INSTALLATION PROCEDURE

Installing a CDS Unit into a 2009 - 2011 Ford Van

Part Numbers Affected: Various

Changes Take Affect: 2011

COMPLETELY READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION!

Check and compare all parts received in the kits with Figure 1 – Figure 3 before starting the installation. Figure 2 shows the contents of the boxed items in Figure 1.

Table 1 - Table 3 list the major components shipped with the CDS 4.6 and the CDS 4.8, respectively.

Figure 1. Contents of Front End Kit

Figure 2. Contents of Boxed Items Shown in Figure 1

Figure 3. Boxed Finished Kit Items

Table 1. Major Components for the CDS 4.6 with Salsa Option (P/N 700-012-144S)

Part No.	Description	Qty
000-001-093	Adapter, Blower Outlet	1
000-033-013	Clamp, Size 48 Hose	2
000-033-058	Clamp, 2 1/2" Muffler	1
000-052-075	Nipple, 3/8"X 1/2" Brass	1
000-052-129	Insert,#812 GFBN	1
000-052-338	Insert,#1212 GFBN	1
000-052-649	Elbow,3” O.D. X 0.065 Wall	1
000-068-035	Hose, 5/8” X 50 ft Garden	1
000-068-187	Hose, 3"X 30" EPDM	1
000-068-200	Hose, 3” I.D. X 6" Lg	1
000-068-250	Hose, 1" Green Stripe Bulk	19 ft
000-068-617	Hose, 3" Silicone	2
000-068-884	Hose, 3.0" X 13" Wire	1
000-078-069	Kit, CDS Parts Package	1
000-078-094	Kit, 1st Aid - CDS Parts	1
000-078-221	Hose Kit, 150 ft Orange	1
000-078-405	Kit, Ford Throttle	1
000-079-077	Kit, Salsa CDS	1
000-081-057	Decal, HM Equipped	1
000-093-094	Silencer, CDS Ford	1
000-105-012	Plate, Machine Serial	1
000-154-146	Spacer, Power Pack Front	1
000-154-147	Spacer, Power Pack, Rear	1
000-159-016	Jug,5 Gallon Plastic	1
000-163-020	Wand, 1 1/2”S/S w/#6	1
000-164-009	CDS Wheel Chocks	1
601-015-013	Finish Package, 2k F8 4.8	1
601-020-001	Assembly, Cowling	1
601-021-128	Kit, Ford Front End	1
601-050-105	Assembly, Water Box	1
601-050-111	Exchanger, CDS Dual Heat	1
601-060-122	Assembly, CDS Tank	1
601-060-136	Assembly, Power Pack	1

Table 2. Major Components for the CDS 4.8 with Salsa Option (P/N 700-012-143S)

Part No.	Description	Qty
000-052-075	Nipple,3/8"X 1/2" Brass	1
000-052-129	Insert,#812 GFBN	1
000-052-338	Insert,#1212 GFBN	1
000-052-649	Elbow,3” O.D. X 0.065 Wall	1
000-068-035	Hose, 5/8"X 50'Garden	1
000-068-200	Hose, 3” I.D. X 6" Lg	1
000-068-250	Hose, 1" Green Stripe Bulk	19 ft
000-068-617	Hose, 3" Silicone	1
000-068-884	Hose, 3.0" X 13" Wire	1
000-078-069	Kit,4 .8 CDS Parts Package	1
000-078-094	Kit, 1st Aid - CDS Parts	1
000-078-221	Hose Kit, 150 ft Orange	1
000-078-405	Kit, Ford Throttle	1
000-079-077	Kit, Salsa CDS	1
000-081-057	Decal, HM Equipped	1
000-093-094	Silencer, CDS Ford	1
000-105-012	Plate, Machine Serial	1
000-154-146	Spacer, Power Pack Front	1
000-154-147	Spacer, Power Pack, Rear	1
000-159-016	Jug,5 Gallon Plastic	1
000-163-020	Wand, 1 1/2”S/S w/#6	1
000-164-009	CDS Wheel Chocks	1
601-015-013	Finish Package,2k F8 4.8	1
601-020-001	Assembly, Cowling	1
601-021-128	Kit, Ford Front End	1
601-050-105	Assembly, Water Box	1
601-050-111	Exchanger, CDS Dual Heat	1
601-060-122	Assembly, CDS Tank	1
601-060-135	Assembly, Power Pack	1

Table 3. Components for the Finish Package (P/N 601-015-013)

Part No.	Description	Qty
000-033-053	**Clamp,1 1/2” Cushion ***	**3**
000-033-117	**Clamp, 1" Cushion Loop With 7/16” Mount Hole ***	**1**
000-037-003	Connector, Butt 14/16	5
000-037-009	Terminal, Fully Insulated	2
000-037-012	Terminal, Fully Insulated	6
000-037-014	Terminal,#10 Ring-16	1
000-037-017	Terminal, 3/8 Stud	2
000-037-029	Connector,12-10 Wire	1
000-037-031	Terminal, #16 w/3/8	1
000-056-006	Fuse Holder, In-Line	1
000-056-011	Fuse, 30 Amp ATC Plug	1
000-063-021	Harness,1/4" Split	10
000-078-378	Kit, Ford CDS Doghouse	1
000-094-066	**Nut, 6 mm X .8" Stand-Off ***	**2**
000-094-100	Nut, 3/8-16 S/S Nylock	4
000-094-116	Nut, 3/8-16 Hex S/S	12
000-131-020	Gasket, Cowling Tray	5
000-131-021	**Trimlok, 5/8" X 1/8" ***	**5**
000-143-011	Screw, 5/16-18 X 1/2"	2
000-143-025	Screw, 3/8-16 X 1 1/4	4
000-143-191	Screw, 3/8-16 X 4 1/2	2
000-143-198	Screw, 3/8" X 4" S/S	5
000-143-205	Screw, 3/8-16 X 1 1/4" S/S	4
000-162-001	Tie Wrap, 4" Nylon	15
000-162-005	Tie Wrap,12" Nylon	20
000-174-004	Washer, 5/16 Flat	8
000-174-032	Washer, 3/8 ” S/S Flat	50
000-174-057	Washer, 3/8" S/S Lock	12
600-011-003	Tie Down Cleat Washer	10

NOTICE

* These parts are necessary for the procedure explained on page 10 and page 11 of this document.

BATTERY RELEARN FOR FORD VAN

(Excerpt from 2011 Ford Econoline Owner's Guide - p. 262)

Because your vehicle's engine is electronically controlled by a computer, some control conditions are maintained by power from the battery. When the battery is disconnected or a new battery is installed, the engine must relearn its idle and fuel trim strategy for optimum driveability and performance. Flexible fuel vehicles (FFV) must also relearn the ethanol content of the fuel for optimum driveability and performance.

To begin this process:

1. With the vehicle at a complete stop, set the parking brake.
2. Put the gearshift in P (Park), turn off all accessories and start the engine.
3. Run the engine until it reaches normal operating temperature.
4. Allow the engine to idle for at least one minute.
5. Turn the A/C on and allow the engine to idle for at least one minute.
6. Release the parking brake. With your foot on the brake pedal and with the A/C on, put the vehicle in D (Drive) and allow the engine to idle for at least one minute.
7. Drive the vehicle to complete the relearning process.
   - The vehicle may need to be driven 10 miles (16 km) or more to relearn the idle and fuel trim strategy along with the ethanol content for flexible fuel vehicles.
   - If you do not allow the engine to relearn its idle trim, the idle quality of your vehicle may be adversely affected until the idle trim is eventually relearned.
   - For flexible fuel vehicles, if you are operating on E85, you may experience poor starts or an inability to start the engine and driveability problems until the fuel trim and ethanol content have been relearned.

If the battery has been disconnected or a new battery has been installed, the clock and radio settings must be reset once the battery is reconnected.

Tools and supplies needed include:

- 1-¼” Wrench
- 3-¼” Hole Saw
- 1-7/16" Wrench – Production Fan Clutch
- 1-7/8" Wrench – New PTO Fan Clutch
- Long 3/8” Drill Bit
- Torque Wrench (adjustable up to 115 ft-lbs)
- Loctite 242® or equivalent
- Adhesive such as Super Glue®
- Motorcraft Premium Gold Antifreeze
- Common Metric and Standard Wrenches/ Sockets
- Reciprocating Saw
- Wire Strippers/Crimpers
- Harmonic Pulley Puller
- JB Weld or equivalent

NOTICE

Always check clearances under the van before drilling any holes!

PRE-INSTALLATION

- Check and compare all parts received in kits with Table 1 - Table 3 before starting the installation.

- Always verify clearances before drilling holes through floor or anywhere else on the van.

- Dry fit all equipment before securing.

NOTICE

Dry fit means do not bolt parts down; verify fit and check the layout. Ensure that wires will not be compromised, pinched or stretched.

- Torque all nuts and bolts as noted.

- All hoses and wires that are installed or re-routed during the installation must be secured away from all rotating parts, sharp edges, and excessively hot areas. Quality of the fit and finish of the CDS system solely depends on the installer. While HydraMaster provides all parts and instructions necessary, it is up to the installer to use their own craftsmanship to provide a clean, safe and quality installation that the customer will be satisfied with. Please follow sound, standard shop practices.

- These installation instructions are to be used as a guideline. In some cases, due to prior vehicle modifications, it may be necessary to modify the vehicle to continue installation. Please call HydraMaster Technical Support if the vehicle has been modified from an OEM cargo van.

- All accessories such as fresh water tanks, hose reels and shelving should be discussed with the customer to find out what would best fit his/her needs. Taking your time and doing a quality installation along with thorough training on the operation of the CDS system will create a satisfied customer.

- For any questions regarding these install procedures call HydraMaster Technical Support.

INSTALLING THE FORD POWER TAKE-OFF (PTO) UNIT

1. Open the hood and disconnect the negative battery cable.
2. Remove the air cleaner assembly (disconnect the wire plug on the backside). See Figure 4 and Figure 5.

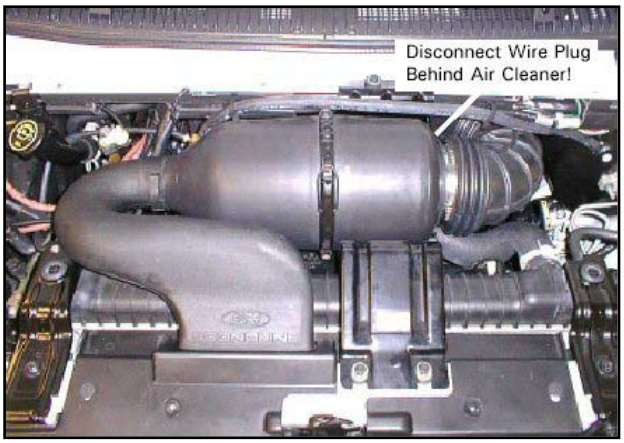


Figure 4. Disconnect Wire Plug

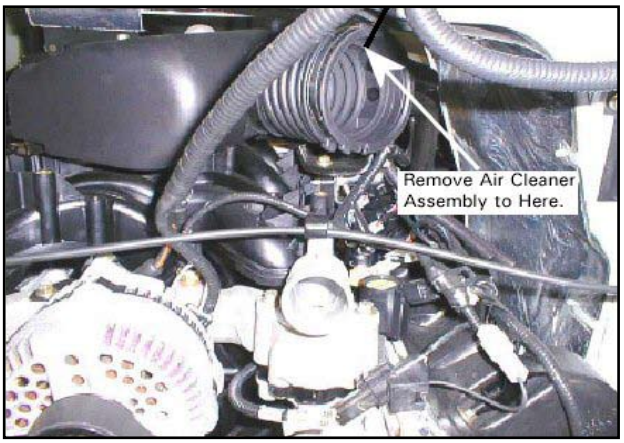


Figure 5. Remove Air Cleaner Assembly

3. Drain antifreeze from bottom of radiator on the driver's side into a clean five-gallon bucket.

NOTICE

Connect a hose to the nipple of the drain valve; if drained carefully, the coolant can be reused.

4. Remove driver and passenger seats and lower dash panels (at knee level.)
5. Remove plastic cup holder, (lift up and out) and remove engine cover.
6. Remove upper radiator hose and save it to be used later.
7. The fan shroud and fan clutch need to be removed together.
   a. First, unhook the plastic clamp on lower radiator hose from the underside of the fan shroud and the 'push in' plastic rivet located on the driver side of shroud.
   b. Using a 1 7/16" wrench, remove the fan clutch by turning it counterclockwise.
   c. Remove both items together.
8. Remove the drive belt by loosening the belt tension pulley.
9. Refer to the Ford's installation instruction (see page 22) for procedure and torque specs to install the PTO kit.

NOTICE

The drive belt must be re-installed before the PTO pulley is installed.

NOTICE

Do not install the fan assembly at this point; it will be done later.

INSTALLING THE FRONT END KIT

1. Locate and pull the breather hose off of the plastic nipple in center of the driver side valve cover. Using a hacksaw blade and a shop vacuum to collect shavings, cut below the bulge of the nipple at the base of the quick connect connection. See Figure 6.

NOTICE

Make sure to leave enough material to epoxy new breather adapter barb. Lightly sand the outside of the breather nipple and the inside of the new PVC elbow (included in kit). Use J-B weld® or equivalent epoxy to join the two pieces together. Install the modified elbow so that it points towards the driver's side of the vehicle. See Figure 7 and Figure 8. Re-attach the hose after the epoxy cures.

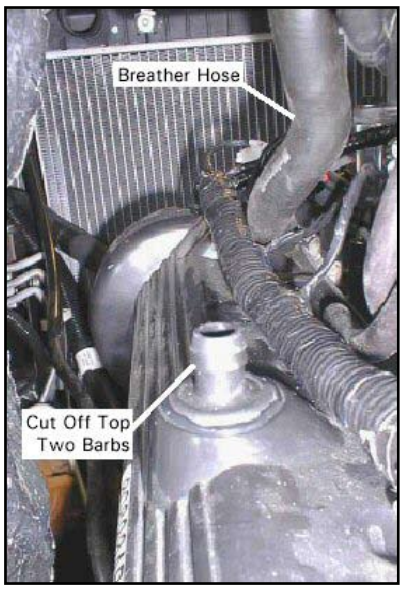


Figure 6. Cut at Base of Quick Connect

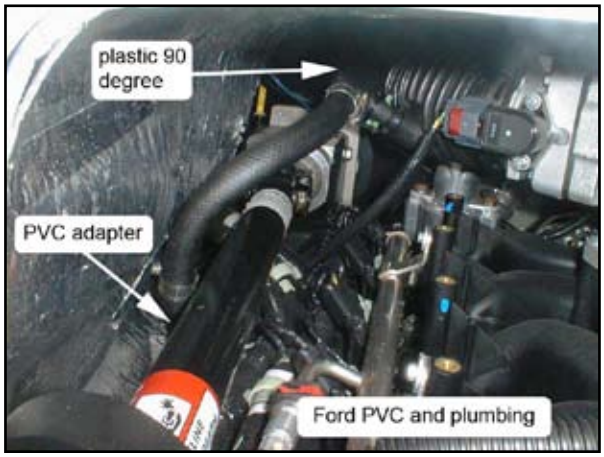


Figure 7. Install Modified Elbow

2. Unbolt the thermostat housing; discard bolts and original thermostat. Save the O-ring, as you will need it to install the new thermostat assembly. Install the new thermostat assembly in the following order: manifold, O-ring, thermostat housing adapter, 205° F thermostat, O-ring, Ford housing.

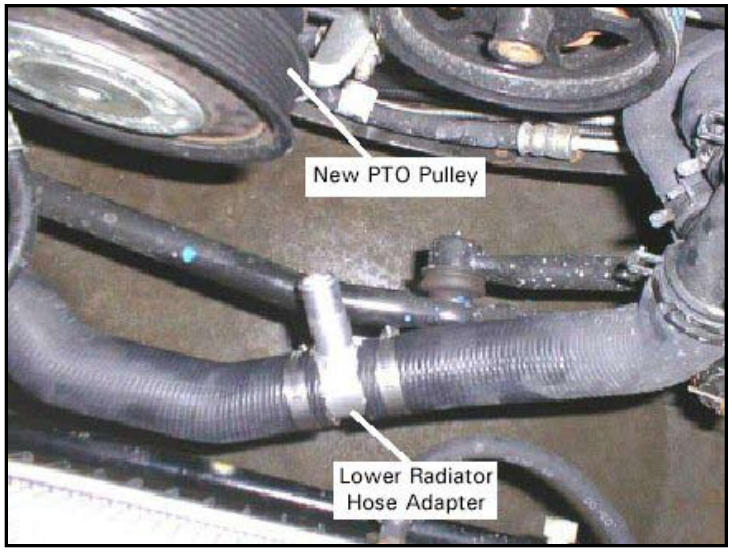


Figure 8. Install Adapter Tee

NOTICE

Dip the O-rings in antifreeze before installing.

3. Cut lower radiator hose and install aluminum adapter tee. See Figure 8.

NOTICE

If needed: On the driver side valve cover, locate the plastic wiring rail. A wire harness is taped to this rail, cut tape and lift up on plastic rail to remove. Use caution not to damage the wire harness. Leave wire harness in place. See Figure 9**.**

Figure 9. Locate Plastic Wiring Rail

4. Route the 1" green stripe coolant hose between the passenger and driver seats. Route the hose over passenger side valve cover.

NOTICE

Do not cut hose in half until vacuum tank is installed.

5. Connect one end to the thermostat housing adapter. Route the other end down the front passenger side of motor to the lower radiator hose adapter. Hoses should be routed away from all moving parts and hot areas. Be careful with the A/C compressor (if equipped) when routing down to the lower radiator hose; the coolant hose can be tied off of the transmission cooler line bracket.
6. On the engine, locate 3 studs on front of driver's side head. Remove the ground sensor and the oil dipstick and nuts. Slide oil dipstick tube off the stud, this will be re-attached to the clutch bracket.
7. Bolt the new pulley tensioner to clutch bracket. Slide the clutch bracket onto the studs.

CAUTION

When sliding the bracket on, <u>do not</u> pinch the wire harness on the cam position sensor or the wire harness between the bracket and valve cover. Component damage could result.

8. Route the ground sensor through the hole with the cam position sensor and attach it to the top left-hand stud. Loctite® and torque all nuts to 15 –17 ft lbs. See Figure 10.

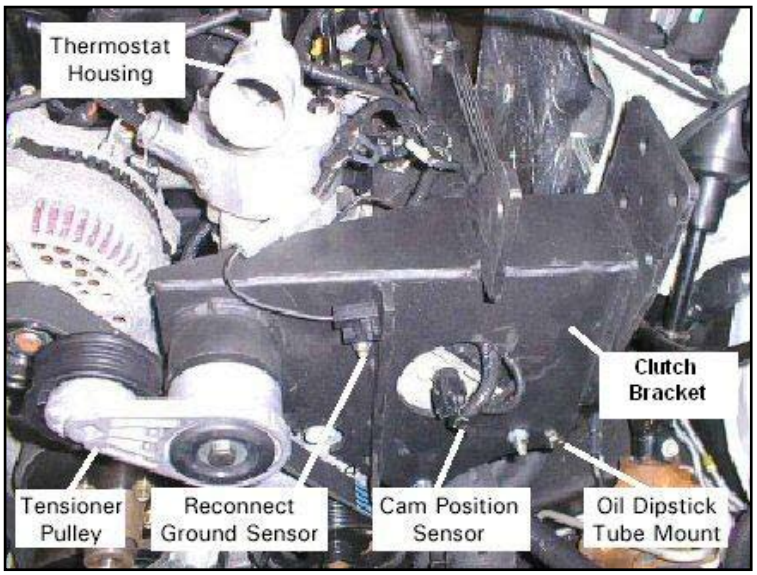


Figure 10. Route Ground Sensor through Hole with Cam Position Sensor

9. Bolt the oil dipstick tube to the hole in the clutch bracket. See Figure 10.
10. Install the PTO pulley using the instructions located on page 22 of this installation procedure.
11. Install fan shroud and fan clutch. Tighten fan clutch using a 1 7/16” wrench.

CAUTION

The wire harness discussed in the following steps needs to be moved and secured with cushion clamps to prevent wires from getting drilled or clamped down. If the wires are damaged, machine failure can result.

12. Route the wire harness to the main computer under the clutch housing.
13. Remove the existing tie wrap from the van’s computer wiring harness.
14. Install the 1 1/2” clamps (P/N 000-033-053) and route the smaller harness in the lower position as shown in Figure 11 - Figure 12. Also, use existing fasteners as shown.
15. Using an adhesive such as Super Glue®, install Trimlok (P/N 000-131-021) on the bracket edge (see Figure 12).
16. Install the 1” clamp (P/N 000-033-117) and route the larger harness through the clamp as shown in Figure 13.

NOTICE

It may be necessary to push the bracket that mounts the computer over, away from the clutch housing and bracket, giving the engine room to flex without touching the computer.

Figure 11. Route Smaller Harness, in Lower Position, using One P/N 000-033-053 Clamp (1 1/2”)

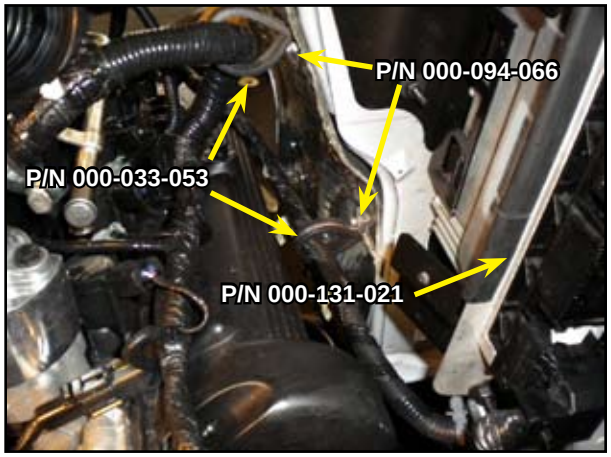


Figure 12. Install Other Clamps, Nuts and Trimlok (P/N 000-131-021) on Bracket Edge

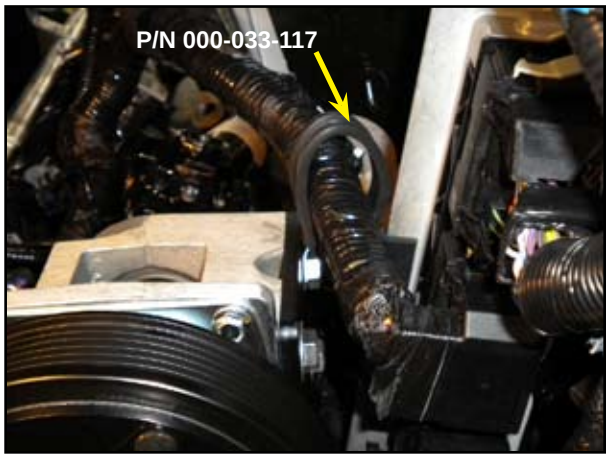


Figure 13. Install 1” Clamp and Route Larger Harness

17. Install the clutch assembly to the clutch bracket using the 5 bolts provided in the kit. Loctite® and torque all bolts to 25 - 30 ft lbs. The opening in the clutch housing will face up. Install the new CDS drive belt. See Figure 14.
18. In the center of the straight section of the upper radiator hose, cut the hose in half. The end that attached to the radiator will go on the same way. The other end that attached to the thermostat housing needs to be flipped over so the cut end is facing the thermostat housing. See Figure 14. (Use the adapter and clamps provided.)
19. Bolt the fly strap to back of driver side head with metric bolts provided. It may be necessary to cut the harness to mount the fly strap.

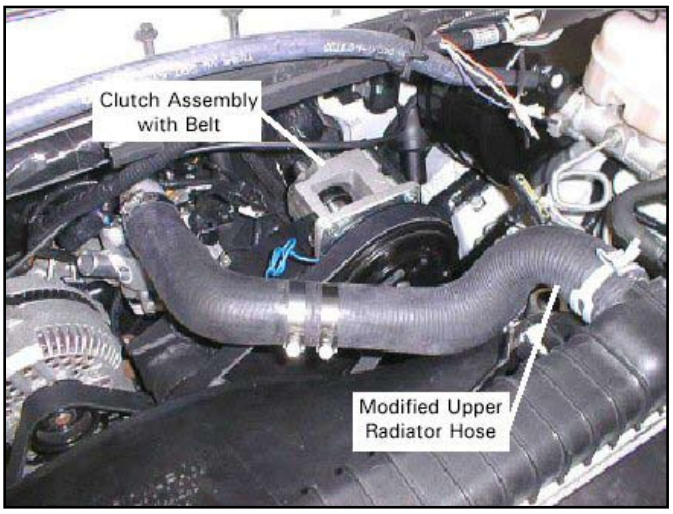


Figure 14. Install New CDS Driver Belt

NOTICE

Fuel lines should not touch fly strap. See Figure 15.

20. Install the driveshaft onto the clutch housing shaft. The inside bore of the yoke should be flush with the end of the shaft.

NOTICE

The splined end of the driveshaft goes towards the blower power pack. Torque the bolt to 40 ft lbs.

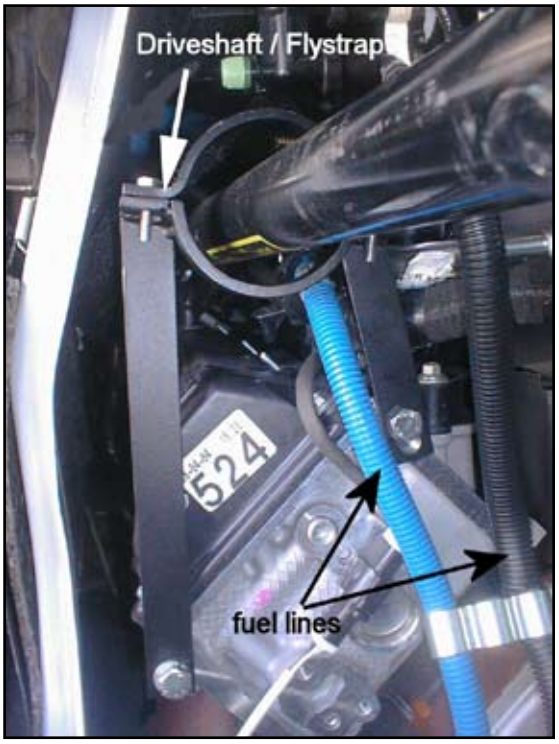


Figure 15. Fuel Line Should Not Touch Fly Strap

INSTALLING THE FINISH KIT AND BLOWER POWER PACK

1. Dry fit spacers under the power pack (see Figure 16).
2. Position power pack between seats, towards driver side.
3. Fully compress the driveline.
4. Move the power pack jackshaft within a ¼" of the end of the driveline yoke. The length of the elbe shaft determines the power pack position when the yoke is flush with the end of the jack shaft.

NOTICE

The exposed spline of the elbe shaft should be no longer than 5".

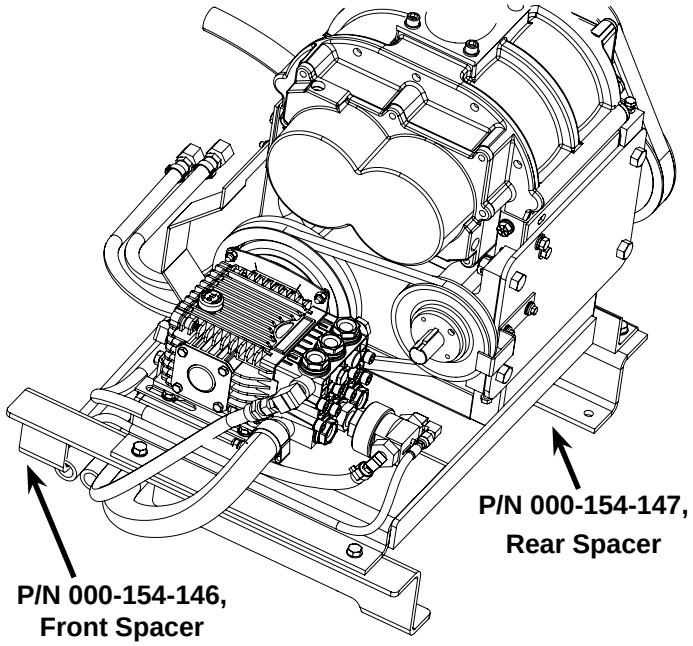


Figure 16. Dry Fit Spacers under Power Pack

5. Slide the yoke onto the blower shaft.

NOTICE

Make sure the inside bore of the yoke is flush with the end of the jackshaft.

6. Carefully position the power pack front to back and side to side.

NOTICE

The side of power pack should be approximately 1" from driver seat. See Figure 17. Remove both the passenger and driver's seat arm rests. The side-to-side measurement will be approximately ¼" to ½" from the chrome fuel line above the back end of the driver side valve cover. See Figure 18.

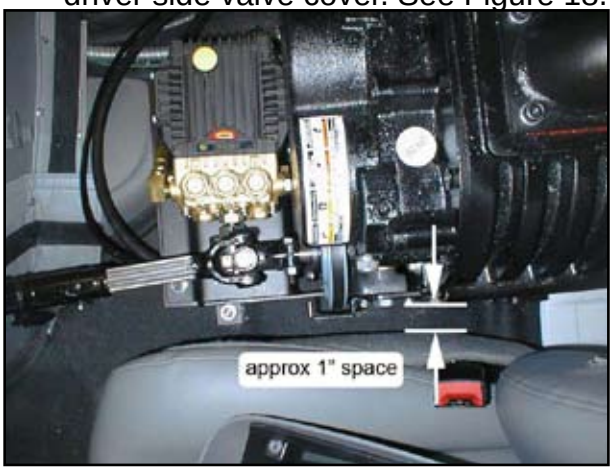


Figure 17. Position Power Pack

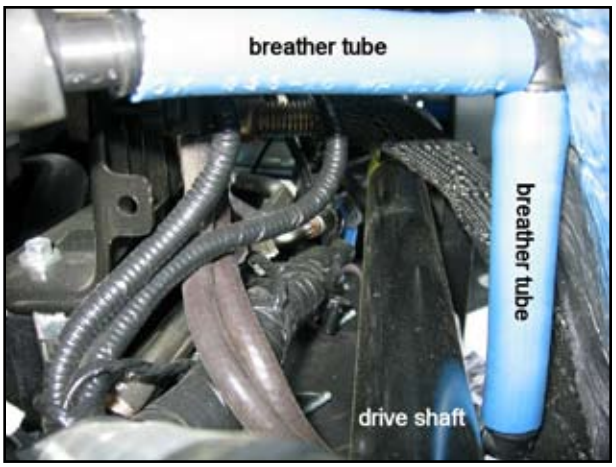


Figure 18. Side-to-side Measurement

NOTICE

Set the driver's seat in place, cut the doghouse, and test fit the cowling before bolting down the power pack.

7. Front to back measurement of the power pack will be set by the measurement off of the driveshaft splines. The driveline should be centered in the safety ring. See Figure 19. It will be necessary to turn the power pack so that the shaft is centered AND the power pack is spaced between the seats.

Figure 19. Driveline Centered in Safety Ring

NOTICE

Sensor tubes may need to be slightly bent to clear the bottom of the driveshaft. Remember to re-install the sensor hoses onto the correct barbs, the hoses are different size. If not properly re-installed, the "check engine" light will turn on. See Figure 20**.**

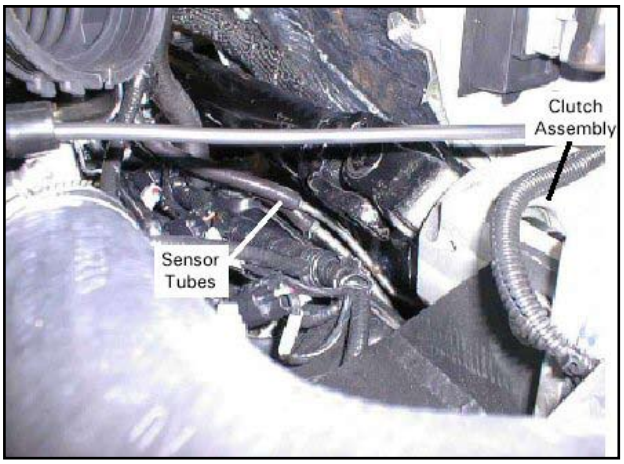


Figure 20. Adjust Sensor Tubes if Needed

INSTALLING THE MINI SALSA AND SILENCER

NOTICE

If the CDS is purchased without a Salsa, install the hush silencer in the same manner and in same location.

1. Attach the long end of the 90 degree 3” rubber elbow to blower outlet.
2. Attach the short end of the 3” rubber elbow to the Salsa inlet (see Figure 21).
3. If needed, cut the 3” rubber hose to an appropriate length to allow for clearance under the van.
   a. Attach second 3” rubber elbow to the heat exchanger outlet.
4. Position the hose where it will go through the floor and outline this with a felt tip pen.
5. Pilot drill a hole; make sure to check for clearance under the truck.
6. Drill a 3.25” hole for the hose to pass through. The location of the hole depends on your van.
7. Slip fit the 3” aluminum elbow in the 3” rubber hose protruding through the floor.
8. Install external silencer under the van (Figure 22). Depending on the van model, the silencer may span the “rib” of the floor or bolt directly to the van floor.
9. Direct the 3” aluminum elbow towards the silencer inlet.
10. Tighten the clamp and measure the distance between the elbow and the inlet.
11. Cut the 3” hose provided and install.

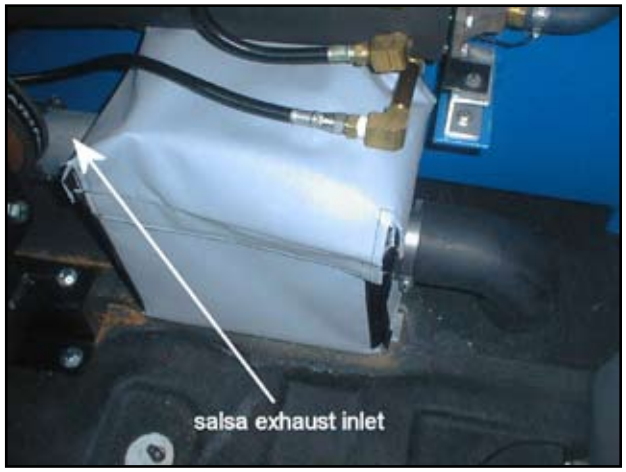


Figure 21. Attach Short End of Elbow to Salsa Inlet

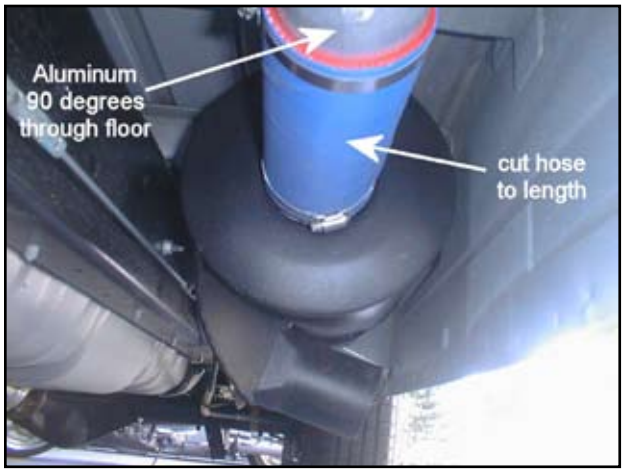


Figure 22. Install External Silencer

INSTALLING THE WIRING HARNESS

1. The wire harness will follow the same path as the heat exchanger coolant hoses. Feed the molded plug on harness from the front of the van, over top passenger side of motor. Feed the harness until the two white ground wires with ring terminals are in line with the ground lug located on the power pack (passenger side). Attach wires to ground lug. See Figure 23.

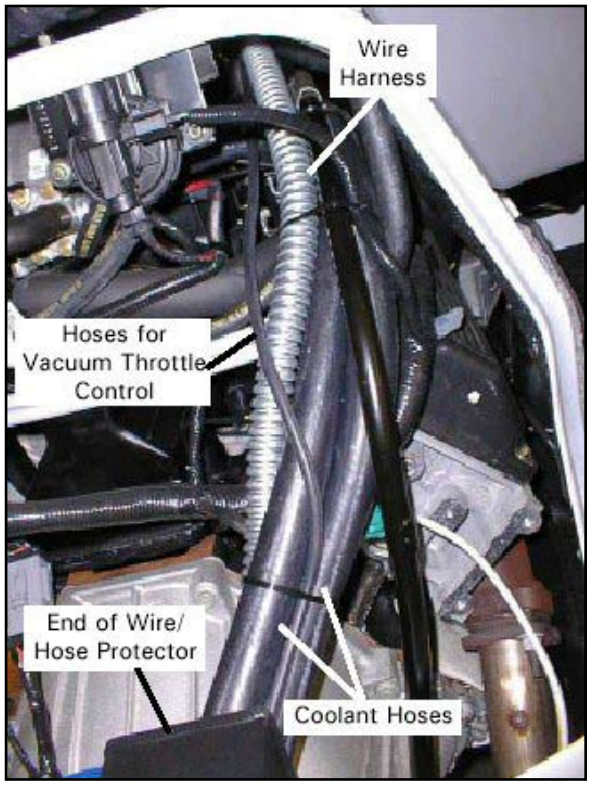


Figure 23. Install Wire Harness

NOTICE

The green wire will extend out of the wire harness next to the ground wires and will attach to the tachometer sensor on the back of the blower.

The red wire at the base of the power pack connects to the positive wire on the APO.

The blue wire at the base of the power pack connects to the high pressure pump clutch.

The white 12 gauge wires will be bolted to the power pack base - negative grounds.

2. Connect one black wire to the CDS clutch, located in the engine compartment.
3. Run the 4 pole plug to the pass-through and follow the throttle control instructions included with the kit.
4. The white ground wire will connect directly to the negative side of the battery.
5. The 25 Amp fuse and fuse holder (supplied in finish kit) will connect between the red wire and the positive side of the battery.
6. Use the electrical connectors and small wire loom provided in finish kit to complete the wire harness.
7. Next to the molded plug on the wire harness (from the recovery tank side) there will be a white and a yellow wire. These wires are ground and power for an optional pump-in pump.

NOTICE

The red wire is for power to the optional APO, the blue wire is for the high pressure pump clutch.

COMPLETING THE INSTALLATION

1. Install the recovery tank using two pieces of hose and the elbow (P/N 000-052-649), shown in Figure 24, between the blower inlet and the elbow on the backside of the recovery tank.

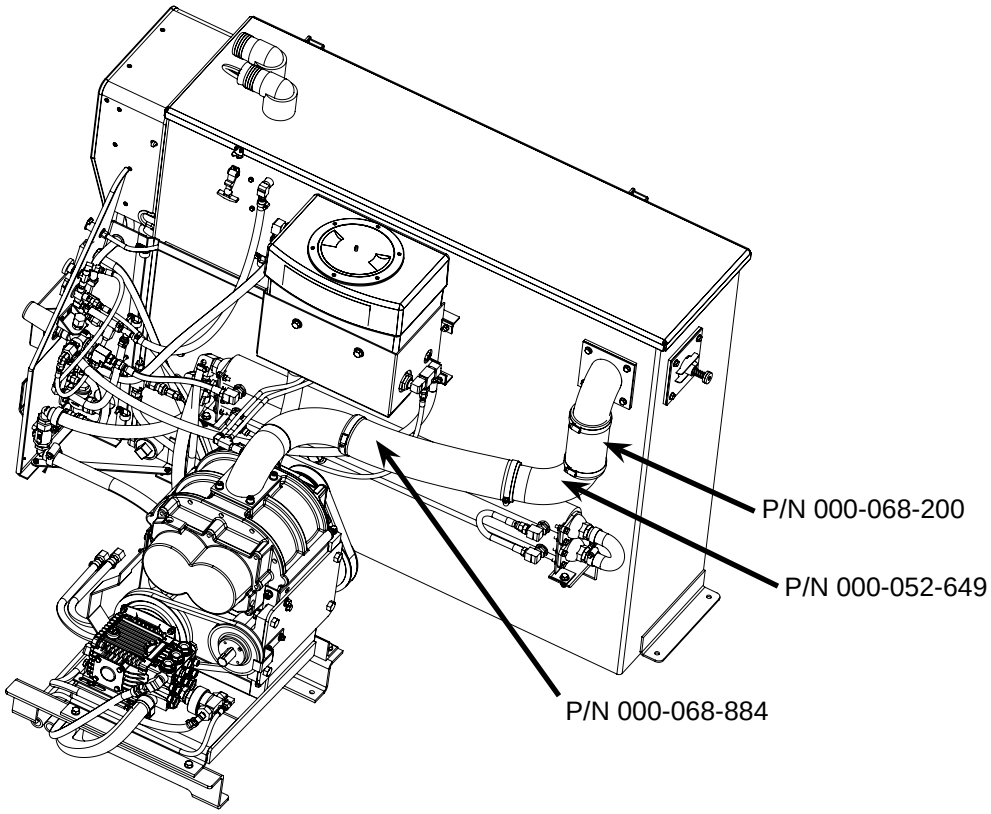


Figure 24. Install Hoses and Elbow Between Recovery Tank and Blower Inlet

2. Connect the 1” hose to the intake of the pump guiding it along the bottom of the power pack. Cut as needed. Connect the black high pressure throb hose to the high pressure pump.
3. Connect the 5/32” vacuum hoses to the brass nipples on blower intake.
4. Route the 1” green stripe coolant hoses along passenger side of the blower assembly back to the CDS heat exchangers.
5. Cut hose to fit.

NOTICE

The hose from the thermostat housing connects to the ball valve on that dash panel.

6. The upper heat exchanger will return to the lower radiator hose adapter.

NOTICE

Leave enough extra hose in case hoses if ever need to be cut off the brass barbs.

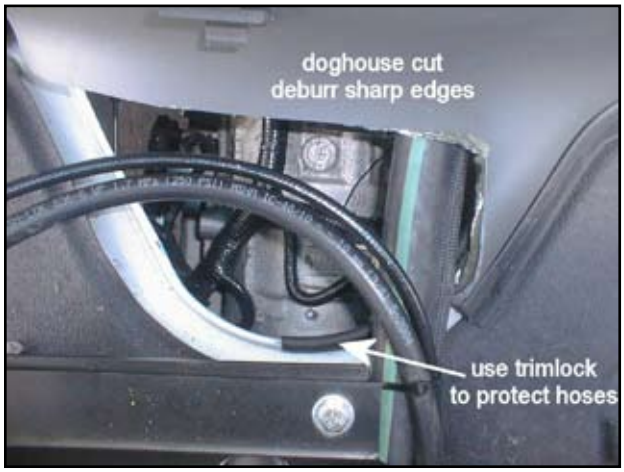


Figure 25. Engine Cover Alteration #1

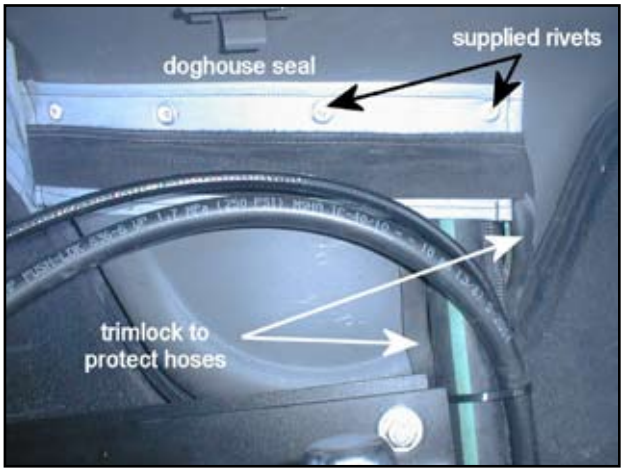


Figure 26. Engine Cover Alteration #2

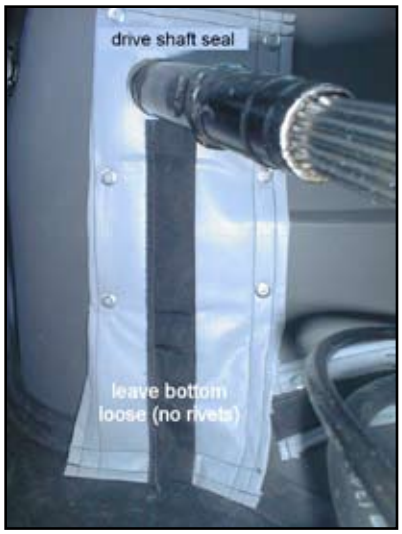


Figure 27. Engine Cover Alteration #1

Figure 28. Cup Holder Alteration #2

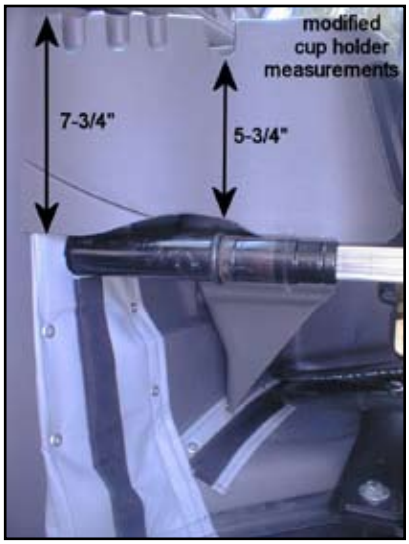


Figure 29. Cup Holder Alteration #3

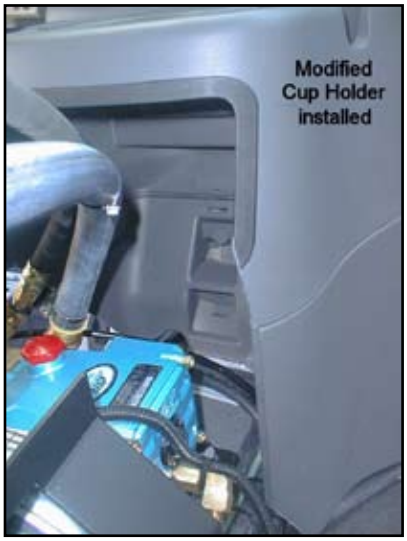


Figure 30. Cup Holder Alteration #3 (View from Passenger Side)

Figure 31. Water Box and Cowling Should Barely Touch

7. Plug wire harness to the tank harness. Keep harness away from any moving or hot parts.
8. The wire harness and coolant hoses should be zip tied together in a clean bundle from back of the blower assembly to the back of passenger side valve cover.
9. Every install is slightly different; take careful measurements of the wire/ hose pack and the driveshaft before cutting the engine cover. Use trim lock with bulb gasket on the engine cover where the wire/hose protector meet. Install the driveshaft seal to the engine cover using rivets to seal the driveshaft. See Figure 25 - Figure 27 for engine cover alteration.
10. The plastic cup holder will have to be modified as well. See Figure 28 - Figure 30 for cup holder alteration.
11. Re-install the seats and set the cowling over the blower assembly. Check clearances between the cowling and all rotating pulleys of the blower assembly. The cowling can be trimmed if necessary. The water box and cowling should just barely touch as shown in Figure 31.
12. Be sure recovery tank is located straight in van and that the lid can be opened to access the filter basket before bolting down.

NOTICE

The CDS unit can be tested before bolting down tank.

TESTING THE CDS

1. Install air cleaner assembly.
2. Run petcock hose to a small drain pan and open to allow air to vent.
3. Refill CDS coolant heat exchanger antifreeze, additional antifreeze will need to be added (use a 50/50 mix).
4. Allow the engine to idle until the antifreeze starts to bleed down.
5. Repeat this procedure until all the air is bled out of the petcock and the engine is operating at the normal temperatures.

NOTICE

This procedure could take up to 1 ½ hours to complete.

6. Close petcock and recheck that the engine is still operating at normal temperatures.
7. Be sure the CDS key switch is in the off position and the E-brake is set.
8. Reconnect the positive lead to battery.
9. Refer to page 5 of these instructions and follow the Battery Relearn procedure.

NOTICE

Check on the antifreeze level as air bleeds out of system.

10. Check for antifreeze leaks around water pump.
11. Connect the garden hose or pump in pump hose to the inlet quick connect.
12. Install the warning label, supplied with the Owner's Manual, on the driver's side sun visor as shown in Figure 32.

Figure 32. Location of Warning Label on Sun Visor

13. After van has warmed up, turn on the CDS.

NOTICE

Under a 14” load and no load, tachometer on the CDS recovery tank should read:

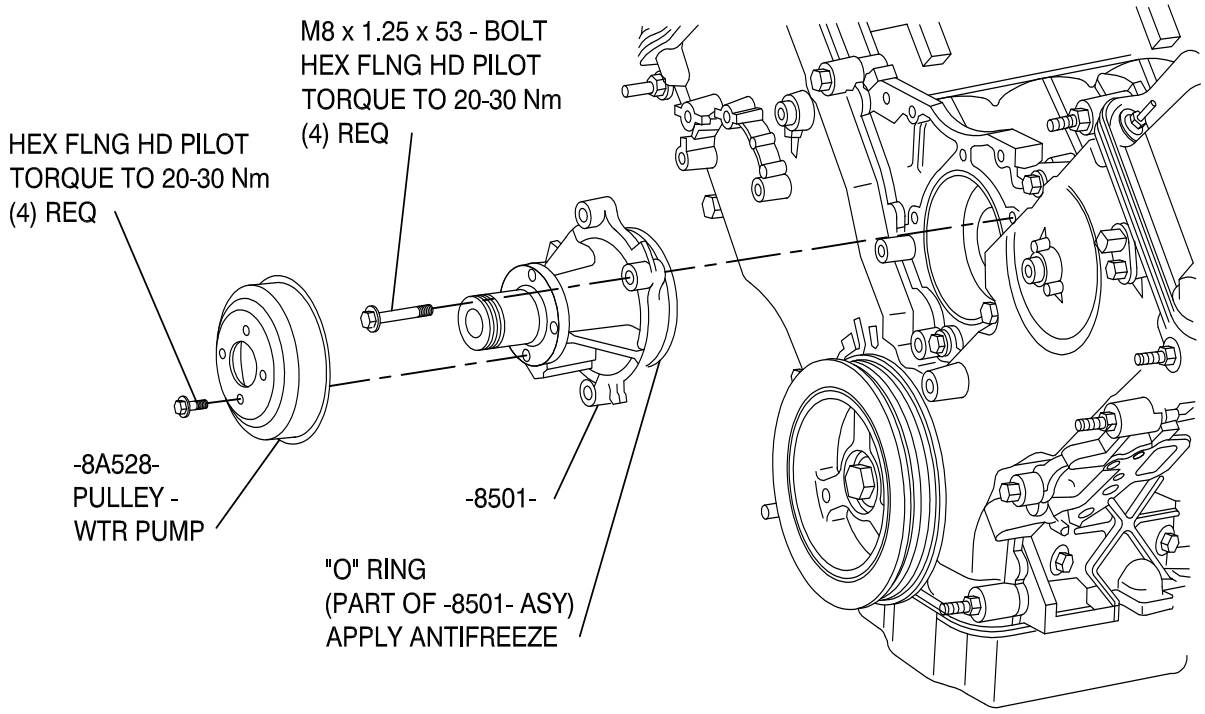
- 1,300 rpm at speed 3
- 1,400 rpm at speed 2
- 1,500 rpm at speed 1

14. Set the vacuum relief valve to 14” lift on the vacuum gauge.
15. Turn the power on to the high pressure pump. Check the water pressure and look for any leaks in the system.
16. Run and test the CDS for approximately 2 hours.
17. Engage and disengage the clutch several times to ensure it is functioning properly. If full torque will be required immediately, the clutch should be properly burnished. Energize the clutch three times a minute with no load for 50 cycles.
18. Test all equipment and accessories to the CDS.
19. After testing is complete, pull the air cleaner assembly off and visually inspect all components of the installation.
20. Retighten all the hose clamps installed.
21. Re-install air cleaner.
22. Fill out the “Truckmount Document Package” and return to HydraMaster before delivering the van.
23. Spend time with the customer, showing him/her how all features of the CDS operate. Explain all safety features.

INSTALLATION INSTRUCTIONS FOR THE POWER TAKE-OFF UNIT

Excerpt from Ford Product Engineering Installation Instructions for
Front End Accessory Drive Crankshaft Ext. Support (Spider)

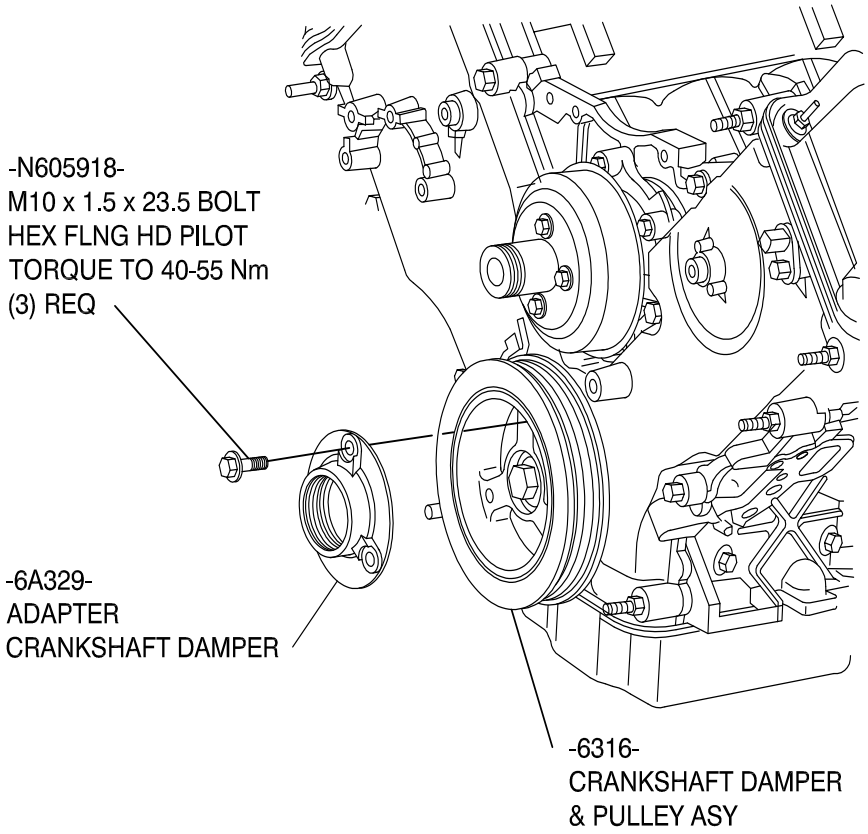
5.4L (DewEze 740276) INSTALLATION SHOWN, 6.8L (DewEze 740275) PROCESS IS IDENTICAL EXCEPT WHERE NOTED.



1. REMOVE AND DISCARD -8501- PRODUCTION WATER PUMP

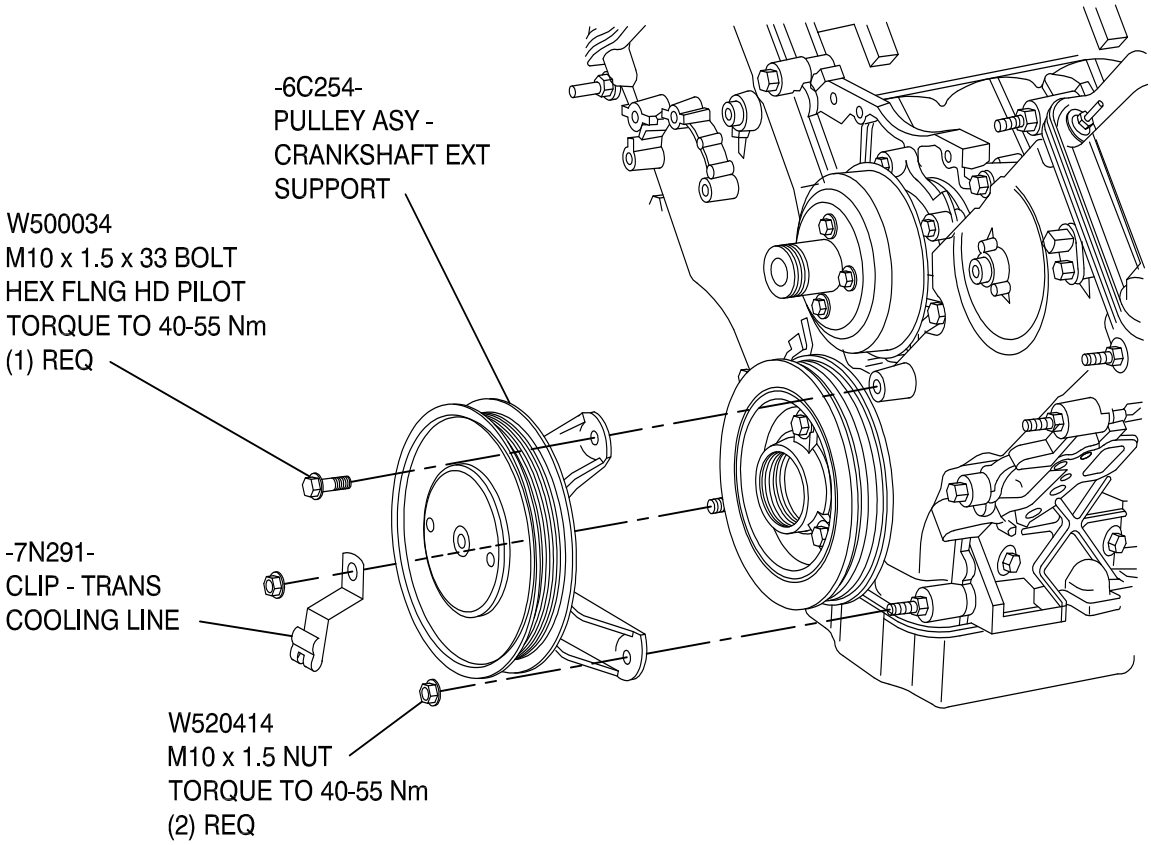
2. INSTALL -8501- PTO WATER PUMP
   WITH EXTENDED HUB

3. REATTACH -8A528- PULLEY - WATER PUMP TO
   -8501- WATER PUMP ASY WITH (4) BOLTS
   TORQUE TO 20-30 Nm (15-22 lb-ft)



4. INSTALL -6A329- ADAPTER - CRANKSHAFT DAMPER TO -6316- DAMPER - CRANKSHAFT WITH (3) N605918 BOLTS TORQUE TO 40-55 Nm (30-40 lb-ft)

5. COAT THREADS OF ADAPTER WITH A HIGH TEMPERATURE NICKEL ANTI-SEIZE LUBRICANT SUCH AS FORD MOTOR COMPANY PART NUMBER F6AZ-9L494-AA, SPECIFICATION ESE-M12A4-A OR EQUVALENT



6. RETAIN CRANKSHAFT WITH FORD ROTUNDA TOOL TO BE ANNOUNCED

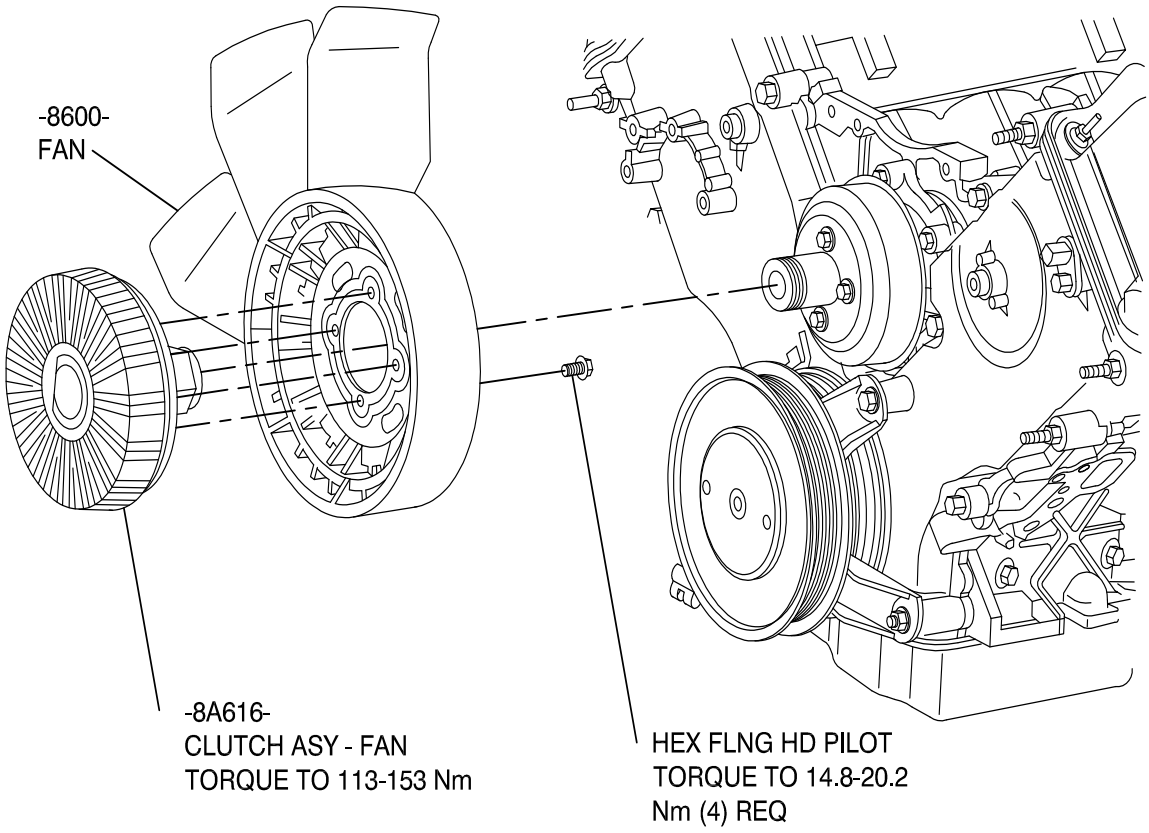
7. INSTALL -6C254- PULLEY ASY - CRANKSHAFT EXT SUPPORT BY TURNING PULLEY COUNTER CLOCKWISE INTO -6A329- ADAPTER - CRANKSHAFT
   TORQUE TO 95-105 Nm (70-77 lb-ft)

8. PLACE LEGS OF -6C254- PULLEY ASY - CRANKSHAFT EXT SUPPORT ON TWO STUDS LOCATED AT FRONT OF ENGINE, BOTTOM OF BLOCK

9. ATTACH -7N291- CLIP - TRANS COLING LINES TO STUD AT FRONT OF ENGINE, PASSENGER SIDE BOTTOM OF BLOCK

10. SECURE TWO LEGS WITH TWO -W520414- NUTS M10 x 1.5
    TORQUE TO 40-55 Nm (30-40 lb-ft)
    ATTACH OTHER BRACKETS TO STUD ABOVE LEGS OF -6C254- PULLEY ASY-CRANKSHAFT EXT SUPPORT AND SECURE

11. SECURE LAST LEG WITH ONE -W500034- BOLT M10 x 1.5 x 33 TO TAPPED HOLE IN ENGINE FRONT COVER
    TORQUE TO 40-55 Nm (30-40 lb-ft)



NOTE: (PROCESSES 12 AND 13 APPLY ONLY TO 5.4L EQIPPED VEHICLES, CORRECT CLUTCH EXISTS ON 6.8L EQUIPPED VEHICLES)

12. REMOVE AND DISCARD 5.4L FAN CLUTCH ASY

13. ATTACH FAN TO NEW -8A616- FAN CLUTCH ASY WITH FOUR SCREWS
TORQUE TO 14.8-20.2 Nm (11-15 lb-ft)

14. INSTALL FAN AND FAN CLUTCH ASY TO WATER PUMP HUB
TORQUE TO 113-153 Nm (83-113 lb-ft)