

INSTALLATION PROCEDURE

Installing a CDS Unit into a 2008-9 Chevy Van

Issue No: 120 Part Numbers Affected: Various Date Changes Take Effect: 2007

COMPLETELY READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION!

CAUTION

Engines in vans dated 2003 and later require special care to bleed the antifreeze coolant.

Pre-installation:

- Check and compare all parts received in kits with **Figures 1 and 2** (see following page) before starting the installation.
- Always verify clearances before drilling holes through floor or anywhere else on the van.
- 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 Service Department if the vehicle has been modified from an OEM cargo van.

- All accessories such as fresh water tanks, hose reels, shelving, etc. should be discussed with the customer to find out what would best fit their 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 Service Dept.
- Torque all nuts and bolts as noted.



Figure 1



Figure 2

I. PREPPING VEHICLE FOR INSTALLATION

1. Open hood and disconnect negative battery cable at the battery.
2. Disconnect the wiring plug at the air cleaner, then remove air cleaner and tube assembly down to the throttle body. Use a shop rag to cover the intake of the throttle body.
3. Remove radiator over-flow container.
4. Remove the main engine drive belt. If van is equipped with air conditioning, the compressor is driven by a separate belt and does not need to be removed.
5. Drain the radiator coolant as follows:

Note: *On the 2003 Model Chevy the petcock has been eliminated at the bottom of the radiator, this makes draining the radiator very difficult.*

- a. One method for recapturing the antifreeze is to insert a hose barb into the water pump hose to drain the coolant. This can be done by cutting a small 'X' in the $\frac{3}{4}$ " water pump hose approx. 2.5" from the water pump housing. It is located on the passenger side of the water pump and thermostat housing (see **Figure 3**). Insert a barbed fitting with a hose attached so the coolant can now be drained into a proper container. Once the coolant has drained then the hose can be cut in half so the $\frac{3}{4}$ " plastic tee

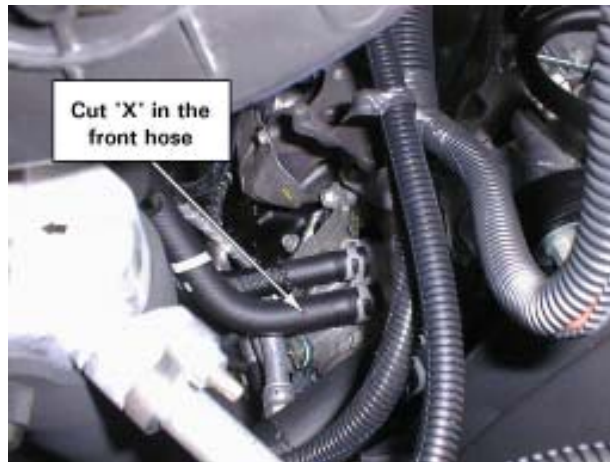


Figure 3

- b. can be installed as described later in these instructions. The other option is to cut the hose in half (at 2.5 inches) and let the anti-freeze drain. We do not recommend this especially on A/C equipped vans. Coolant will drain straight on top of the air compressor clutch and wiring then on to the cross member and the floor, making the coolant unusable.

Note: *Use Dex-cool Red GM antifreeze or equivalent.*

CAUTION

One Manufacturer of antifreeze cautions:

“WHEN DISPOSING OF USED ANTIFREEZE COOLANT: Follow local laws and regulation. If required, dispose at facilities licensed to accept household hazardous waste. If permitted, dispose in sanitary sewer systems. Do not discard into storm sewers, septic systems, or onto the ground.”

WARNING

This warning appears on the label of one brand of antifreeze:

“HARMFUL OR FATAL IF SWALLOWED. Do not drink antifreeze coolant or solution. If swallowed, induce vomiting immediately. Call a physician. Contains Ethylene Glycol, which caused birth defects in animal studies. Do not store in open or unlabeled containers.” **KEEP OUT OF REACH OF CHILDREN AND ANIMALS**

6. Remove the drivers and passenger seats.
7. Unplug the wiring from the bottom of the driver seat.
8. Remove the cup holder assembly from the engine cowling.

Note: *The cup holder assembly will not be reused.*

9. Carefully remove the plastic dash covers on the driver and passenger sides (see **Figure 4**). There are two bolts on the underside of each, then the top portion is removed by carefully pulling straight out. The dash cover on the driver side needs to be modified for clearance of the CDS cowling.
10. Once the seats and dash covers are removed the engine cowling can be removed.



Figure 4

Note: *Set cowling aside for now. It will need to be modified later in the installation.*

II. INSTALLATION OF THE FRONT END CLUTCH ASSEMBLY

1. For 2003 through 2006 vans, on the right hand side of the stock alternator-mounting bracket, locate the throttle cable support bracket. Remove and discard the two bolts and the bracket. Vans after 2006 drive by wire.

Note: *The alternator will need to be removed and installed on the clutch bracket provided. This moves the alternator over to the right to provide room for the clutch and drive shaft assembly. The two small wires (gray & orange) with the wiring plug will need to be extended along with the battery lead cable.*

2. At the rear of the alternator, the wires and cable must be extended. First unplug the wiring connector and then remove the battery cable. Modify the harness and cable as follows:
 - a. First remove the tape and plastic split loom back to expose gray and orange wires. Cut the wires approximately 2 inches from the plug and install the orange and gray extension wires with the pink butt connectors provided in the kit. The extended wires can be routed inside the main Chevy wire harness that runs forward (see **Figure 5**).
 - b. Second remove the 6-gauge red battery cable by pulling the boot back and then loosen the nut to remove the cable.
3. Remove the two bolts that mount the alternator.
4. Remove the alternator from the bracket.
5. Assemble the alternator into the clutch housing using the hardware provided. The clutch housing is designed to accommodate either a standard or heavy-duty alternator. Move the (2) brackets to the appropriate set of holes depending on which alternator you are using. The bottom (4) holes are for the standard alternator and the top (4) holes are for the heavy-duty alternator. The alternator will need to be rotated so that the stud is on the bottom (see **Figure 6**). Torque alternator bolts to 30 foot pounds.
6. Attach the new battery cable extension lead provided in this kit to the back of the alternator. The end with the red boot will attach to the alternator stud (see **Figure 6**).
7. Before installing the clutch and alternator assembly, the engine wiring harness that is located directly behind the stock alternator location should be secured so that it will clear the driveshaft. At the “Y” in the harness.
8. Plastic clamp used to secure harness must be removed from intake. This allows driveshaft knuckle clearance.
 - a. Cable tie harness down to allow shaft knuckle to clear harness.

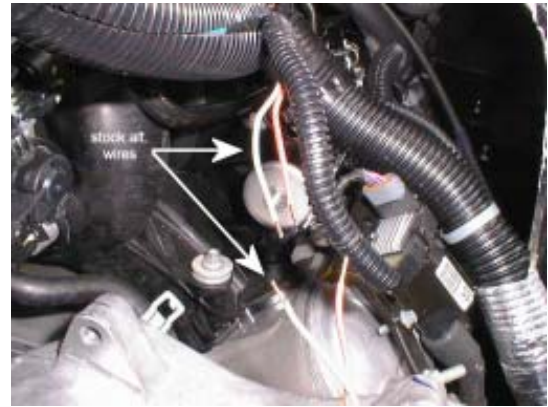


Figure 5

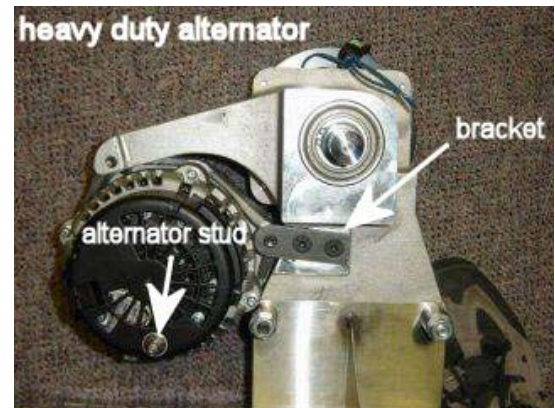


Figure 6

⚠ WARNING

Failure to do this may cause serious damage.

⚠ WARNING

Do not attach the harness to the fuel rail. Doing so could cause the fuel injectors to leak.

9. Secure the breather located at the rear of the drivers side valve cover to the metal tubes just below it with the provided tie wraps.
10. Install the clutch and alternator bracket as one unit. You will need to grind off the corner of the stock bracket in order for the assembly to fit. Use the supplied 10mm X 90mm Allen head screw on the right side and use the supplied modified bolt on the left side. The modified bolt has the head shaved down to allow clearance for the new drive belt. Tighten the bolts evenly and torque to 30 foot pounds.
 - a. Large case alternator will need to have a small portion of the bracket additionally ground down for clearance. Alternator and factory alternator bracket should NOT touch after installing HydraMaster clutch housing into alternator bracket.
 - b. See Figure to gage the grinding of alternator bracket.
 - i. Remove the top right corner of the bracket as shown in **Figure 7**.
 - ii. Mark the corner 1-1/8" in length and 3/8" deep as shown in **Figure 8**.
 - iii. Use a die grinder with cut off wheel – cut 3/8" into bracket after marked on both ends of measured area – hog out remaining material as shown in **Figure 9**.



Figure 7



Figure 8

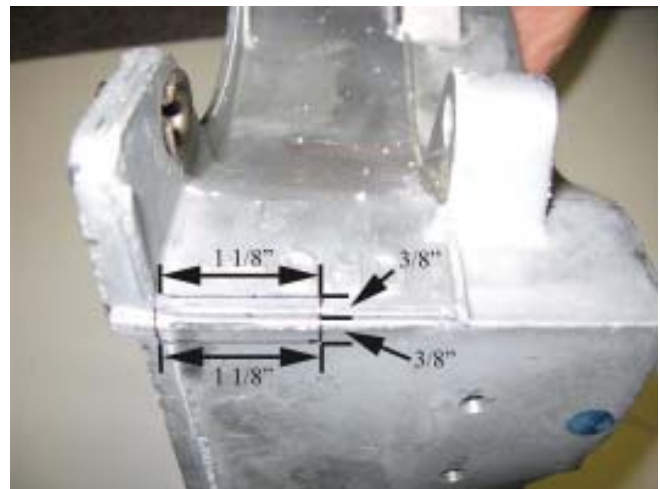


Figure 9

- iv. .025" feeler gauge will verify alternator/bracket clearance.

Note: Verify that the van throttle cable is not pinched behind the alternator. It should be routed next to it.

11. Install the new drive belt routing diagram (see **Figure 10**)
12. Install the safety ring to the back of the driver side head (see **Figure 11**). Use the original bolt in back of head and the provided 10mm bolt for mounting. Leave the top of the safety ring off until the drive shaft has been installed.

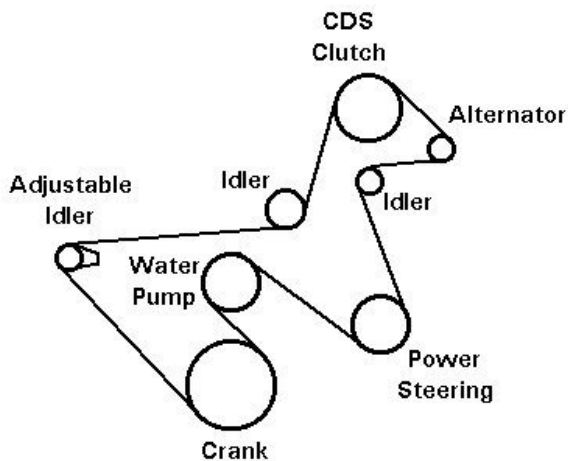


Figure 10



Figure 11

13. Install the drive shaft onto the back of the clutch. The spline end of the drive shaft will face the blower power pack. Slide the yoke of the drive shaft onto the clutch shaft. The end of the clutch shaft needs to be flush with the inside of the yoke. Torque bolts to 35ft pounds.
14. Temporarily rest the drive shaft on the safety ring until the blower power pack is installed.
15. Install the top of the safety ring.

Note: With the drive shaft attached to the clutch and resting in the center of the safety ring check all clearances of the; wire harness, breather tubes, throttle cable or anything that may rub on the drive shaft. Secure as necessary.

16. Install the coolant hoses as follows:
 - a. Locate the 1-3/8" upper radiator hose and cut in half just before the end of the fan shroud. Install the provided aluminum tee and clamps facing the passenger side.

- b. Install the provided 3/4" tee into the 3/4" lower hose coming off the water pump. (The same hose from which the coolant was drained). Cut the hose in half and install the tee. The tee needs to be pointing up and slightly towards the front of the van (See **Figure 12**).
- c. Leave the provided 3/4" green stripe hose in its full length. Feed the two ends, from the passenger compartment, over the passenger valve cover to the front of the van and attach to the tees. Carefully route the hoses away from any moving parts, sharp edges, or hot parts. Secure the hoses with provided clamps. See (**Figures 13, 14, and 15**)



Figure 12



Figure 13



Figure 14



Figure 15

⚠ WARNING

Improper installation of the coolant hoses may result in engine damage.

III. INSTALLATION OF THE BLOWER POWER PACK

1. For the 2003-2009 we have provided a spacer frame for the blower power pack. The frame gets bolted down to the van floor and the power pack is bolted to the spacer frame. If there is a need to remove the power pack in the future it just needs to be unbolted from the spacer frame.
2. Position the power pack with spacer frame (Cat pump towards front of van) between the driver and passenger seat locations.

Note: *No measurements have been given to locate the power pack assembly. Side to side measurements will be determined by the position of the drive shaft against the engine and the safety ring. Front to back location will be determined by the drive shaft length.*

Note: *The drive shaft spline must be completely compressed before positioning the power pack. To do so, take the yoke at the end of the drive shaft and push towards the clutch.*

3. Slide power pack up to the drive shaft. Hold the drive shaft in line with jackshaft.
4. Properly position the power pack as follows:
 - a. **Front to Back:** Leave $\frac{1}{4}$ inch between the jackshaft and the drive shaft yoke. This will allow for future removal of the drive shaft. Slide yoke onto jackshaft but do not tighten bolt yet. (**Figure 16**)
 - b. **Side-to-Side:** Position as far as possible to the passenger side so the driveshaft does not contact the engine's wire harness, throttle cable, breather tube or fly strap. Leave $\frac{1}{4}$ inch to $\frac{1}{2}$ inch between any part of the engine and the drive shaft.
5. With the power pack set, place the driver seat in and check clearance. The backrest adjustment may be touching the power pack but it should not compress the handle. There should be enough room to slide the blower cowling between the seat and power pack. Adjust the power pack as necessary.



Figure 16

Note: *Verify that the drive shaft yoke will slide off the jackshaft. Slide the yoke back onto the jackshaft and torque the bolt to 35 foot pounds. The exposed spline of the elbe shaft should be no longer than 5".*

6. Dry fit tank, seats, and salsa in an effort to make sure doors close and tank lids open all the way. Blower placement is the key to a good fit and finish. **(Figure 17)**
7. With the power pack in place, drill 3/8" holes through the floor using the blower frame spacer as a template.
8. Bolt the power pack down with the provided hardware.



Figure 17

IV. INSTALLATION OF THE FINISH KIT

1. To extend the alternator main battery charge cable we provide a 150 amp terminal post, self-tapping screws and a 4-gauge battery extension cable. The terminal block needs to be mounted to the firewall. This eliminates the need to cut off the original ring connector or splice the wire. (see **Figure 18** for mounting).

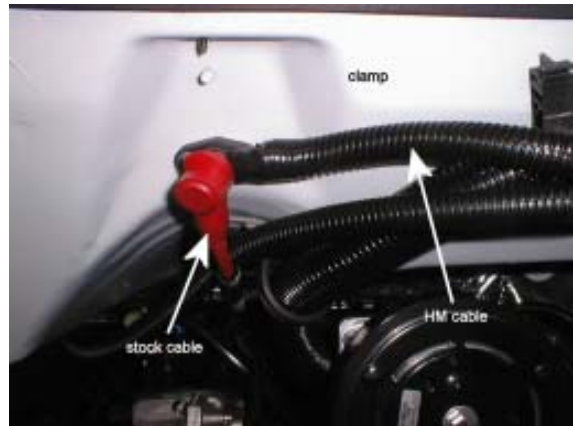


Figure 18

CAUTION

Proper routing of this cable is critical.

2. The extended wire plug for the back of the alternator needs to be plugged in and the exposed wires covered with the provided ¼ inch split loom.

Note: Verify that the pink butt connectors are properly secured to the wires.

3. Use the provided 1-½ cushion clamp and self-tapping screw to hold the main wire harness away from the CDS clutch. (see **Figure 19**)
4. Refer to the electronic throttle kit instructions to complete this portion of the installation.



Figure 19

V. INSTALLATION OF MINI SALSA AND SILENCER

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

1. Attach the short end of the 90 degree 3" rubber elbow to blower outlet. Attach the long end of the 3" rubber elbow to the salsa inlet (see **Figure 20**).
2. If needed, cut the 3" rubber hose to an appropriate length to allow for clearance under the van.
3. Position the hose where it will go through the floor and outline this with a felt tip pen. Pilot drill a hole; make sure to check for clearance under the truck. Drill a 3.25" hole for the hose to pass through. The location of the hole depends on your van.
4. Slip fit the 3" aluminum elbow in the 3" rubber hose protruding through the floor.
5. Install external silencer under the van. Depending on the van model, silencer may span the "rib" of the floor or bolt directly to the van floor.
6. Direct the 3" aluminum elbow towards the silencer inlet. Tighten the clamp and measure the distance between the elbow and the inlet. Cut the 3" hose provided and install.



Figure 20

VI. INSTALLATION OF THE VACUUM TANK

1. Slide vacuum tank into van. Recovery tank placement will be determined by dry fit placement. Flex house allow us to attach tank and blower without clearing issues.
2. Route the coolant hoses from the back of the engine along the passenger side of the blower power pack to the heat exchangers mounted on the vacuum tank.

Note: *Proper routing of the coolant is critical for optimum performance. The inlet hose that comes from the upper radiator hose tee must be connected to the valve located on the heat exchanger. The return hose comes off the other heat exchanger and routes to the lower tee installed at the water pump. Secure hoses using the provided clamps. See **Figure 21** for hose routing.*



Figure 21

3. Route the 1 inch hose and the high pressure hose from the blower assembly, down and next to the blower and to the tank.
4. Place cowing and fit the tank to the cowling. The cowling and tank should just touch. (see **Figure 22**)



Figure 23

VII. INSTALLATION OF THE WIRE HARNESS

1. Harness wire colors and functions:

- A - Red – Main power (10 gauge)
- C - Red – For APO if optioned (16 gauge)
- D - White – Main ground
- E - Green – Tachometer pick up on blower
- F - Black – Clutch, throttle control

2. Plug the harness into the vacuum tank (behind the side dash panel).
3. Route the harness towards the passenger side of the power pack. At the first “Y” in the harness, route the red wire along the blower spacer frame to underneath the driver seat.
 - a. Long black wire routed with main power 10g. route under driver’s side mat and cable tie to loom on floor. Bring out under steering column.
 - b. The red wire connects to the provided inline 25-amp fuse. The fuse connects to the power source under the seat. The fuse holder mounts to the top of the fuse box. **Figure 23** shows the power pack bracket orientation.



Figure 23

CAUTION

When re-installing the driver’s seat take care not to crush or pinch the wires.

4. Route the rest of the harness along the side of the power pack.
 - a. The green wire attaches to the tachometer magnetic pickup (white wire, back side of blower). The tachometer uses a single magnet on pulley.
 - b. The white wires exiting the harness connect to the side of the power pack and provide a ground.
5. Continue routing the harness up over the passenger side of the engine, along with the coolant hoses. The single white wire attaches to the back of the engine head. Use the stud that mounts the transmission fill tube.
6. Finally route the rest of the harness up and over the air cleaner.
 - a. The black wire attaches to the CDS clutch.

CAUTION

Make sure to keep the black wire away from the rotating clutch.

7. Cover all the exposed wires with the provided ¼ inch split loom. This will produce a clean, finished look.

VIII. FINISHING THE INSTALLATION

1. Secure the coolant hoses and wire harness into a clean bundle using provided tie wraps.
2. To cut the doghouse, refer to **Figures 24** and **25** for the correct dimensions.



Figure 24



Figure 25

Note: Only one large cut needs to be made in the doghouse. The piece that is cut out can be discarded. Clean the edges of the cut.

3. Reinstall the doghouse into the van.

Note: It will be a tight fit over the high-pressure pump and hoses.

4. Install the doghouse seal as follows:
 - a. On the back of the seal is a Velcro strip; this needs to be installed using rivets to the metal lip of the van floor. This will help create a tight seal all the way around.

- b. Open the Velcro strips of the seal and slide over the drive shaft and hose bundle. Position the seal as is shown in **Figure 26**. Close Velcro strips around shaft and hose bundle.
 - c. With the seal square on the doghouse drill 7/32" holes between the stitching around the perimeter of the seal and install the provided rivets.
5. Modify the driver's side dash cover, closest to the doghouse (see **Figure 29**).
 6. Reinstall the passenger dash cover.
 7. Reconnect the positive battery cable.
 8. Reinstall air cleaner assemble and antifreeze overflow container.
 9. CDS clutch burnishing: 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 and minute with no load for 50 cycles.



Figure 26



Figure 27

CAUTION

Use Dex-cool Red GM antifreeze or equivalent.

10. Run petcock hose (mounted on heat exchanger) to a small drain pan and open to allow air to vent.
11. Fill the radiator with coolant (It is recommended by Chevy that you fill the antifreeze a small amount at a time):
 - a. Fill the radiator until it is full and no bubbles are indicated and close petcock.
 - b. Start the vehicle and run for approximately 2-3 minutes. Monitor the engine temp gauge the entire time.

Note: The motor will heat up rapidly.

CAUTION

If gauge starts to read over 210-215 degrees turn engine off. Failure do so may result in engine damage.

- c. Allow the engine to sit until the antifreeze starts to bleed down.
- d. Repeat this procedure until all the air is bled out of the pet cock and the engine is operating at the normal temperatures.
Note: *This procedure could take up to 2-3 hours to complete.*
- e. Close pet cock and recheck that the engine is still operating at normal temperatures.

12. Place the blower cowling over the power pack and check fit.

Note: *It is best to do this before starting the CDS to avoid grease from flinging off the drive shaft.*

13. Start the van and check for antifreeze leaks at the installed tees and heat exchangers.

IX. TESTING THE CDS SYSTEM

1. Starting up of CDS unit:
 - a. After the safeties have been checked, start the van.
 - b. Before starting the CDS, verify that all the air has been bled from the coolant and that the van is running at normal operating temperature.
 - c. Hook up water to the inlet quick-connect on the CDS.
 - d. Turn the key "on" to the CDS unit.
2. Turn the pump clutch switch on and adjust pressure to 300-400 psi. The rpm's may need to be readjusted due to the load of the pump.
3. Check for any water leaks around the pump, heat exchangers and behind the side dash panel.
4. After the run in time, turn the van off and allow it to cool. Once the van has cooled down, retighten all coolant hose clamps.