with sealing washer and test drive vehicle again. It may take repeated attempts to get this adjustment set. If heavy smoke is still encountered with star wheel moved completely to rear position, go back to step 26, loosen AFC housing and slide it rearward a 1/16 inch, retighten and test again. Repeat unit desired results occur.
37. To make your installation look professional, paint the new parts and chips on screws and bolts with a matching engine paint. Cummins paint part number 3822975 "bluke" matches most earlier engines that appear grayish-blueish-black. Later engines are painted a glossy black 3824514 "titanium black".