VMAC®

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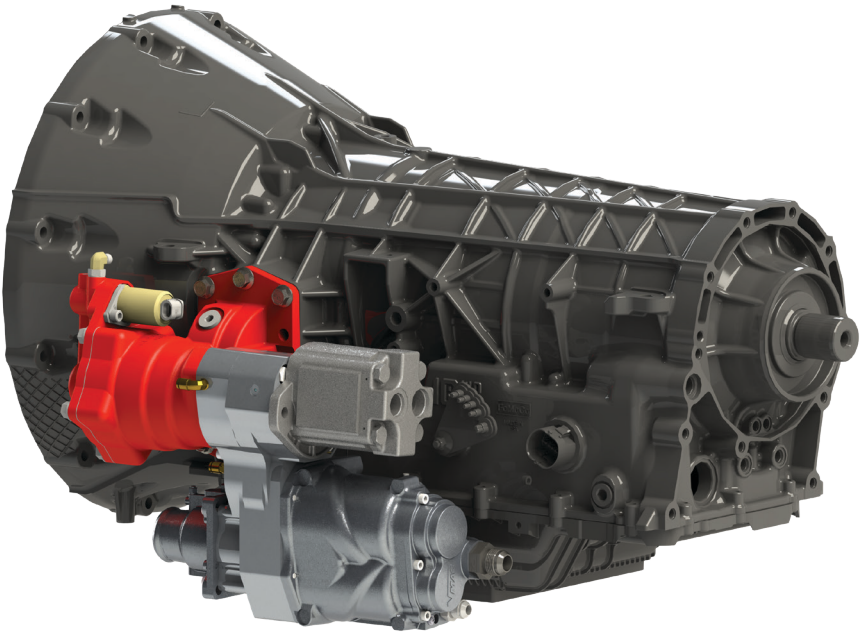

Installation Manual for VMAC Systems

DM2A030 | DM2B030 | DM2C030

2023+ Ford Super Duty F-250 – F-600
6.7 L Diesel

www.vmacair.com

Table of Contents

Revision	Revision Details	Revised by	Checked by				Implemented
			Eng.		Tech.	Qual.	
			Mech.	Elec.			
A	Initial release	MSP	CAM	ASE	RDB	TPK	29 May 2023
B	ECN: 24-195 Update to safety testing	MSP	N/A	TDF	MSP	N/A	29 Nov. 2024
C	ECN: 25-026 Add info on A900025	MSP	CAM	N/A	MSP	N/A	28 Apr. 2025

Additional Application Information

- 2020+ Ford Super Duty F-250 – F-600, 6.7 L Diesel.
- F350 pickups equipped with dual rear wheels, and all F450 pickups will need to purchase the A900025 Cooler Adapter Kit (not required for any chassis cab vehicles).

Registered Trademarks

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Eaton Aeroquip® is a registered trademark of EATON AEROQUIP INC.
Ford® and **Super Duty®** are registered trademarks of Ford Motor Company.

Important Information

The information in this manual is intended for certified VMAC installers who have been trained in installation and service procedures and/or for anyone with mechanical trade certification who has the tools and equipment to properly and safely perform the installation or service. Do not attempt installation or service without the appropriate mechanical training, knowledge and experience.

Follow all safety precautions. Any fabrication for correct fit in modified vehicles must follow industry standard "best practices".

Notice

Printed in Canada

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, service techniques and running OEM changes. If a discrepancy is found in this manual, contact VMAC Technical Support prior to initiating or proceeding with installation, service or repair. Current information may clarify the issue. Anyone with knowledge of such discrepancies, who proceeds to perform 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 ensure that their safety and that of others is not being compromised, and that there will be no adverse effects on the operational safety or performance 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 anyone to properly adhere to the procedures set out in this manual or standard safety practices.

Safety should be the first consideration when performing any service operations. If there are any questions concerning the procedures in this manual, or more information is required, please contact VMAC Technical Support prior to beginning work.

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 attention to instructions concerning 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 aware of the possibility of personal injury or death. As it is impossible to warn of every conceivable hazard, common sense and industry standard safety practices must be observed.

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

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

Warranty

VMAC Standard Warranty (Limited)

For complete warranty information, including both VMAC Standard Warranty (Limited) and VMAC Lifetime Warranty (Limited) requirements, please refer to our current published warranty located at: **www.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.

VMAC Lifetime Warranty (Limited)

A VMAC Lifetime Limited Warranty is offered on the base air compressor only and only on UNDERHOOD™, Hydraulic Driven, Transmission Mounted, Gas and Diesel Engine Driven Air Compressors, Multifunction Power Systems, and other products as defined by VMAC, provided that (i) the purchaser fully completes and submits a warranty registration form within 3 months of purchase, or 200 hours of operation, whichever occurs first; (ii) services are completed in accordance with the Owner's Manual; (iii) proof of purchase of applicable service kits are made available to VMAC upon request.

The VMAC Lifetime Warranty is applicable to new products shipped on or after 1 October, 2015.

Warranty Registration

The VMAC warranty registration form is located near the back of this manual. This warranty registration 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 the warranty can be registered with VMAC:

www.vmacair.com/warranty

warranty@vmacair.com

(877) 740-3202

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

VMAC Warranty Claim Process

VMAC warranty work must be pre-authorized by VMAC. Claims are processed via our dealer network. If you are not a VMAC dealer, please select one to work with via our Dealer Locator:
https://www.vmacair.com/dealer-locator/

1) Communicate with VMAC Technical Support at 1-888-241-2289 or tech@vmacair.com to help diagnose/troubleshoot the problem prior to repair. VMAC technical support will require the VMAC System ID, and the hours on the compressor.
2) VMAC will provide direction for repair or replacement of the failed components.
3) If requested, failed parts must be returned to VMAC for evaluation.
4) Dealers may login to the VMAC website to view the "VMAC Labour Time Guide" (under "Agreements") to see the allowable warranty labour times.
5) Warranty invoices must include the Service Ticket number, VMAC System ID#, hours on the compressor, and a detailed description of the work performed.
6) VMAC Warranty does not cover consequential damages, overtime charges, mileage, travel time, towing/recovery, cleaning or shop supplies.
7) Dealers submit warranty claims on behalf of the Vehicle Owner/End User affected by the defective part(s). The dealer ensures that all warranty credits are refunded back to the Vehicle Owner/End User who made the initial warranty claim.

In order to qualify for Lifetime Warranty (Limited), the completed warranty registration form must be received by VMAC within 3 months of the buyer receiving the Product(s), or 200 hours of operation, whichever occurs first.

If the completed warranty registration form has not been received by VMAC within 3 months of the buyer receiving the Product(s), or 200 hours of operation, the warranty period will be deemed to commence 30 days from the date of shipment from VMAC.

Failure to follow the warranty claim process may result in denial of the warranty claim.

VMAC Product Warranty Policies & Warranty Registration can be found on the VMAC website (see previous page for URL).

General Information

Optional Equipment Compatibility

While VMAC strives to design systems compatible with optional OEM equipment (such as running boards), it is impractical to develop systems that accommodate every OEM and aftermarket option or add-on. Whenever possible, VMAC endeavors to advise of compatibility issues in the "Additional Application Information" section of the manual. Even when specific optional equipment is determined by VMAC to be incompatible, it does not preclude the vehicle upfitter or end user from modifying the optional equipment to make it compatible with the installed VMAC system. VMAC does not warranty or accept responsibility or liability for the fitment, function or safety of any products modified in any way not expressly outlined in the installation manual.

Before Starting

Note and label all parts that are removed from the vehicle as many of the OEM parts will be reused during the installation of the VMAC system.

Read this manual prior to beginning the installation to ensure familiarity with the components and how they will fit on the vehicle. Identify any variations from the application list such as vehicle model, engines, or optional equipment (e.g., dual alternator, active steering assist, etc.).

Open the package, unpack the components and identify them using the Illustrated Parts List (IPL) included in the Fastener Pack.

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.

Ordering Parts

To order parts, contact a VMAC dealer. The dealer will ask for the VMAC serial number, part number, description and quantity. Locate the nearest dealer online at www.vmacair.com/dealer-locator or call 1-877-912-6605.

Special Tools Required

- Pneumatic fan wrench removal set (such as Lisle® 43300) or a manual fan pulley holder (such as KD Tool® KD3900)
- ***Vehicles with adaptive power steering:*** Pulley removal tool kit (such as a Lilse 39000, Jet H3565 or Performance Tool 389708 or equivalent).

Torque Specifications

All fasteners must be torqued to specifications. Use manufacturers' torque values for OEM fasteners.

The torque values supplied in Table 1 are intended for VMAC supplied components, or for use as a guide in the absence of a torque value provided by an OEM.

Apply Loctite 242 (blue) to all fasteners (except nylon lock nuts) unless otherwise stated.

Torque values are with Loctite applied unless otherwise specified.

Standard Grade 8 National Coarse Thread								
Size (in)	**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 (in)	**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 (mm)	**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

Table 1 — Torque Table

Preparing for Installation

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 no steps are missed.***

Apply Loctite 242 (blue) to all fasteners (except nylon lock nuts) unless otherwise stated.

☐ Review the contents of the system using the illustrated parts list to ensure all components are present and in the correct quantity. If any components are missing, have the system ID ready and call VMAC Technical Support.

☐ Disconnect both batteries.

☐ Raise the front of the vehicle and support the axle on axle stands (or appropriate blocking).

Ensure the vehicle is supported safely with appropriately rated jack stands.

☐ Drain the coolant from the primary radiator into a clean container for re-use later. The drain can be found on the driver side of the radiator. Close the drain spigot once the coolant has been drained.

F350 Pickups With Dual Rear Wheels, and all F450 Pickups

☐ Refer to the instructions included with the A900025 Cooler Adapter Kit.

All Other Vehicles

☐ Cut a slit in the center of the hose to drain the remaining coolant (Figure 1).

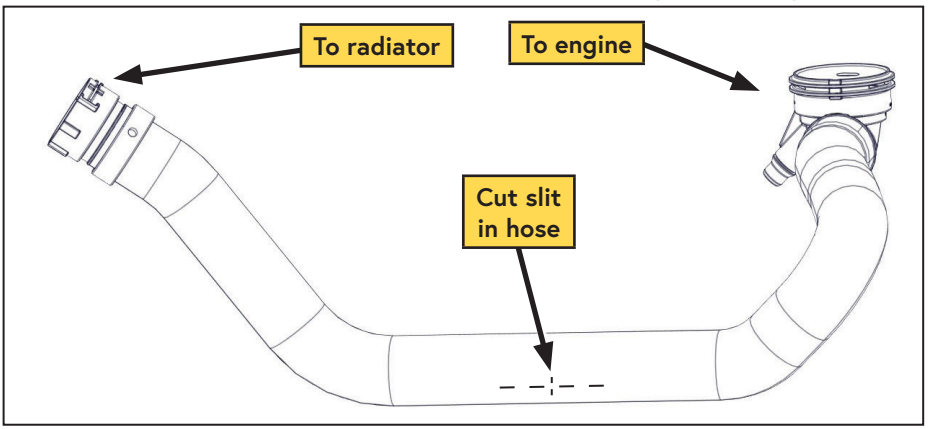


Figure 1 — Lower radiator hose

☐ Uncouple the lower radiator hose assembly at the engine and radiator and remove the assembly from the engine bay (Figure 1).

Modifying the Hoses, Installing the Cooler

Refer to Figure 8 on page 12 for an illustration of the modified coolant system.

☐ Roll the OEM anti-abrasion mesh up towards the radiator side quick connect as this will be retained on the hose.

☐ From the radiator side of the hose, measure 5 1/4 in along the outside radius towards the center of the hose and mark with a grease pen (Figure 2).

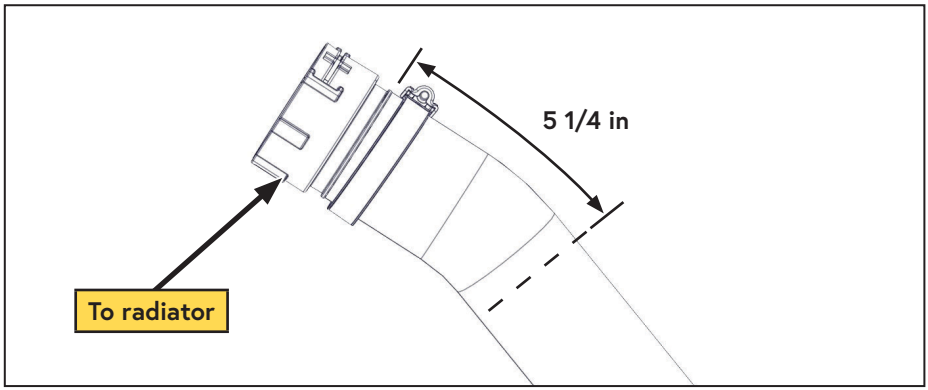


Figure 2 — Lower radiator hose modification

☐ From the radiator side of the hose, measure 6 3/4 in along the outside radius towards the center of the hose and mark with a grease pen (Figure 3).

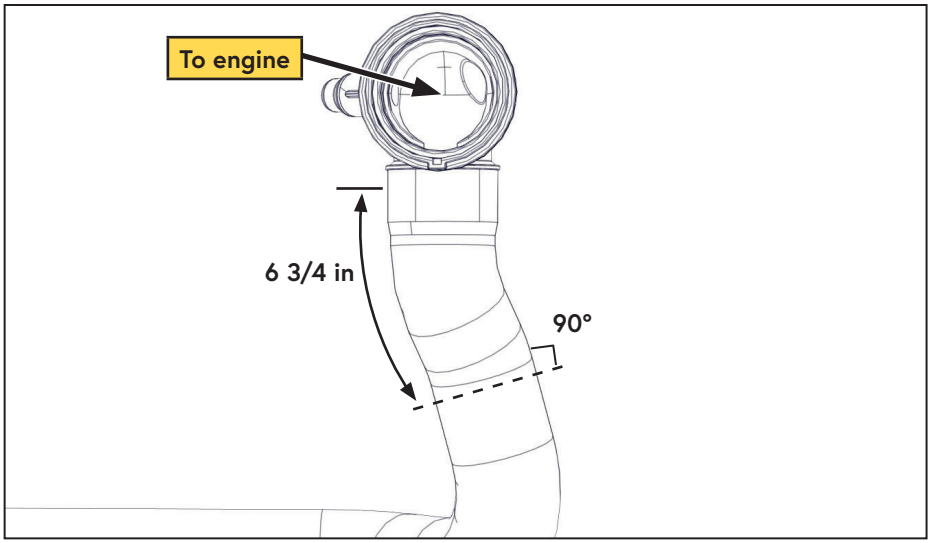


Figure 3 — Lower radiator hose modification

- ☐ Cut the radiator hose in the two marked locations, ensuring the cuts are square to the hose section.
- ☐ Install the modified radiator side of the lower radiator hose onto the radiator.
- ☐ Install the modified engine side of the lower radiator hose onto the engine.
- ☐ Remove the anti-abrasion sleeve from the center section of the lower radiator hose and slide it over the radiator side coolant tube; securing it in place with cable ties (Figure 4).

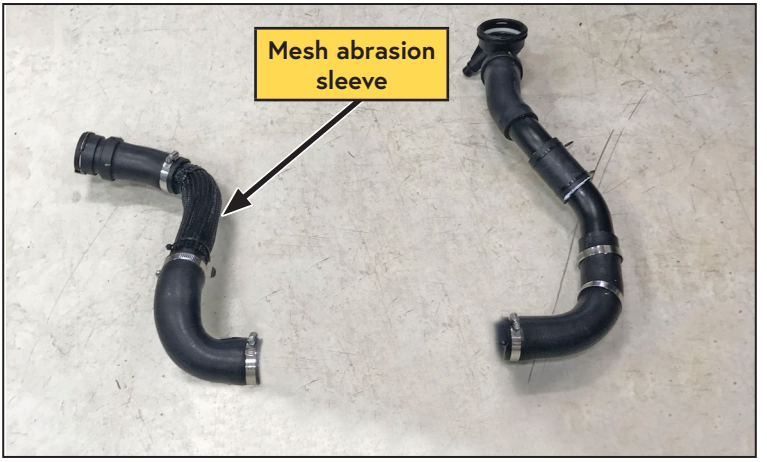


Figure 4 — Radiator side anti-abrasion sleeve
(Coolant assembly removed from vehicle for clarity)

- ☐ Cut a straight 6 in section of the discarded lower radiator hose and slit it lengthwise. This will be used as an anti-abrasion sleeve on the driver side coolant tube.
- ☐ Wrap the 6 in section around the straight section of the driver side coolant tube and secure with cable ties (Figure 5).

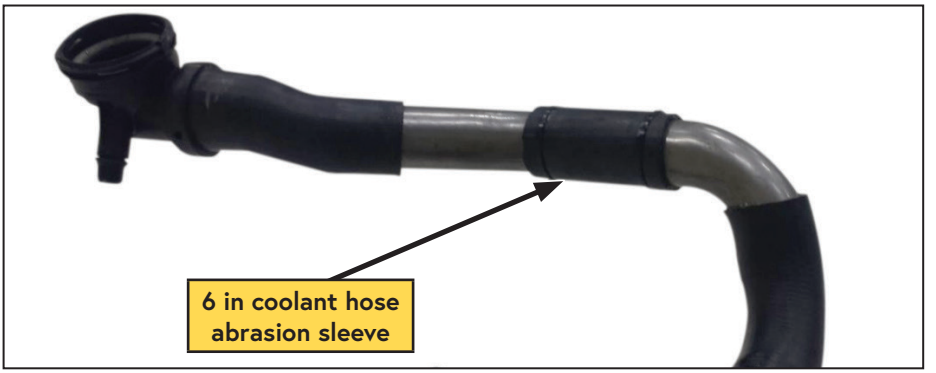


Figure 5 — Engine side anti-abrasion sleeve

☐ Mount the cooler to the cooler bracket (Figure 6).

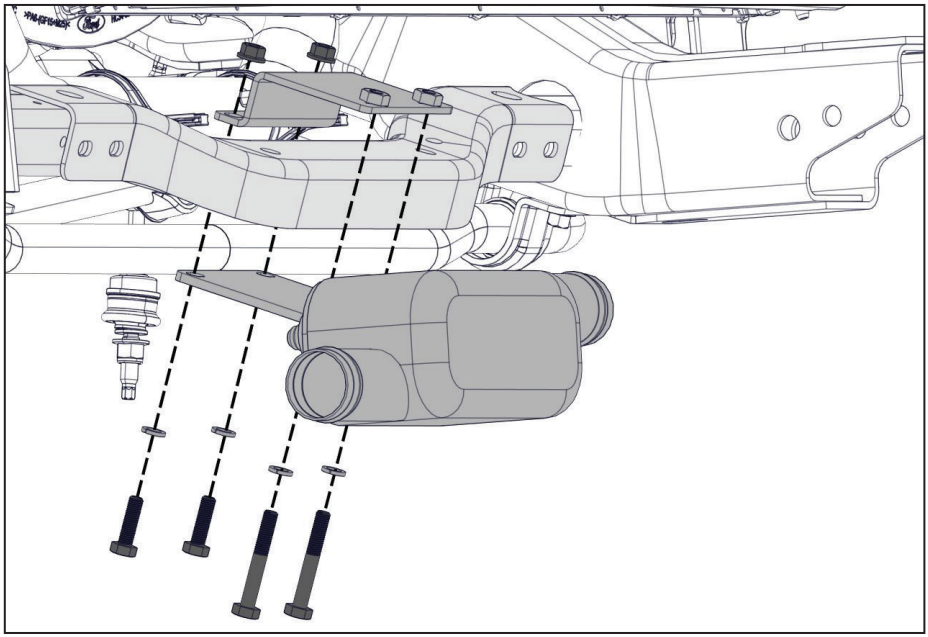


Figure 6 — Install cooler

☐ Connect passenger and driver side radiator hoses, and tubes to the VMAC cooler. Route the steel tube connectors between the cross member and the radiator support (Figure 7).

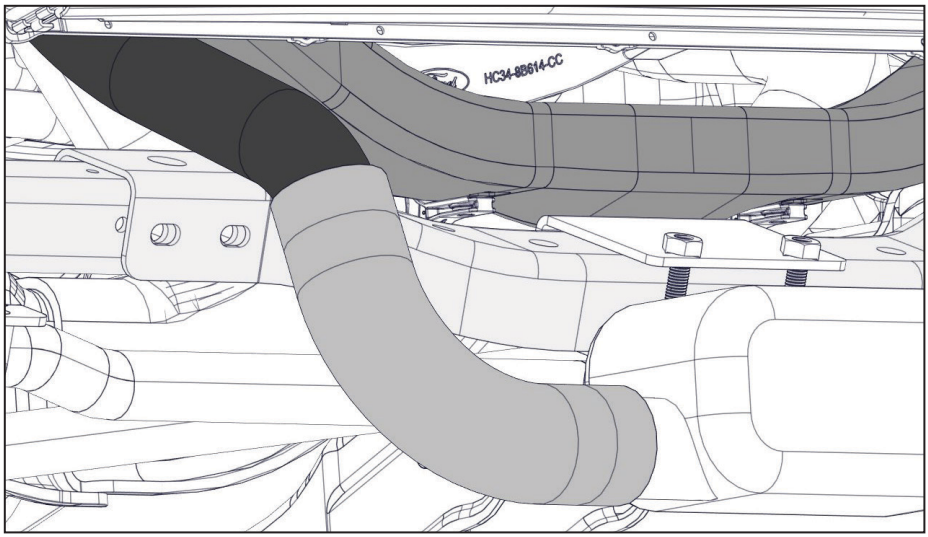


Figure 7 — Install radiator hoses and tube connectors

☐ Connect the modified OEM hoses as indicated (Figure 8).

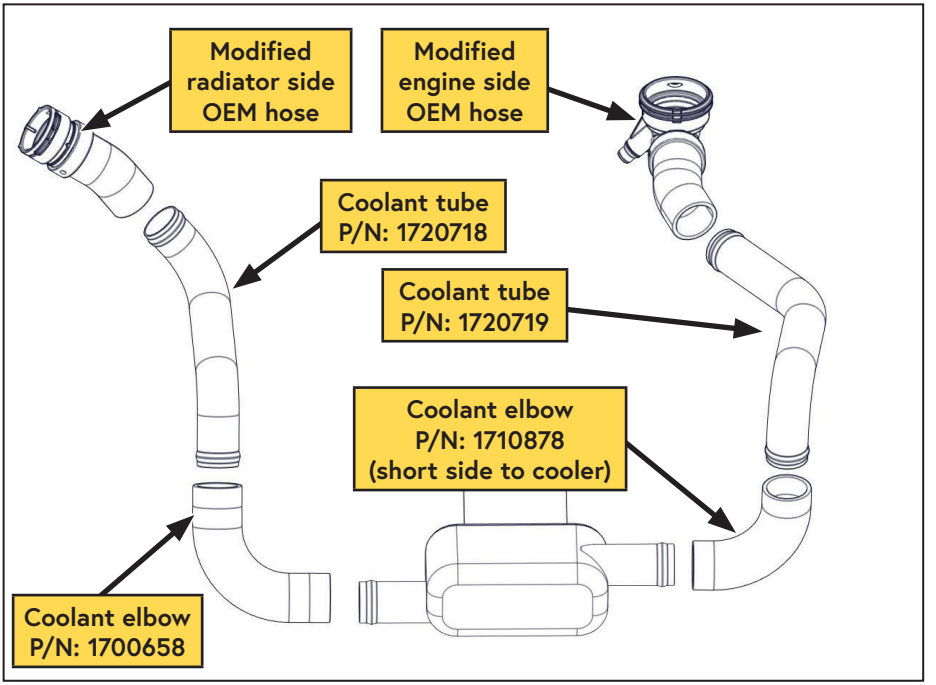


Figure 8 — VMAC cooler assembly

☐ Disconnect the small flexible hose secured to the cable run tray on the front of the engine, above the steering linkage, from the metal coolant tube. Retain the OEM spring clamp (Figure 9).

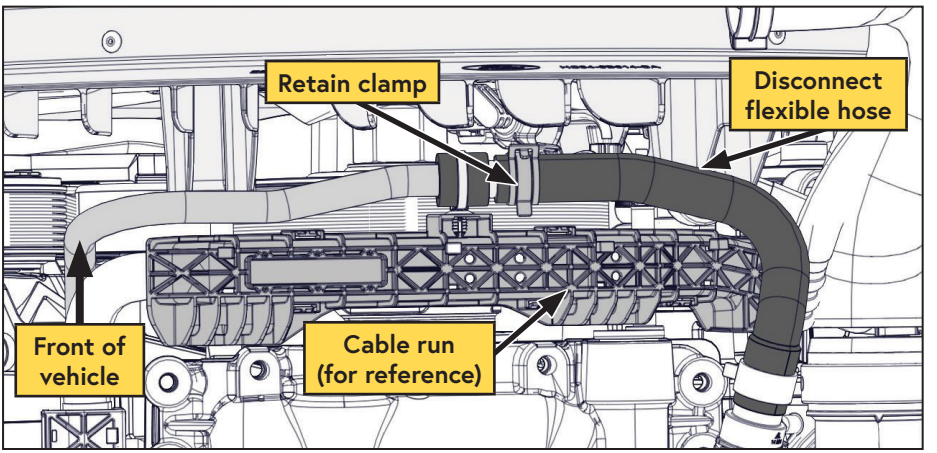


Figure 9 — Disconnect the heater return hose
(Viewed from below the vehicle)

☐ Insert the supplied aluminum plug into the flexible hose section and secure using the OEM spring clamp (Figure 10).

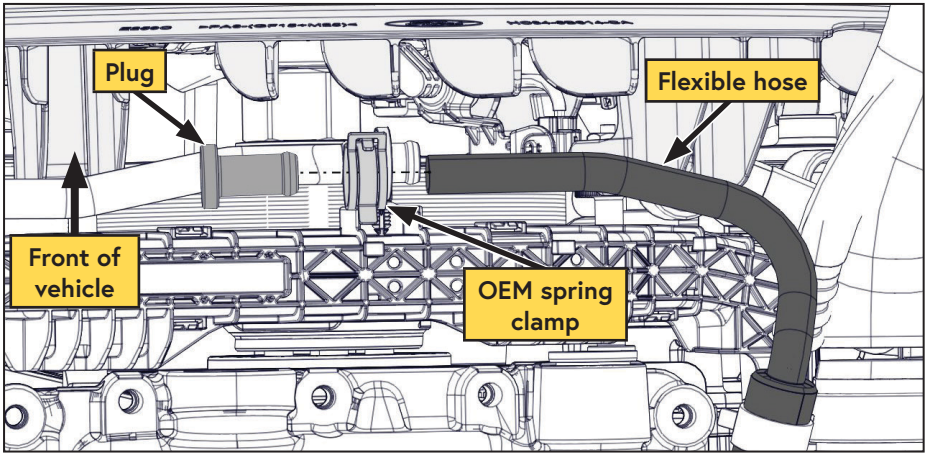


Figure 10 — Plug the flexible hose
(Viewed from below the vehicle)

☐ Connect one end of the supplied hose to the metal coolant tube. Ensure the hose is seated against the bead in the OEM hard line and secure using a hose clamp (Figure 11).

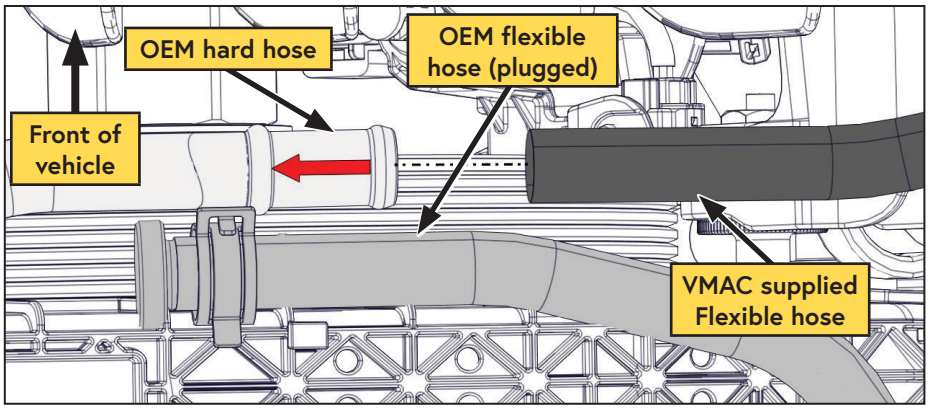


Figure 11 — Plug the flexible hose
(Viewed from below the vehicle)

☐ Secure the plugged OEM flexible hose to the metal coolant tube using a cable tie.

☐ Route the hose between the body and the frame crossmembers, following the coolant tube toward the cooler.

☐ Connect the hose to the small spigot on the passenger side of the cooler using a hose clamp (Figure 12).

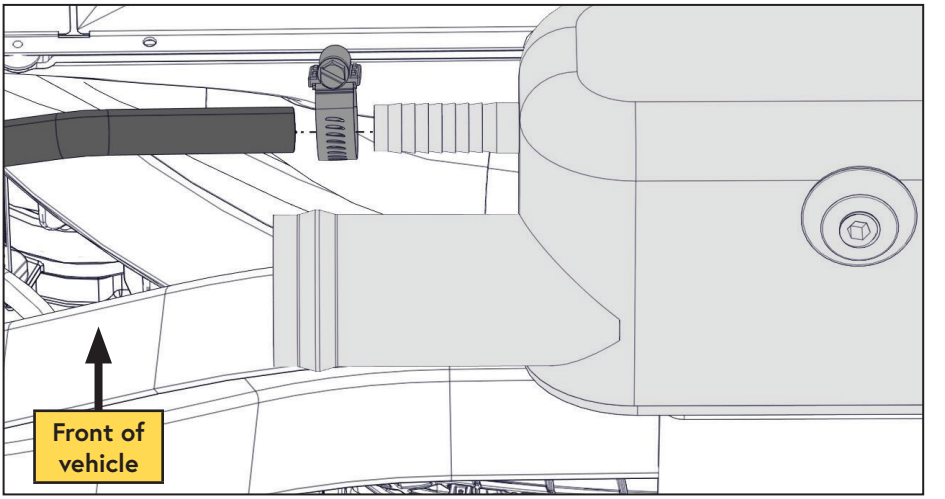


Figure 12 — Connect hose to VMAC cooler

☐ Using the supplied P-clips, bolts, and clip nuts, secure the heater hose to the radiator support.

☐ Adjust all connections as necessary to confirm that all joints are engaged securely and that there are no twists, kinks or pinches.

☐ Secure all the connections with the supplied hose clamps.

Do not remove the coolant lines from the coolant valve.

☐ Remove the coolant valve (located near the transmission PTO port) from its mounting bracket (Figure 13).

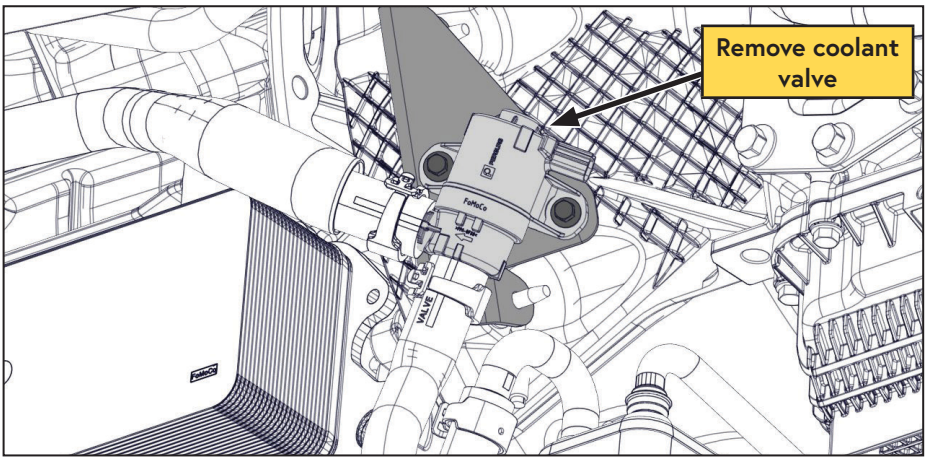


Figure 13 — Connect hose to VMAC cooler

☐ Disconnect any clips retaining the wiring harness to the bracket.

☐ Remove and discard the bracket from the bellhousing mounting studs.

☐ Using the OEM fasteners, install the supplied bracket onto the bellhousing mounting studs (Figure 14).

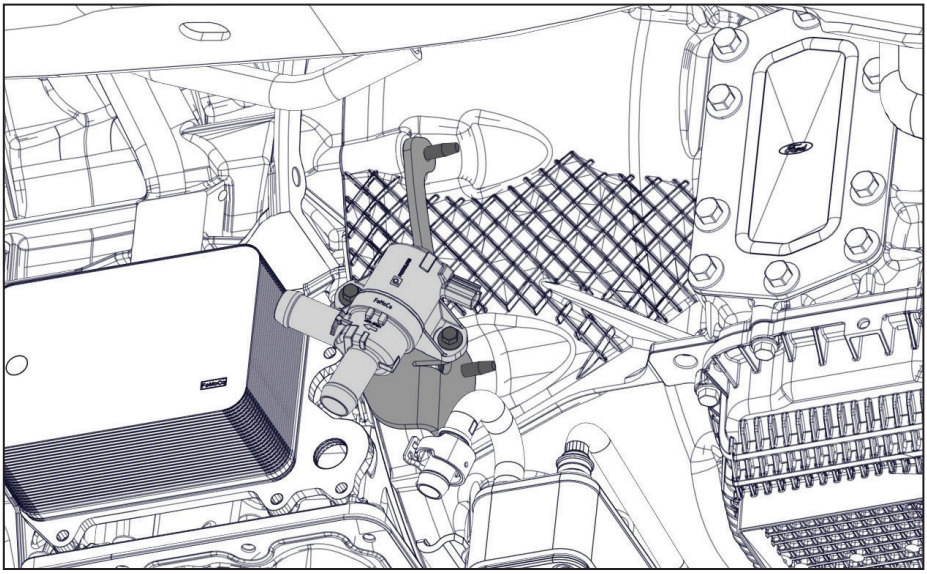


Figure 14 — Install supplied coolant valve bracket

☐ Using the OEM fasteners, mount the coolant valve to the bracket (Figure 14).

☐ Using a cable tie, re-secure the wire harness to the bracket.

Installing the PTO

Apply Loctite 242 (blue) to all fasteners (except nylon lock nuts) unless otherwise stated.

It is extremely important to ensure that no foreign particles or debris enter the PTO port on the transmission.

On 4x4 vehicles, mark the front drive shaft with a grease pen (or similar permanent marker) for re-alignment later. Unbolt the front of the drive shaft, pivot it out of the way and secure it to allow room to install the PTO.

☐ Except as noted below, follow the mechanical portion of the OEM PTO installation instructions (210 Series).

The PTO electrical installation will be covered in "Installing the Control Components" and differs from the OEM PTO instructions.

☐ Clock the hydraulic fitting on the transmission pressure port to 12 o'clock (Figure 15).

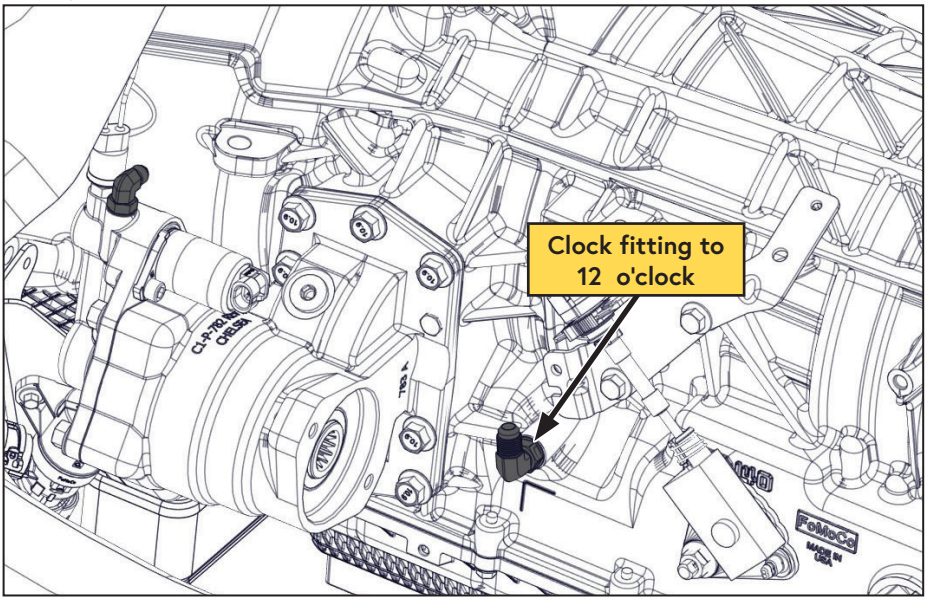


Figure 15 — Install the compressor

☐ Route the hydraulic feed line from the fitting, over top of the PTO, and connect it to the corresponding fitting on the top of the PTO (Figure 15).

☐ Apply a generous amount of spline grease (supplied with the PTO) to both splines. Ensure that the grooves of each are fully filled.

☐ Slide the compressor forward onto the PTO until it is fully mated (Figure 16).

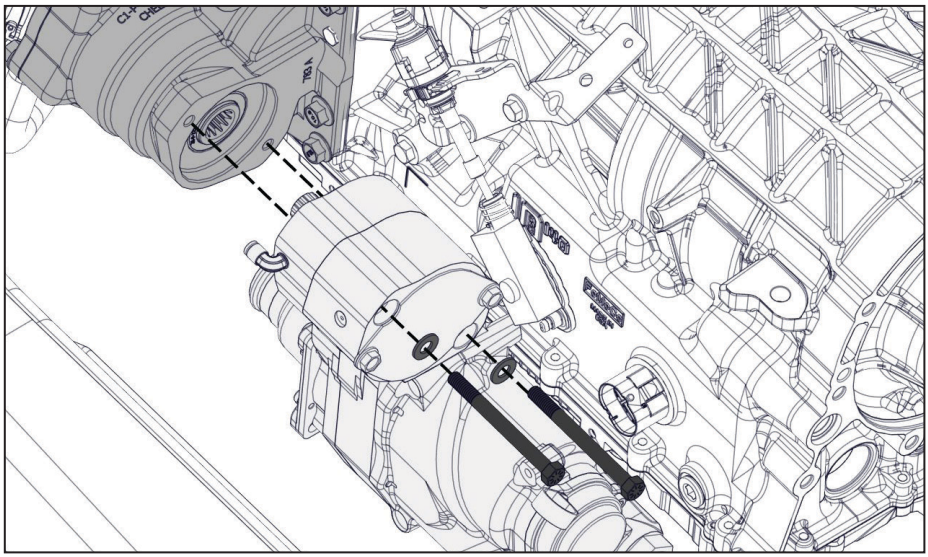


Figure 16 — Install the compressor

☐ Using the (×2) supplied fasteners and flat washers, secure the compressor to the PTO. *Using a torque wrench, ensure the bolts are torqued to 40 (ft•lb).*

☐ Install the supplied clip nuts onto the remote regulator bracket (Figure 17).

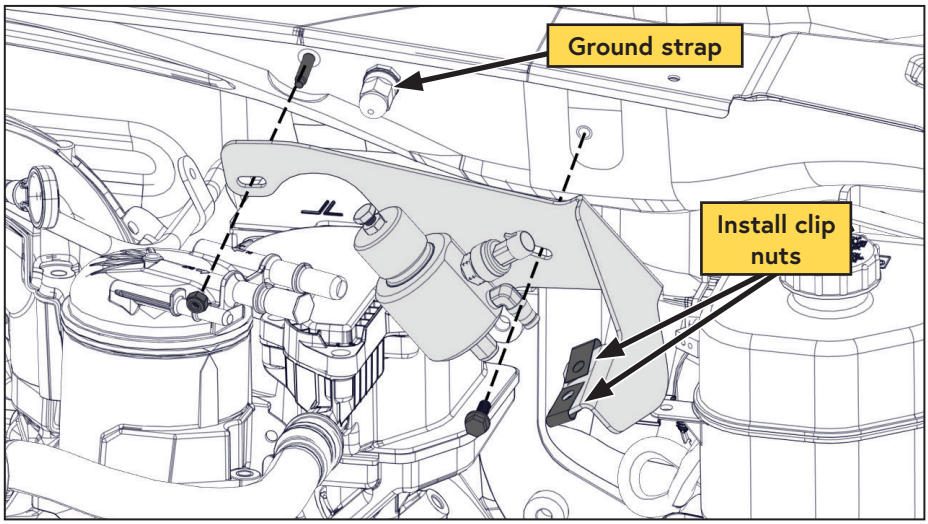


Figure 17 — Install the regulator

☐ Locate the (×2) M6 studs on the driver side firewall near the OEM ground strap (Figure 17).

☐ Mount the regulator assembly and secure it using the (x2) supplied M6 lock nuts (Figure 17).

☐ Remove the plastic retainer clip from the wiring harness running over the EGR cooler, unthread the clip from the hole and discard it.

☐ Position the oil fill bracket over the hole and align the smaller hole with the nearby OEM bolt head (Figure 18).

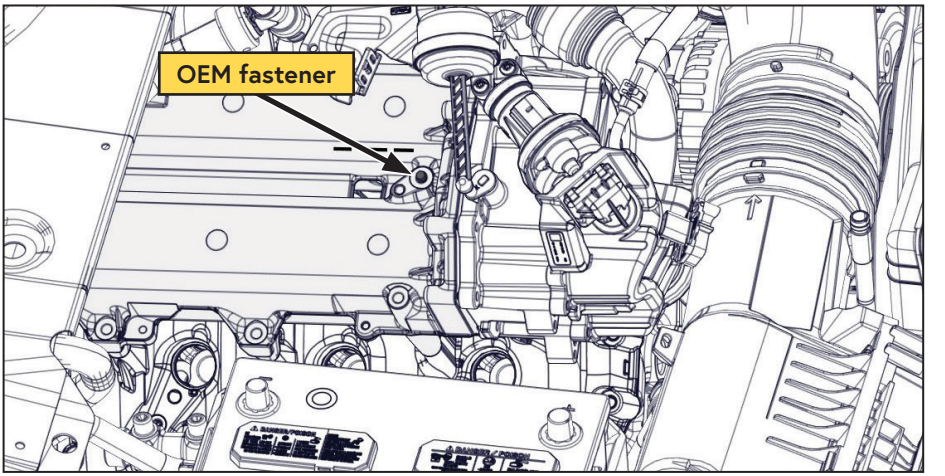


Figure 18 — Install oil fill bracket

☐ Secure the bracket using the supplied M8 fastener, ensuring there are no wires or harnesses pinched under the bracket (Figure 18).

☐ Using the supplied P-clip and fasteners, secure the harnesses where they pass over the oil fill bracket (Figure 19).

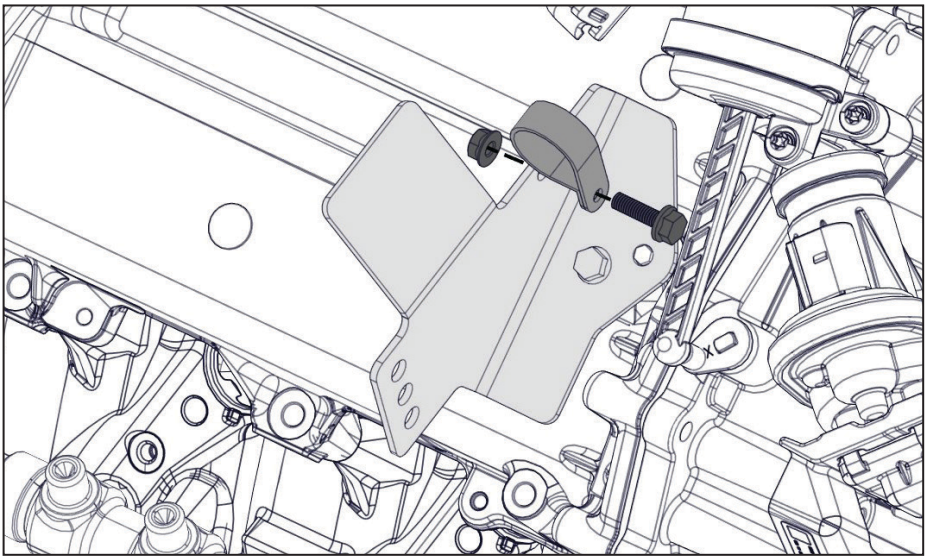


Figure 19 — Install oil fill bracket

Installing the Hydraulic Pump

☐ Remove the plate from the rear of the compressor gearcase (Figure 20).

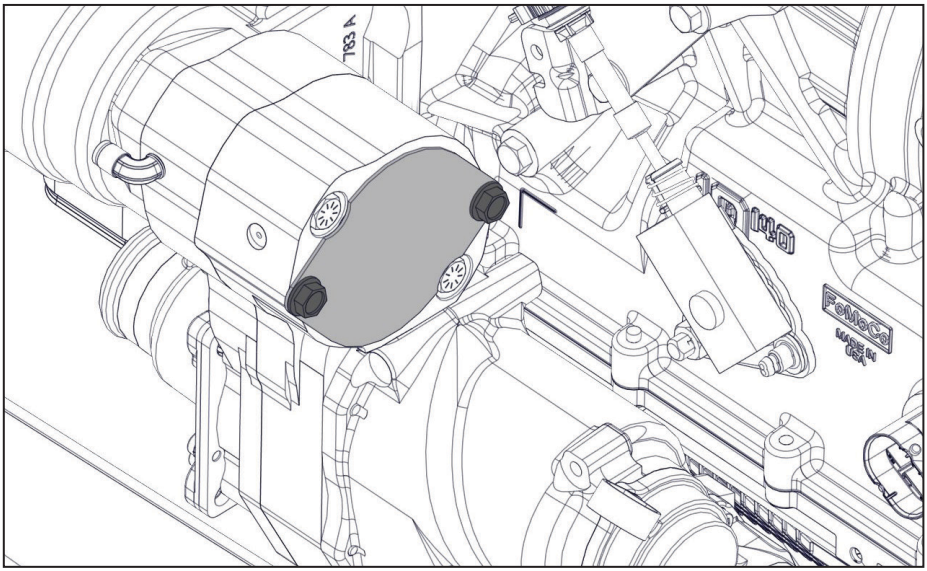


Figure 20 — Install alignment guides

☐ Apply a generous amount of spline grease (supplied with the PTO) to both splines. Ensure that the grooves of each are fully filled.

☐ Slide the pump onto the compressor mount flange. Rotate the pump as necessary to align the splines and mounting bolts (Figure 21).

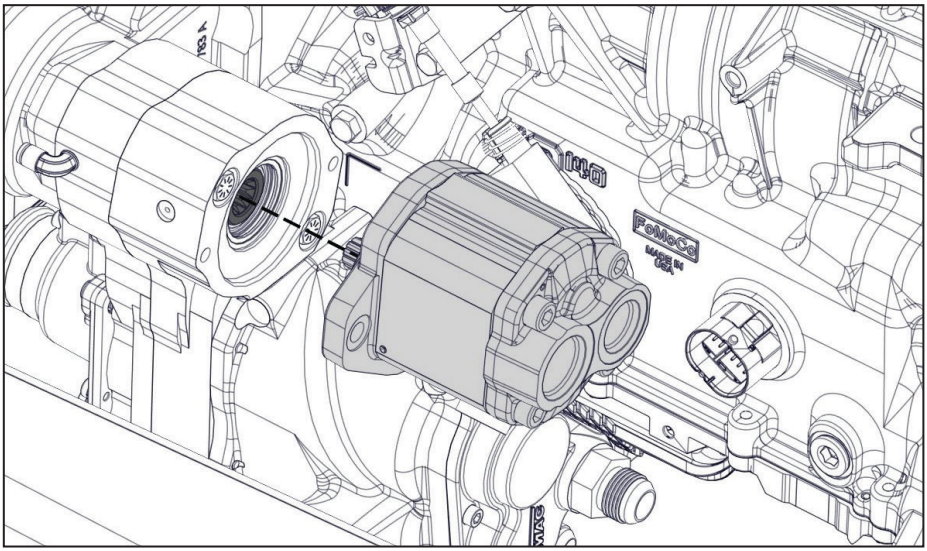


Figure 21 — Mounting the hydraulic pump

When determining hydraulic hose routing, consider the relative motion of the transmission, vehicle cab and front drive shaft (if installed). Ensure the hoses are adequately protected and secured away from any hot, sharp or moving parts.

- ☐ Loosely connect the hydraulic discharge and feed hoses to determine the correct hose routings and fitting orientation (the inlet port on the hydraulic pump is #12 ORB, the outlet port is #10 ORB).
- ☐ Remove the pump and tighten the hydraulic fittings.
- ☐ Apply Loctite 242 (blue) to the supplied fasteners and install the hydraulic pump. Refer to the instructions included with the hydraulic pump for torque values (Figure 22).

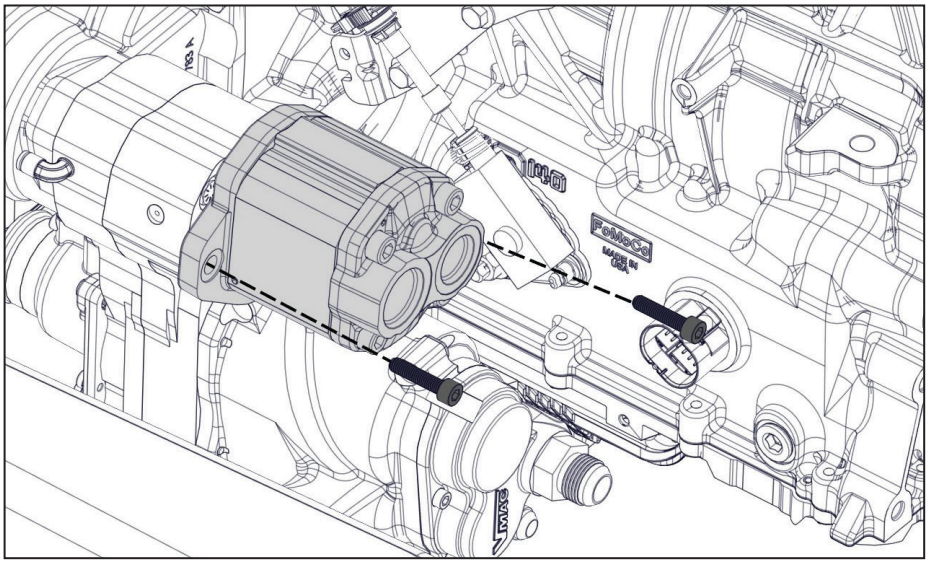


Figure 22 — Securing the hydraulic pump

Installing the Air Oil Separator Tank (AOST)

Dependent upon other installed equipment, it may be necessary to move the AOST 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 the warranty.

The AOST must be level for proper air/oil separation, and to ensure that the oil level will display accurately in the sight glass.

Apply Loctite 242 (blue) to all fasteners (except nylon lock nuts) unless otherwise stated.

Installing the AOST

The AOST will mount to the passenger side frame rail, with the brackets straddling the transmission cross member (Figure 23).

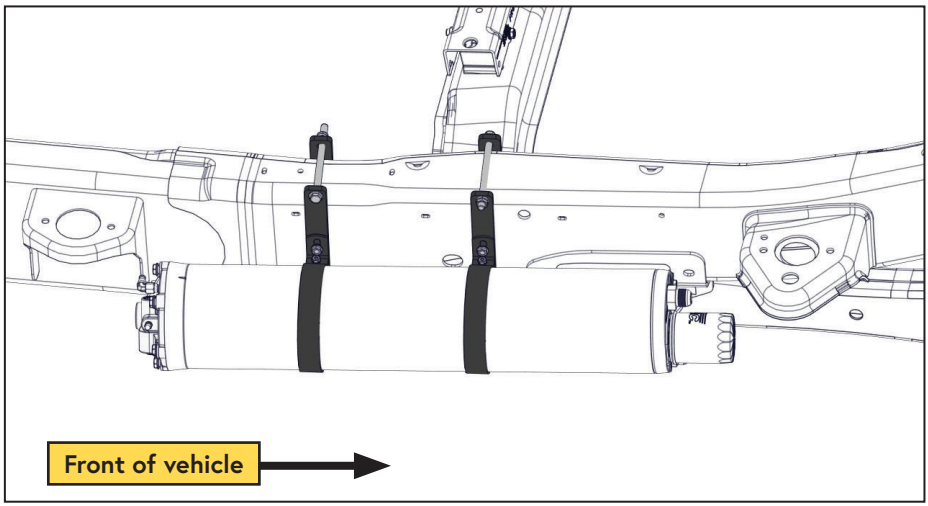


Figure 23 — AOST installed

☐ Using the OEM mounting hardware, replace the (×2) front running board brackets with the supplied low profile brackets.

The top bolt on the forward tank mount will need to be installed from the inside of the frame (Figure 24).

☐ Install the tank mounting brackets on the frame (Figure 24):

- The front tank mount bracket mounts between the radius arm mount and the transmission crossmember.
- The rear tank mount bracket mounts just before the bend in the frame.

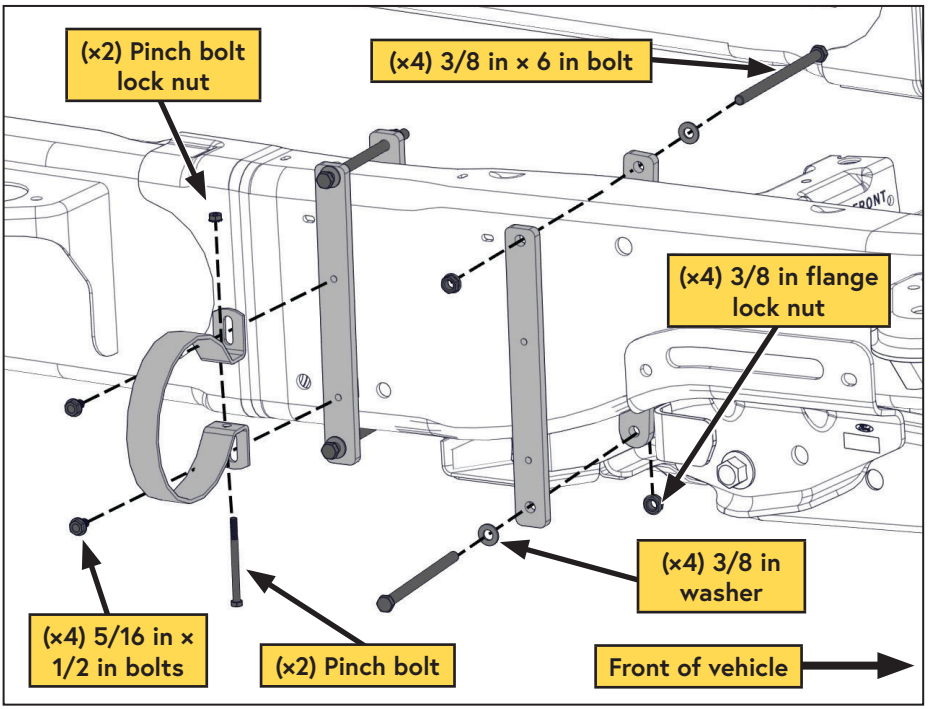


Figure 24 — Installing the AOST
(For clarity, the rear AOST mounting hardware is not shown)

☐ Using the (×2) supplied 3/8 in × 6 in bolts, install the rear tank mount and backing strap approximately 10 in ahead of the rear cab mount. Leave the bolts finger tight to allow for minor adjustment (Figure 24).

☐ Remove the tank clamp pinch bolts.

☐ Install the tank clamps over the front of the tank and slide them toward the center of the tank.

Install the tank onto the tank mounts (Figure 24)*:

☐ *Adjust the tank in the straps to bring the rear of the tank close to (but not touching) the rear cab mount.

☐ Using the (×2) supplied 3 in × 1/4 in pinch bolts and install them into the mounting clamps. Leave the fasteners finger tight to allow for adjustment when installing the hoses.

☐ Rotate the tank so that the directional arrow on the rear of the tank is pointing upwards (Figure 25).

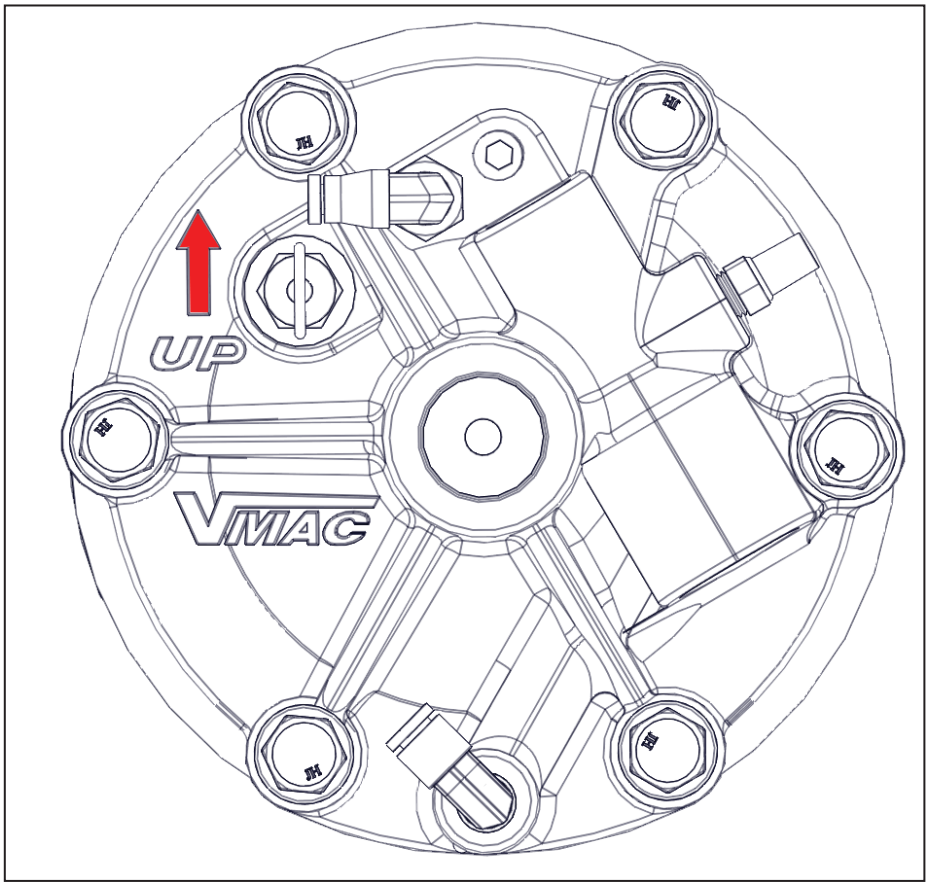


Figure 25 — Securing the AOST (Rear view)

AOST orientation is critical. The arrow must be pointing up to prevent compressor failure due to oil starvation, or oil in the discharge air.

Hose Requirements

Only attempt to shorten the supplied hose if there is access to the appropriate equipment. <u>Do not</u> attempt to cut the hose and splice it using hose clamps.

VMAC Compressor oil will degrade rubber lined hoses, use only hoses with an AQP elastomer type liner. Contact VMAC Technical Support at 1-888-241-2289 for further information.

The PTFE tubes and AQP elastomer lined hoses are specifically designed to work with VMAC compressor oil and at compressor operating temperatures.

Based on the desired location of the AOST, the hose lengths provided with this system may not be ideal. VMAC suggests first trying to adjust the AOST within its mounts to take up any excess slack in the hoses. If this is not effective, the hoses can be shortened or replaced as necessary, or hose extenders can be used.

VMAC recommends shortening these hoses as a preferred alternative to coiling up and securing the excess. ***Shorter hose length will maximize system performance.***

Avoid using 90° fittings wherever possible as they cause flow restrictions and negatively impact performance.

The following hoses are included with this compressor kit:

- 3/4 in × 47 in (oil fill hose).
- 3/4 in × 50 in (discharge hose).
- 1/2 in × 85 in (AOST to cooler).
- 1/2 in × 128 in (cooler to compressor).
- 1/4 in (PTFE tube) × 120 in.
- 1/4 in (black air brake tube) × 60 in.
- 3/16 in (PTFE tube) × 120 in.

If longer hoses are required:

To order parts, contact a VMAC dealer. The dealer will ask for the VMAC serial number, part number, description and quantity. See page 6 for ordering information.

- Eaton Aeroquip hoses with an "AQP" type inner liner are required.
- OTC fittings are required for the VMAC supplied hose.
- Push-lock fittings are suitable if FC332 hose is used.
- If Push-lock fittings are being used, do not use hose clamps as they will damage the hose and cause leaks.

Routing and Connecting the Hoses

When routing hoses, ensure cap plugs are installed so that contaminants do not get in the line. Take care when routing hoses, as a hose failure may damage the compressor and/or cause injury.

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

Ensure there is sufficient slack in the hose routing to allow for normal engine / transmission movement.

PTFE Tubing, Loom, and Push-To-Connect Fittings

- ☐ PTFE tubing should only be cut using proper tubing cutters. Side cutters, utility knives, etc. will deform the tube, preventing a proper seal (or leave sharp edges which cut the internal O-ring).
- ☐ When applying loom to the PTFE tube, leave approximately 1 in between the loom and the fitting.
- ☐ Ensure the tube is clean, cut at 90° and that there are not sharp edges.
- ☐ Lubricate the tube and firmly push it into the fitting so that the tube fully seats in the fitting.
- ☐ Slide the collet out, away from the body of the fitting to lock the tubing in place.
- ☐ Ensure the tube does not have any "play" to prevent the O-ring from wearing.

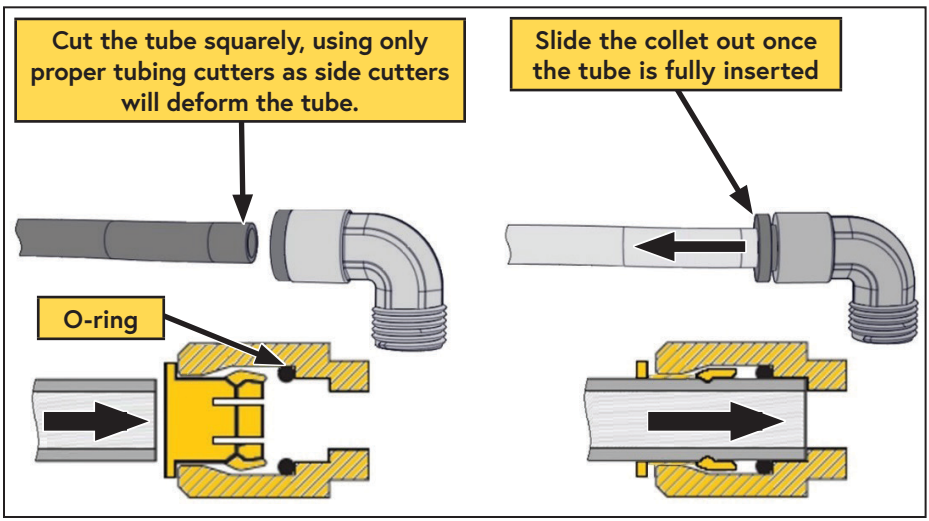


Figure 26 — Push-to-connect fittings

☐ Remove the spin on oil filter and set it aside. Install a cap plug to prevent any contaminants entering the system.

☐ Install the supplied Tee fitting onto the AOST in the orientation shown (Figure 27).

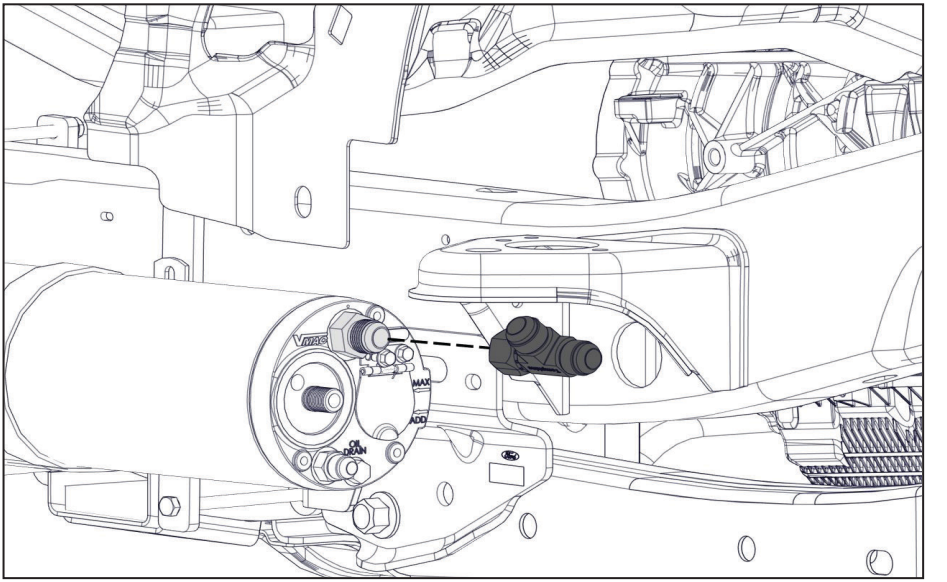


Figure 27 — Install fittings

☐ Using the supplied P-clip and fasteners, secure the shorter 3/4 in hose (oil fill) to the oil fill bracket installed earlier (Figure 28).

Figure 28 — Install oil fill hose

☐ Route the hose down toward the firewall; pass the hose between the inner fender and the body mount and connect it to the Tee on the AOST (Figure 29).

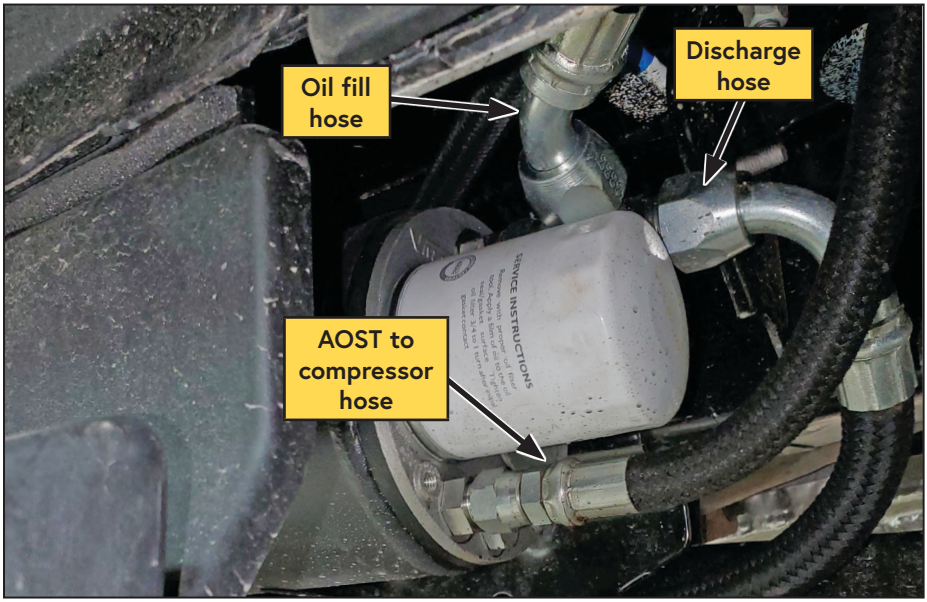


Figure 29 — Routing the hoses

☐ Route the hose down toward the firewall; pass the hose between the inner fender and the body mount and connect it to the Tee on the AOST.

☐ Connect the 90° fitting from the longer 1/2 in hose (cooler to compressor) to the passenger side fitting on the oil cooler.

☐ Connect the 90° fitting from the shorter 1/2 hose (AOST to cooler) to the driver side fitting on the oil cooler.

☐ Route the (x2) 1/2 in oil hoses along the top of the frame, to the rear of the inner fender liner.

☐ Route the (x2) 1/2 in hoses out of the engine bay and down, past the body mount.

☐ Connect the 90° fitting on the 3/4 in (discharge) hose to the front of the Tee fitting on the AOST.

☐ Connect the shorter 1/2 in hose (AOST to cooler) to the matching fitting on the front of the AOST.

☐ Route the 1/2 in hose (cooler to compressor) between the frame and the AOST, and down through the forward AOST bracket (Figure 30).

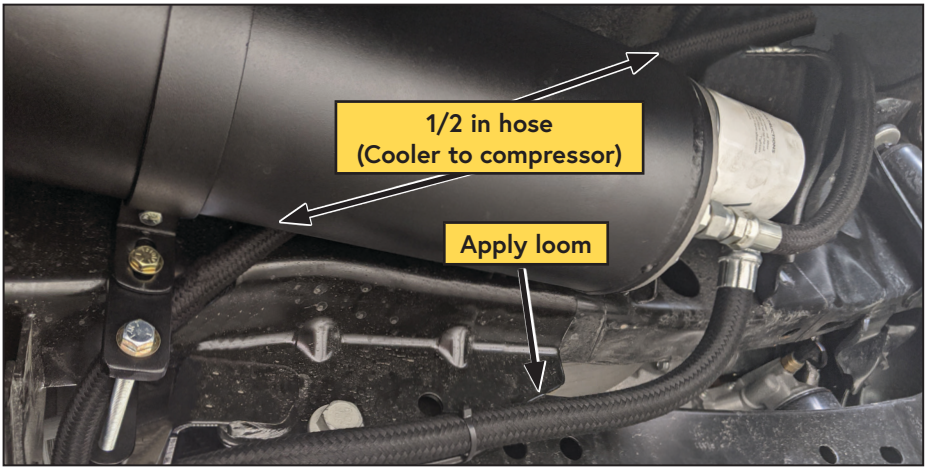


Figure 30 — Routing the hoses

☐ Route the 3/4 in hose over to the control arm, past the control arm mount and around to the transmission crossmember (Figure 30).

☐ Apply the supplied spiral loom to the 3/4 in hose where it runs along the control arm mount and wraps around to the rear of the control arm to provide abrasion protection.

☐ Using a cable tie, secure the 3/4 in hose to the control arm mount.

☐ Route the 3/4 in hose, and 1/2 in hose over to the transmission crossmember, and along the front of the crossmember to the driver side of the vehicle (Figure 31).

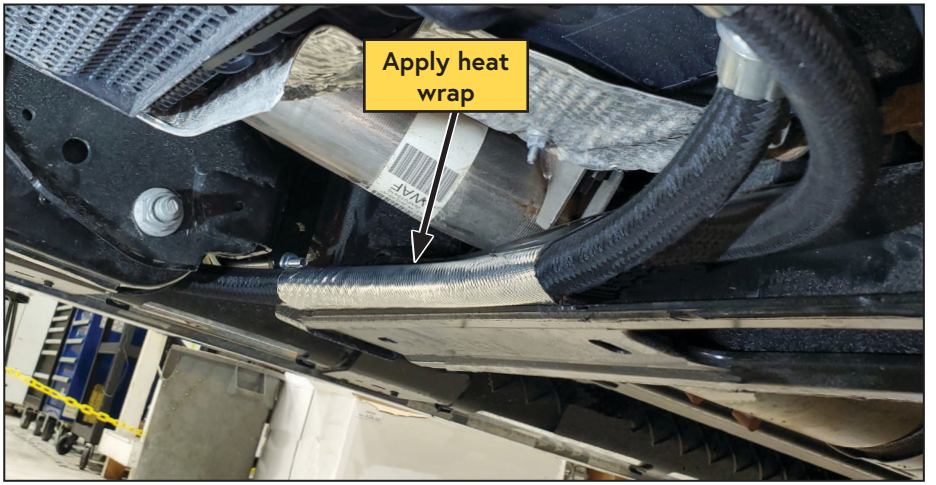


Figure 31 — Routing the hoses

☐ Using the supplied 1 in and 3/4 in heat wrap, protect the 3/4 in and 1/2 in hoses where they pass below the exhaust (Figure 31).

☐ Install the supplied 3/4 in 45° fitting onto the matching fitting on the rear of the compressor (Figure 32).

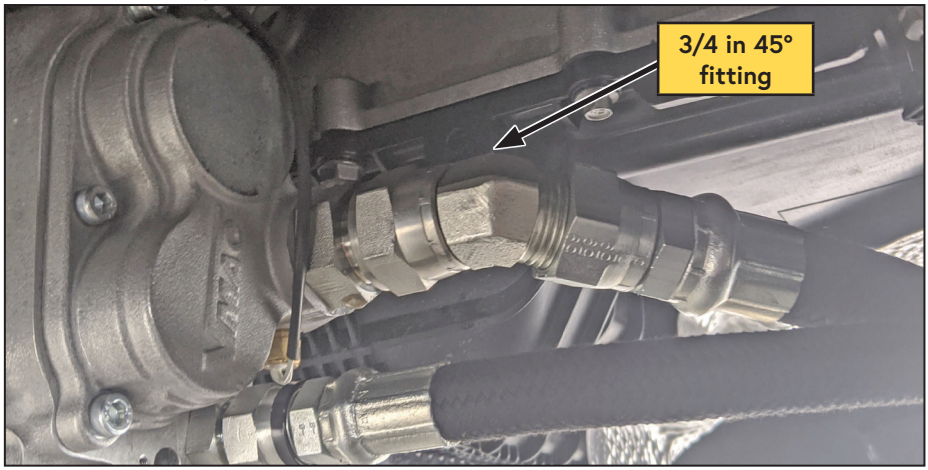


Figure 32 — Connect hoses

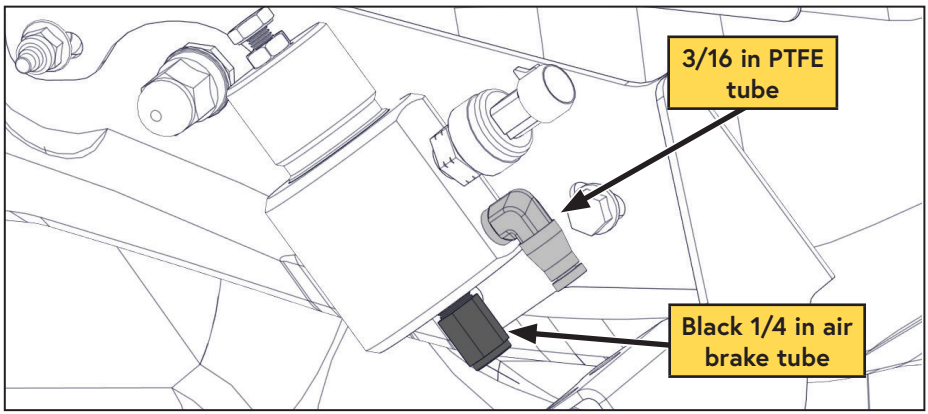
☐ Connect the straight fitting on the 3/4 in hose to the 45° fitting installed in the previous step (Figure 32).

☐ Connect the straight fitting on the 1/2 in hose to the matching fitting on the compressor (Figure 32).

☐ Apply the supplied spiral loom to the (×2) 1/2 in hoses where necessary to protect them from abrasion (e.g. where it passes through the AOST mount, where it passes over the body mount, etc.).

☐ Apply the supplied loom to the (×2) PTFE tubes and the black air brake tube.

☐ Install the black 1/4 in air brake tube into the straight fitting on the remote regulator (Figure 33).



☐ Install the translucent 3/16 in PTFE tube into the 90° fitting on the remote regulator (Figure 33).

☐ Route the PTFE tubes down the firewall to the compressor.

☐ Connect the black 1/4 in air brake tube to the fitting on the inlet (Figure 34).

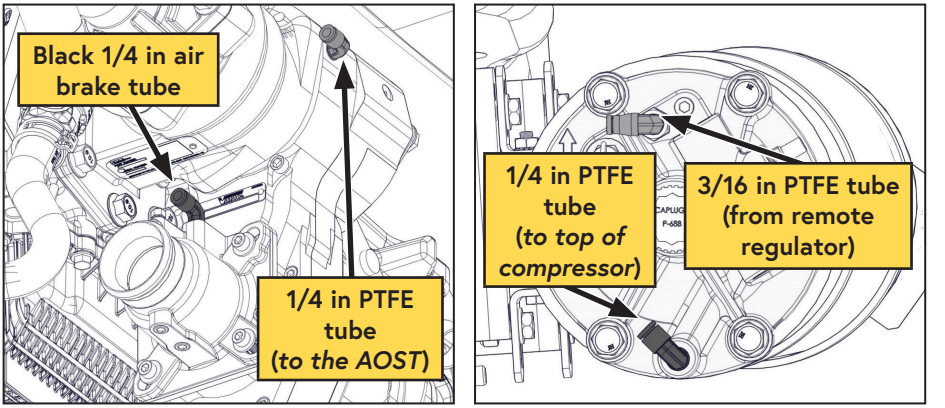


Figure 34 — Connect PTFE tubes

☐ Install the translucent 1/4 in PTFE tube into the scavenge fitting on the top of the compressor (Figure 34).

☐ Route the 1/4 in and 3/16 in PTFE tubes to the AOST along the same path as the 3/4 in discharge and 1/2 in oil supply hoses.

☐ Using the supplied heat wrap, protect the 1/4 in and 3/16 in PTFE where they pass below the exhaust.

☐ Trim the PTFE tubes as necessary and connect them to their respective fittings on the back of the AOST (Figure 34).

☐ Adjust the hoses and/or the AOST to minimize sharp bends, contact with any hot, sharp or moving parts, then tighten all fittings and the tank mounts and straps.

☐ Using the supplied cable ties, secure the hose bundle as necessary to protect from road hazards and contact with any hot, sharp or moving parts.

Installing the Hydraulic Hoses

☐ Install the priority valve in a location where it will be protected from hot, sharp or moving parts, and where the adjustment screw will be accessible (Figure 35).

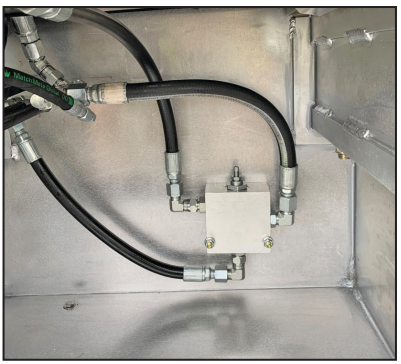


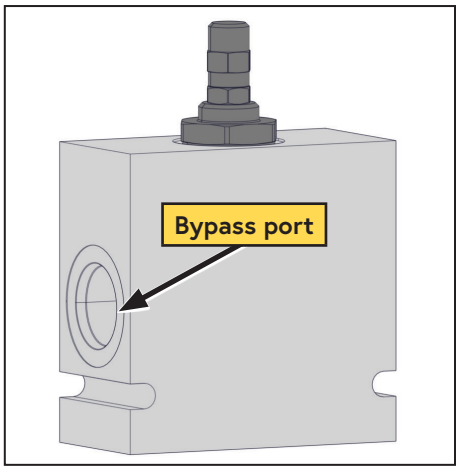
Figure 35 — Priority valve

Ensure the hydraulic hoses are adequately supported; the span between the pump and the nearest hose support must be 12 in or less.

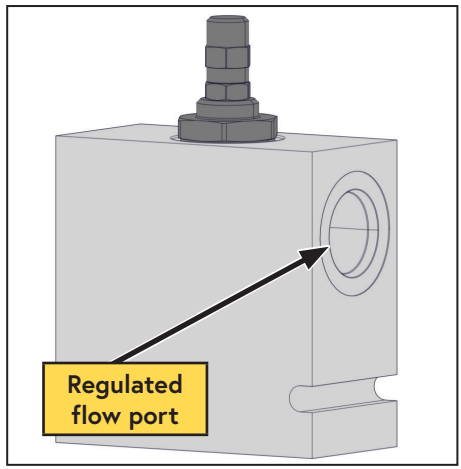
Failure to properly support the hydraulic hoses may damage the pump and will void the PTO warranty.

Connect the hoses to the priority valve* (Figure 36):

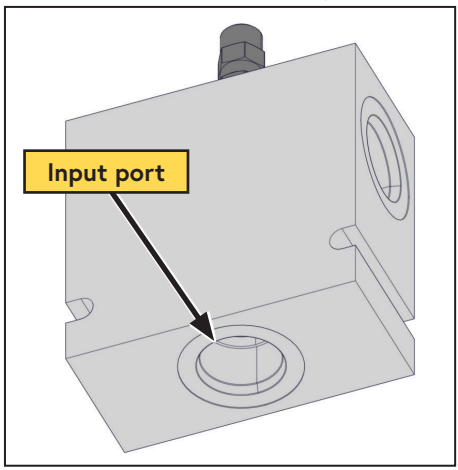
- ☐ *Connect the bypass port on the priority valve to a hose running back to the hydraulic fluid reservoir.
- ☐ *Connect the regulated flow port on the priority valve to the input port on the crane.
- ☐ *Connect the input port on the priority valve to the hydraulic pump.



Bypass port (return to tank)



Regulated flow port (to crane)



Input port (from pump)

Figure 36 — Connect priority valve

Installing the Air Intake

☐ Install the short side of the supplied rubber elbow onto the inlet and secure it using a gear clamp (Figure 37).

Figure 37 — Installing the remote air intake housing

☐ Install the steel connector tube into the top of the elbow.

☐ Adjust the rubber elbow and tube assembly to ensure they are routed away from any hot, sharp, or moving components. If required, trim any extra length from the hose to allow for the best routing.

☐ Route the supplied flexible hose from the remote regulator, down toward the driver side frame rail.

☐ From the wheel well, pull the hose down, and route it toward the PTO.

☐ Using the supplied gear clamps, attach the flexible hose to the connector tube (Figure 38).

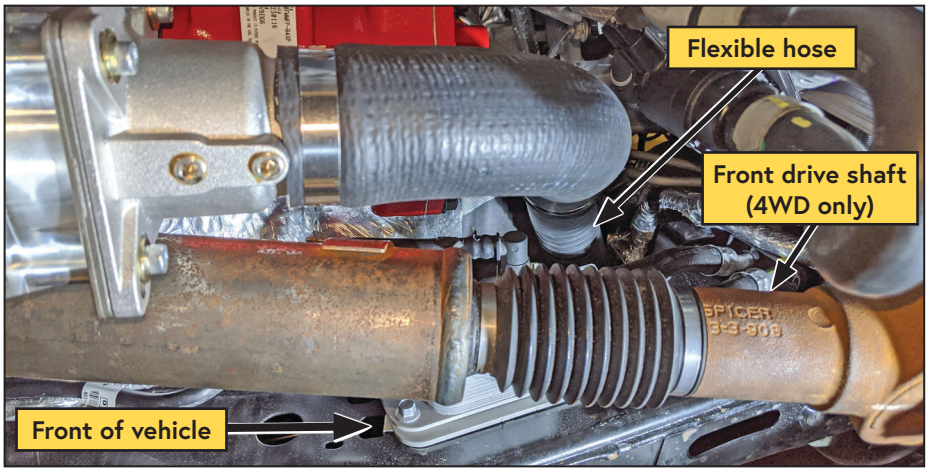


Figure 38 — Installing the air filter

☐ Remove the plastic filter cover and filter element from the remote filter plate.

☐ Using the supplied M6 fasteners, secure the filter plate to the bracket (Figure 39).

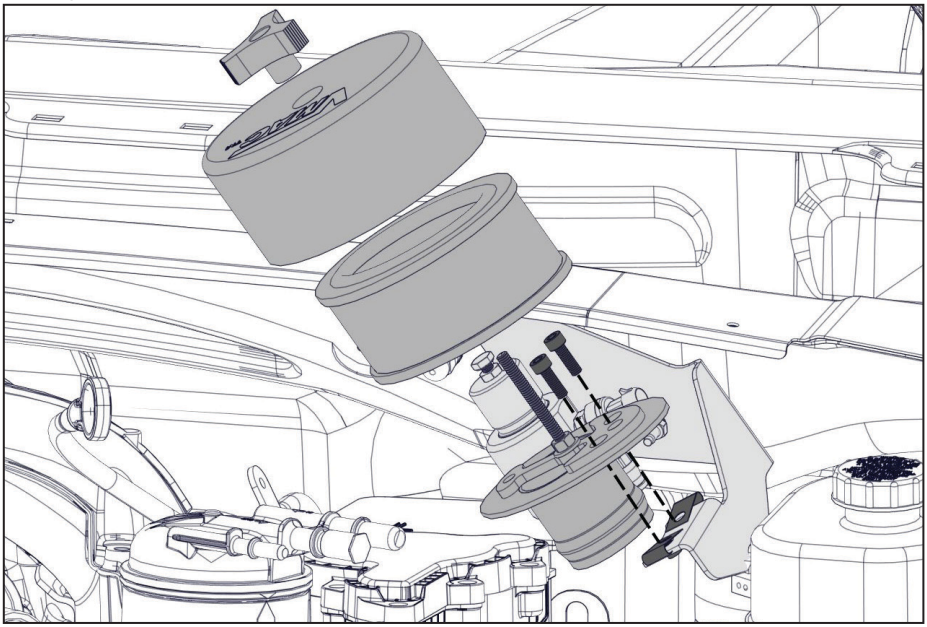


Figure 39 — Installing the air filter

☐ Cut the flexible hose to length and, using the supplied gear clamp, secure the flexible hose to the remote air filter assembly.

☐ Replace the filter element and filter cover.

☐ Adjust the flexible tube and/or rubber elbow as necessary to ensure they will not come in contact with any hot, sharp, or moving components and secure it in place using cable ties.

Ensure the air intake hose assembly is adequately secured away from hot, sharp or moving components using rubber coated P-clips or cable ties (not supplied) as required.

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.

- ☐ Lower the vehicle from the axle stands.
- ☐ Ensure the vehicle is parked on level ground.
- ☐ Tighten all fittings on the AOST.
- ☐ Remove the cap plug used to cover the oil filter port on the AOST.
- ☐ Apply a light film of compressor oil to the filter gasket and thread the filter onto the AOST until the gasket makes contact. Tighten the filter an additional 3/4 to 1 turn after the gasket contacts the base.
- ☐ Remove the plug from the oil-fill hose located in the engine bay on the passenger side of the engine (Figure 40).

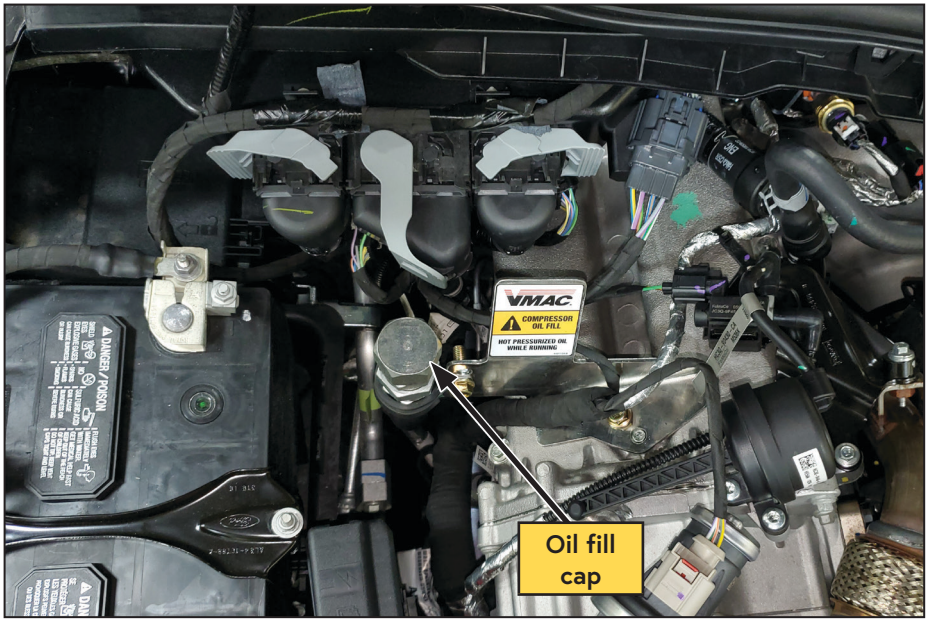


Figure 40 — Oil fill location

- ☐ Using a funnel, fill the AOST with 4 L to 5 L (4.2 qt to 5.2 qt) of the supplied oil.
- ☐ Replace the oil fill cap and tighten.

The actual oil level can be difficult to determine in the AOST sight glass until the system has been run. Final oil level will be checked (and can be corrected) during the final testing chapter.

Installing the Control Components

Best Practices

- To confirm a good ground, use an ohm meter to measure the resistance between the ground point and the negative battery terminal. Resistance should be less than 1 Ω.
- Route all wires to ensure they will not contact hot, sharp or moving parts (including the park brake mechanism, steering column, and pedals).
- Before drilling any holes ensure there are no OEM wires, hoses, or components that may be damaged.
- Do not use a test light to probe for power on vehicle circuits, the increased current draw of the test light may damage components.
- VMAC recommends using only sealed crimp and solder butt connectors for all electrical connections.
- To ensure a durable connection, use only good quality crimping tools.
- Apply loom to all wiring:
    - Use high temperature loom in areas where high temperatures may be expected.
    - Use spiral loom in areas with high vibration.

In-line Butt Splice Connections

- Cut the wire approximately 2 in from the connector.
- Strip approximately 3/8 in from the end of both sides of the cut wire, as well as from the end of the wire being spliced in-line.
- Twist the wire to be spliced in-line, together with the "live" side of the wire (not the wire attached to the connector).
- Slide the butt connector onto the twisted wires and crimp it.
- Insert the "connector side" of the wire into butt connector and crimp it.
- Lightly tug the wires to ensure they are properly crimped.
- Using a heat gun, carefully apply heat to the butt connectors to seal the connection.

Posi-Tap Connectors

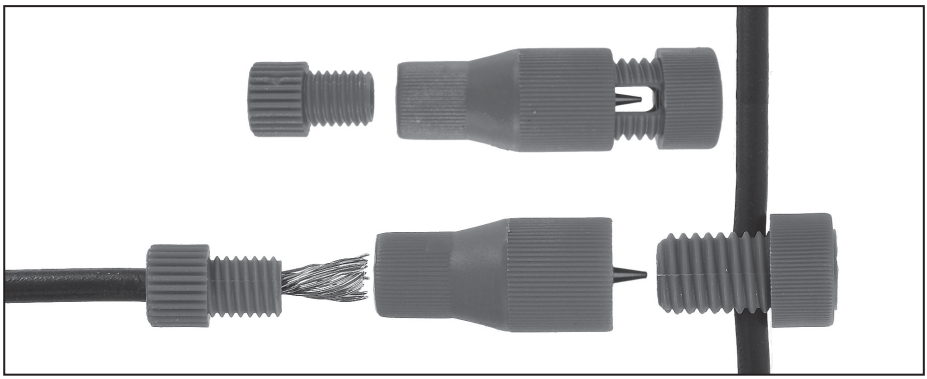


Figure 41 — Posi-Tap wire connector

- Slide the OEM (live) wire into the slot on the large cap as far as it will go.
- Thread the tap (barrel with pin) over the slotted cap, ensuring the pin is centered on the wire. Firmly tighten the tap.
- Strip approximately 3/8 in from the end of wire.
- Unscrew the small cap.
- Twist the wires together and insert the wire into the cap.
- Deflect the wires to one side.
- Insert the cap into the tap, ensuring the wires enter one side of the metal core.
- Ensuring the wire does not slip out of the cap, push and turn until the threads catch and firmly tighten the cap.
- Ensure all of the connections are firmly tightened by hand (overtightening will cause the threads to strip).

Tying into OEM connectors

Some OEM connectors may have locking tabs that must be disengaged prior to inserting a crimped connector.

Digital Throttle Control Wire Schematic

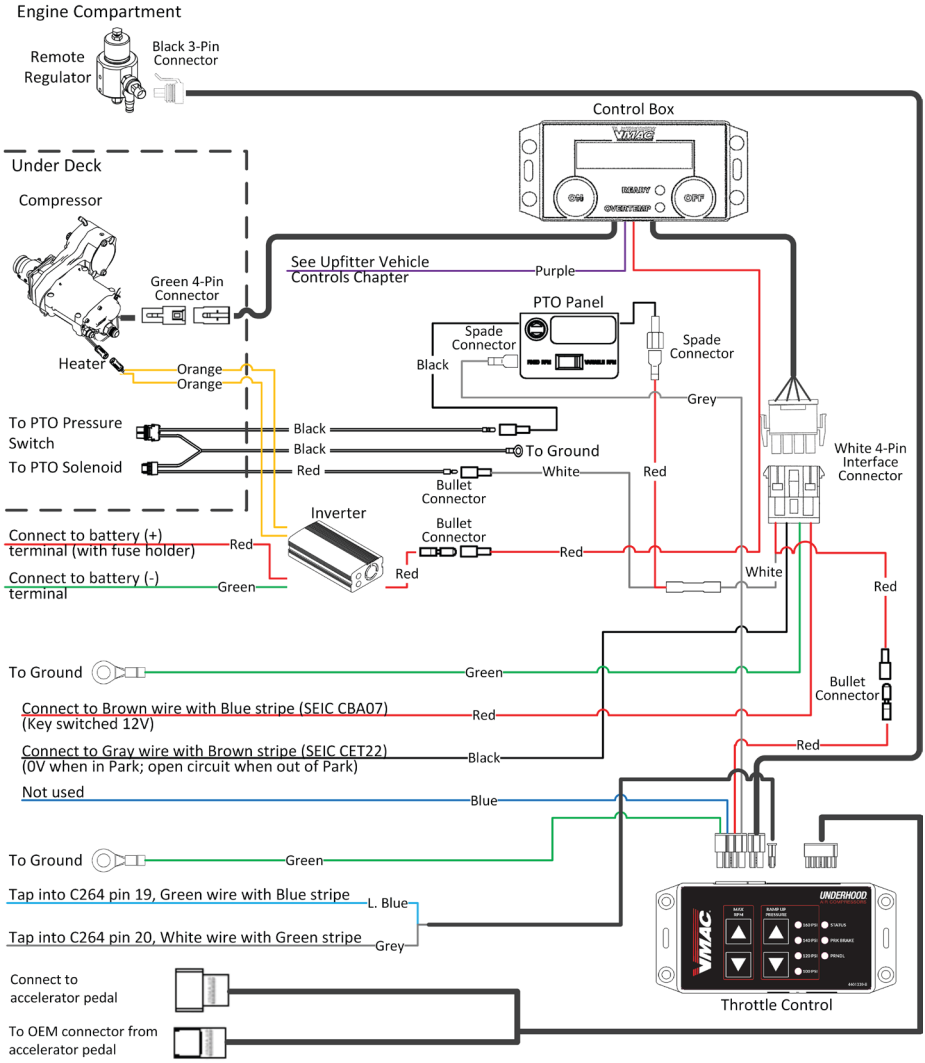


Figure 42 — Digital throttle control

Power Inverter

☐ Using the supplied cable ties, mount the inverter onto the inverter bracket (Figure 43).

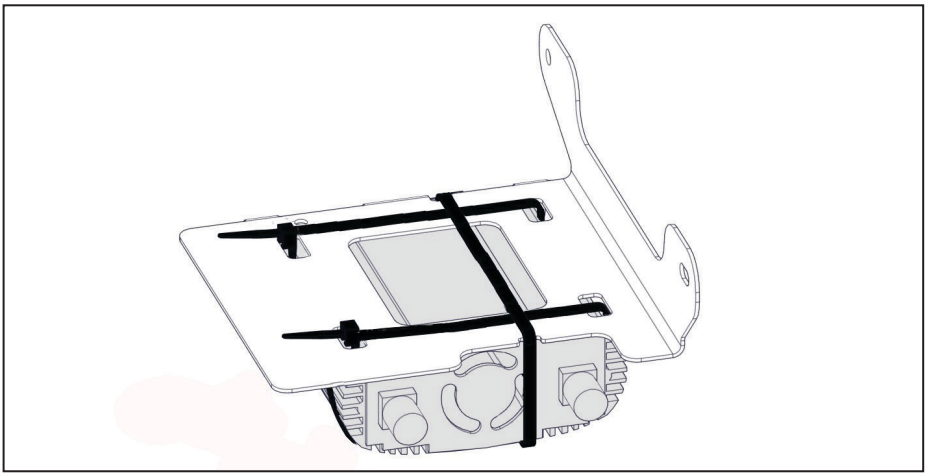


Figure 43 — Mount inverter

☐ Remove the driver side vent bezel (Figure 44).

Figure 44 — Remove vent bezel

☐ Remove the side dashboard panel (Figure 45).

Figure 45 — Remove Side panel

☐ Remove the lower dashboard and metal plate (Figure 46).

Figure 46 — Remove lower dashboard

☐ Using the OEM fasteners, secure the inverter bracket behind the lower dashboard (Figure 47).

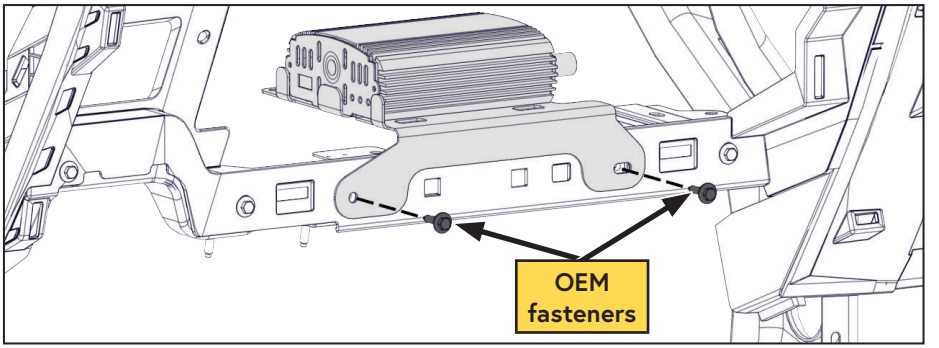


Figure 47 — Install inverter assembly

☐ Reconnect the OEM harnesses to the lower dashboard switches.

Control Box and PTO Indicator Panel

☐ Remove the plastic trim panel from the doorsill and the kick panel on the driver side.

☐ Install the control box in a convenient location in the cab, positioned so that the wire harness will reach the compressor location at the PTO on the driver side of the engine. The preferred location is between the driver side seat and the door.

☐ Mount the PTO indicator panel on the dashboard or beside the control box (an extra decal is provided in cases where the indicator light is mounted directly on the dashboard).

Throttle Control (DTC)

☐ Using cable ties, secure the throttle control under the dashboard, next to the OBD II port. Ensure it is away from moving parts and positioned so that the buttons and LED lights are accessible.

Connecting the Wiring

☐ Unplug the OEM cable from the accelerator pedal and plug it into the matching connector from the throttle control. Plug the cable from the throttle control into the matching connector on the accelerator pedal.

☐ Connect the interface harness to the matching connector from the control box.

☐ Replace the doorsill trim and the kick panel.

☐ Route the grey wire running from the 8 pin plug on the digital throttle to the PTO indicator panel.

☐ Connect the grey wire to pin 1 on the "FIXED MODE" side of the selector switch on the PTO indicator panel.

☐ Attach the (×2) green wires with ring connectors, running from the control box, and the DTC to a good ground under the dashboard.

☐ Remove the kick panel beside the hood release lever (Figure 48).

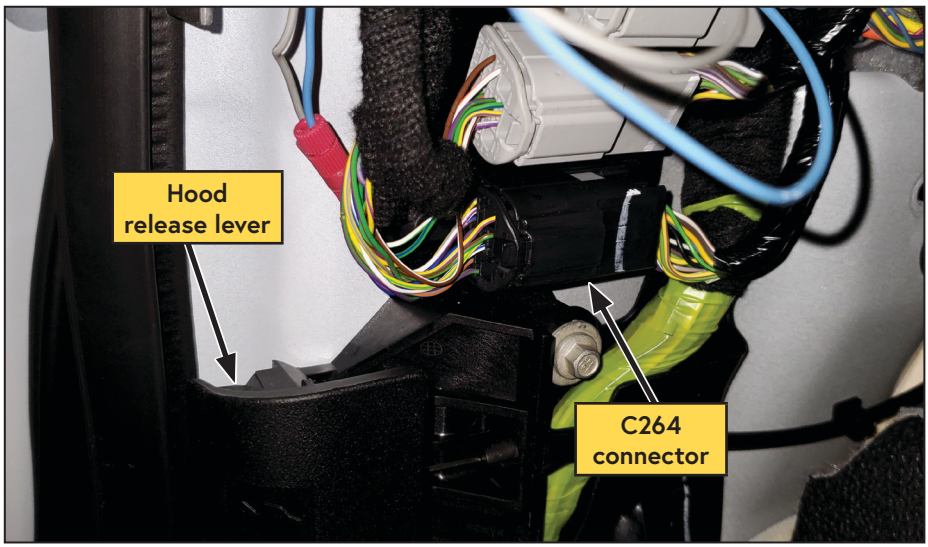


Figure 48 — Locate C264 connector

☐ Splice the blue wire running from the DTC to the wire at pin 19 (green wire with blue stripe at the time of writing) of the C264 connector (Figure 49).

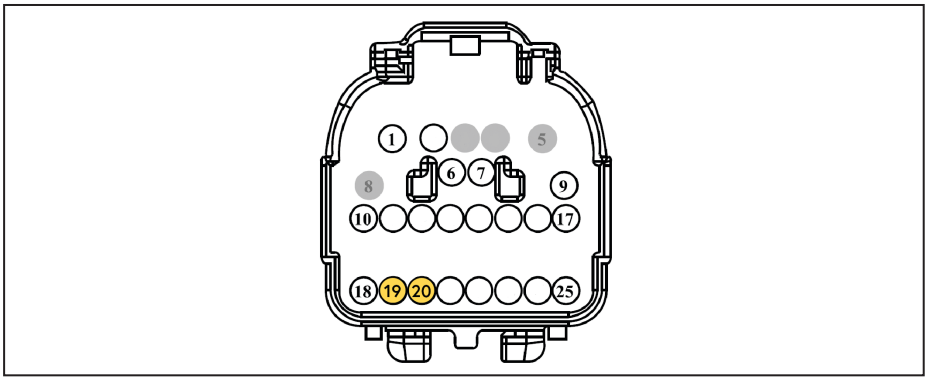


Figure 49 — C264 connector (male)

☐ Splice the grey wire running from the DTC to the wire at pin 20 (white wire with green stripe at the time of writing) of the C264 connector (Figure 49).

☐ Remove the glove box compartment to gain access to the wire run behind it.

☐ Shorten the darker blue wire running from the throttle control and apply insulation (e.g. shrink tube, electrical tape, etc.) to safely terminate the wire.

☐ Connect the red wire with the bullet connector, running from the control box, to the matching red wire running from the inverter.

☐ Connect the red wire with the spade connector, running from the 4 pin interface connector, to the matching connector on the PTO indicator panel.

☐ Connect the red wire with the bullet connector, running from the 4 pin interface connector, to the matching connector on the throttle control.

The SEIC blunt cut harness is located in the passenger side footwell. It may be necessary remove the black module behind the kick panel to gain access to the SEIC wire bundle.

Route the following wires to the SEIC interface located behind the kick panel in the passenger side footwell (there is a wire run behind the glove compartment)*:

- ☐ *Black wire from the white 4-pin connector.
- ☐ *Red wire from the white 4-pin connector.

☐ Splice the blunt cut red wire (from 4-pin connector) to the brown wire with blue strip on the SEIC pigtail harness (CBA07: key switched 12 V).

☐ Splice the black wire to the grey wire with brown stripe (CET22: Park status).

Route the following wires into the engine compartment via a grommet in the firewall*:

- ☐ *Grey wire with the green 4 pin connector (temperature sensor).
- ☐ *Grey wire with the black 3 pin connector (pressure sensor).
- ☐ *Orange wires, with black 3-pin connector (PTO heater cable).
- ☐ *Red and green 14 AWG wires (PTO inverter power wires).

☐ Cover all of the engine compartment wires with plastic loom.

Routing and Connecting the PTO and Compressor Wires

Route the following wires down the firewall, and behind the inner fender to the compressor*:

- ☐ *Orange heater wires: Connect to the heater in the compressor body.
- ☐ *Grey cable with green connector: Connect to the temperature sensor in the compressor.

☐ Route the red and green inverter power and ground wires to the driver side battery.

☐ Connect the green wire to the nut on the negative terminal clamp.

☐ Connect the red wire with the fuse holder to the nut on the positive battery terminal clamp. Ensure the fuse holder is protected and readily accessible for servicing.

PTO Harness connections*:

- ☐ *Connect the PTO pressure switch and solenoid plugs to the solenoid and pressure switch at the top of the PTO.
- ☐ *Route the PTO pressure switch and solenoid harness into the cab along the same path used for the compressor heater and temperature sensor.
- ☐ *Connect the red wire with the blue bullet connector to the white wire on the 4 pin interface cable.
- ☐ *Connect the black wire with the ring connector to the ground location used for the control box and DTC earlier.
- ☐ *Connect the black wire with red bullet connector to the black "PTO INDICATOR" wire.

☐ Reinstall the metal plate located behind the lower dashboard (Figure 46 on page 40).

Upfitter Vehicle Controls

It is the responsibility of the installer or upfitter to ensure that third party vehicle control systems <u>are not</u> able to affect engine speed while the PTO system is in use.

Any change to engine speed while the PTO system is activated could cause component damage or unexpected hydraulic circuit function (e.g. unpredictable crane control) which could result in injury or death.

All third party vehicle control systems intended to activate the PTO system must do so via the VMAC Control Box. Refer to the electrical schematic on page 37.

This section is intended as a general guideline. Refer to the third party vehicle control manufacturer's documentation for specific installation instructions.

The following steps are only applicable to vehicles equipped with third party vehicle control systems (such those included with hydraulic cranes), or that would like to install a remote compressor/hydraulic pump activation switch.

On vehicles with additional control systems (such as crane remotes), the DTM70-H can be activated/deactivated remotely much like a standard PTO using these controls.

In order to activate the PTO and VMAC Control Box with third party vehicle controls (e.g. crane remote):

☐ Connect the purple wire from the VMAC Control Box to the PTO activation circuit on the third party vehicle controls. The VMAC Control Box requires a +12 V DC latching input.

For operators who prefer to have separate "ON" and "OFF" switches, refer to "Remote Operation (Optional)" on page 47.

Completing the Installation

- ☐ Check all wiring, hoses and tubes to ensure that they will not contact any hot or moving components and will not interfere with the operation of the vehicle. Ensure all wiring, hoses and tubes are secured with cable ties and protected with loom as required.
- ☐ Cover all VMAC under-hood wiring with high heat plastic loom (if not done previously). Secure the harness with cable ties as needed to avoid hot, sharp or moving components.
- ☐ Pull any excess wiring back into the cab and tie it up and out of the way under the dash with cable ties.
- ☐ Replace all dash panels and covers removed during installation.
- ☐ Fill the primary radiator with the saved coolant.
- ☐ Connect the batteries.

The System Identification 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.

- ☐ Locate a conspicuous area in the engine bay (where the tag will be easily noticed) to install the System ID tag.
- ☐ Mark and drill (×2) 7/64 in holes and secure the plate with the supplied self-tapping screws (Figure 50).

Figure 50 — System Identification Plate

- ☐ To alert any technicians that may service the vehicle, affix the servicing caution/contact label in the engine compartment near the hood latch in a visible location (Figure 51).

Figure 51 — Advisory label

☐ 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. A good spot for this is usually on the inside of the door or on the panel underneath the steering wheel (Figure 52).

Figure 52 — Operating Instruction label

Remote Operation (Optional)

The VMAC compressor can be started, and shut down remotely using the remote start/stop wires.

The remote wires are tucked into the heat shrink tubing at the base of the control box (Figure 53).

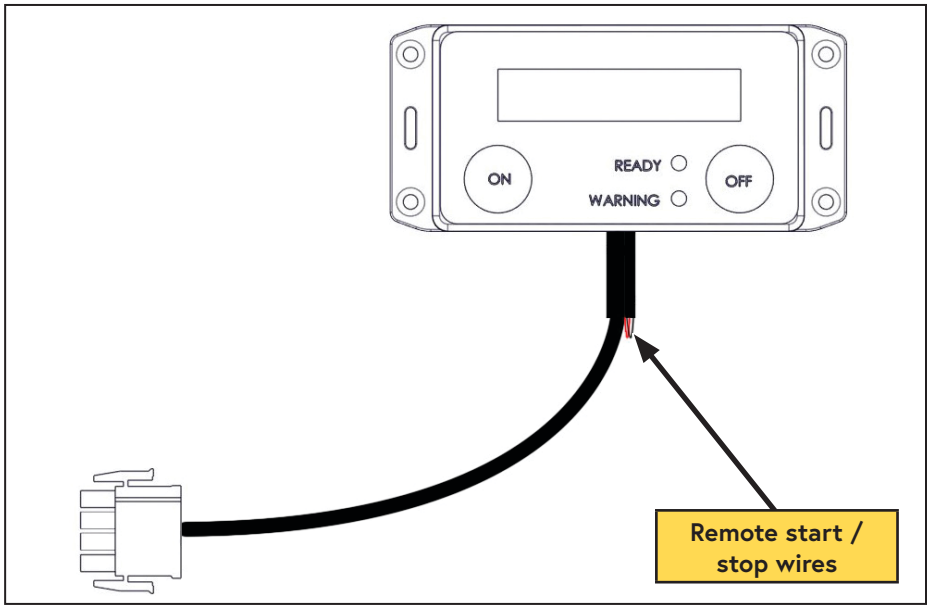


Figure 53 — Remote start / stop wires

Installation

☐ Connect the red wire (ON) to a switch that will apply a momentary ground when activated.

☐ Connect the black wire (OFF) to a switch that will apply a momentary ground when activated.

Starting the Compressor via Remote Start

- Place the vehicle transmission in "PARK" and fully apply the parking brake.
- Start the engine and allow the vehicle to reach operating temperature.
- Ensure the oil level in the AOST is above the "ADD" line (this should be checked while parked on level ground).
- Ensure the vehicle hood is closed.
- Ensure all compressor air valves/tools are closed.
- Turn on the compressor using the remote momentary "ON" switch.

Shutting Down the Compressor via Remote Shutdown

- Close all open air valves/tools and allow the system to build to full pressure (factory default: 150 psi).
- Allow the engine speed to reduce to VMAC base idle for at least 10 seconds.
- Turn the compressor off using the remote momentary "OFF" switch.

Recommended Accessories

While the compressor system will function without the following accessories, VMAC strongly recommends their use for optimal performance.

See the "Accessory Product" section of this manual on page 60 for a list of products available for purchase through VMAC.

Receiver Tank

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.

Pressure Gauge

While not critical to system performance, a pressure gauge is important for fine tuning the system and simplifies any potential troubleshooting.
Install a 200 psi pressure gauge downstream of the air discharge valve.

Pressure Regulator and/or Lubricator or FRL

The compressor can produce air pressures up to approximately 175 psi (1207 kPa). It is the responsibility of the user to know the pressure and air flow requirements of the tools powered by the air compressor system.

An appropriate air pressure regulator and lubricator can be installed downstream of the air discharge valve. Failure to regulate the air pressure may cause damage to the tool.

Air Receiver Tank

If an air receiver tank will be used with this system, a check valve (not supplied) must be installed to prevent damage to the system.

Once a check valve is installed, 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, discharge any stored air 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.

The VMAC compressor system will automatically depressurize when it is shutdown, therefore the hose from the VMAC AOST to the air receiver tank must have a check valve installed; this prevents blow back and moisture from the receiver tank entering the AOST

While the air receiver tank can be installed at any height in relation to the AOST, the discharge hose running from the AOST must be installed as high as possible on the air receiver tank to prevent problems with condensation that may have accumulated in the receiver tank (Figure 54).

Drain the condensed water from the receiver tank daily.

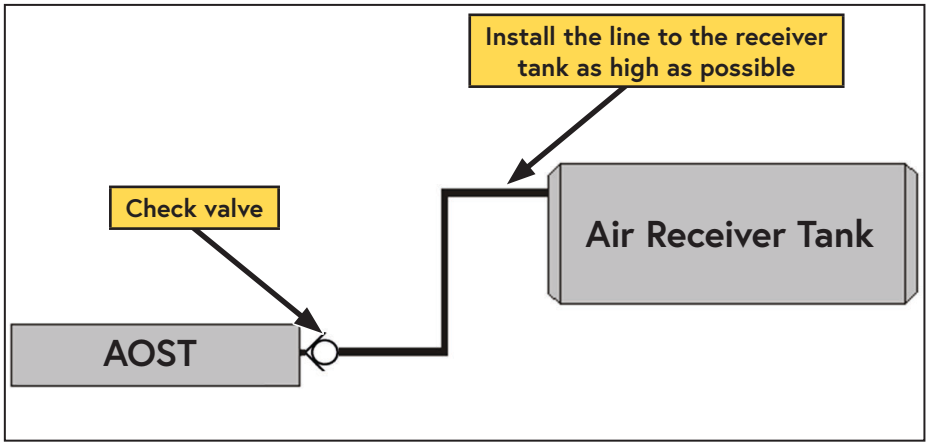


Figure 54 — Air receiver tank

Testing the Installation

Safety Test

Ensure the following has been completed:

- ☐ Place the automatic transmission in "PARK" and apply the park brake. Turn the ignition "ON" but do not start the engine.
- ☐ Check the control box to verify that it is illuminated. If there is no display, there is no power to the control box.
- ☐ Press the "ON" button. The green LED on the control box, as well as the "STATUS", "PRK BRAKE", and "PRNDL", LED's on the DTC should illuminate.

Disengage the park brake.*

- ☐ *The "PRK BRAKE" LED on the DTC will turn off.

Shift the vehicle into "NEUTRAL".*

- ☐ *The green LED on the control box should flash and the display will flash "OUT OF PARK".
- ☐ *All of the LEDs on the DTC will turn off.

- ☐ Shift the vehicle back into "PARK", reengage the park brake, and press the "OFF" button on the control box, followed by the "ON" button. The green LED on the control box, and the interlock LED's on the DTC should come on.
- ☐ Press the "OFF" button.
- ☐ Turn the ignition "OFF".
- ☐ The engine must be running to complete the final steps in the safety test. This will be done after the pre-start checks have been completed.

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

Before Starting the Engine Checklist

Ensure the following has been completed:

- ☐ Verify that the compressor oil level at the AOST sight glass is correct.
- ☐ Verify that the vehicle coolant level is correct.
- ☐ Perform a final inspection of the installation to ensure everything has been completed.
- ☐ Check all wiring for security and protection. Ensure nothing is touching the compressor body.
- ☐ Install the VMAC Air Test Tool (P/N: A700052) with the 70 cfm (0.190 in) orifice installed and the ball valve closed.
- ☐ Ensure all of the compressor outlets are closed.
- ☐ Ensure the parking brake is engaged and the transmission is in "PARK".
- ☐ Disconnect the white wire connecting to the PTO harness (required for calibration).
- ☐ Start the engine.

After Starting the Engine Checklist.

- ☐ Check for any leaks.
- ☐ Close and latch the hood.
- ☐ Allow the vehicle to reach operating temperature.

DTC Calibration

- ☐ Press the "ON" button on the control box. The green LED on the control box will turn on. The DTC will turn on with the "STATUS", "PRK BRAKE", and "PRNDL", LEDs illuminated. If not, ensure that the vehicle is in Park with the Park Brake applied.
- ☐ Press and hold "▲" and "▼" buttons in the "RAMP UP PRESSURE" column for several seconds until all of the LEDs turn on. Then release the buttons (this indicates the DTC is in "Idle Adjust Mode")
- ☐ The engine RPM will stay at VMAC base idle (approximately 1,200 rpm) regardless of the pressure level returned by the system pressure sensor.
- ☐ Allow the DTC to calibrate for 3 minutes. During this time the "STATUS" LED will occasionally flash indicating that the DTC is calibrating. The engine speed will eventually settle at VMAC base idle (approximately 1,200 rpm).
- ☐ After 3 minutes. Press the "OFF" button on the control box.
- ☐ Shut down the vehicle.
- ☐ Connect the PTO harness wire.

Continue Safety Test

- ☐ Start the vehicle.
- ☐ Allow the vehicle to run for a minimum of 30 seconds.

Ensure all hydraulic equipment is shut down prior to proceeding. As the hydraulic priority valve has not been adjusted, the next steps have the potential to produce hydraulic flow that exceeds what the equipment was designed for.

- ☐ Toggle the PTO selector to "VARIABLE RPM" and turn on the compressor.
- ☐ Press the "ON" button on the control box.
- ☐ When the VMAC system is first engaged, the engine speed should increase to approximately 2,500 rpm and then drop down to VMAC base idle (approximately 1,200 rpm) once system pressure is reached.

With the system running, check for*:

- ☐ *Coolant leaks.
- ☐ *Compressor oil leaks.
- ☐ *Hydraulic system leaks.
- ☐ *Check the hydraulic fluid level.

- ☐ Allow the compressor to run until the system reaches full system pressure.
- ☐ Engine speed should reduce to between 1,200 rpm to 1,300 rpm.
- ☐ Turn off the compressor.
- ☐ Shut down the engine.

☐ Check the compressor oil level after the engine has been shut down and the oil level has had time to stabilize.

Ensure any stored air is drained from the system prior to adding oil.

☐ Add oil as necessary to bring the level to the "MAX" line in the sight glass and check for leaks.

☐ Start the engine.

☐ Turn on the compressor and allow it to build to full system pressure.

☐ Release the park brake.

☐ Open the ball valve to drain the air from the system.

☐ The engine speed should not increase.

☐ Re-engage the park brake.

☐ Press the "OFF" button on the control box.

☐ Press the "ON" button on the control box.

☐ Allow the engine speed to stabilize after re-engaging the compressor.

With the brake pedal firmly depressed, shift the vehicle into "REVERSE".*

- ☐ *The engine speed should reduce to OEM base idle (Approximately 650 rpm).
- ☐ *The green LED on the control box will go out indicating the system has shut down.
- ☐ *Shift the vehicle back into "PARK".
- ☐ *Cycle the compressor off, then on again to reset the safety parameters.
- ☐ *Repeat these steps in all gear selector positions to ensure the engine speed remains at OEM base and the system shuts off when the vehicle is shifted out of "PARK".

The VMAC digital throttle is equipped with an auto calibration and engine learning routine that will assist with maintaining accurate and stable engine speeds. No user input is required unless the DTC is replaced or reset.

Operators may however notice that while the system is at full system pressure and the vehicle is at base VMAC idle, the vehicle engine speed may drop by a few hundred rpm and then return to normal VMAC base idle as the VMAC digital throttle control auto calibrates. This is normal and should only occur once each time the system is being operated.

Hydraulic Priority Valve Adjustment and Flow Testing

☐ Install a hydraulic flowmeter between the regulated flow port on the priority valve, and the crane.

☐ Start the engine.

☐ Set the PTO mode selector switch on the PTO indicator panel to "FIXED RPM".

☐ Turn on the compressor. The engine speed should increase to 1,250 rpm.

☐ Remove the cover cap (Figure 55).

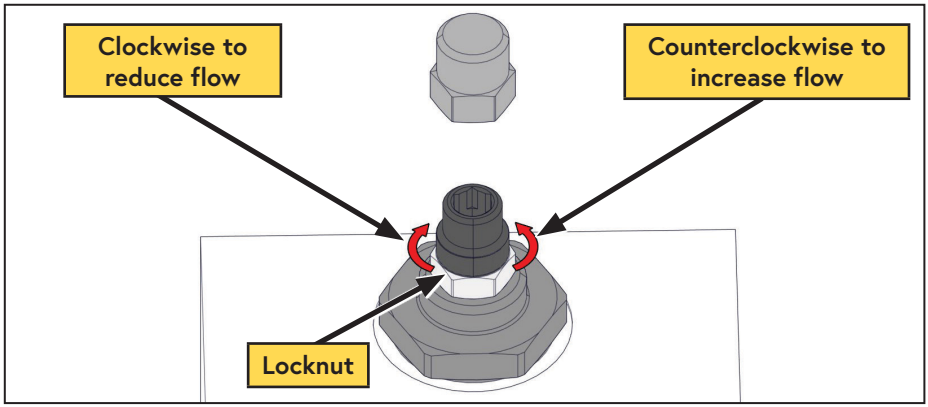


Figure 55 — Adjust priority valve

☐ Loosen the adjustment locknut (Figure 55).

☐ Adjust the priority valve to the desired flow rate via the adjustment spigot (counterclockwise to increase flow, clockwise to decrease flow) (Figure 55).

☐ Once the adjustment has been completed, tighten the locknut.

Ensure the vehicle's maximum engine speed does not exceed the maximum rpm listed on page 55 (the maximum engine speed is hydraulic pump model specific).

Set the PTO mode selector switch on the PTO indicator panel to "VARIABLE RPM" and open the ball valve on the air test tool*.

☐ *Vehicle engine speed should increase to meet the demand for air.

While the PTO selector switch is set to "VARIABLE RPM", vehicle engine speed will vary dependent upon air demand.

☐ Ensure the hydraulic flow remains steady at any vehicle engine speed.

☐ Remove the flowmeter.

Final Testing

Ensure the following has been completed:

☐ Operate the system with an air tool (or the VMAC Air Test Tool with the appropriate orifice installed) for at least 1/2 hour (1 hour preferred).

☐ Road test the vehicle for approximately 14 miles (20 km).

☐ Observe the compressor operation to ensure that the belt alignment is good and nothing is rubbing or contacting hot components.

☐ 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.

Performance Testing and System Adjustment

System operation can be tested using the tools that will be operated by the system or by using the VMAC Test Tool (A700052) with the 70 cfm (0.190 in) orifice in the outlet to simulate tool use (Figure 56).

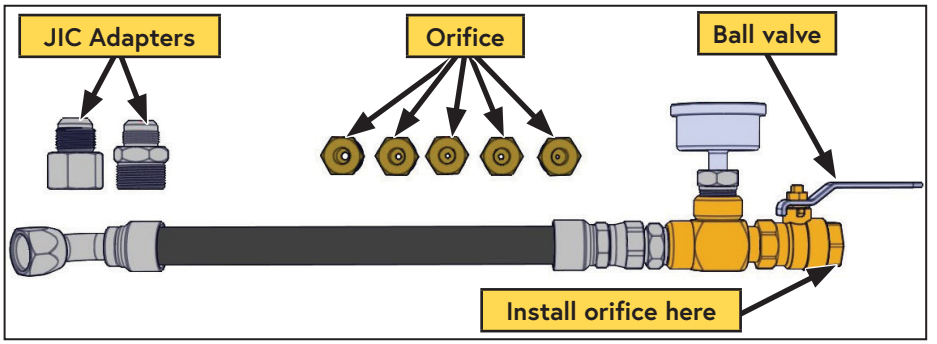


Figure 56 — A700052 VMAC Air Test Tool

Disconnect all downstream equipment (hose reels, etc.) and connect the test tool directly to the discharge fitting on the AOST.

Ensure there are no leaks in the test tool. The system may not idle down if there are leaks in the lines or fittings.

- ☐ Install the VMAC test tool at the AOST outlet with the 70 cfm (0.190 in) orifice.
- ☐ Ensure that the ball valve is closed.
- ☐ Place the transmission in "PARK" and fully apply the park brake.
- ☐ Allow the engine to run until it is at operating temperature.
- ☐ Turn on the air compressor system and allow it to operate until the oil is warm.
- ☐ Observe the pressure gauge. Pressure should be approximately 150 psi.

Open the ball valve on the test tool and observe the engine tachometer*:

- ☐ *Engine speed should increase to approximately 2,400 rpm.
- ☐ Close the air valve slowly to allow the system pressure to rise.
- ☐ Once 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 when the pressure drops to approximately 140 psi.

Hydraulic Pump Specifications

Exceeding the maximum engine speed listed below will void the warranty and may lead to premature PTO, compressor, or hydraulic pump failure.

See page 58 for instructions on how to adjust the maximum rpm.

VMAC Model: DM2A021 (Hydraulic Pump P/N: 4500162)

Maximum engine speed: 2,500 rpm.

Hydraulic flow in "FIXED RPM" (1,250 rpm): 2.5 gpm - 3.2 gpm.

Air output in "FIXED RPM" (1,250 rpm): 32 cfm.

Hydraulic flow in "VARIABLE RPM" (2,500 rpm): 6.8 gpm.

Air output in "VARIABLE RPM" (2,500 rpm): 65 cfm.

VMAC Model: DM2B021 (Hydraulic Pump P/N: 4500163)

Maximum engine speed: 2,300 rpm.

Hydraulic flow in "FIXED RPM" (1,250 rpm): 4.3 gpm - 6.0 gpm.

Air output in "FIXED RPM" (1,250 rpm): 32 cfm.

Hydraulic flow in "VARIABLE RPM" (2,300 rpm): 11.0 gpm.

Air output in "VARIABLE RPM" (2,300 rpm): 60 cfm.

VMAC Model: DM2C021 (Hydraulic Pump P/N: 4500164)

Maximum engine speed: 2,100 rpm.

Hydraulic flow in "FIXED RPM" (1,250 rpm): 6.5 gpm - 8.0 gpm.

Air output in "FIXED RPM" (1,250 rpm): 32 cfm.

Hydraulic flow in "VARIABLE RPM" (2,100 rpm): 13.6 gpm.

Air output in "VARIABLE RPM" (2,100 rpm): 55 cfm.

Adjusting the Pressure Regulator

Never adjust the pressure regulator to exceed 175 psi (1205 kPa). At 200 psi (1379 kPa), the pressure relief valve at the AOST will activate, resulting in rapid air loss, which may cause component damage, injury or death.

Prolonged operation above 175 psi / 1205 kPa may damage the pressure regulator.

The pressure regulator is adjusted to limit maximum air pressure to a safe level. As air pressure and flow are related, this adjustment is also very important for optimum performance.

- ☐ Install the test tool in the tank outlet with the ball valve closed.
- ☐ Ensure that the oil level is correct and the system is at operating temperature.
- ☐ Operate the system until it reaches full pressure. Observe the pressure on the gauge.
- ☐ Loosen the lock nut on the regulator (Figure 57).
- ☐ Pressure can be adjusted within a range of 145 psi (999.7 kPa) – 175 psi (1205 kPa), dependent upon requirements.
- ☐ Rotate the setting bolt clockwise to increase pressure. Rotate counter clockwise to decrease pressure. Tighten the lock nut once adjustments are complete.
- ☐ Open the ball valve to allow air to flow and the pressure to drop. Close the valve and observe the pressure to ensure that the adjustment is correct.

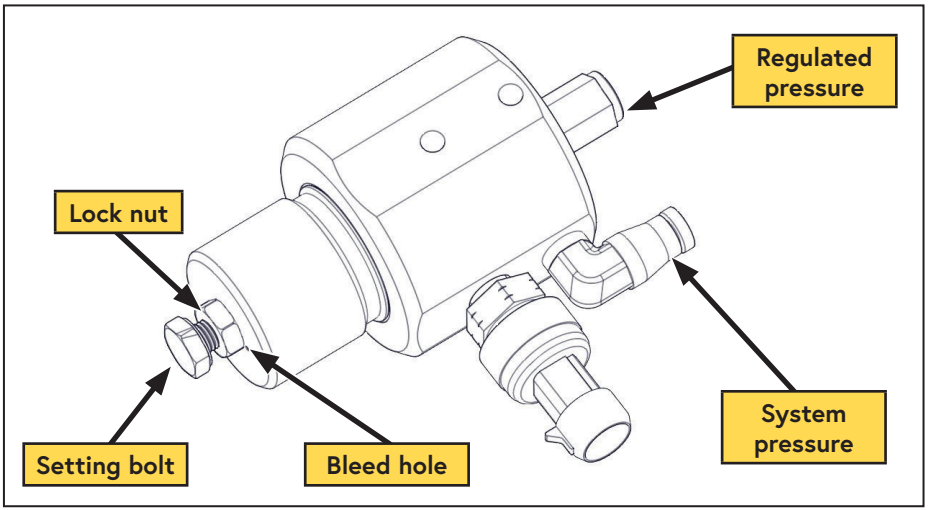


Figure 57 — Air regulator

- ☐ Test the system after any adjustments are made to verify it is operating properly.

Digital Throttle Control Operation and Adjustments

The throttle control is configured at the factory for optimum performance at maximum cfm. In applications where maximum cfm is not required, or noise is a concern, the throttle control can be adjusted to reduce the maximum VMAC rpm.

Safety features

The throttle control has built in safety features that will disable the system if an unsafe condition is detected, or either of the lock out parameters is not met (the vehicle must be in "PARK" and the park brake must be engaged).

If an unsafe condition is detected, the "STATUS" LED will turn off, and engine speed will return to idle. Once all unsafe conditions have been removed, the system must be cycled off, then on again to reset it. Once the system powers up, the "STATUS" LED will illuminate, and the system will operate normally.

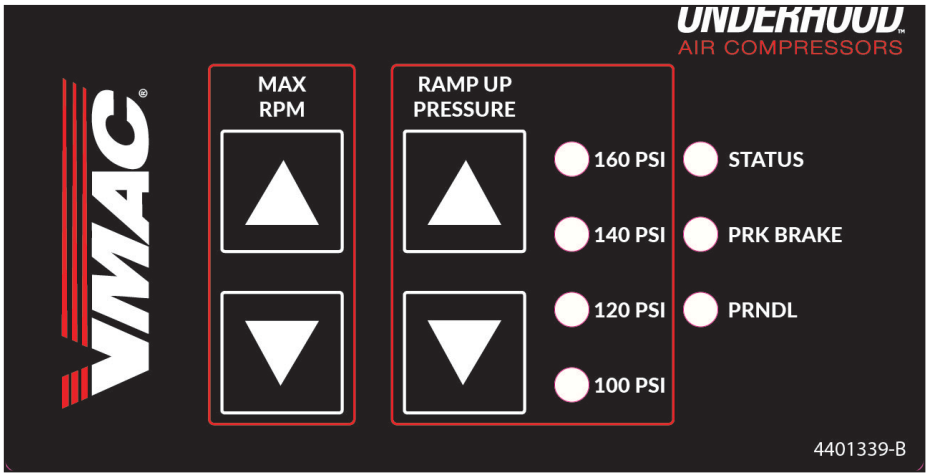


Figure 58 — Throttle control

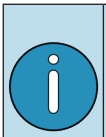
If the park brake is released, or the vehicle is placed in gear, the "STATUS" LED and the corresponding lockout LED will turn off and the throttle control will deactivate. This will reduce engine speed to base idle.

In order to activate the system again, re-engage the appropriate lockout and cycle the VMAC "OFF" then "ON" via the control box.

RAMP UP PRESSURE

"RAMP UP PRESSURE" is the amount of pressure the system will drop before the engine speed is increased to generate air; as air continues to be used and the pressure drops, engine speed will increase until maximum VMAC rpm is achieved.

"RAMP UP PRESSURE" is set to 140 psi (10 psi below the factory default maximum system pressure of 150 psi). This allows for a small amount of air use without the need to increase engine speed.



"RAMP UP PRESSURE" should only be adjusted if the maximum system pressure is changed (via the inlet regulator). To maintain proper performance, and rapid response to air demand, ensure the "RAMP UP PRESSURE" is set at no more than 20 psi below the maximum system pressure.

The "RAMP UP PRESSURE" can be set to "100 PSI", "120 PSI", "140 PSI", or "160 PSI via the "▲" or "▼" buttons in the "RAMP UP PRESSURE" column; an LED will illuminate beside the setting that has been selected.

MAX RPM

The cfm produced by the system is directly related to engine speed; refer to the table on page 55 for the cfm values for each DTM model.

Maximum VMAC rpm can be adjusted (in 50 rpm increments) via the "▲" or "▼" buttons in the "MAX RPM" column. The rpm adjustment range is dependent upon the DTM model (Table 2).

- When the PTO mode selector switch is set to "VARIABLE RPM", the "▲" or "▼" buttons adjust the VMAC maximum rpm.
- When the PTO mode selector switch is set to "FIXED RPM", the "▲" or "▼" buttons adjust the VMAC base idle rpm.

Model	Engine Speed Range
DM2A021	1,700 - 2,500
DM2B021	1,700 - 2,300
DM2C021	1,700 - 2,100

Table 2 — Engine speed range

Factory Reset

The throttle control can be reset to factory default values via a button inside the throttle control box.

To perform a factory reset, turn the system on and allow the engine speed to drop to VMAC base idle (approximately 1,000 rpm). Using a paper clip (or similar object), push and hold the factory reset button for 5 seconds. All of the LED lights will illuminate for several seconds while the settings revert to their defaults. Once the LED's return to their normal state, the DTC will need to be recalibrated.

DTC Calibration

- ☐ Disconnect the white wire running to the PTO harness.
- ☐ Press the "ON" button on the control box. The green LED on the control box will turn on. The throttle control will turn on with the PRNDL, PRK BRAKE, and STATUS LEDs illuminated. If not, ensure that the vehicle is in Park with the Park Brake applied.
- ☐ Press and hold "▲" and "▼" buttons in the "RAMP UP PRESSURE" column for several seconds until all of the LEDs turn on. Then release the buttons (this indicates the DTC is in "Idle Adjust Mode")
- ☐ The engine RPM will stay at VMAC base idle (approximately 1,000 rpm) regardless of the pressure level returned by the system pressure sensor.
- ☐ Allow the DTC to calibrate for 3 minutes. During this time the "STATUS" LED will occasionally flash indicating that the DTC is calibrating. The engine speed will eventually settle at VMAC base idle (approximately 1,000 rpm).
- ☐ After 3 minutes. Press the "OFF" button on the control box.
- ☐ Shut down the vehicle.
- ☐ Connect the white wire running to the PTO harness.

For more information on the digital throttle, including error codes, see the related article the VMAC Knowledge Base: https://kb.vmacair.com/help/vmac-digital-throttle-control

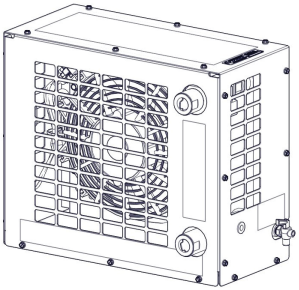
Accessory Products from VMAC

Compressor Service Kits

200 Hour or 6 Month Service Kit -
Part number: A700229
Includes 6 L VMAC high performance compressor oil, oil filter, air filter, and next service due decal.

400 Hour or 1-Year Service Kit -
Part number: A700230
Includes 6 L VMAC high performance compressor oil, oil filter, air filter, coalescing filter, pressure relief valve, muffler, and next service due decal.

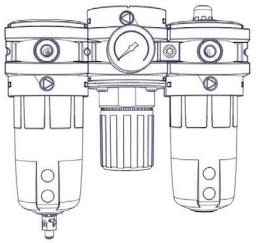
Air Aftercooler — 70 cfm



Part number: A800070
Improves tool performance and extends the life of air tools; removes up to 80% of water from compressed air; includes automatic water drain.

- Max air flow: 70 cfm / 175 psi.
- Port size: 3/4 in NPT inlet and outlet.
- Electrical: 12 V.
- Dimensions: 17 in (43.2 cm) L × 8.0 in (20.3 cm) W. × 14.5 in (36.8 cm) H.
- Weight: 35 lb (15.8 kg).

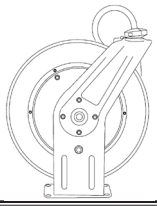
Filter Regulator Lubricator (FRL) — 70 cfm



Part number: A700151
Extends the life of air tools; filter removes contaminants from the compressed air, adjustable regulator can reduce air pressure going to tools, lubricator adds atomized tool oil to the air stream to lubricate air tools (Tool oil not included).

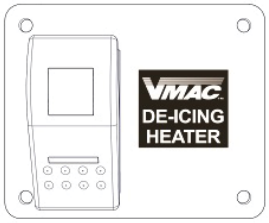
- Max air flow: up to 70 cfm / 150 psi
- Port size: 3/4 in NPT inlet and outlet

1/2 in × 50 ft Hose Reel



Part number: A700007
Spring-loaded 1/2 in × 50 ft hose reel; steel construction; full flow shaft and swivel for maximum performance.

VMAC De-icer Kit



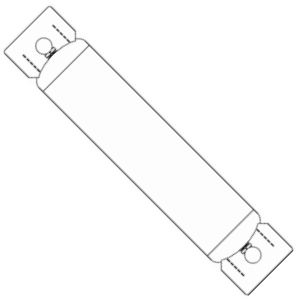
Part number: A700031
Cold climate heater package for operating VMAC compressors in cold climates; proven at temperatures of -30 °C (-22 °F). Requires 12V DC at 10A.

10 Gallon Air Receiver Tank w/ Mounting Feet

Part number: A300047
Air receiver tanks are used for lowering compressor duty cycle and removing water from compressed air. Recommended for optimum operation of VMAC Hydraulic Air Compressors, VMAC Diesel Driven Air Compressors, UNDERHOOD40, UNDERHOOD70 – Green Series Air Compressors, and VMAC Multifunction Power Systems, which include standby mode; ASME certified; includes fittings, 200 psi pressure relief valve, tank drain, and 200 psi pressure gauge.

- Max pressure: up to 200 psi.
- Dimensions: 30 in (76.2 cm) L × 10 in (25.4 cm) D.
- Weight: 33 lb (15 kg).

35 Gallon Air Receiver Wing Tank



Part number: A300010
Air receiver tanks are used for lowering compressor duty cycle and removing water from compressed air. Recommended for optimum operation of VMAC Diesel Air Compressors, Hydraulic Air Compressors, UNDERHOOD40, UNDERHOOD70 – Green Series Air Compressors, and VMAC Multifunction Power Systems, which include standby mode; ASME certified; includes fittings, 200 psi pressure relief value, tank drain, and 200 psi pressure gauge.

- Max pressure: up to 200 psi.
- Dimensions: 73 3/4 in (187.3 cm) L × 14 in (35.6 cm) D.
- Weight: 95 lb (43.1 kg).

Notes

Notes

Warranty Registration

This form must be fully completed and returned to VMAC at the time the vehicle is put into service. Warranty may be void if this form is not received by VMAC within 3 months of receiving the vehicle, or 200 hours of operation, whichever occurs first.

VMAC's Warranty policy and registration can be viewed online at: **www.vmacair.com/warranty**

Product Information

System Identification Number: **D M** _ _ _ _ _ _ _ _ _ _ _ _

Compressor Serial Number: **P** _ _ _ _ _ _ _ _ _ _ _ _

Owner / End User Information

Company Name: _____

City: _____ State / Province: _____

Phone: (____) _____–_____

Email Address: _____

Date vehicle was put into service: _____/_____/_____
Day Month Year

Installer Information

Installer Company Name: _____

City: _____ State / Province: _____

Submitted by

Name: _____ Phone: (____) _____–_____

Email: _____

Vehicle Information (Optional)

Unit: _____ Year: _____

Make: _____ Model: _____

Vehicle Identification Number: _____

Manufactured by

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