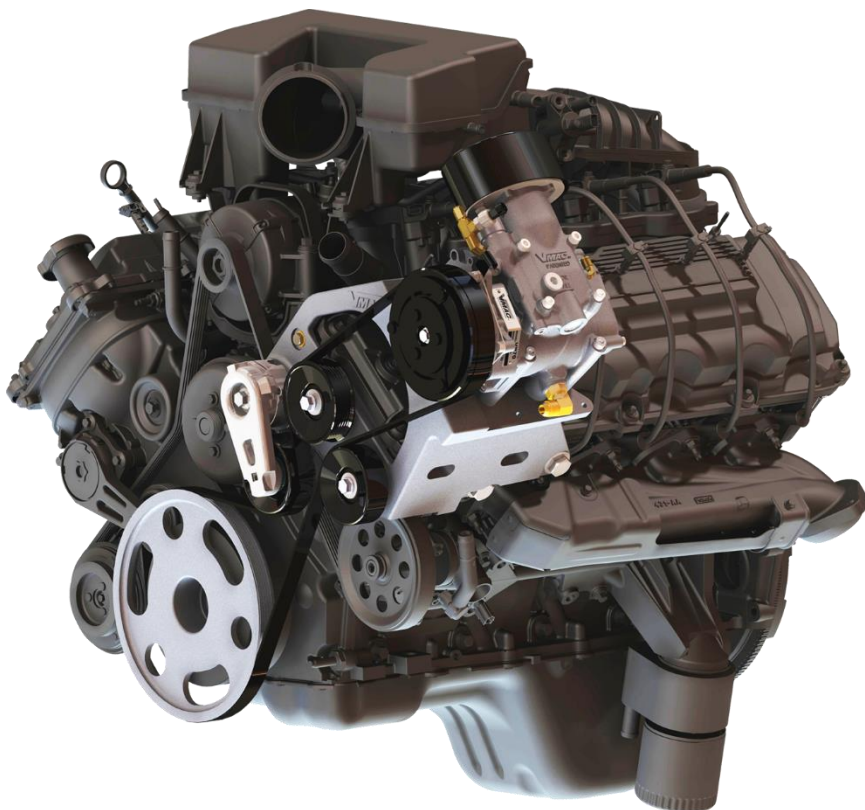




VMAC[®]

VEHICLE MOUNTED AIR COMPRESSORS
COMPACT. POWERFUL.



Installation Manual for VMAC System V900136

**2015 – 2018 Ram 2500-3500 Pickup, Cab & Chassis
2015 – 2018 Ram 4500-5500 Cab & Chassis
6.7L Cummins Diesel**

www.vmacair.com

Installation Manual for VMAC System V900136

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Additional Application Information

- Adaptor kit A900008 is required when installing this system on a 2500 – 3500 Pickup or 3500 Chassis Cab.

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Important Information

The information in this manual is intended for certified VMAC installers who have been trained in installation procedures and for people with mechanical trade certification who have the tools and equipment to properly and safely perform the installation. Do not attempt this installation if you do not have the appropriate mechanical training, knowledge and experience.

Follow all safety precautions for mechanical work. Any grinding, bending or restructuring operations for correct fit in modified trucks must follow standard shop practices.

Notice

Manuals are subject to change without notice.

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Safety

Important Safety Notice

The information contained in this manual is based on sound engineering principles, research, extensive field experience and technical information. Information is constantly changing with the addition of new models, assemblies and service techniques. If a discrepancy is noted in this manual, contact VMAC prior to initiating or proceeding with installation, service or repair. Current information may clarify the issue. Any person with knowledge of such discrepancies who performs service and repair assumes all risks.

Only proven service procedures are recommended. Anyone who departs from the specific instructions provided in this manual must first assure that their safety and that of others is not being compromised and that there will be no adverse effects on performance or the operational safety of the equipment.

VMAC will not be held responsible for any liability, consequential damages, injuries, loss or damage to individuals or to equipment as a result of the failure of any person to properly adhere to the procedures set out in this manual or standard safety practices. Safety should be your first consideration in performing service operations. If you have any questions concerning the procedures in this manual or require any more information on details that are not included in this manual, please contact VMAC before beginning repairs.

Safety Messages

This manual contains various warnings, cautions and notices that must be observed to reduce the risk of personal injury during installation, service or repair and the possibility that improper installation, service or repair may damage the equipment or render it unsafe.



This symbol is used to call your attention to instructions concerning your personal safety. Watch for this symbol; it points out important safety precautions, it means, "Attention, become alert! Your personal safety is involved". Read the message that follows and be alert to the possibility of personal injury or death. Be alert; your safety is involved. While it is impossible to warn about every conceivable hazard, let good common sense be your guide.



This symbol is used to call your attention to instructions on a specific procedure that if not followed may damage or reduce the useful life of the compressor.



This symbol is used to call your attention to additional instructions or special emphasis on a specific procedure.

Warranty

Standard Product Warranty

For complete warranty information, including both our standard Product Warranty and Limited Lifetime Warranty requirements, please refer to our current published warranty located at:

<http://vmacair.com/warranty/>



If you do not have access to a computer, please contact us and we will be happy to send you our warranty.

VMAC's warranty is subject to change without notice.

Limited Lifetime Warranty

Effective 1 October 2015 - The Compressor Assembly (excluding Inlet and Clutch, where applicable) is warranted against manufacturer defects in materials and workmanship for the lifetime of the Compressor Assembly. Restrictions apply – refer to VMAC Warranty Policy and VMAC Limited Lifetime Warranty for full details.



Warranty Registration

The VMAC warranty form is located at the back of this manual. This warranty form must be completed and sent to VMAC at the time of installation for any subsequent warranty claim to be considered valid.

There are 4 ways warranty forms can be submitted to VMAC:

Online

<http://vmacair.com/support/warranty/>

Email

tech@vmacair.com

Fax

(250) 740-3202

Mail

VMAC - Vehicle Mounted Air Compressors 1333 Kipp Road, Nanaimo, BC, Canada V9X 1R3

VMAC – Vehicle Mounted Air Compressors

Toll Free: 1-888-241-2289

Fax: 1-250-740-3201

General Information

Before You Start

Read this manual before attempting installation so that you can familiarize yourself with the components and how they fit on the vehicle. Identify variations for different engine models and different situations that are listed in the manual. Open the package, unpack the components and identify them.

Torque Specifications

All fasteners must be torqued to specifications. Use manufacturers' torque values for OEM fasteners. **Apply Loctite 242 or equivalent on all engine-mounted fasteners.** Torque values are with Loctite applied unless otherwise specified.

STANDARD GRADE 8 NATIONAL COARSE THREAD								
Size	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4
Foot-pounds (ft.lb)	9	18	35	55	80	110	170	280
Newton meter (N•m)	12	24	47	74	108	149	230	379

STANDARD GRADE 8 NATIONAL FINE THREAD					
Size	3/8	7/16	1/2	5/8	3/4
Foot-pounds (ft.lb)	40	60	90	180	320
Newton meter (N•m)	54	81	122	244	434

METRIC CLASS 10.9						
Size	M6	M8	M10	M12	M14	M16
Foot-pounds (ft.lb)	4.5	19	41	69	104	174
Newton meter (N•m)	6	25	55	93	141	236

Special Tools Required

- Pneumatic fan wrench (Lisle 43300 or equivalent)
- #30 drill bit
- 6mm ball end hex driver
- Pop rivet gun

Hose Information

Depending on other installed equipment, it might be necessary to move the air/oil separation tank from its intended location. The hoses used in VMAC compressor systems have a specific inner liner that is compatible with VMAC compressor oil. Use of hoses other than those supplied or recommended by VMAC may cause compressor damage and may void your warranty. Please contact VMAC for replacement hoses and further information.

System Identification, Warranty and Warnings

Preparation for installation is very important. Missing a step or an item can cause problems in the installation or damage to components.

- Check off each item as it is completed so that you do not miss any preparation steps.**
- Check through the illustrated parts list to ensure that all components are present and that they are in the correct quantity. If any components are missing, have the system ID ready and call VMAC technical support at (888) 241-2289.
- Complete the warranty form. The VMAC warranty form is located at the back of this manual, as well as online at:

<http://vmacair.com/warranty/>

This warranty form must be completed and returned to VMAC at the time of installation for any subsequent warranty claim to be considered valid.

i **The System Identification Number Plate must be attached to the vehicle at the time of installation. This plate provides information that allows VMAC to assist with parts and repairs.**

- Mark and drill 2 x 7/64 in holes in the top of the cross member in front of the hood support. Secure the plate with the supplied self-tapping screws. (Figure 1)



Figure 1 - System Identification Plate

- Clean the cross member beside the System ID plate and stick the belt routing diagram to the cross member.

- As part of the installation process, ensure that the operating instruction label is affixed in an obvious location so that it can be seen by vehicle operators. A good spot for this is usually on the inside of the door or on the panel underneath the steering wheel (Figure 2).



OPERATING INSTRUCTIONS

Daily Pre Start Check:

- 1. Check oil level in tank.**
- 2. Check for leaks.**

Start Up Procedure:

- 1. Ensure air system is depressurized.**
- 2. Ensure all air outlets are CLOSED.**
- 3. Place vehicle in Neutral or Park and engage park brake.**
- 4. Start engine and bring to operating temperature.**
- 5. Turn ON compressor.**

Shutdown Procedure:

- 1. Ensure discharge valve is CLOSED.**
- 2. Allow engine to idle for 1 minute.**
- 3. Turn OFF compressor.**
- 4. Wait for system to depressurize before restarting.**

For Technical Support/Parts contact your VMAC Dealer
To locate your nearest dealer call 1-800-738-8622 (250-740-3200)

4401158-A



WARNING
Always allow system to depressurize before restarting

Figure 2 - Operating Instruction Label

- To alert any technicians that may service the vehicle, affix the warning label in the engine compartment near the hood latch in a visible location. Thoroughly clean the selected area before affixing the label (Figure 3).



Figure 3 - Warning Label

Preparing for Installation



Do not use a test light to probe for power on vehicle circuits, the increased current draw of the test light may damage components.

Preparation for installation is very important. Missing an item can cause problems in the installation or even damage to components. Check off each item as it is completed so that you do not miss any preparation steps.



Ensure that you have filled out the VMAC Warranty Registration. Install the System Identification Number Plate and operating instruction label. (Please see page 6 for details).

- See page 38 for “Park” / “Neutral” wiring connections.
- Disconnect both of the batteries.
- Raise the front of the vehicle and support the axle on axle stands (or appropriate blocking).



Ensure the vehicle is safely supported on axle stands before working under it.

- Optional:** Remove both front wheels.
- Remove the grille. First remove the upper cover (4 x tree style trim/panel fasteners). Then remove the 4 upper bolts. Gently pull the grille forward and use a long flat screwdriver to gently pry between the mounting bosses on the grille and the tabs on the radiator support.
- Remove the passenger side inner fender liner.
- Optional:** Remove both front inner fender liners.



Removing both wheels and inner fenders improves access to the compressor discharge hose and electrical routing.

- Remove aesthetic engine covers (if equipped).
- De-burr the sharp front edge of the EGR crossover tube cover, above the OEM upper radiator hose.
- Remove the air box assembly. Note that there is an electrical connector near the base of the housing that can be difficult to access until the air box is partially removed. Cover the intake tube to prevent entry of contaminants into the turbo.
- Drain the coolant. The radiator drain ports use a 10 mm hex driver and are accessible from the front of the truck once the grille is removed.
- Remove the lower radiator hose and save for use later.
- Remove the upper radiator hose and save for use later (The hose clamps may be glued to the hose, use care when removing).

- Remove the upper radiator hose support bracket from the cylinder head. Clean any clear coat or foreign material from the mounting surface and the three tapped holes on the cylinder head, in front of the air intake tube.
- Remove the plastic EGR wiring harness clip from the stud on the front of the OEM intake tube (near the throttle body). This clip can be inverted to support the wiring harness above the stud.
- Disconnect the fan clutch wire and secure it to the stator brace using a cable tie.
- Remove the 4 bolts from the radiator section of fan shroud.
- Remove the radiator section of fan shroud.



To access the bottom fasteners, you may need to loosen the T-Bolt clamps and move the charge air cooler hose out of the way as room is limited.

- Insert a protective sheet of cardboard between the radiator and radiator fan.
- Remove the 4 nuts securing the engine mounted portion of the fan shroud to its support brackets.
- Remove the upper driver side fan shroud support bracket from the engine. This part may be discarded.
- Remove the fan (RH thread) and the engine portion of the fan shroud.

- Position the supplied template on the fan shroud as shown in Figure 4 and Figure 5.
 - Loosely insert the 4 supplied rivets through the holes at the center and outer holes of the template. The 2 outer rivets will sit on the edge of the shroud while the center 2 will sit inside the mount hole.

NOTE *Do not expand rivets*

- Gently clamp the template in position.
- Using the empty holes below the rivets as a guide, drill through the shroud with a #30 drill
- Mark the shroud along the edges in preparation for cutting.

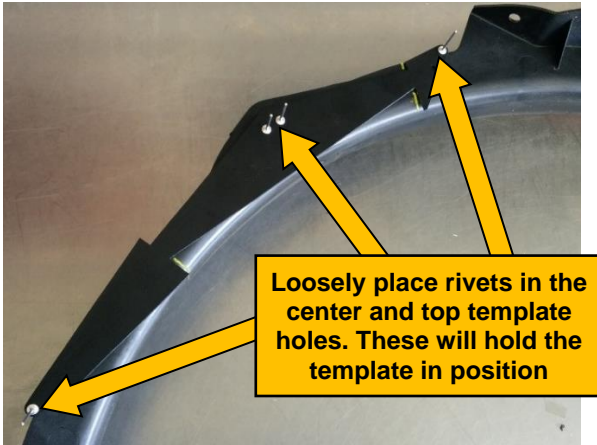


Figure 4 - Modifying the Shroud

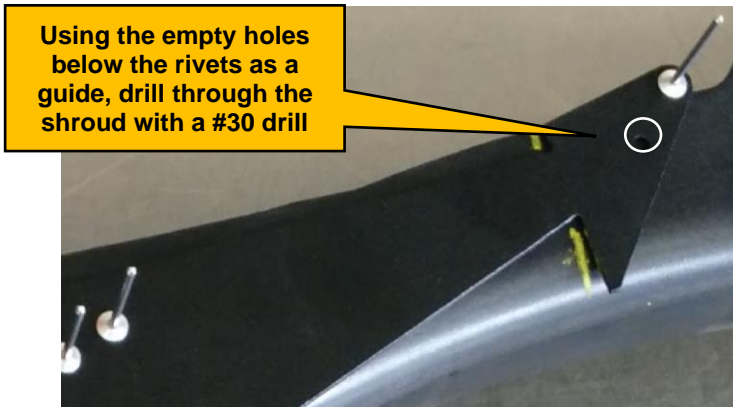


Figure 5 - Modifying the Shroud

- Cut away the shroud section using the marks made with the template and the raised soft rubber lip as a guide. (Figure 6 and Figure 7)

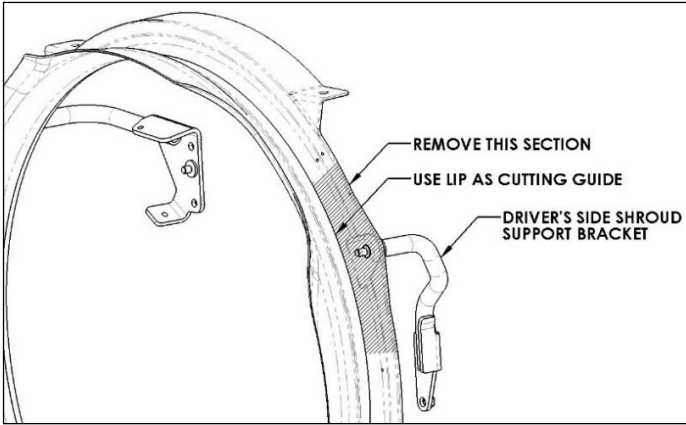


Figure 6 - Modifying the Shroud



Figure 7 - Modifying the Shroud

- Using the stiffener bracket as a template, mark and cut away 3 sections of the remaining soft rubber lip so the stiffener bracket feet sit directly on the hard plastic surface. (Figure 8)



Figure 8 - Modifying the Shroud

- Attach stiffener bracket to the fan shroud using the 2 drilled holes and supplied rivets as shown in Figure 9. Using the stiffener bracket as a template, drill and rivet each remaining hole individually before moving on to drilling and riveting the next hole. Start with the center bracket foot and work towards the ends of the bracket, alternating sides. Finished product should look like Figure 10.

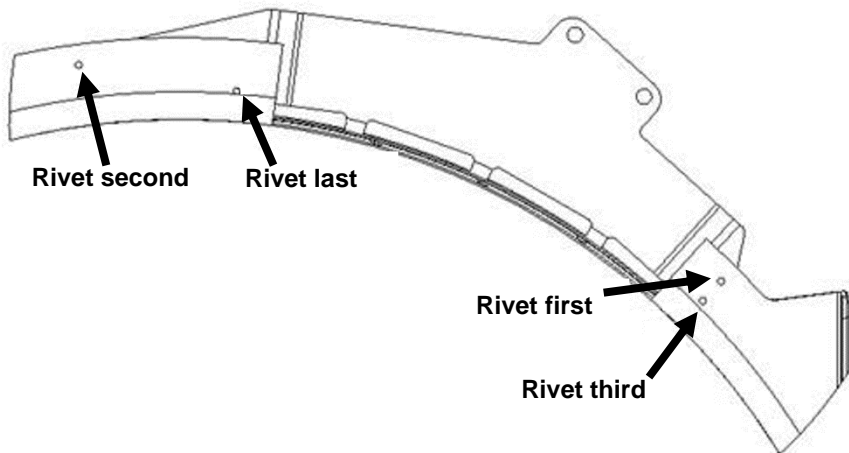


Figure 9 - Installing the Stiffener Bracket



Figure 10 - Stiffener Bracket Attached

- Cut away the section shown in Figure 11 from the top surface of the fan shroud. It will look similar to Figure 12 when done.

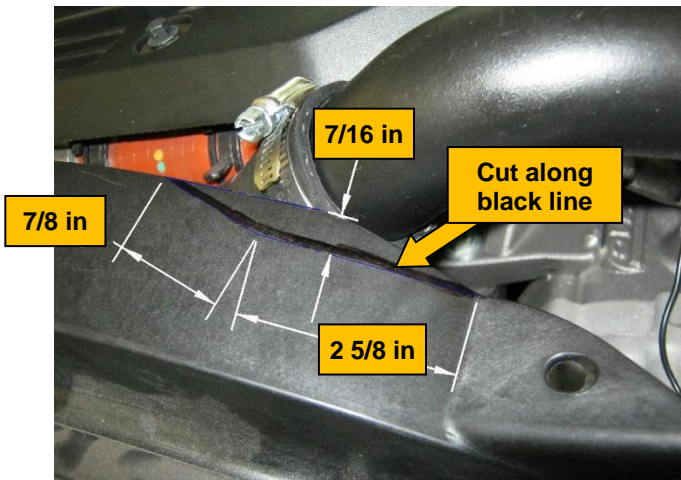


Figure 11 - Modifying the Shroud



Figure 12 - Modifying the Shroud

- Remove the 4 nuts securing the fan body to fan clutch and remove fan body. Discard nuts. (Figure 13)

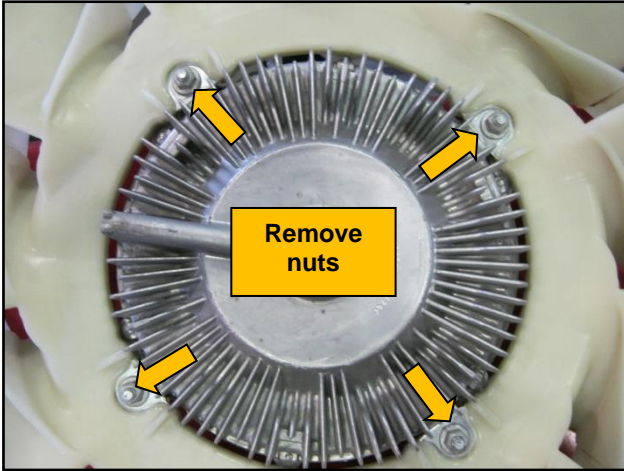


Figure 13 – Modifying the fan

- Remove the 4 Torx bolts from fan clutch. Discard bolts. (Figure 14)

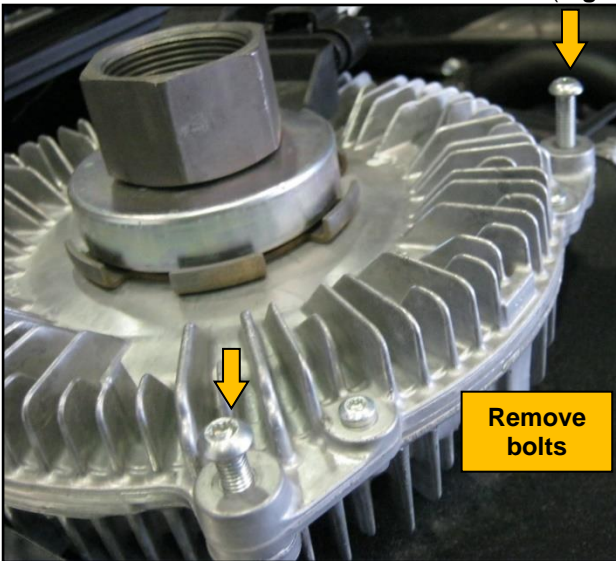


Figure 14 – Modifying the fan

- Re-install fan body on fan clutch using the new spacer (**Figure 15**).
 - Position new fan spacer on fan clutch.
 - Position fan body on new fan spacer.

NOTE *Excess plastic from the molding process may need to be removed for proper fitment.*

- Install supplied flange head bolts. Use Loctite 242 (blue).

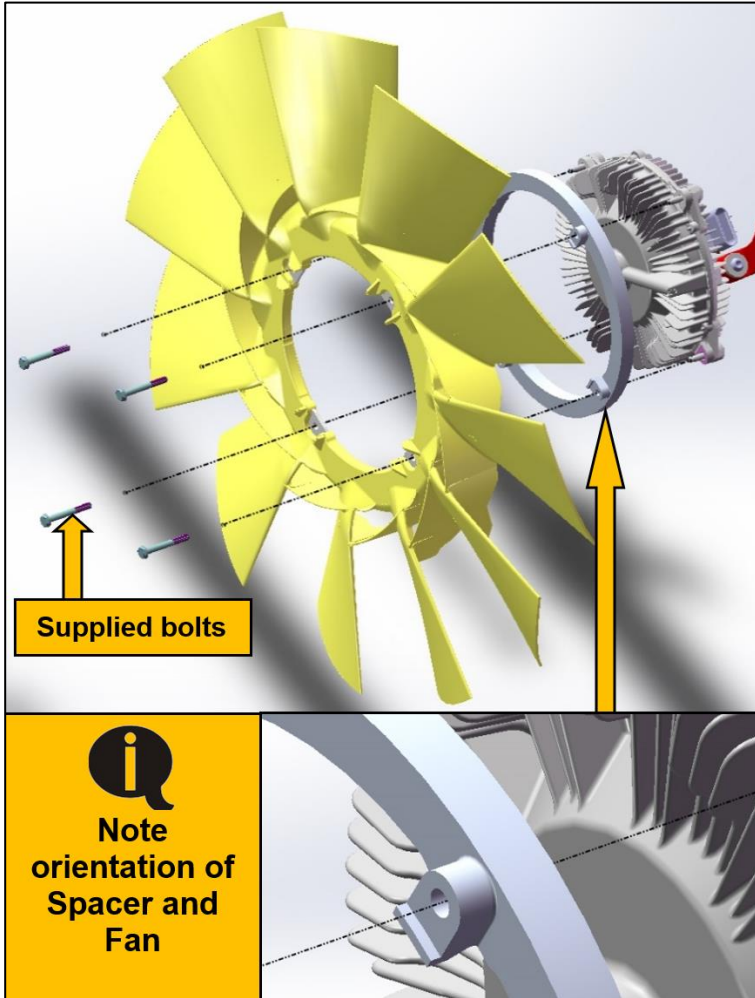


Figure 15 – Modifying the fan

- Release the tension from the OEM accessory drive belt.
- Remove the OEM crank pulley bolts and save for use later.
- Remove the OEM crank pulley and scrape off the clear coat from the inside front face of the hub. Discard the locking plate.
- Remove and discard the plug from the passenger side of the cylinder head (Figure 16) Use thread sealant on all connections, and install the supplied reducer bushing, pipe nipple, and tee fitting in the cylinder head port. Face the tee fitting towards the passenger side of the truck, and install the hose barb in the tee (Figure 17).

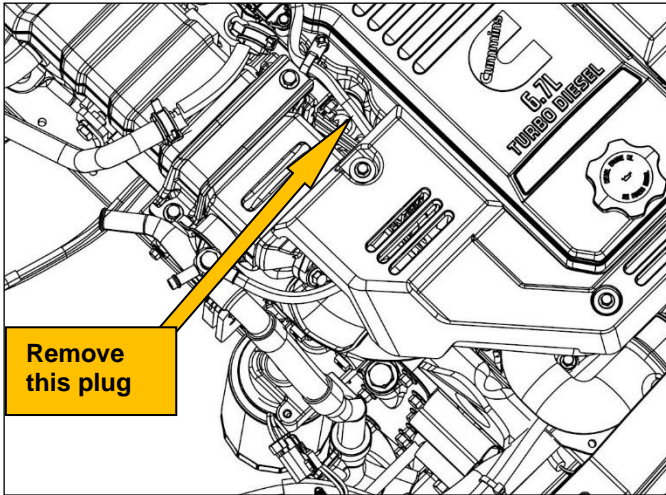


Figure 16 – Coolant vent



Figure 17 – Coolant vent

- Install 3/8 in coolant hose on barb fitting and secure with 2200001 hose clamp. Route the hose forward to the corner of the air box and then down towards frame mount on the passenger side.
- Remove throttle body shield.
- Disconnect wiring clip and remove throttle body. Clean any old gasket material off of intake tube and throttle body surfaces.
- Reinstall throttle body in 90° rotated position using throttle body adapter and supplied gaskets and hardware per Figure 18.



The engraved arrow on the adapter points towards the front of the truck.

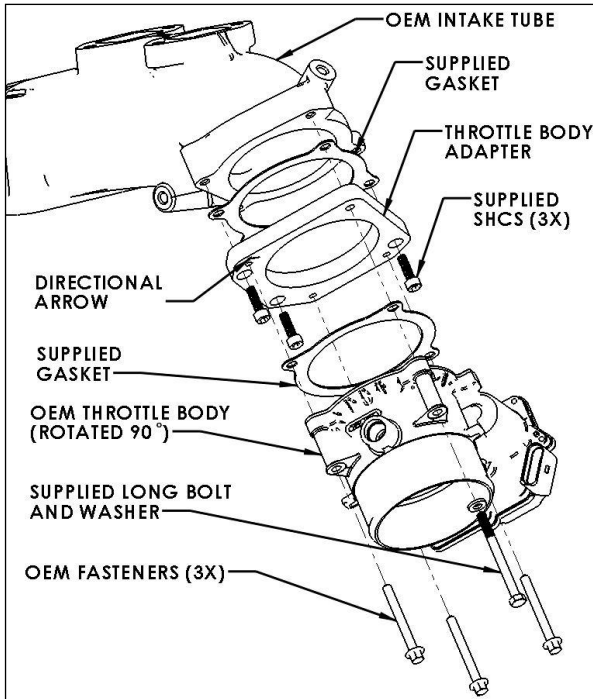


Figure 18 - Rotate throttle body

- Ensure the wiring for the throttle body is not pulled tight. It may be necessary to split open the OEM harness where the throttle body wires branch off, relieve the wires, and re-wrap the harness.
- Re-install throttle body shield.

Installing the Tank



Adaptor kit A900008 is required when installing this system on a 2500 – 3500 Pickup or 3500 Chassis Cab.

The tank will mount on the passenger side of the vehicle between the two cab mounts, with the oil filter facing forward (Figure 19).

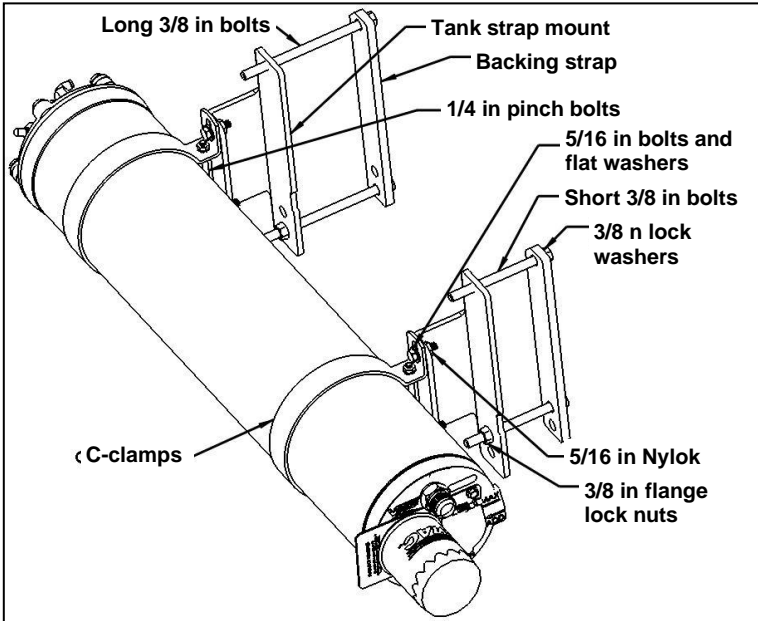


Figure 19 - Installing the AOST

Assembling and Installing the Brackets

- Place the tank on a workbench with the front (oil filter end) of the tank to your left.
- Remove the two 1/4 in pinch bolts from the C-clamps. Expand the clamps slightly and slide them over the front of the tank.
- Position the front clamp 7 in from the filter end of the tank, and the rear clamp 24 in from the filter end.
- Place the 2 formed tank strap mounts under the C-clamps with the ends with threaded holes facing you.
- Insert 5/16 in bolts with flat washers through the bottom hole on each bracket. Install Nylok nuts, but do not tighten.
- Install the 1/4 in pinch bolts into the C-clamps so that the heads of the bolts face toward you, apply Loctite and install the nuts but do not tighten.

- Rotate the tank so that the directional arrow on the Blowdown Cap is parallel to the workbench and faces toward you.
- Install a 3/4 in fitting (not supplied) in the back of the tank.
- Insert 5/16 in bolts with flat washers through the upper hole on each bracket. Install Nylok nuts, but do not tighten.
- Check tank alignment and gently tighten the C-clamp bolts.

Installing the Tank Assembly

- Apply Loctite 242 and insert 3/8 in bolts through the tank flat bar backing straps and route the bolts over the top of the frame so that the flat bar is on the inside of the frame rail (Figure 19).
- Support the tank in position with the tank strap mounts on the outside of the frame rail. Thread the top 3/8 in bolts into the tank strap mounts.
- Slide the tank assembly forward, positioning the front of the tank as close to the body mount as possible without making contact.
- Apply Loctite and loosely install the lower 3/8 in tank strap bolts and nuts.
- Adjust the tank for the best fit. It may be necessary to re-position the clamps based on body mount and cross-member locations.
- Tighten all fasteners to specifications.

Installing the Main Bracket and Compressor

Installing the Main Bracket and Compressor

- Place the OEM crank pulley on the front of the crankshaft and rotate it to align it with the locating pin. Route the belt as per (Figure 4.1) but leave the belt loose.



Do not tension the OEM belt before the OEM crank bolts are torqued.

- Place the VR pulley in front of the OEM crank pulley and align it with the locating pin. Ensure the OEM belt is routed around the OEM crank pulley before installing the VMAC crank pulley.

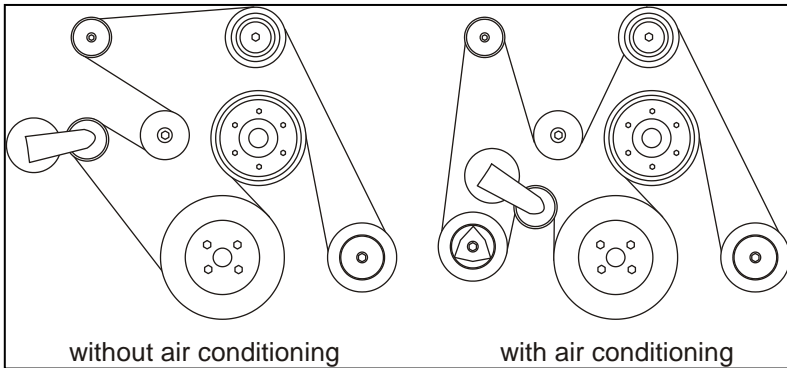


Figure 20 - OEM Belt routing

- Apply Loctite to the four OEM bolts and install them through the two pulleys into the crankshaft. Torque the crank pulley bolts to 69 ft.lb.
- Check the OEM belt routing diagram for the correct installation. (Figure 20)
- Remove idler and tensioner from VMAC main bracket.



Apply Loctite 242 (blue) to all main bracket fasteners

- Confirm the M10 threads in the engine block are clean and clear of debris.

- Position VMAC main bracket as shown in Figure 21 and install two M10 bolts finger tight into cylinder head.

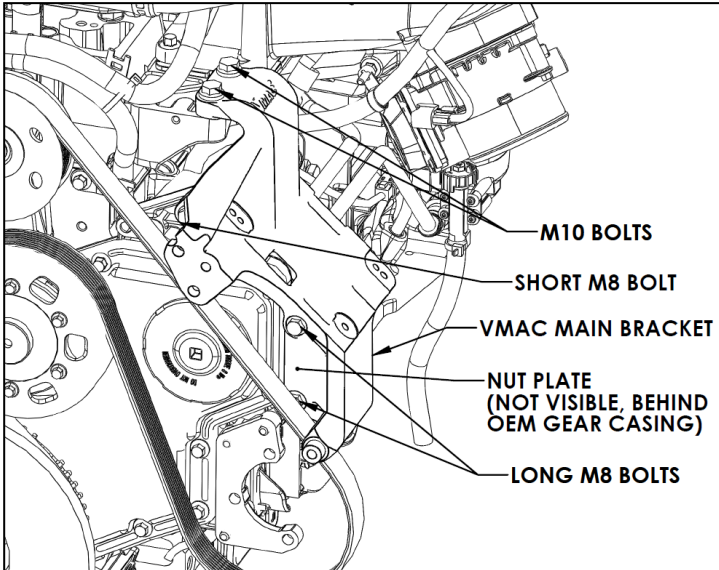


Figure 21 (Some components omitted for clarity)

- Install short M8 bolt finger tight through main bracket into timing gear housing tapped hole.
- Position nut plate behind timing gear housing and install long M8 bolts finger tight through main bracket and timing gear housing and into nut plate.
- Once all main bracket bolts are finger tight, torque bolts to specifications.
- Tension OEM drive belt.
- Install VMAC idler and tensioner using blue Loctite and torque bolts to specifications.
- Remove inlet valve from compressor and set aside.
- Install compressor on main bracket using blue Loctite and torque bolts to specifications. Note that a ball end 6mm hex driver is required to access some fasteners.

- Install VMAC drive belt per Figure 22.

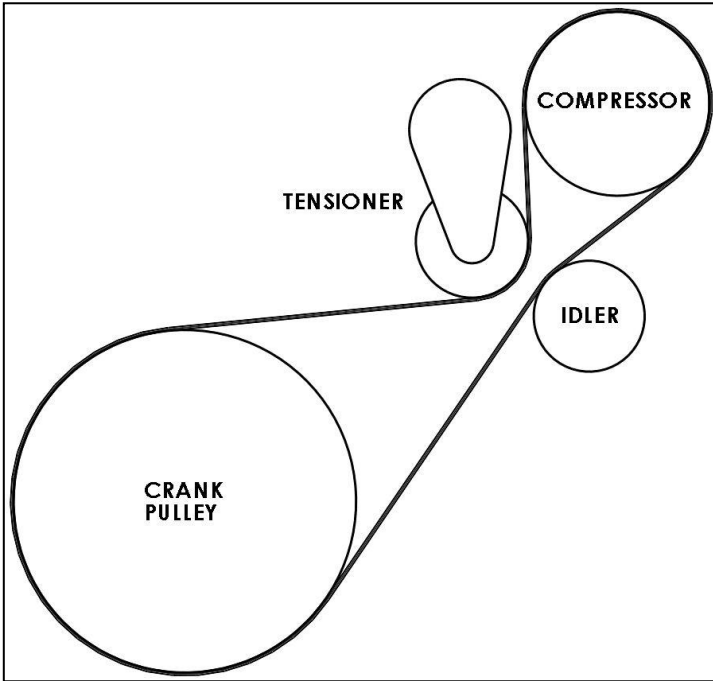


Figure 22 - VMAC Belt routing

- Tension VMAC drive belt.
- Install inlet valve per Figure 23. Do not torque bolts yet.

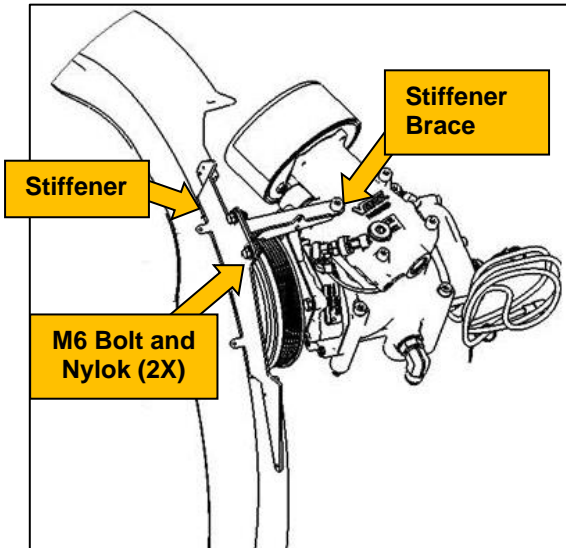


Figure 23 (Some components omitted for clarity)

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Fax: 1-250-740-3201

- Install supplied 1/4 in plastic loom on the supplied 1/4 in and 3/16 in PTFE tubes
- Install 1/4 in and 3/16 in PTFE tubes in the matching fittings on the compressor inlet valve.
- Route the PTFE tubes across the front of the engine, parallel to the OEM wiring, and under the thermostat housing spigot. Ensure they do not contact the Engine EGR valve.
- Secure the PTFE tubes to the OEM wiring bundles, and route the PTFE tubes down, behind the alternator. Tube installation will be continued later.
- Install radiator fan and engine mounted portion of the shroud.
- Connect fan clutch wiring and attach fan stator brace re-using 'tree' style fastener or with a cable tie.
- Remove protective cardboard from radiator and re-install radiator mounted portion of the fan shroud.



Ensure the rubber flange on the engine mounted shroud is sitting evenly on the outside surface of the radiator mounted shroud.

- Connect fan shroud brace to fan shroud stiffener per Figure 23.
- Torque inlet valve bolts to specifications.

Installing the Cooler and Hoses



Do not use air tools or electric impact guns to tighten hose clamps, they can over-torque the clamp and may cause coolant leaks. Use hand tools only.

Modifying the upper radiator hose

- Remove OEM upper radiator hose, and discard support bracket.
- Measure and cut the radiator hose at 5 in from bend at Radiator end, see (Figure 24).
- Make a second cut on the engine side of the straight portion of hose and remove 3 in of material (Figure 24).

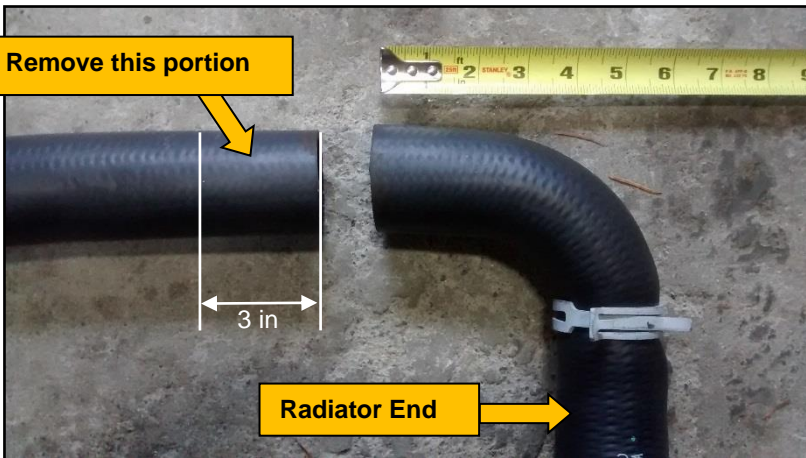


Figure 24 - Modifying the upper radiator hose

Connecting the upper radiator hoses

- Reconnect the straight portion of hose to the engine spigot and secure with the OEM spring clamp.
- Install supplied hose coupler (1720701). Ensure coupler is located above compressor.
- Reconnect elbow portion of hose between hose coupler and radiator with OEM spring clamp.
- Secure hose coupler (1720701) with supplied hose clamps. (Figure 25)



Figure 25 – Connecting the upper radiator hose

- Install P-Clamp (2200212) to radiator shroud using M6 nut and bolt (Figure 26).



Figure 26 - Connecting the upper radiator hose

Preparing the Lower Radiator Hoses

- Separate hose at OEM coupler. It is not necessary to remove the engine mounted section of the lower radiator hose.
- Remove and discard front (radiator) portion of hose.
- Keep OEM spring clamps as they will be re-used during cooler installation.

Installing the Cooler and Hoses

- Install the supplied (1710852) 3-1/2 in hose on short VMAC cooler spigot and secure with supplied t-bolt clamp (2200223). (Figure 27)

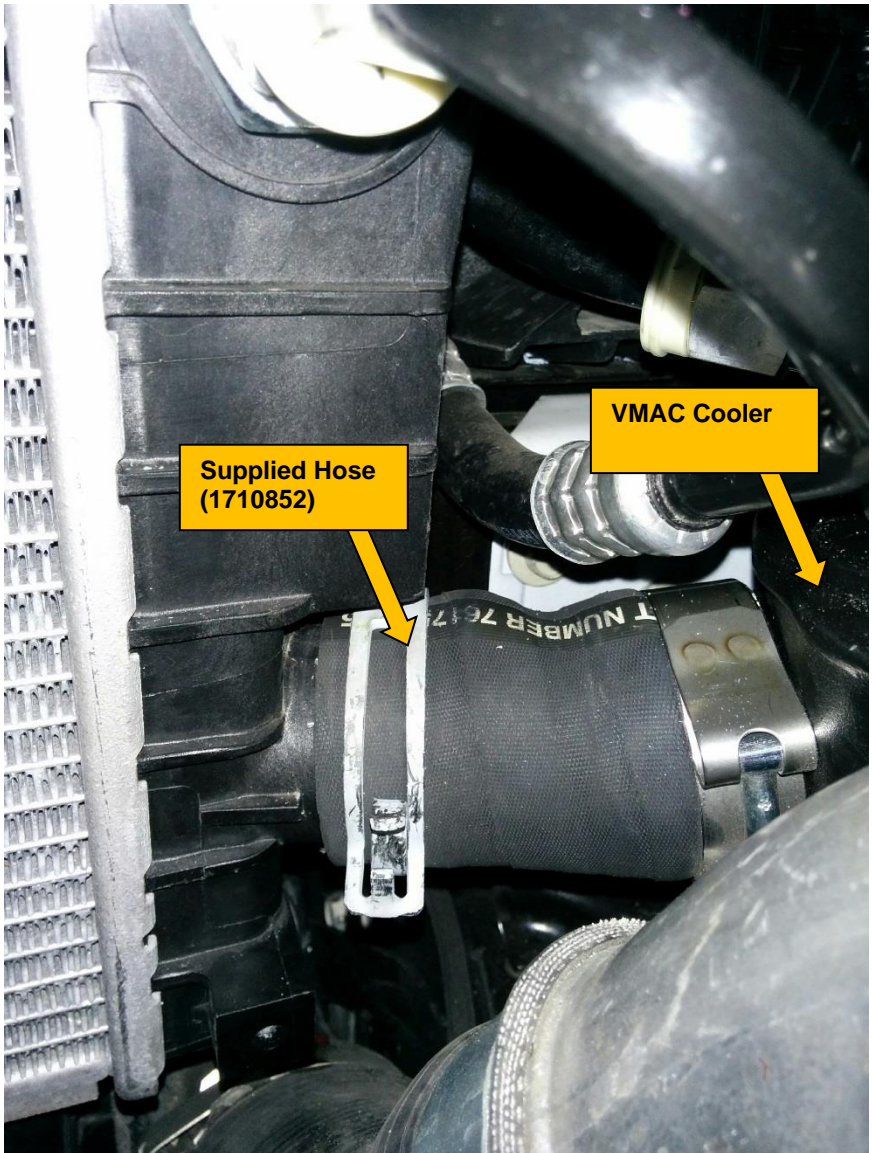


Figure 27 – Installing the cooler

- Slip OEM spring clamp over OEM radiator spigot, and Install Oil Cooler. Apply blue Loctite, and loosely attach cooler to OEM body bracket using washer (1570503) and bolt (1520501) (Figure 28).



Figure 28 – Installing the cooler

- Secure short hose on OEM radiator spigot using OEM spring clamp. Install OEM engine mounted radiator hose on VMAC cooler and secure with OEM spring clamp. (Figure 29)

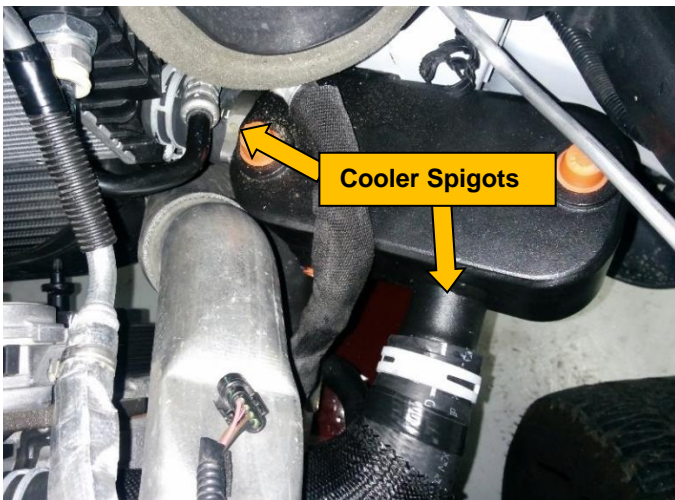


Figure 29 – Installing the cooler

- Ensure there are no kinks/restrictions in any of the hoses and that the abrasion sleeves are positioned correctly at contact points. Tighten all clamps.
- Tighten cooler onto OEM body bracket. Ensure cooler maintains alignment while tightening to OEM body bracket.

Installing 3/8 in Preheat Line

- Using thread sealant, install 1/4 in NPT-3/8 in Barb Connector (5000192) in port on back of cooler (Figure 30).
- Install 3/8 in coolant hose (Figure 30) on barb fitting and secure with 2200001 hose clamp.

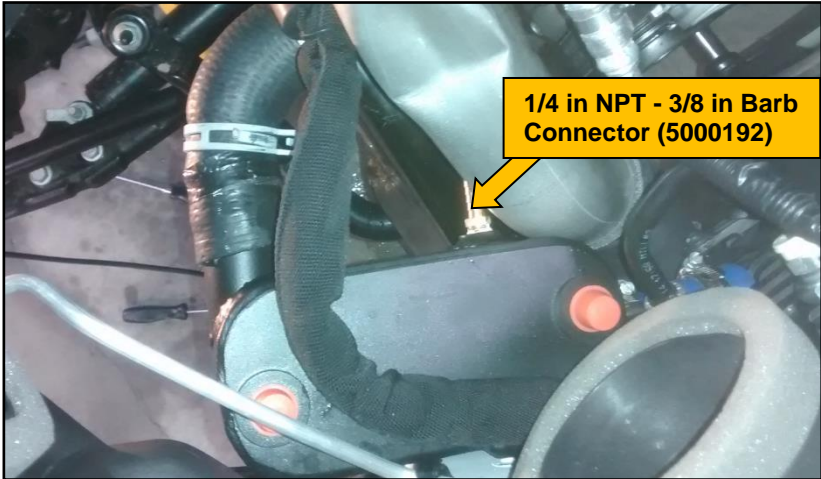


Figure 30 – Installing the preheat line

- Disconnect the small rubber hose on the upper passenger side of the primary radiator. Fill the coolant system at the reservoir tank, using the disconnected hose as an air bleed. Once coolant is seen coming out of the hose and/or port on the radiator, re-connect the hose and finish filling the reservoir to the marked level.



Using thread sealant, install the supplied plug in the top of the tee fitting installed on page 16.

- Remove the oil filter from the air/oil separator tank (AOST).
- Connect the 45° angled end of the 3/4 in hose to the fitting on the back of the compressor.
- Route the hose down and towards the transmission bell housing.
- Orient the 45° fitting to keep the hose away from any hot or moving parts.

- Install the bent discharge hose bracket on the bell housing bolt near the front driveshaft per Figure 31 and attach the hose to the bracket with the supplied clamp, bolt, and nut.



Figure 31 – Securing the hoses

- Install the straight discharge hose bracket on the transmission fluid cooler line bracket per Figure 32 and attach the hose to the bracket with the supplied clamp, bolt, and nut.



Figure 32 – Securing the hoses

- Route the hose between the lower suspension arm and the bottom of the frame.
- Install the 45° JIC elbow on the corresponding fitting on the separator tank.
- Connect the straight end of the hose to the 45° fitting.
- Tighten the fittings.

Connecting the Oil Cooler Hoses

- Connect the straight fitting on the end 1/2 in x 71 in to the fitting on the side of the compressor.
- Route the oil hose under the fan shroud and towards the oil cooler.
- Connect the 90° fitting on the driver side port on the cooler (Figure 33).
- Connect the straight end of the 1/2 in x 67 in hose to the corresponding fitting on the separator tank.
- Route the hose up along wheel well and forward towards the cooler. Run along top of frame.
- Install the 90° fitting on the passenger side port on the cooler (Figure 33).
- Orient the fittings to position the hoses so they will not touch any moving or hot parts and tighten the fittings.
- Secure hoses using cable ties.

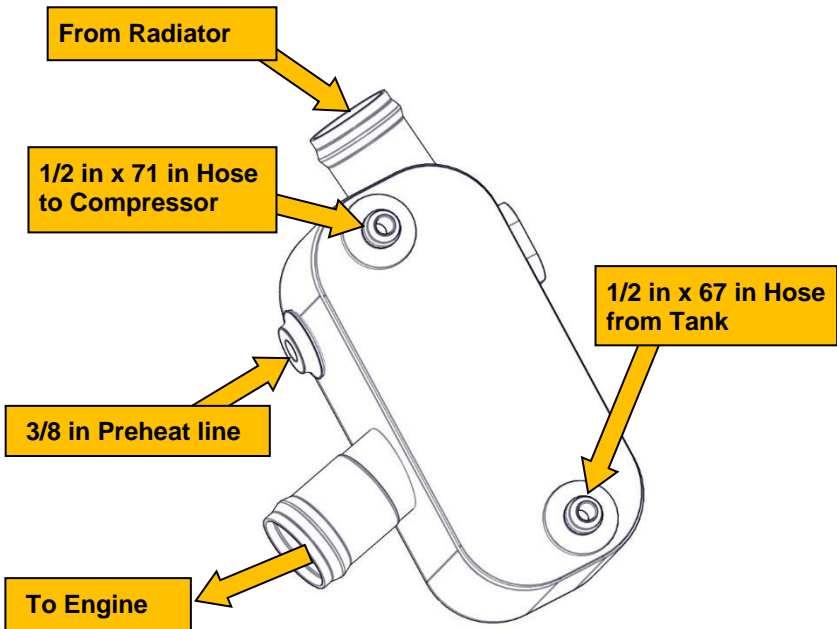


Figure 33 – Cooler connections

Connecting the PTFE Tubes

- Route the PTFE tubes and loom partially routed on page 23 from the alternator towards the solenoid near the passenger side battery.
- Route the PTFE tubes back towards the firewall along the OEM wiring bundle and down towards the frame.
- Route the PTFE tubes over the suspension link mount, over the body mount, and to the back of the tank.
- Connect the PTFE tubes to the matching fittings on the rear of the tank, trimming any excess tube in the process. Use proper soft tubing cutters or a utility knife to cut tubing, as typical side cutters will deform the tubing which can cause leaks.

NOTE *Lubricate the tube and firmly push it into the fitting so that it fully seats past the internal O-ring. Slide the collet back to lock tubing in place.*

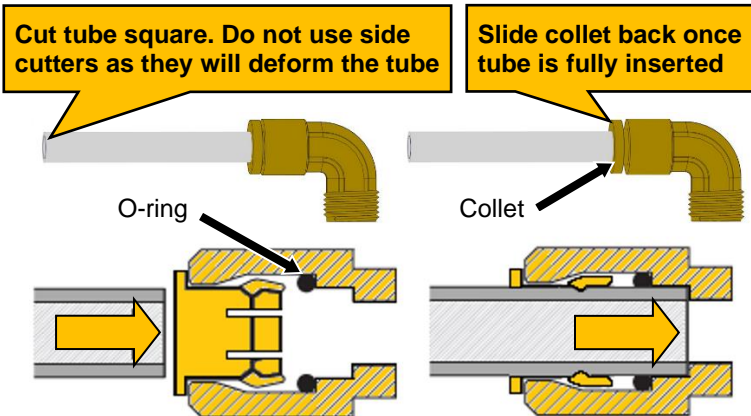


Figure 34 – Push to connect fittings

- Perform a check of all hoses to ensure they did not shift when the fittings were tightened. Secure with cable ties.

Adding Oil to the System



The VMAC supplied and approved compressor oil must be used in this system. Failure to use this special oil will result in damage to the compressor and will void warranty.

Do not overfill the system. Overfilling the system with oil can flood the sight glass window and make the system appear empty.

- Remove the plug or open the outlet of the tank.
- Remove the bolt securing the fan shroud brace to the inlet valve and pull the fan shroud forward to access the compressor clutch bolt per (33).

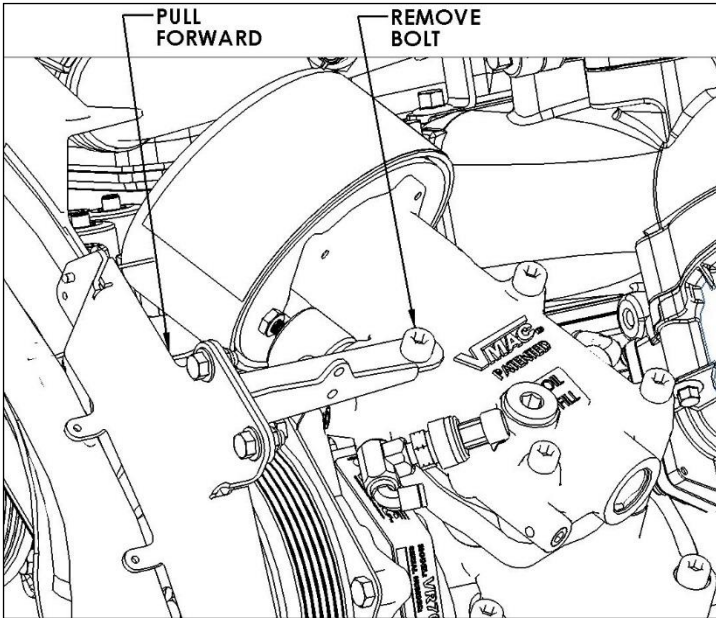


Figure 35 - Adding oil to the system

- Remove the plug from the fill port on the compressor inlet valve and slowly pour oil into the opening using a funnel.
- Rotate the clutch clockwise by hand, during filling to speed up the filling process.
- Continue adding oil until the level is correct on the tank sight glass.
- Install the fill plug in oil fill fitting and tighten it securely.
- Re-install the fan shroud brace and torque the inlet valve bolt to specifications.
- Confirm charge air cooler hose is properly positioned and T-bolt clamps are secure.

Installing the Control Components

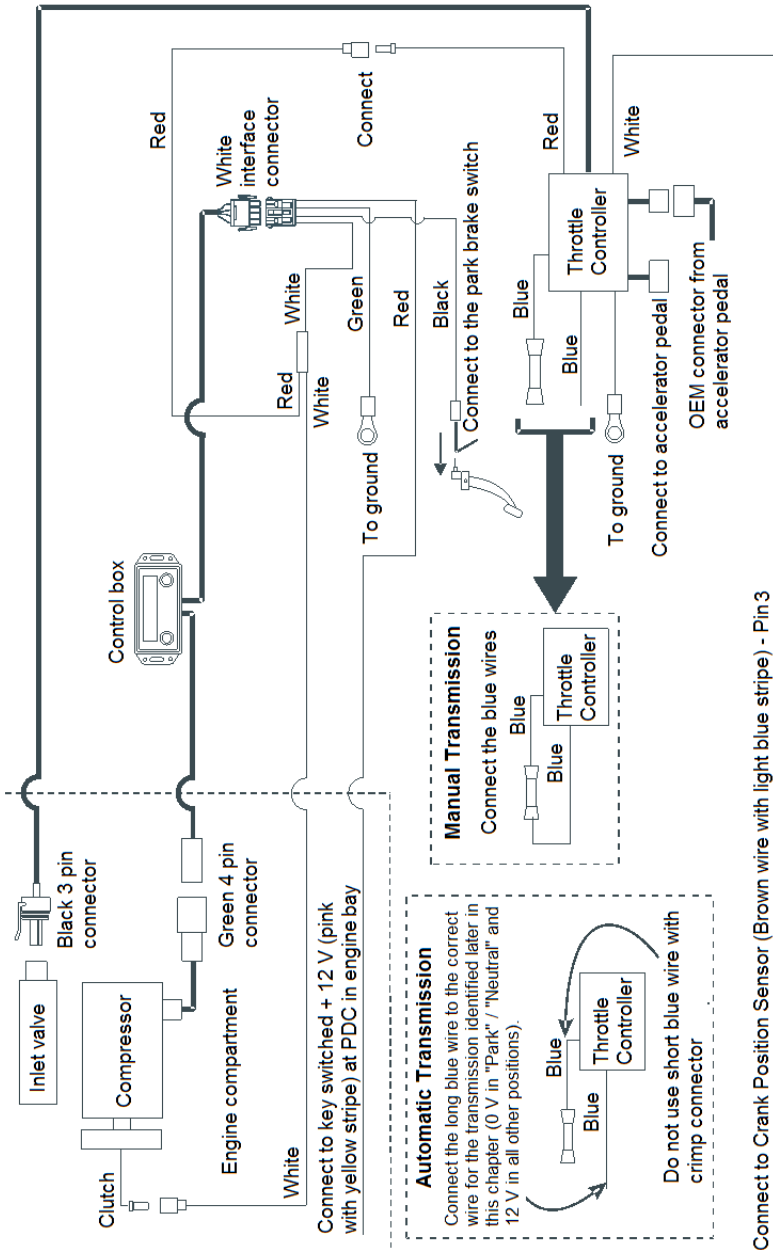


Figure 36 – Wire diagram

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Do not use a test light to probe for power on vehicle circuits, the increased current draw of the test light may damage components.

Installing the Control Box and Throttle Control

- Remove the plastic trim panel from the doorsill and the kick panel on the driver's side.
- Mount the control box on the floor beside the driver's seat. Use the bracket as a template, drill 3 x 3/32 in holes through the cab floor and fasten the bracket to the floor of the cab using the 3 supplied #8 pan head screws. Fasten the control box onto the bracket using the 4 screws, washers and nuts.
- Route the cables from the control box along the doorsill, under the trim panel, behind the kick panel and up under the dash.
- Mount the throttle control under the dash to the right of the steering column so that the connectors will easily reach the accelerator pedal. Secure it in place with cable ties.



To confirm a good ground, use an ohm meter to measure the resistance between the ground point and the battery negative terminal. Resistance should be less than 1 Ω .



Keep wires away from the park brake mechanism. Route wires clear of the steering column and pedals so they do not contact moving parts. Before drilling holes, ensure that there are no OEM wires, hoses, or components in the way.

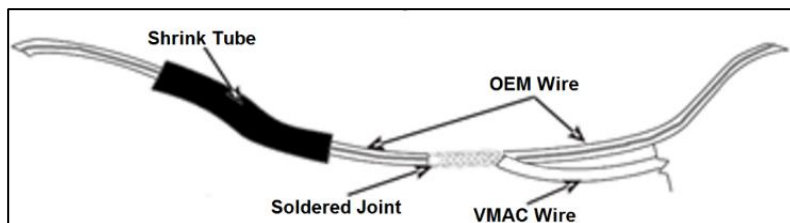


Figure 37 - Splice into OEM Wire

VMAC suggests not cutting OEM wires whenever practical. The preferred method is to remove the pin from the connector using an appropriate tool and slide the shrink tube onto the wire. Strip the wire at the desired location and solder the VMAC wire into place. Slide the shrink tube up to the soldered joint and seal it. Finally, replace the pin in the connector taking special care to ensure the pin is fully inserted and the locking tabs are engaged



If this is not practical, cut the OEM wire and solder and seal using shrink tube.

Connecting the Wiring



Do not use the dashboard support brackets or vehicle body panels for a ground point.

- Unplug the cable from the foot pedal assembly and connect it to the throttle control box. Connect the throttle control box cable to the foot pedal assembly.
- Connect the interface harness to the matching connector from the control box.
- Replace the doorsill trim and the kick panel.
- Attach the two green wires with the ring connectors to a good ground under the dash.
- Route the following wires into the engine compartment:
 - White wire with the blue bullet connector.
 - White wire from the throttle control.
 - Gray wire with the green 4 pin connector.
 - Gray wire with the black 3 pin connector.
 - Long blue wire (automatic transmission only).
- Insert all of the engine compartment wires (except the long blue wire) into a plastic loom and route them from the firewall, along the driver's side fender, across the top of the radiator to the compressor. Connect them to the matching connections at the compressor.
- Connect the gray wire with the green 4 pin connector to the matching connector at the compressor.
- Connect the gray wire with the black 3 pin connector to the matching connector at the compressor.
- Connect the white wire with the bullet connector to the compressor clutch.

- Locate the crank position sensor on the front of the bottom driver side of the engine (Figure 38).

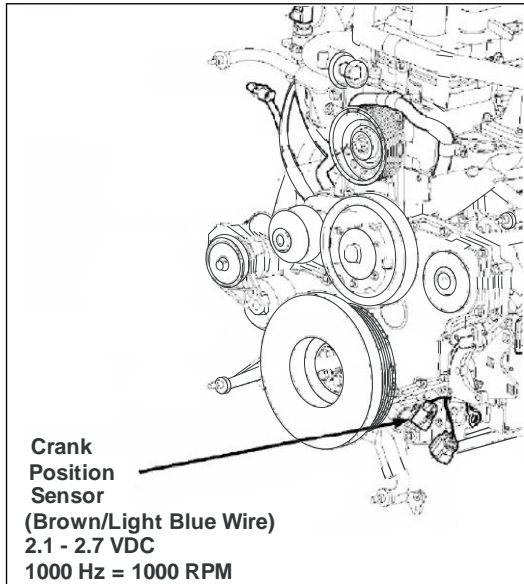


Figure 38 – Crank Position Sensor Location

- Solder and seal the white wire from the throttle control to the brown wire with a light blue stripe that is connected to the crank position sensor (Figure 39).

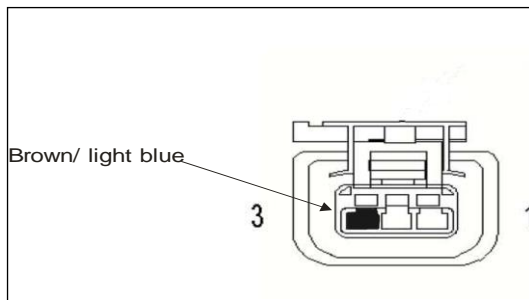


Figure 39– Crank Position Sensor (looking into front of connector)

- Remove the OEM connector from the park brake switch. Connect the black wire with the piggyback connector from the interface cable to the park brake switch.
- Connect the OEM connector to the piggyback connector.

Park / Neutral Connections

Automatic Transmission: 68RFE

- Locate the 23 pin connector as indicated by the arrow in the picture of the left side of the transmission (Figure 40). Solder and seal the long blue wire from the throttle control to the yellow wire with the dark blue stripe. Reconnect the connector to the transmission.
- This wire should show 0 V in “Park” or “Neutral” and approximately 12 V in all other gear selections when tested with a multi-meter.

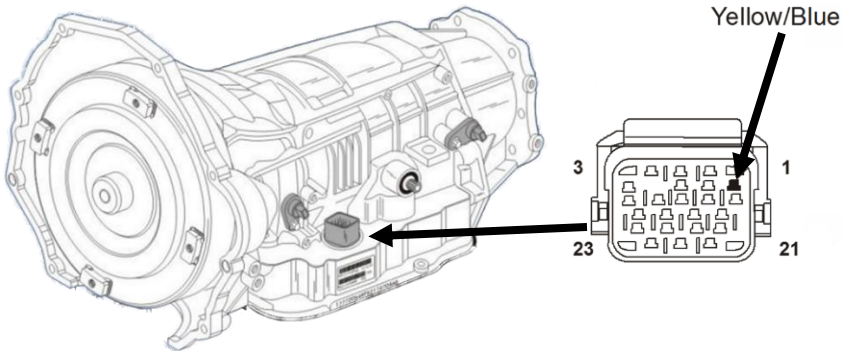


Figure 40– Park Signal Connector Location (68RFE)

Automatic Transmission: Aisin AS69RC

- Route the long blue wire from the throttle control to the transmission range sensor on the driver side of the transmission above the oil pan. Solder and seal the blue wire to the yellow wire with the dark blue stripe at pin 9 on the connector (Figure 41).
- This wire should show 0 V in “Park” or “Neutral” and approximately 12 V in all other gear selections when tested with a multi-meter.

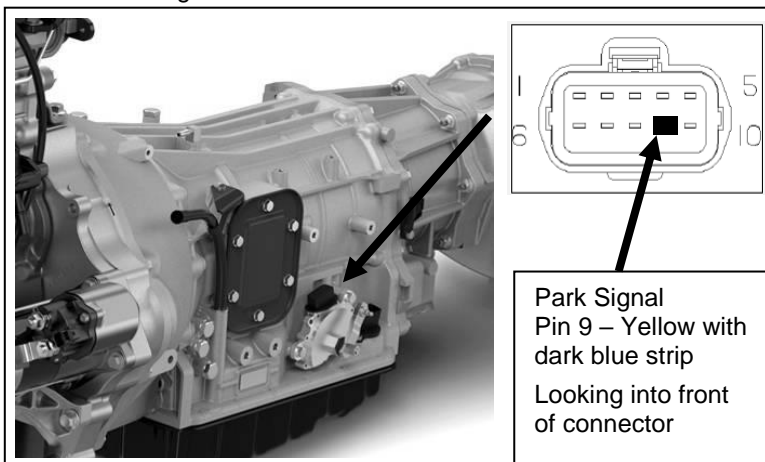


Figure 41 – Park Signal location – AS69RC

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Manual Transmission

- Cut the long blue wire to about 6 in, strip the end and connect it to the short blue wire with the crimp connector.

Connecting to Key Switch 12 V Supply

- Locate the PDC (fuse box) under hood of the truck (Figure 42).



Figure 42 – PDC (Fuse box) latches

- All PDC connectors are found on the bottom of the fuse box. Remove the fuse box from the bracket by simultaneously squeezing all 4 latches and pulling the fuse box up out of its bracket to access the underside (Figure 42).
- Pull the bracket up and to the passenger side of the truck (Figure 43).



Figure 43 – Accessing PDC connectors

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- Locate the green connector on the bottom of the fuse box, to remove this connector push on the release (Figure 44).

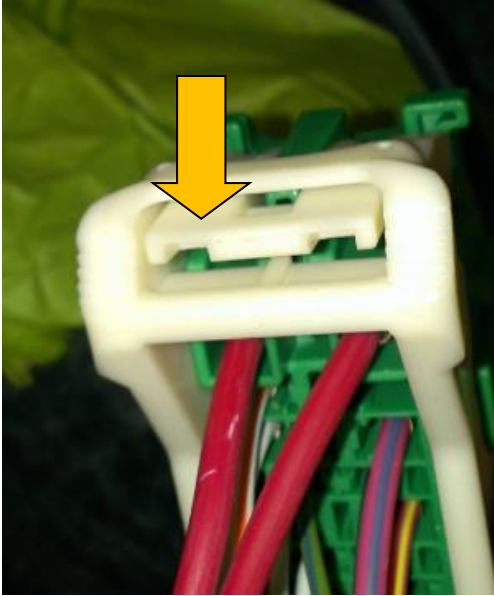


Figure 44 – Accessing PDC connectors

- While holding the release, pull the white lever down (Figure 45).



Figure 45 – Accessing PDC connectors

- The connector will pull out of the fuse box (Figure 46).



Figure 46 – Accessing PDC connectors

- There are numbers printed on the back side of the connector. Locate pin 9, it has a pink wire with a yellow stripe. This is the key switched +12 V wire (Figure 47).

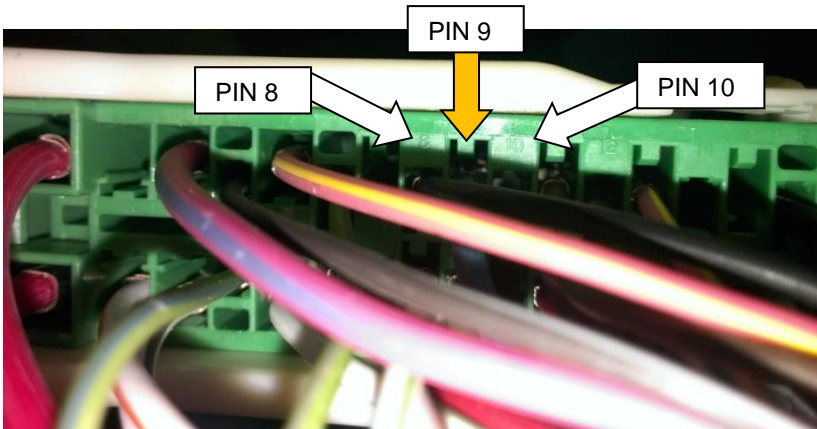


Figure 47 – Locating key switched power

- Route the red ignition switched 12 V wire that was routed earlier down by the other wire harnesses (Figure 48).



Figure 48 – Connecting to key switched power

- Solder and seal the red wire from the interface to the pink wire with the yellow stripe (Figure 49).

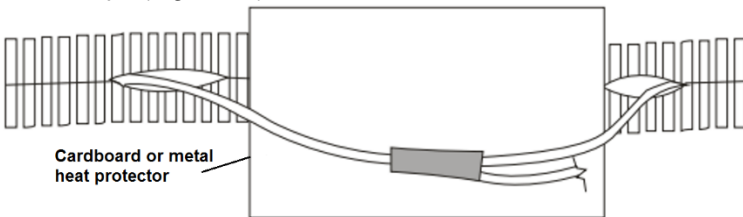


Figure 49 – Splicing into key switched power

- Put the wires back into the OEM loom and wrap with electrical tape. Use 1/4 in wire loom to cover the red interface cable wire (Figure 50).

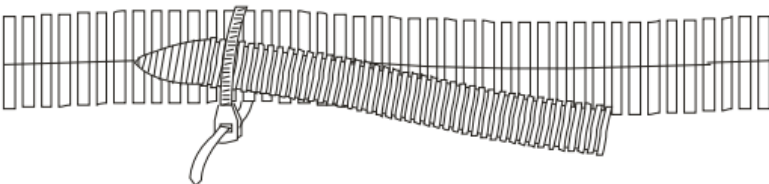


Figure 50 – Splicing into key switched power

- Install new cable tie onto the OEM wire harness.
- Re-install the fuse box into its holder.

Completing and Initial Testing of the Installation

Finishing the installation

- Apply a light coat of compressor oil to the rubber seal on the oil filter and install the oil filter on the tank. Follow the installation instructions on the filter body.
- Check all wiring to ensure that it will not contact any hot or moving components and will not interfere with the operation of the truck. Secure all wiring with cable and loom as required.
- Install the air box in its original mounting position. Secure the air box and connect the intake ducting.
- Connect the batteries.
- Install the inner fender(s).
- Install aesthetic engine covers (if applicable).
- VMAC recommends installing mud flaps behind the front wheels to reduce the potential of road debris damaging the tank.



All hoses, tubes, and wires that are rerouted or shifted during installation must be secure so that they do not contact hot, sharp or moving components. Where possible, use rubber coated P-clips. Follow the routing suggestions in this manual and cover all hoses with plastic loom.

Safety Test

- Place the automatic transmission in “Park” or manual transmission in “Neutral” and apply the park brake. Turn the ignition key “ON” but do not start the engine.
- Check the control box to see if it is illuminated. If there is no display, there is no power to the control box.
- Press the “ON” button. The green light should come on and you should hear the compressor clutch engage.
- Release the park brake. The green light should flash and the compressor clutch should disengage and flash “PARK BRAKE”. Apply the park brake again and press the “ON” button. The light should come on and the clutch should engage.
- On automatic transmission trucks, the engine must be running to complete the final step in the safety test. This will be done after the pre-start checks have been completed.
- Turn the ignition key “OFF”.



The engine must be running to complete the final step in the safety test. This will be done after the pre-start checks have been completed.



If the truck fails the test, check the wiring to ensure that all the connections are correct and secure. If you require additional assistance contact VMAC technical support at 1-888-241-2289 or 250-740-3200.

Before Starting the Engine Checklist

Ensure that the following has been completed:

- Check the coolant.
- Check the compressor oil level at the AOST sight glass.
- Do a final inspection to ensure that everything has been completed and tightened.
- Perform a final belt alignment check.
- Check all wiring for security and protection. Ensure that nothing is touching the compressor body, hot, sharp or moving components.

After Starting the Engine Checklist



Place the truck in a safe operating position and block the wheels. Ensure that there are no people around the truck before beginning the test.

Ensure that the following has been completed:

- Ensure all compressor outlet valves are closed.
- With the engine running, engage the park brake and place your foot firmly on the brake pedal.
- Start the compressor. The engine speed should increase to between 1,800 rpm and 2,200 rpm and then drop down to 1,000 rpm to 1,100 rpm. Shift the truck into gear. The compressor should disengage and the control box will flash "PARK BRAKE". The engine speed should also reduce to base idle (Approximately 650 rpm).
- Repeat this test in all gear selector positions to ensure that the engine speed does not increase unless the selector is in "Park".

Setup, Performance Testing and Adjustments

This system requires minimal adjustment. The maximum system pressure is adjusted via the pressure switch on the tank, and the output is adjusted with the throttle control. Refer to the owner's manual for specific instructions on how to adjust the system.

You can test the system operation using the tools that will be operated by the system or you can test operations using a 3/16 in orifice in the outlet to simulate tool use (Figure 51).

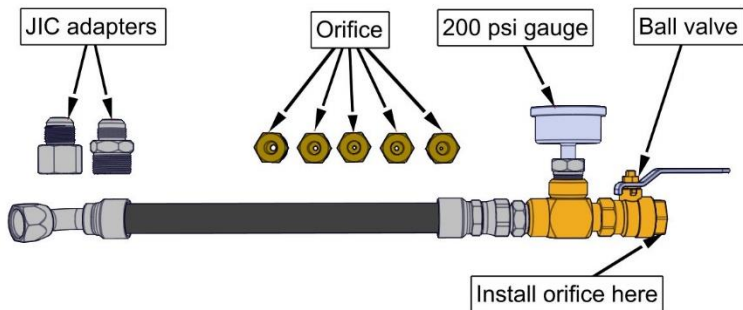


Figure 51 - VMAC Air Test Tool (A700052)

1. Install the test tool at the system outlet. If you are using the VMAC test tool, the appropriate orifice size is 3/16 in.
2. Ensure that the ball valve is closed.
3. Place the transmission in "PARK" and fully apply the park brake.
4. Allow the engine to run until it is at operating temperature.
5. Turn on the air compressor system and allow it to operate until the oil is warm.
6. Observe the pressure gauge. Pressure should be approximately 150 psi.
7. Open the ball valve on the test tool and observe the engine tachometer. Engine speed should increase to approximately 1,800 rpm – 2,200 rpm.
8. Close the air valve slowly to allow the system pressure to rise.
9. Once the system pressure is at maximum, slowly open the ball valve on the test tool until the pressure on the gauge begins to drop. Engine speed should ramp up to approximately 2,800 rpm when the pressure drops approximately 40 psi below the pressure switch set-point.

Final Testing

Ensure that the following has been completed:

- Operate the system with an air tool (or the VMAC Air Test Tool) for at least 1/2 hour (1 hour preferred).
- Road test the truck for approximately 20 km (14 mi.).
- Watch the underhood operation to ensure that the belts rotate properly, pulleys rotate smoothly and nothing is rubbing or contacting hot parts.
- Check all components, connections and fasteners once the engine is turned off and the system has cooled.
- Check the coolant level after the engine has been operated.
- Check the compressor oil level after the engine has been shut down and the oil level has had time to stabilize.

Optional Accessory Installation



While the compressor system will function without the following accessories, VMAC recommends their use for optimal performance. See the chapter titled “Accessory Products” for a list of accessories available from VMAC.

Receiver Tank

The air/oil separator tank (AOST) automatically depressurizes on compressor shut-down to protect the compressor and clutch from damage that may occur if the compressor starts while pressurized. The use of a receiver tank provides a buffer so that tools may be used immediately upon system start-up.

For information on installing a receiver tank see the next chapter.

Receiver tanks are available for purchase through VMAC and include:

- Tank
- Safety valve
- Manual water drain

Pressure Gauge

Install a 200 psi pressure gauge downstream of the VMAC tank outlet, while not critical to system performance, a pressure gauge is important for fine tuning the system and simplifies any potential troubleshooting.

Air Receiver Tank

Pressure in the air receiver tank will not be relieved when the compressor system blows down. This is normal operation. Prior to performing any service work on the system, relieve the pressure in the air receiver tank.

If an air receiver tank will be used with this system, the following installation procedure must be used to prevent damage to the system.

An air receiver tank provides a buffer as it gives the compressor time to react by increasing the engine speed and producing air before the tool stalls. It also has the advantage of lowering the duty cycle of the compressor system. The VMAC compressor system will automatically depressurize when it is shut-down, therefore the line from the VMAC Air/Oil Separator Tank (AOST) to the air receiver tank must have a 1-way check valve installed. This prevents blow back and moisture from the receiver tank entering the AOST. (Figure 52)

The line to the auxiliary tank must be installed as high as possible to prevent water from entering the line.

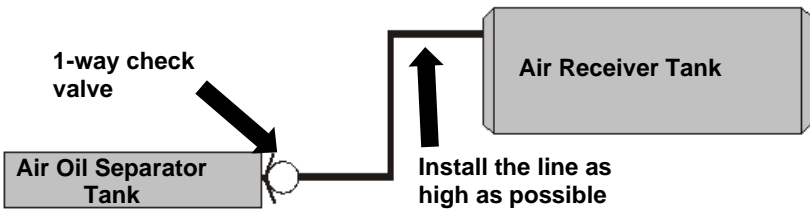


Figure 52 – Air Receiver Tank

Accessory Products

These accessory products for your underhood compressor system are available from VMAC. For more information or to order these products, call 1-800-738-8622 or email sales@vmacair.com.

	<p>Eliminator Aftercooler Part Number A800070</p> <p>Removes up to 80% of moisture from compressed air. Quick installation, automatic drain and compact design</p>
	<p>Filter Regulator Lubricator Part Number A700151</p> <p>Removes lubricants, water and dirt from the air stream. Adds atomized tool oil to lubricate tools. Reduces pressure for longer tool life.</p>
	<p>Hose Reel Part Number A700007</p> <p>Secure, compact, retractable hose storage in a sturdy reel.</p>
	<p>Air Receiver Tank Part Number A300010</p> <p>35 gallon capacity in a compact tank, complete with fittings and a gauge.</p>
	<p>De-icer Kit Part Number A700031</p> <p>Insulated rope heater prevents freezing of lines and regulator.</p>
	<p>Service Kits VR150 200 hour Part Number A700059 VR150 400 hour Part Number A700060 VR70 200 hour Part Number A700019 VR70 400 hour Part Number A700020</p> <p>Using OEM service products will extend the life of your system. Includes oil, filters, seals and O-rings. 200 hour and 400 hour service interval kits are available</p>

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Warranty Registration

This form must be **fully** completed and returned to VMAC at the time of installation. Warranty may be void if this form is not received by VMAC within **30 days** of installation.



VMAC's Warranty policy and registration can be viewed online at: <http://vmacair.com/support/warranty/>

VMAC Dealer Information

Company Name: _____

City: _____ State / Province: _____

Installer Information

Company Name: _____

City: _____ State / Province: _____

Installation Date: ____/____/____
Day Month Year

Owner Information

Company Name: _____

Address: _____

City: _____ State / Province: _____

Zip/Postal: _____ Phone #: (____) ____ - ____

Email Address: _____

Vehicle Information

Year: _____ Make: _____

Vehicle Identification Number: _____

Unit #: _____

Product Information

System Identification Number: **V** _____

Compressor Serial Number: **P** _____

Throttle Control Serial Number: _____

Manufactured by



PH 250-740-3200

FX 250-740-3201

TF 1-888-241-2289

1333 Kipp Road, Nanaimo, BC, V9X 1R3 Canada

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