

Installation Manual for VMAC System V900091

Ford 2008

Triton 6.8 L V10 Superduty F250-F550

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VMAC – Vehicle Mounted Air Compressors

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00	Original manual	IB 09 May 2007	BC 24 May 2007	28 May 2007
A	ECN 07-103 cooler change	IB 5 June 2007	RD 12 July 2007	16 July 2007
B	ECN 07-145	IB 05 Nov 2007	SH 23 Nov 2007	26 Nov 2007

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 underhood mechanical work. Any grinding, bending or restructuring operations for correct fit in modified vehicles must follow standard shop practices.

These instructions are a general guide for installing this system on standard production trucks and do not contain information for installation on non-standard trucks. This system may not fit special order models or those which have had other changes without additional modifications. If you have difficulty with the installation, contact VMAC.

The VMAC warranty form must be completed and mailed or faxed to VMAC at the time of installation for any subsequent warranty claim to be considered valid.

To order parts, contact your VMAC dealer. Your dealer will ask for the VMAC serial number, part number, description and quantity. To locate your nearest dealer, call 1-800-738-8622.

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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 model years and different situations that are listed in the manual. Open the package, unpack the components and identify them.

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	M8	M10	M12	M14	M16
Foot-pounds (ft-lb)	19	41	69	104	174
Newton meter (N•m)	25	55	93	141	236

Hose Coding

Different frame designations will affect the tank mounting position. If you have to move the tank, the lines may be too short. Measure the hose shortfall and order a *Hose Extender Kit*. The following table shows the color code used by VMAC to identify hose diameters.

Hose Diameter	Colour-Coded Label
1/2 inch	Blue
5/8 inch	Blue
3/4 inch	Green
1 inch	Green

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Part 1: Preparing for Installation

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.

- Disconnect the battery.
- Drain the coolant.
- Disconnect and discard the expansion bottle hose from the bottle and the engine, then remove the air box with coolant expansion bottle and the air ducting.
- Remove the inner fender mud guard on the driver side.
- Cut to separate the air box from the coolant expansion bottle (Figure 1.1).

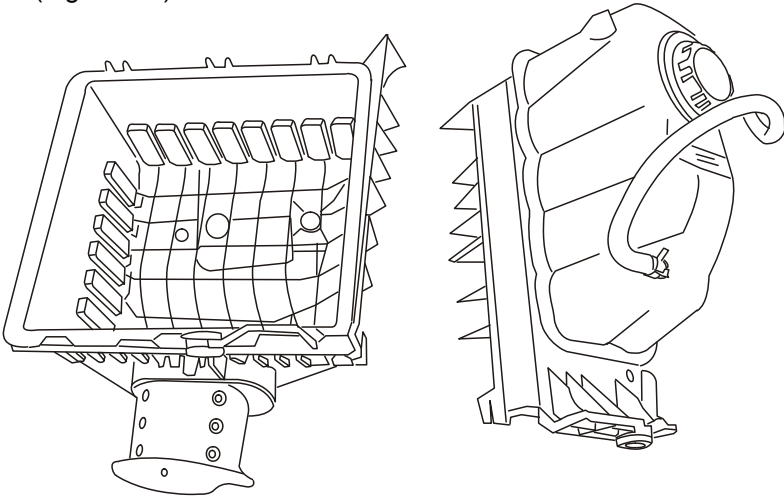


Figure 1.1

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- Cut away all of the webbing on the coolant expansion bottle mount (Figure 1.2).

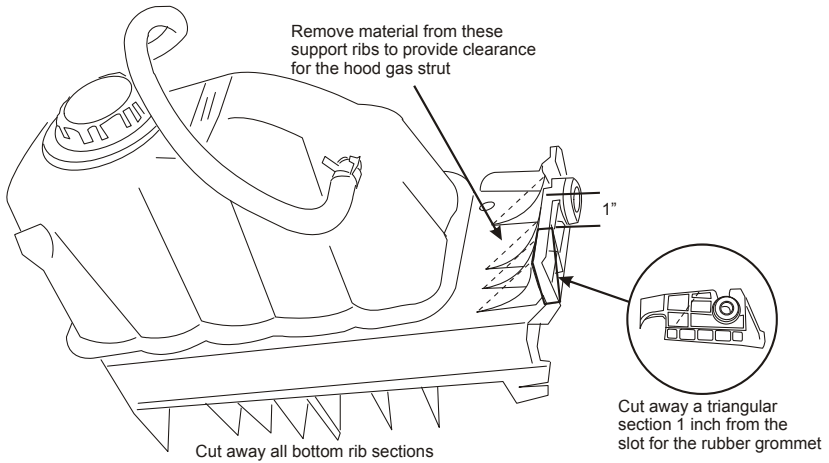


Figure 1.2

- Remove the upper radiator hose. Cut the quick-coupler connector from the hose and discard the hose.
- Separate the lower radiator hose at the center connector to drain coolant, then remove the lower radiator hose. Cut the quick connects off both hoses.
- Unclip the wire harness from the lower fan shroud and all the way around, then pull the harness clear.
- Drain and remove the power steering reservoir. Remove the OEM power steering hose from the reservoir and replace it with the supplied 3/4 inch hose.
- On trucks with hydro boost brakes, remove the 3/8 inch OEM hose from between the master cylinder and the power steering reservoir.
- Cut the hose close to the 90 degree molded elbow on the master cylinder end and reverse the hose so that the elbow will attach to the power steering reservoir.

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- Point the elbow down and away from the clutch. Connect the other end to the master cylinder with the supplied connector and hose.
- Remove the upper and lower bolts locating the fan shroud and remove the coolant overflow hose from the upper fan shroud.
- Loosen the fan (RH thread). Unbolt the fan shroud and remove the fan and shroud together.
- Remove the OEM ground connector to radio suppressor attached to one of the studs and attach it to one of the studs by the thermostat housing.
- Remove and discard the three OEM M10 bolts with the M8 studded ends from the driver's side of the cylinder head.
- Clean the front of the engine on the driver's side.
- Clean the center of the OEM crank pulley.
- Disconnect the wiring from the ABS module on the driver's side frame rail but do not disconnect the brake lines as they will flex and allow the module to be moved.
- Remove the bolt securing the ABS module to the OEM mounting bracket and lift it off the rubber bushings. Remove and discard the ABS mounting bracket but keep the two rubber bushings for installation later.
- Install the replacement ABS bracket in the same location as the original using the OEM fasteners.
- Install the OEM rubber bushings on the ABS module and fit it onto the pins on the replacement bracket. Carefully bend the brake lines to align the OEM mounting bolt with the hole on the new bracket and fasten the module in place.

Part 2: Installing the Main Bracket, Compressor and Cooler

2.1 Installing the Main Bracket and Compressor

- Remove all the components from the bracket (Figure 2.1).

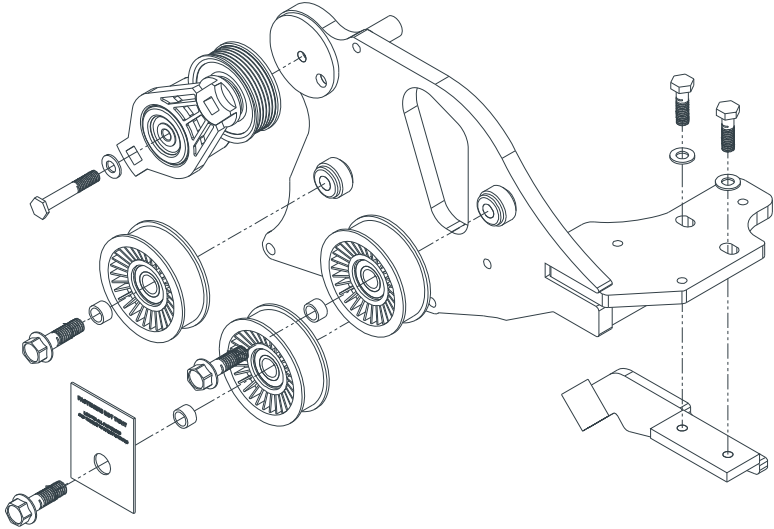


Figure 2.1

- Place the support bracket on the bottom of the driver's side cylinder head, insert the M16 bolt through the tube part of the bracket into the OEM hole in the cylinder head and hand tighten (Figure 2.2).
- Place the main bracket in position and bend the brake lines on the ABS module as necessary to provide clearance.
- Place the main bracket in position to locate the mounting points on the engine. Install and hand tighten the three M8 and one M10 bolts in the front plate (Figure 2.2).

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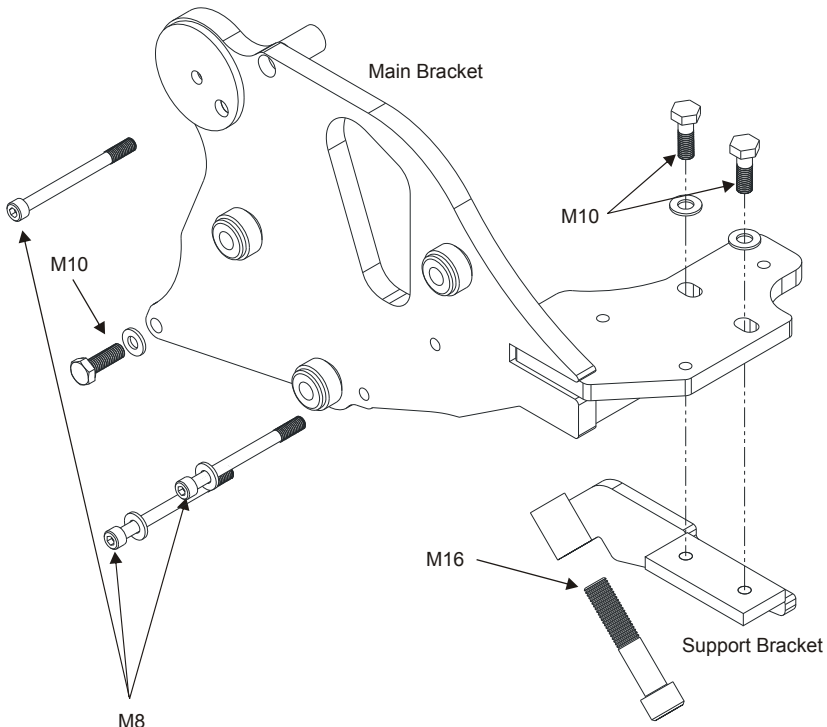


Figure 2.2

- Route the wiring harness from the valve cover behind the top edge of the bracket so that it is not pinched between the bracket and the engine when the bracket is tightened in position.
- Install and hand tighten the two M10 compressor pad to support bracket bolts.
- Check the fit between the support bracket and the main bracket, make sure everything aligns properly, then torque the M16 bolt, then the M10 bolts and finally the M8 bolts, in that order.



If you do not tighten the fasteners in the right order, the mounting pad will be pulled out of alignment with the front plate.

- Remove the multi-wire block from the bracket on the frame by pulling the nylon pin out of the bracket. Move it over and insert the pin into the slotted hole to provide clearance for the compressor.

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- Install the short end of the supplied double 90 degree hose onto the engine spigot on the driver's side front of engine facing forward, place clamps on the hose and install a 1 inch nylon hose connector (Figure 2.5).
- Place the compressor in position on the mounting bracket.
- Thread the three M8 double-serrated nuts onto the compressor mounting studs and torque to specifications.

2.2 Installing Drive Belts and Pulleys

- Install the VR crankshaft pulley onto the OEM pulley using three M10 x 70 mm bolts with washers and torque to specifications. Make sure that the bolt ends do not extend too far through the crankshaft pulley so that they do not hit the timing cover.
- Install the tensioner assembly and idlers on the bracket and torque the fasteners to specifications.
- Install the VR drive belt (Figure 2.3). Make sure that it is aligned correctly and clears all components, including the cam position sensor wire harness.

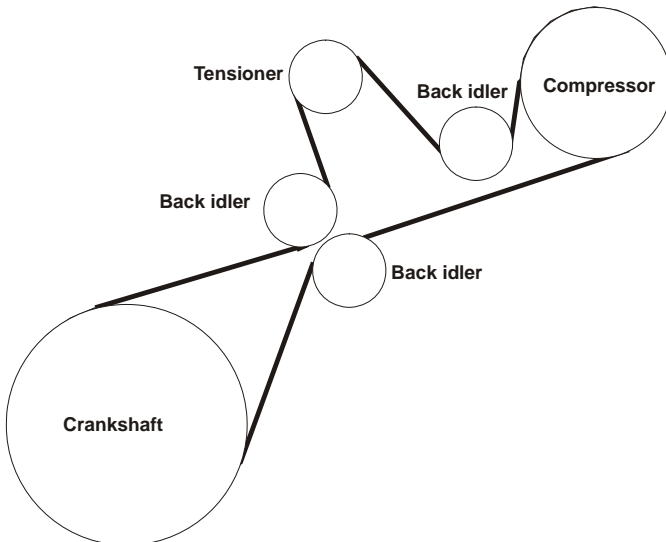


Figure 2.3

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- Place the supplied fan spacer on the water pump pulley before installing the fan.

2.3 Installing Other Components

- Remove the wire harness securing clip on the passenger side of the engine just behind the battery box and ground mount point (Figure 2.4).
- Bend the air conditioning line at the U-shaped pipe so that the end closest to the front of the truck is about 1-1/2 inches lower.
- Route the wiring harness down beside the air conditioning line and move the connectors at the firewall back to provide clearance for the coolant expansion bottle.

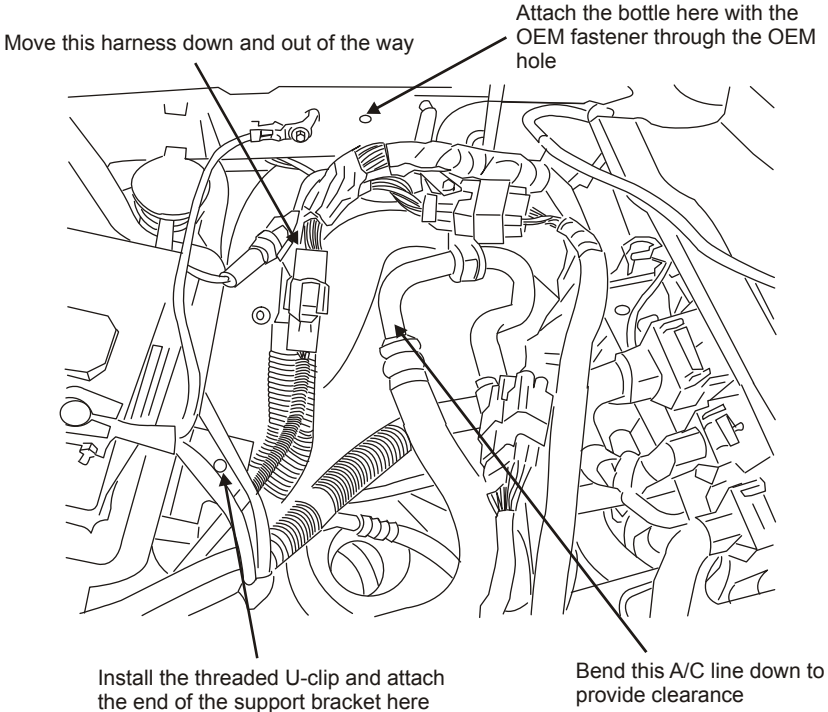


Figure 2.4

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- Install the threaded U-clip into the rear of the battery box and install the support bracket with the bent section upward.
- Place the coolant expansion tank in position on the support bracket so that the OEM mounting hole lines up with the hole on the fender that retained the wire harness.
- Mark the position of the support bracket hole on the plastic base at the backside of the tank and drill a 1/8 inch hole at that spot.
- Mount the tank using the OEM mounting bolt in the fender hole and the supplied self-tapping screw in the drilled hole.
- Install the short end of the supplied 90 degree hose onto the coolant expansion bottle quick-connect fitting onto the bottle (Figure 2.5) and position it so that it faces the front of the truck, between the A/C and the battery box. Install hose clamps and a 1 inch nylon hose connector.
- Connect the supplied 1 inch hose to one of the nylon connectors. Route the hose forward and down to the lower radiator cross member, under the cross member and over the two lugs on the front of the cross-member (Figure 2.5).
- Connect the other end of the supplied 1 inch hose to the connector. Make sure that the hose is clear of all engine and steering parts and secure it in place as required using nylon ties.
- Install all other OEM components. Check clearance between the fan shroud and the crank pulley. If necessary, cut the tab from the bottom of the fan shroud to provide clearance.
- After the fan shroud is installed, slot the power steering reservoir into the fan shroud and secure it with two OEM 6mm bolts.
- Route the OEM power steering reservoir hose up behind the compressor and insert the 3/4 inch plastic hose connector. Connect the hose from the reservoir to the plastic hose connector. Route the 3/4 inch hose from the power steering reservoir to the connector and cut to length as required.

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- Fasten the hose to the wiring harness on the valve cover with nylon ties so it doesn't contact any hot or moving parts.

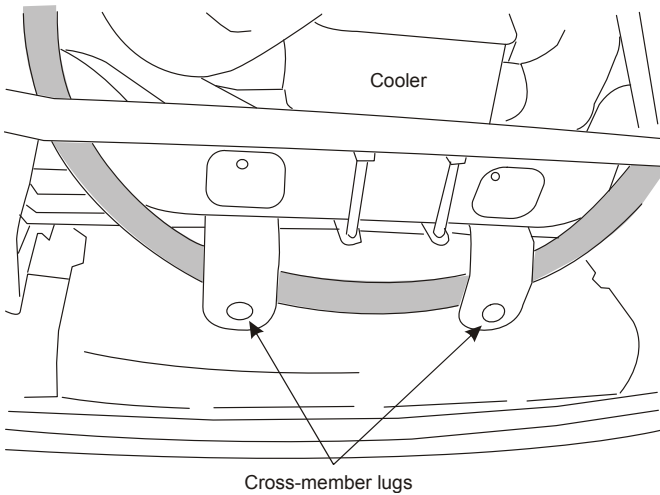
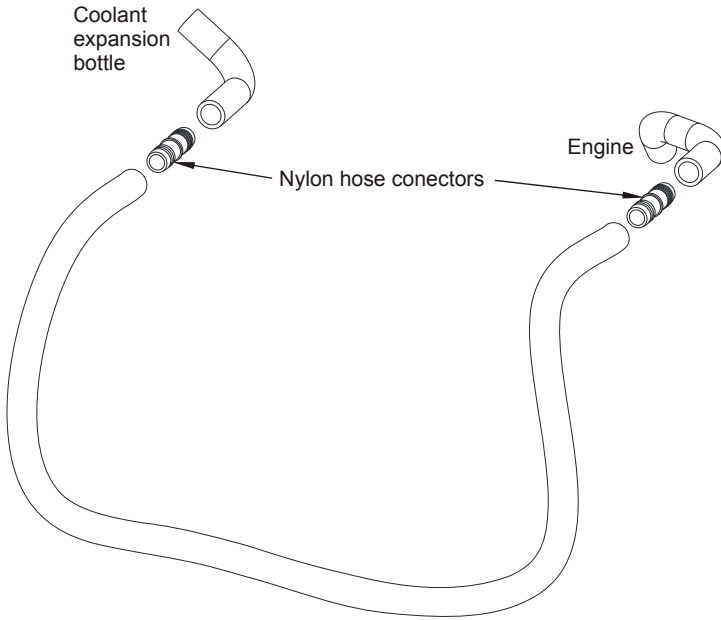


Figure 2.5

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2.4 Installing the Cooler

- Position the cooler in the center of the cross-member so that it is just above the sway-bar with the small spigot on the driver's side and the large spigot on the passenger side.
- Install bolts through the flat mounting straps (Figure 2.6) and place them on the front of the cross-member on each side of the impact sensor.



Do not strike the impact sensor as this could cause the airbags to actuate.

- Thread the bolts into the matching holes on the cooler mounts and tighten them securely.

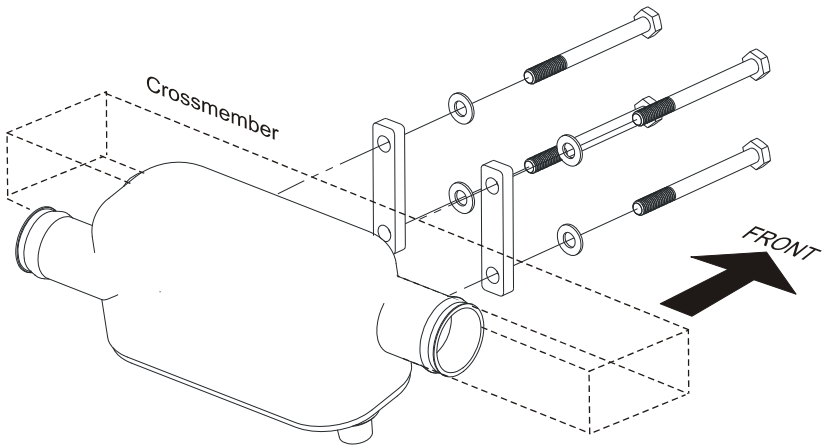


Figure 2.6

- Connect the cut ends of the lower radiator hose to the spigots on the cooler and secure them with hose clamps.
- Cut the driver's side hose at a suitable point just before the cooler and insert the supplied diverter with the two small hose spigots facing to the rear. Connect the OEM oil cooler hoses and make sure that they clear the steering arms (Figure 2.7).

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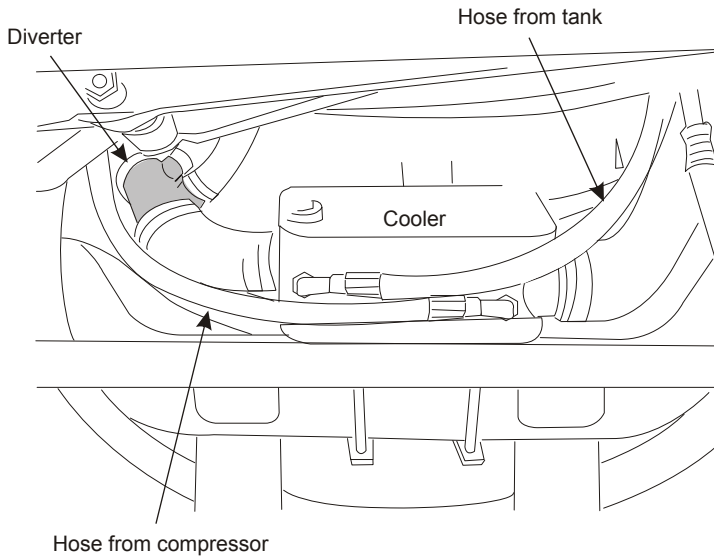


Figure 2.7

- Insert the OEM top radiator hose quick-connect coupler into the large diameter end of the supplied short 90 degree coolant hose and install it on the radiator (Figure 2.8).

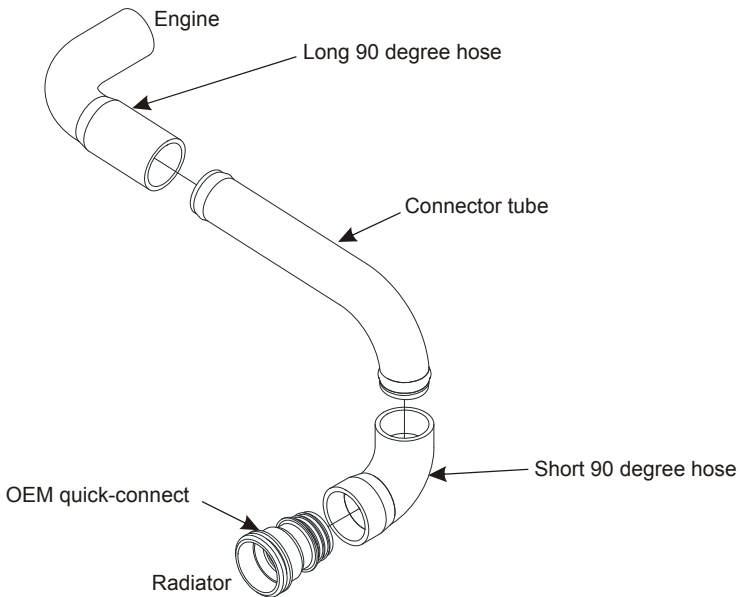


Figure 2.8

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- Install the small end of the longer 90 degree coolant hose onto the thermostat spigot on the engine.
- Position the hoses so that they can be connected using the steel connector tube. Make sure that the hoses will clear the power steering and air intake MAF sensor. Secure all connections with hose clamps.
- Fill the cooling system with the manufacturer recommended coolant.

Part 3: Installing the Tank and Hoses

3.1 Installing the Tank and Mount Brackets

The tank (Figure 3.1) will mount to the passenger side frame rail behind the front cab mount. The recommended location is about 1 inch back from the end of the cab floor stiffener, a rib with an attached ground wire.

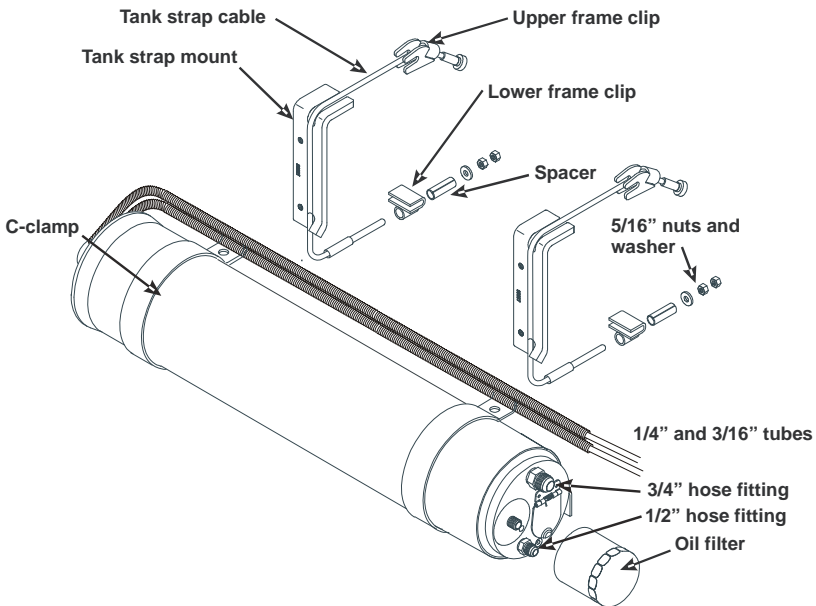


Figure 3.1

- Place the tank on a work bench with the front (oil filter end) of the tank to your left and remove the oil filter.
- Remove the two 1/4 inch clamp bolts from the C-clamps. Expand the clamps slightly and slide them over the front of the tank.

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- Place the two L-shaped tank strap mounts under the C-clamps with the right-angle ends facing you and hanging over the edge of the work bench. Apply Loctite and thread 5/16 x 1/2 inch bolts with flat washers into the bottom hole on each bracket, but do not tighten.
- Install the 1/4 inch clamp bolts into the C-clamps so that the heads of the bolts face toward you and install the nuts but do not tighten. Rotate the tank so that the directional arrow on the end of the tank is parallel to the work bench and faces toward you.

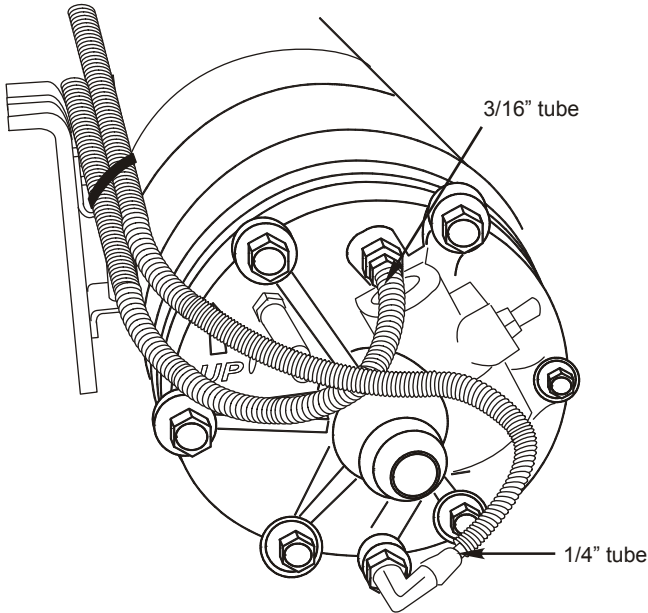


Figure 3.2

- Apply Loctite and insert 5/16 x 1/2 inch bolts through the C-clamps and thread them into the mount brackets, but do not tighten.
- Install a suitable 3/4 inch fitting (not supplied) in the back of the tank.
- Check tank alignment then tighten the C-clamp bolts and the mounting bolts.

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- Insert the cable straps through the tube of the upper frame clips.
- Fit the cables onto the tank strap mounts with the cables in the grooves of the mounts and the clips above the right-angle end of the tank strap (Figure 3.1).
- Support the tank and L-bracket assembly in place on the outside of the frame between the cab mounts, with the short part of the L-bracket over the top of the frame.



Do not pinch the wiring harness on the top of the frame.

- Pass the upper frame clip between the frame rail and the body and clip it onto the top of the frame. Insert the threaded end of each cable strap through the tubes on the lower frame locating U-clips. Install the spacers (if necessary for narrow frames) and nuts and tighten just enough to hold the tank in position.
- Position the tank between the two cab mounts to provide clearance for installing the lines and filter. Make sure that the tank mounting system does not interfere with any transmission components.
- When the tank is correctly positioned, tighten the securing cable retaining nuts until the cables pull tight and snug around the frame. Do not over-tighten.
- Install a second 5/16 inch nut and tighten it securely against the first to act as a locknut.

3.2 Installing the Hoses

- Route the straight end of the 3/4 inch and the longest 1/2 inch hoses over the cab mount and thread them into the matching fittings on the tank but do not tighten.
- Insert the 1/4 and 3/16 tubes into the fittings on the back of the tank and cover them with high temperature loom and route them through the frame away from the exhaust system.

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- Route the 1/2 hose from the tank along the passenger side frame rail to the underside of the radiator, clear of suspension pinch points and connect the 90 degree end to the driver's side fitting on the cooler.
- Route the 3/4 inch hose from the VR tank to the compressor and connect the 45 degree end to the matching fitting.
- Connect the shortest 1/2 inch hose between the compressor and the 90 degree end to the passenger side fitting on the cooler. Route the hose up over the compressor gear case and down beside the engine just behind the main bracket to keep it clear of the belts
- Route the 3/16 and 1/4 inch tubes up over the engine (clear of the exhaust manifold) and connect them to the matching fittings on the compressor air inlet control valve.
- Tighten all hose connections at the tank, cooler and compressor. Prevent the hoses from twisting during tightening.
- Bunch all hoses together, secure them with tie-straps and protect them where they might rub. Make sure that they are clear of hot exhaust parts or moving parts, including the steering column.
- Move the steering between left and right lock positions to check clearance. Secure the hoses to the firewall using 2 inch insulated P-clips onto the 6 mm OEM studs using the supplied 6 mm nuts.
- Apply a light film of compressor oil to the filter gasket and install the filter on the tank. Tighten the filter an additional 3/4-1 turn after the gasket contacts the base.

3.3 Adding Oil to the System



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

- Remove the fill plug from the air inlet control valve and pour oil into the oil fill hole on the inlet control valve using a funnel. Turn the compressor clutch clockwise with a ratchet and a 1/2 inch socket using the hex head bolt at the centre of the compressor clutch during the fill process.
- Allow 5 minutes for the oil to drain into the tank, then check the level at the sight glass at the front of the tank. Continue adding oil until the level is correct.
- Install the fill plug in the inlet control valve and tighten it securely.



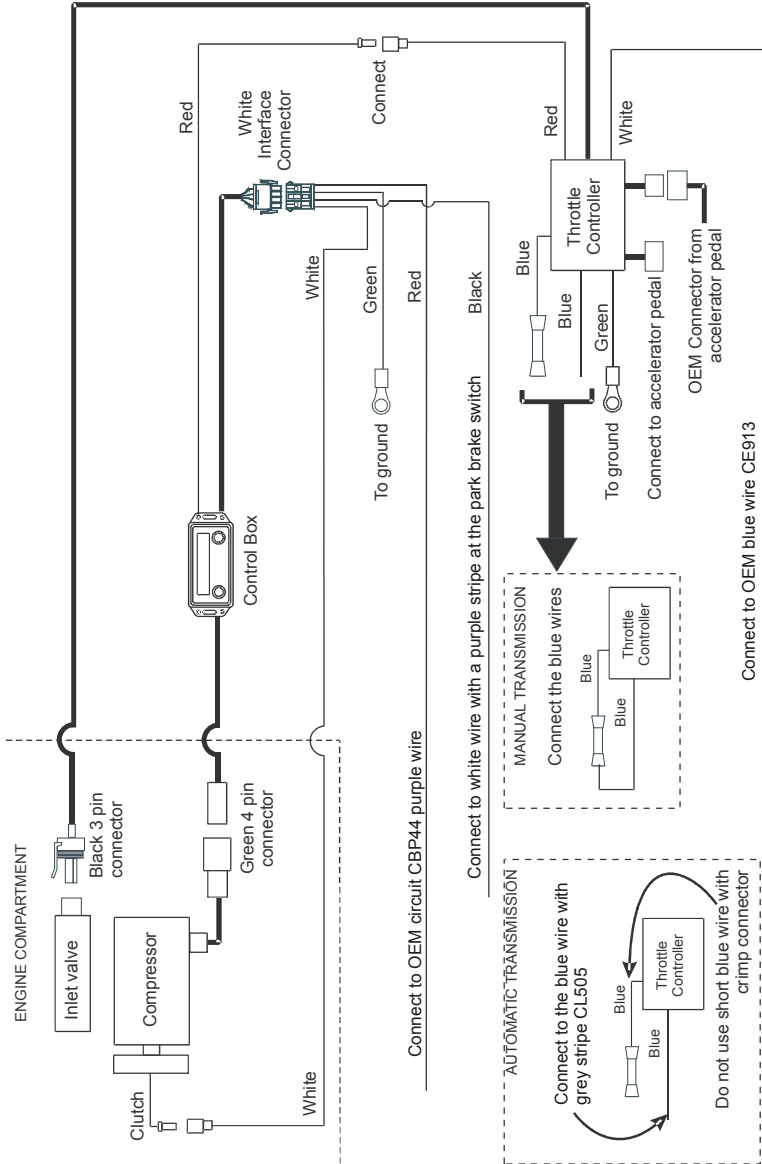
Do not overfill the system. Overfilling the system with oil can flood the sight glass window and make the system appear empty.

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Part 4: Installing the Control Components



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4.1 Installing the Components

- Install the control box in a convenient location in the cab, positioned so that the wire harness will reach the compressor.



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 make sure that there are no OEM wire bundles where you will be drilling.

- Tie-wrap the throttle control under the dash away from moving parts, positioned so that the idle down pressure (IDP) and maximum RPM adjusting screws are accessible.

4.2 Connecting the In-cab Wiring

- Unplug the OEM cable from the accelerator pedal and plug it into the matching connector from the throttle control box. Plug the cable from the throttle control into the matching connector on the accelerator pedal.
- Connect the two white interface connectors together.
- Connect the red wire from the throttle controller to the matching red wire from the control box.
- Connect the green wires from the interface connector and the throttle control to a good ground.
- Connect the single red wire from the interface connector to switched 12 volts. You can use circuit CBP44 (purple wire) located in the blunt cut bundle under the dash beside the park brake (Figure 4.1).
- Connect the white wire from the throttle controller to the “clean tach out” circuit CE913 (blue wire) at the blunt-cut harness.

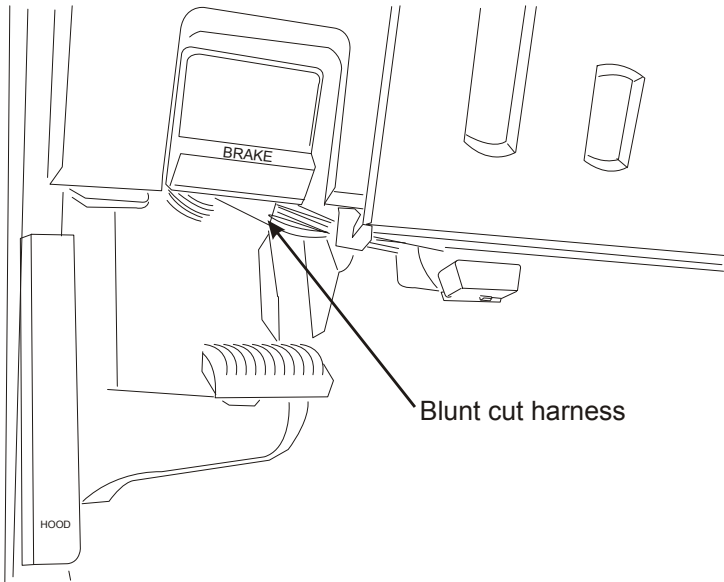


Figure 4.1

4.2.1 Automatic Transmissions

- Solder and seal the black wire from the interface cable to the white with purple stripe wire at the park brake.
- Solder and seal the long blue wire from the throttle to the blue with gray stripe wire in the blunt cut bundle.
- Tie up the short blue wire at the throttle controller.

4.2.2 Manual Transmissions

- Solder and seal the black wire from the interface connector to the white with purple stripe wire at the park brake.
- Cut the long blue wire from the throttle controller to approximately 6 inches, strip the end and crimp it to the short blue wire at the throttle controller with the butt connector.

4.3 Connecting the Underhood Wiring

- Cut a slit in the firewall plug and feed the following wires into the engine compartment:
 - gray harness with the green plug connector from the control box
 - gray harness with the black connector from the throttle controller
 - white wire with a bullet connector from the interface cable
- Connect the two gray wires with the green plug connectors together.
- Connect the gray wire with the black connector to the matching connector on the pressure transducer at the compressor.
- Connect the white wire with the bullet connector to the matching connector at the compressor clutch.

4.4 Completing and Testing the Installation

- Cover all underhood wiring with plastic fireproof loom. Secure the harnesses with nylon ties. Avoid contact with hot or moving parts.
- Pull all excess wiring back into the cab, bundle the wiring together and tie it up out of the way under the dash.
- Replace all dash panels and other covers removed during installation.

4.4.1 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 there is a number showing in the display. If there is no display, there is no power to the control box.

- Push the control box “ON” button. The green LED should come on and you should hear the compressor clutch engage.
- Release the park brake. The green LED should flash, “PARK BRAKE” will show on the display and the compressor clutch should disengage. Apply the park brake again, wait 20 seconds and push the “ON” button. The green LED should come on and the compressor clutch should engage.
- 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 vehicle fails the test, check the wiring to make sure that all the connections are correct and secure. If you require additional assistance, contact your local VMAC dealer. Call 1-800-738-8622 or 250-740-3200.

Part 5: Finishing the Installation

5.1 Before Starting the Engine Checklist

Make sure that the following have been completed:

- Check the vehicle coolant.
- Check the compressor oil level.
- Do a final inspection to make sure that everything has been completed and tightened.
- Perform a final belt alignment check.
- Check all wiring for security and protection.

5.2 After Starting the Engine Checklist



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

- Install a test tool on the air tank outlet and close the ball valve.
- With the automatic transmission in NEUTRAL or PARK and the park brake applied, start the engine and allow it to reach operating temperature. Push the control box "ON" button. Engine speed should increase to 1800-2200 rpm and then reduce to 1050-1100 rpm.
- Place your foot firmly on the brake pedal, shift the automatic transmission out of PARK and into REVERSE. The engine should drop to OEM base idle (about 650 RPM) and the control box green light should stay on. Repeat this test in all gear selector positions to make sure that the engine does not idle up unless the selector is in PARK.
- For trucks with manual transmissions, the compressor should only operate in neutral with the park brake engaged.

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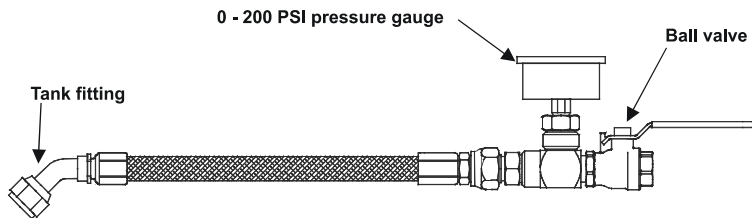
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- Push the control box “ON” button. The green LED should come on and you should hear the compressor clutch engage, but the engine will not idle up. Push the “OFF” button.
- Operate the system with an air tool or with the test tool for at least 1/2 hour (1 hour preferred).
- Road test the vehicle for approximately 14 miles (20 km).
- Watch the underhood operation to make sure that belts rotate properly and nothing is rubbing or contacting hot parts.
- Check all components once the engine is turned off and the system has cooled.
- Check the vehicle coolant after the vehicle reaches operating temperature.
- Check the compressor oil level after the vehicle has been shut down and the oil level has had time to stabilize.

5.3 Setup, Performance Testing and Adjustments

This system has been adjusted at the factory for general operation. If your tests indicate that adjustment is necessary, 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 an orifice in the outlet to simulate tool use (Figure 5.1).



System Testing and Adjustment Tool - A700052

Figure 5.1

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1. Install the test tool in the tank outlet fitting.
2. Make sure that the ball valve is closed.
3. Place the manual transmission in NEUTRAL or the automatic transmission in PARK and fully apply the park brake.
4. Allow the vehicle to run until the engine is at operating temperature.
5. Operate the air compressor system 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 about 1,800 to 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 start to ramp-up when air pressure drops to approximately 140 psi.

5.4 System Identification and Warnings

The System Identification Number Plate must be attached to the vehicle at the time of installation (Figure 5.2). This plate provides information which allows VMAC to assist in customer inquiries and the ordering of parts. Mark and drill two 7/64 inch holes, then secure the plate with self-tapping screws.

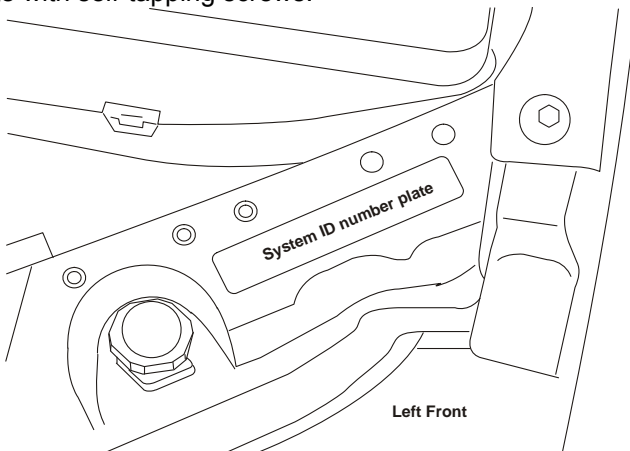



Figure 5.2

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As part of the installation process, ensure that the safety and operational instruction decal is affixed in an obvious location so that it can be seen by vehicle operators (Figure 5.3).



This Vehicle is Equipped with a VMAC Air Compressor System

OPERATING INSTRUCTIONS

<p>Daily Pre-Start Check</p> <ol style="list-style-type: none"> 1. Check Oil Level in Tank 2. Check Drive Belt 3. Check for Leaks 	<p>Start Up Procedure</p> <ol style="list-style-type: none"> 1. Ensure Compressor is OFF 2. Ensure discharge valve is CLOSED 3. Ensure air system is discharged 4. Place vehicle in Neutral or Park and engage vehicle safety features - park brake 5. Start engine and bring up to operating temperature 6. Turn ON compressor 	<p>Shutdown Procedure</p> <ol style="list-style-type: none"> 1. Allow engine to idle for 1 minute 2. Turn OFF compressor 3. Wait for system to discharge for 1 minute before restarting
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For Technical Support/Parts contact your VMAC Dealer
To locate your nearest dealer call 1-800-738-8622 (250-740-3200)

⚠ WARNING
Always allow system pressure to discharge before restarting

Figure 5.3

5.5 Auxiliary Air Receiver



If you intend to use an auxiliary air receiver with this system you must observe the following installation procedure to prevent damage to the system.

The line from the VMAC tank to the auxiliary air receiver must have a one-way check valve installed (part #3600078) to prevent blow back from the auxiliary tank to stop moisture from entering the VMAC tank (Figure 5.4).

The line to the auxiliary tank must not be installed in the bottom of the tank, but must be installed as high as possible to prevent water from entering the line.

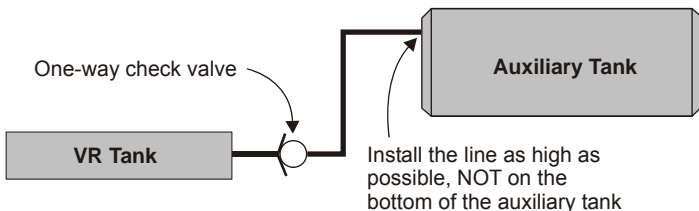


Figure 5.4

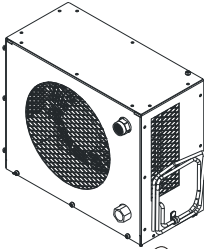
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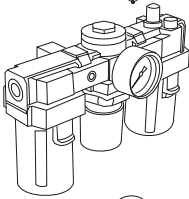
Accessory Products from VMAC

The following accessory products for your VR compressor system are available from VMAC. For more information or to order these products, call 1-800-738-8622.



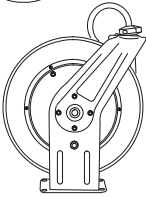
Eliminator Aftercooler

Removes up to 80% of moisture from compressed air. Quick installation, automatic drain and compact design



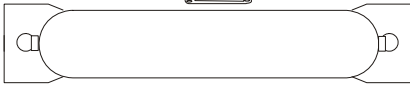
Filter Regulator Lubricator

Removes lubricants, water and dirt from the air stream. Adds atomized tool oil to lubricate tools. Reduces pressure for longer tool life.



Hose Reel

Secure, compact, retractable hose storage in a sturdy reel.



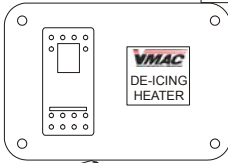
Air Receiver Tank

Thirty-five gallon capacity in a compact tank, complete with fittings and a gauge.



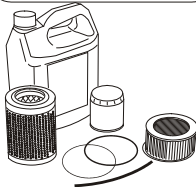
De-icer Kit

Insulated rope heater prevents freezing of lines and regulator.



Service Kits

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



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