VMAC®

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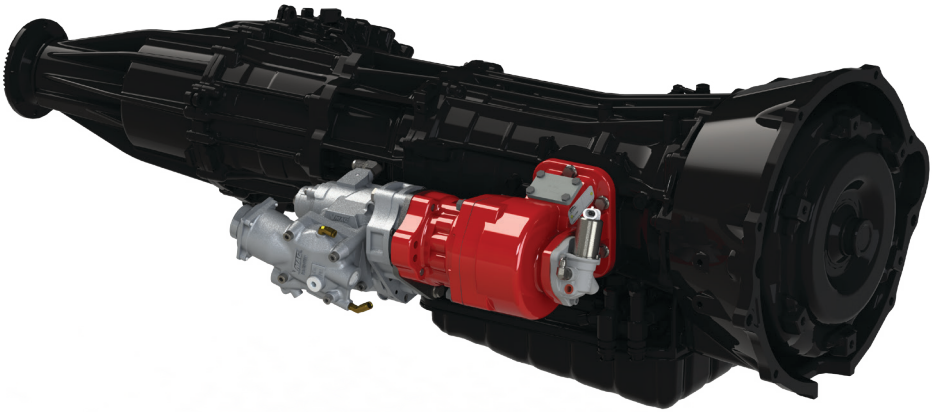

Installation Manual for VMAC System

DM00014

2019+ Ram 3500 – 4500 Chassis Cab
6.7 L Cummins Diesel with PTO

www.vmacair.com

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Revision	Revision Details	Revised by	Checked by				Implemented
			Eng.		Tech.	Qual.	
			Mech.	Elec.			
K	ECN: 23-203 Update AOST instructions	MSP	MRH	N/A	RDB	LPH	21 Sept. 2023

Additional Application Information

- 2019+ Ram 3500 – 4500 Chassis Cab equipped with 6.7 L Cummins Diesel Aisin AS69RC transmission with PTO.
- Must have factory PTO prep package (RPO Production code LBN, passenger side PTO option).
- Note that this VMAC system may be equipped with either a digital or analog throttle control.

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New Line™ is a trademark of New Line Hose and Fittings.

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 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 (Lisle 43300 or equivalent)
- 6 mm ball end hex driver.

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

System Identification, Warranty Registration and Warning Labels

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.

☐ 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 at (888) 241-2289.

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

☐ Complete the warranty form. The VMAC warranty form is located at the back of this manual, as well as online at: www.vmacair.com/warranty

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 (x2) 7/64 in holes and secure the plate with the supplied self-tapping screws (Figure 1).

Figure 1 — System Identification Plate

☐ 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 2).

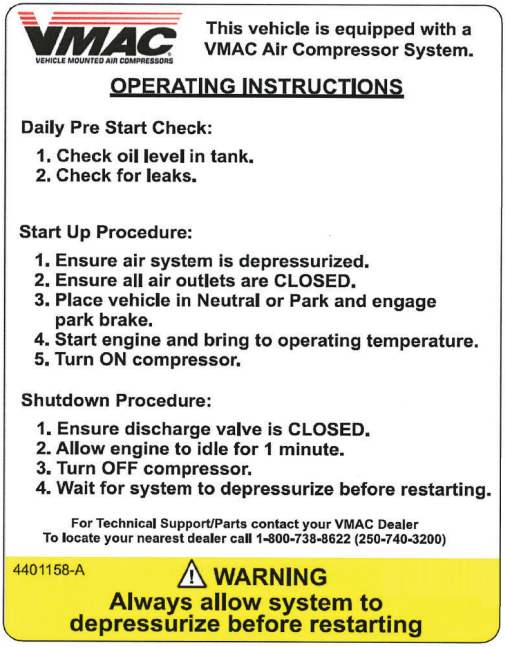


Figure 2 — Operating Instruction label

☐ To alert any technicians that may service the vehicle, affix the servicing caution/contact decal in a conspicuous area in the engine bay (where the decal will be easily noticed) (Figure 3).

Figure 3 — Advisory label

Preparing for Installation

Ensure the VMAC Warranty Registration has been completed and the System Identification Plate and Operating Instruction Label are installed prior to proceeding (Please see page 8 for details).

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

Vehicles equipped with RAM's Vehicle System Interface Module (VSIM), skip, to page 11.

Identify the "PARK"/"NEUTRAL" wire.

☐ Locate the 10 pin connector plugged into the transmission range sensor on the driver side of the transmission (Figure 4).

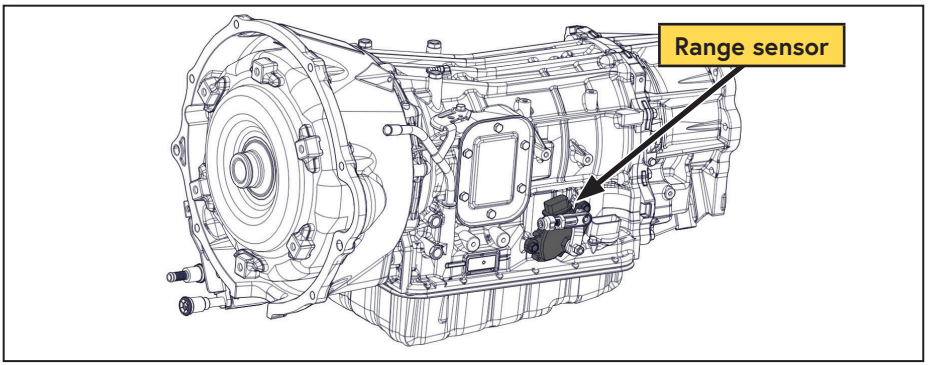


Figure 4 — Locate range sensor

☐ Locate the yellow wire with blue stripe going to pin 9 in the transmission range sensor connector (Figure 5).

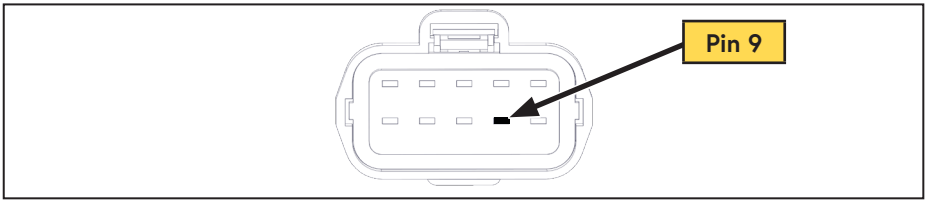


Figure 5 — View from front of connector

☐ To verify pin 9 is the "PARK"/"NEUTRAL" wire, turn the ignition key to "RUN" but do not start the engine.

☐ Using a multimeter, verify the voltage is between 0 V - 2 V while the gear selector is in "PARK" or "NEUTRAL", and approximately 12 V in all other gears.

☐ Mark the "PARK"/"NEUTRAL" wire for identification later.

☐ Turn the ignition key to "OFF".

☐ Disconnect the negative terminal from the batteries.

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

☐ Raise the front of the vehicle and support it appropriately.

☐ Remove the air box assembly. Cover the intake tube to prevent any contaminants from entering the system.

☐ Drain the coolant into a clean container and set it aside for use later.

Due to variations in service body design and other equipment, VMAC is unable to recommend mounting locations for the remote air filter housing.

☐ Determine a location for the remote air filter.

☐ Determine the approximate remote air filter duct length:

- Refer to page 47 for air filter mounting guidelines.
- For optimum performance, the duct length should be minimized.
- The kit includes 8 ft. of hose, which can be cut to length.
- Longer hose may be purchased from VMAC, or a hose supplier (VMAC P/N: 1700650, New Line P/N: NL6025-200).

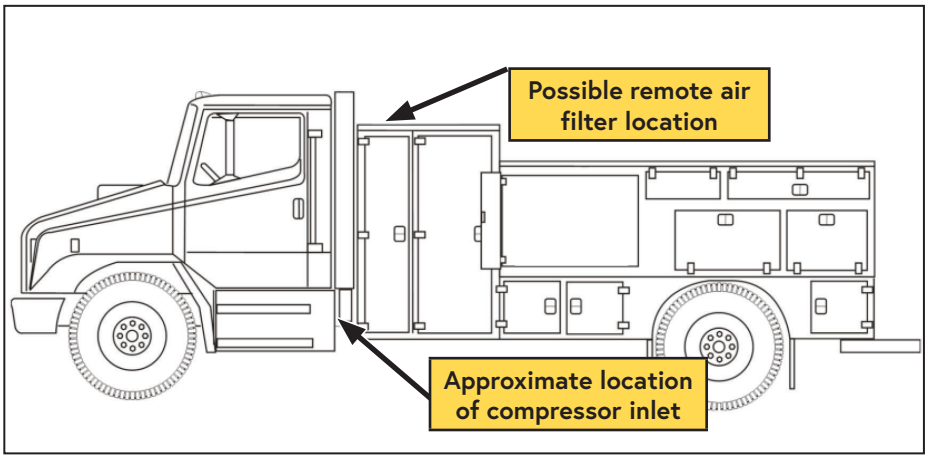


Figure 6 — Determine remote air filter location

If the flexible hose has been extended, test the system once installation is complete as extending the hose may affect compressor performance.

Installing the PTO and Compressor

Apply Loctite 242 (blue) to all fasteners.

It is extremely important to ensure that contaminants do not enter the PTO port on the transmission.

Refer to the "PTO Installation Alternative" bulletin on the RAM Body Builder's Guide for detailed instructions on accessing the PTO access panel on the passenger side of the cab. https://www.ramtrucks.com/ram-commercial/body-builders-guide.html

- ☐ Remove the passenger seat, and doorsill guards to allow the vinyl floor mat to be lifted.
- ☐ Fold the floor mat toward the rear of the cab to expose the PTO access hatch.
- ☐ Remove the fasteners and sealer from the PTO access hatch (Figure 7).

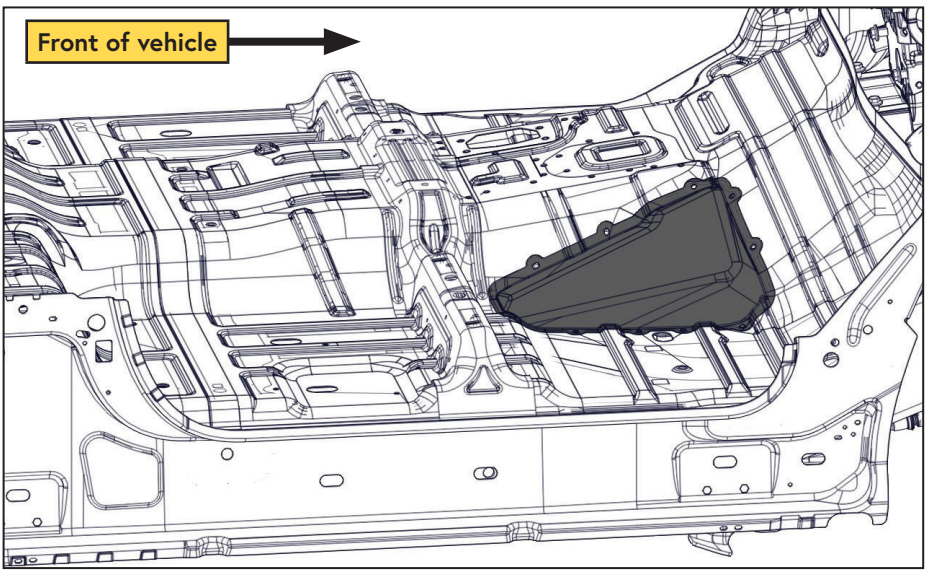


Figure 7 — PTO access hatch

- ☐ ***Optional:*** Remove the passenger side inner fender. This provides much better access for the PTO install.

☐ Remove the nuts from the exhaust flange and set them aside for later (Figure 8).

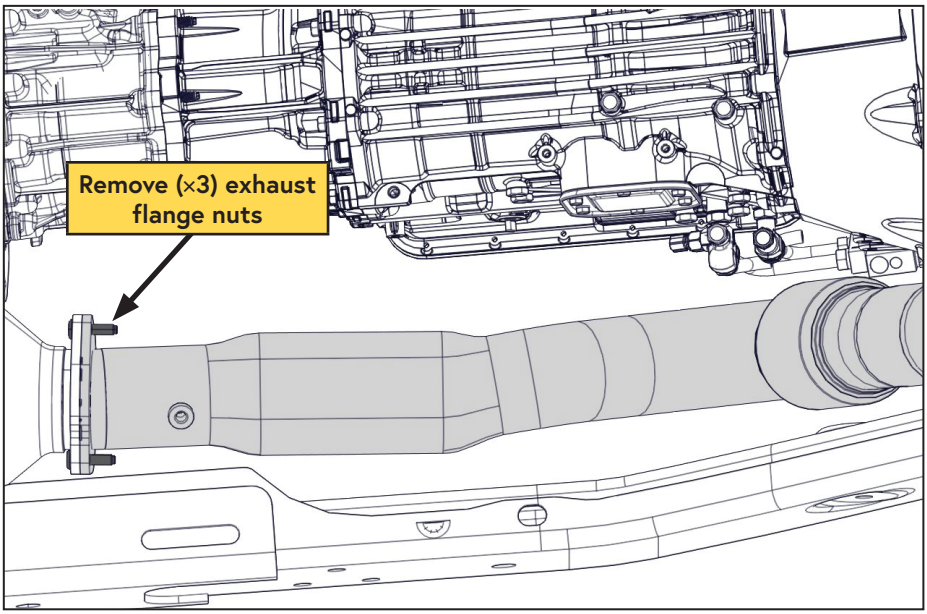


Figure 8 — Exhaust flange

☐ Disconnect the exhaust from the turbo outlet (Figure 9).

Use care when disconnecting the exhaust components to prevent damaging the gaskets (forward gasket OEM P/N: 6807 1676AA, rear gasket OEM P/N: 52122213AB).

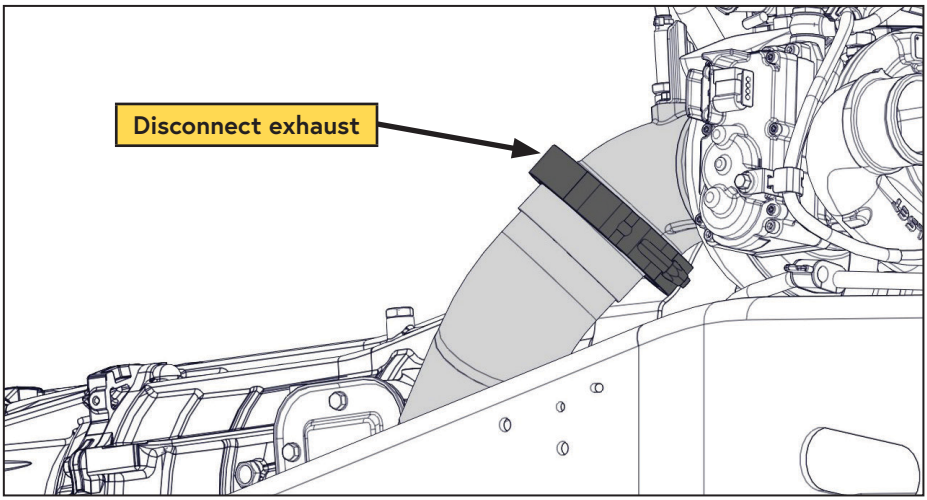


Figure 9 — Turbo outlet

☐ Remove the exhaust support bracket.

☐ With the exhaust pipe disconnected, push the pipe toward the front of the vehicle to clear the studs in the flange, rotate it toward the frame, and secure it in place with a ratchet strap (Figure 10 and Figure 11).

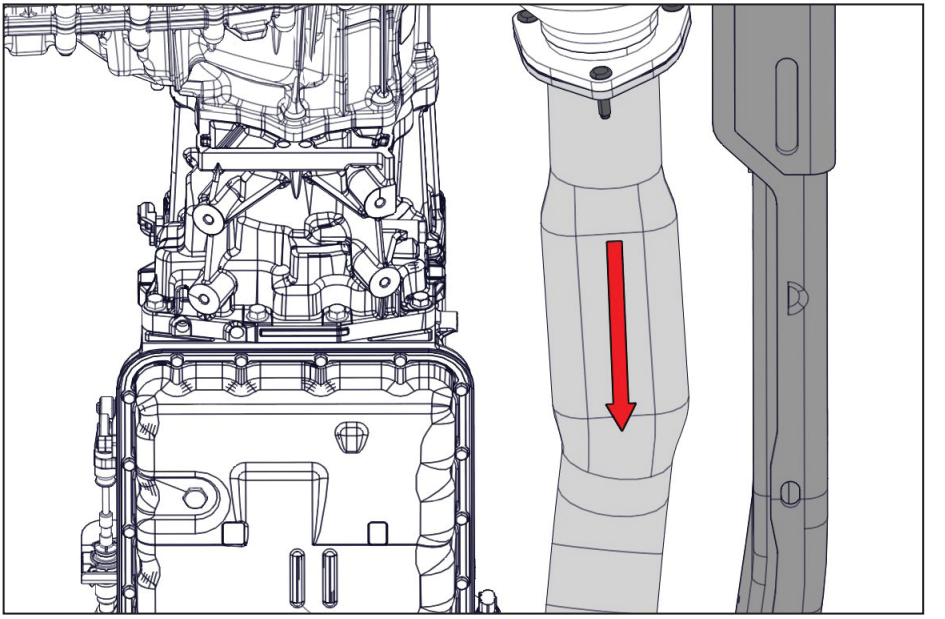


Figure 10 — Shift exhaust forward

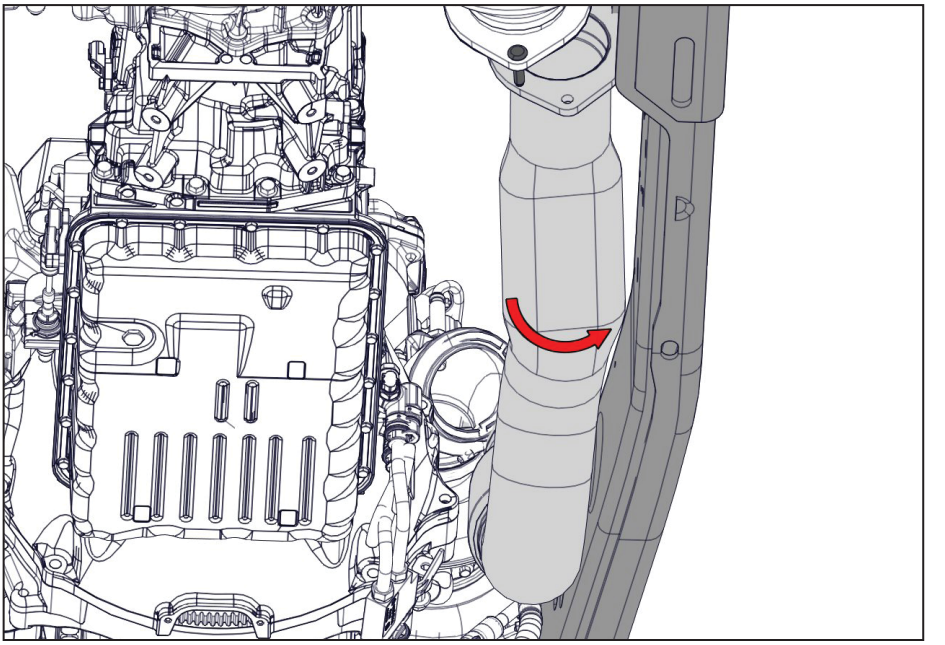


Figure 11 — Rotate exhaust

☐ Remove the inlet and O-ring from the compressor and cover the opening of the compressor to prevent any contaminants from entering the system (Figure 12).

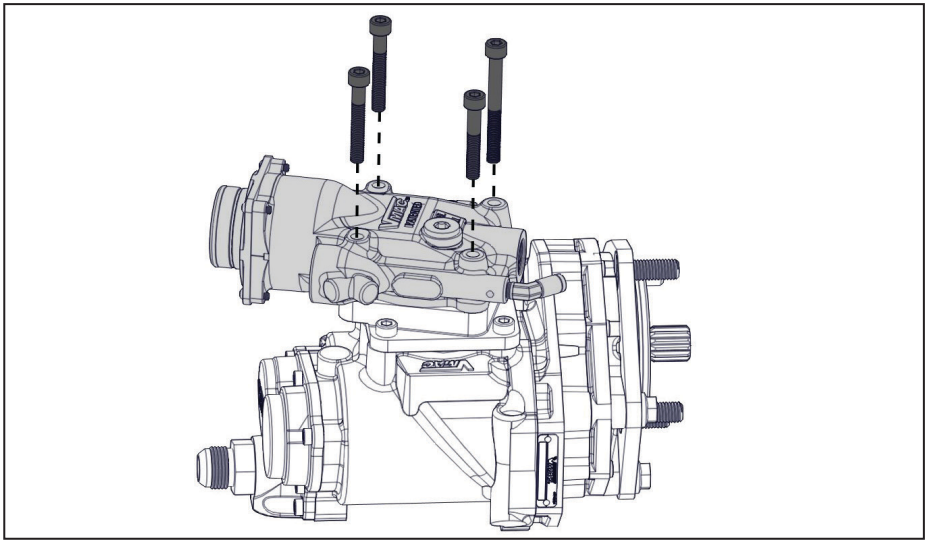


Figure 12 — Remove intake

☐ Insert the compressor through the PTO access hole (or up from the bottom of the vehicle), slide it toward the rear of the vehicle, and set it on the transmission cross member.

☐ Secure the compressor in place to prevent it from falling while the PTO is installed.

☐ Install the PTO clocking ring in the orientation shown (see Chelsea manual for torque specifications) (Figure 13).

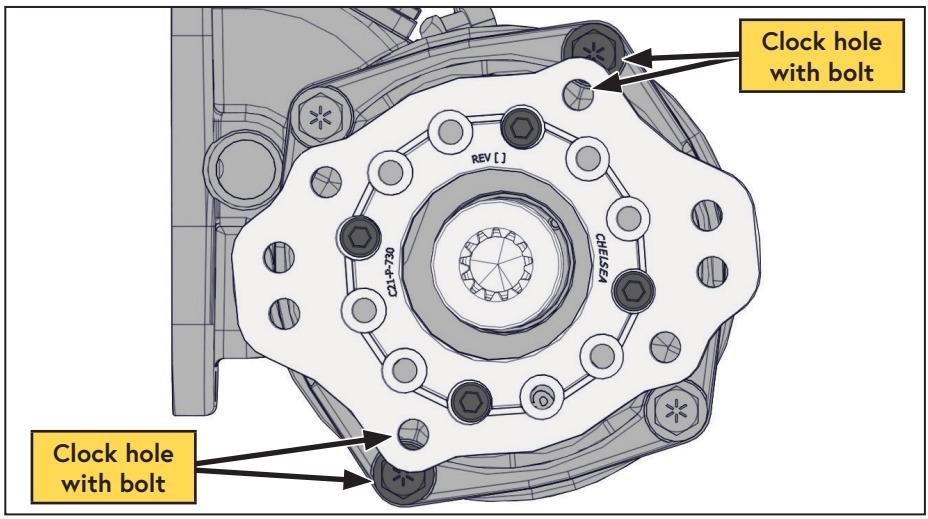


Figure 13 — PTO Clocking ring orientation

☐ Using the (×3) flat head fasteners, install the PTO flange adapter; torque the fasteners to specification (Figure 14).

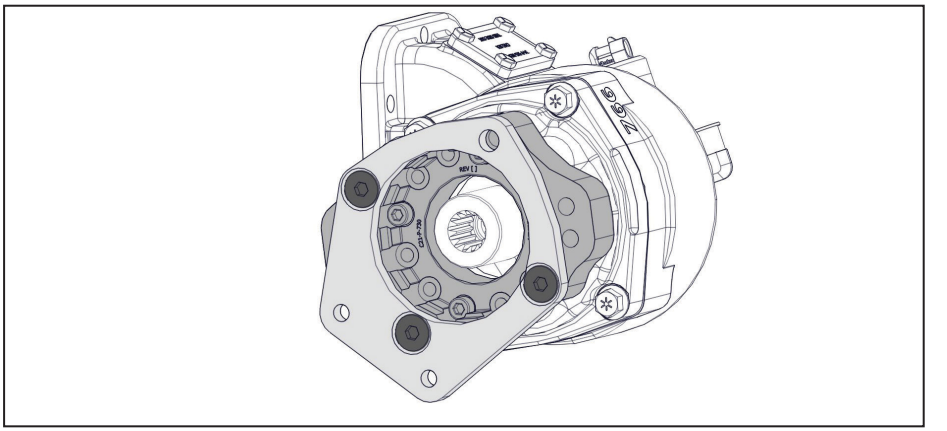


Figure 14 — PTO flange adaptor

☐ Follow the mechanical portion of the OEM PTO installation instructions (272 Series for 2013+ Aisin AS69RC transmission).

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

☐ Apply a generous amount of spline grease to the compressor input shaft.

☐ Install the compressor onto the PTO (Figure 15).

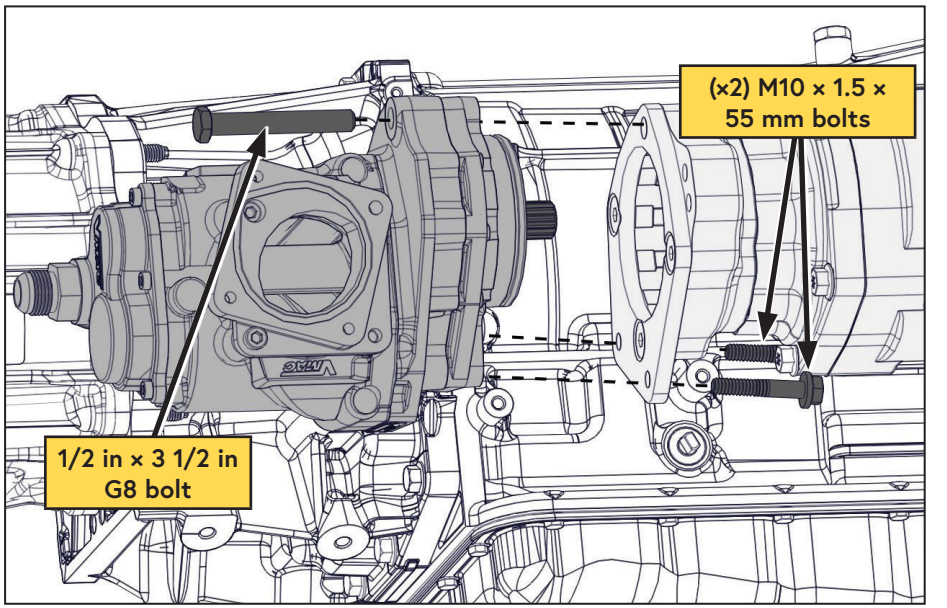


Figure 15 — Mount compressor to PTO

☐ Remove the covering from the compressor opening and reinstall the inlet and O-ring onto the compressor (Figure 16).

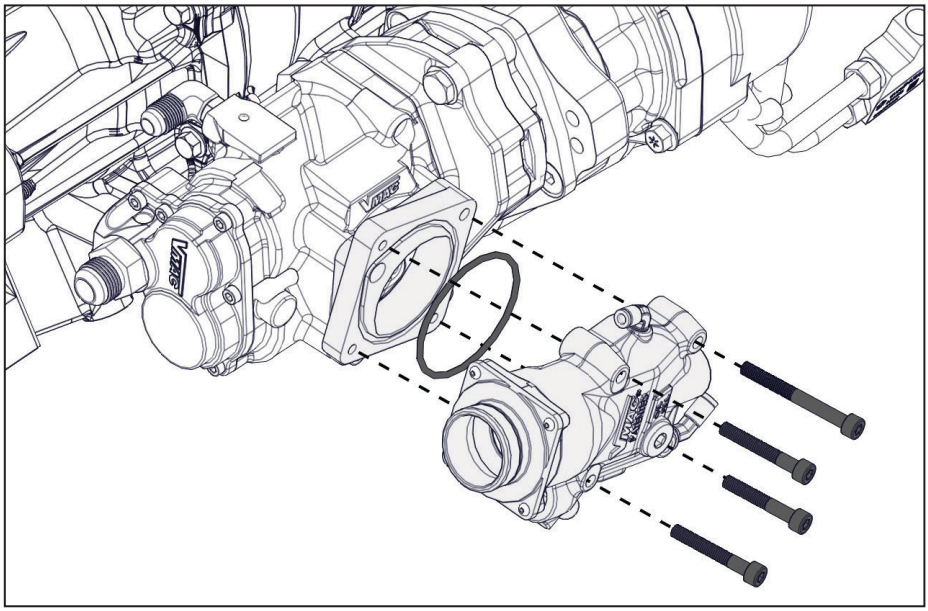


Figure 16 — Install inlet

☐ Remove the (×2) transfer case fasteners (Figure 17).

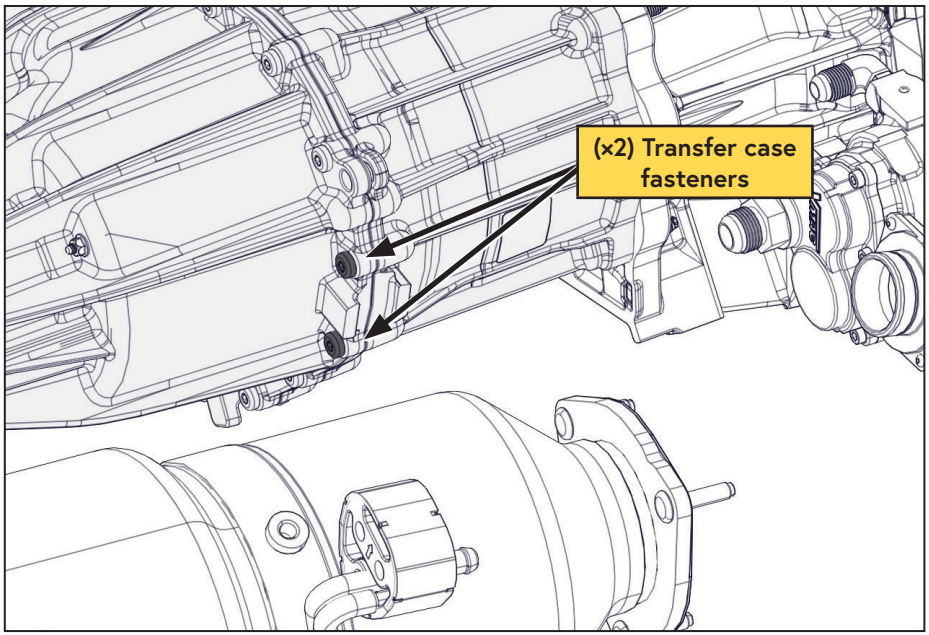


Figure 17 — Remove fasteners

☐ Apply Loctite 242 (blue) to the transfer case fasteners, removed in the previous step, and install the air intake support bracket (Figure 18).

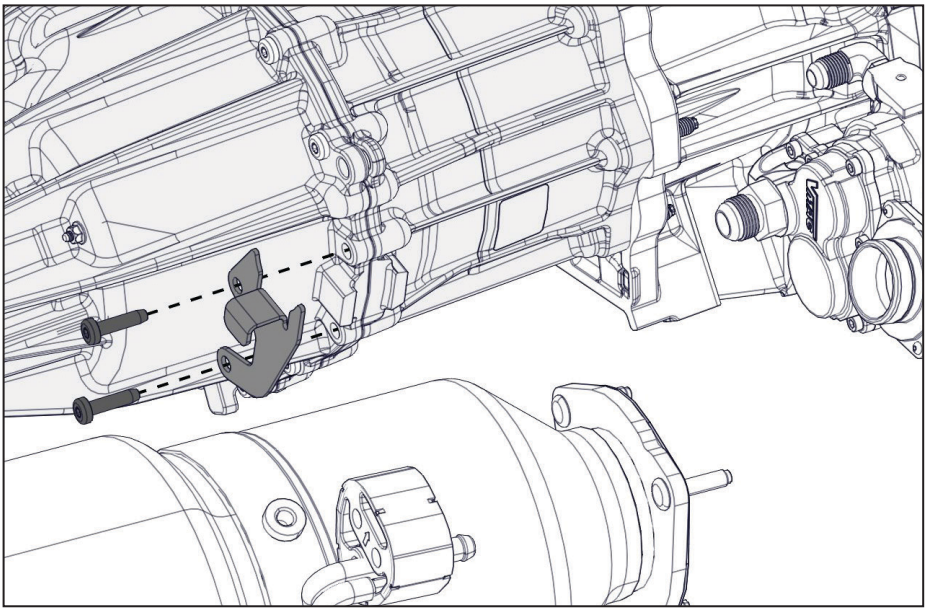


Figure 18 — Install air intake support bracket

☐ Install the rubber air intake hose coupler onto the inlet and secure it using a gear clamp (Figure 19).

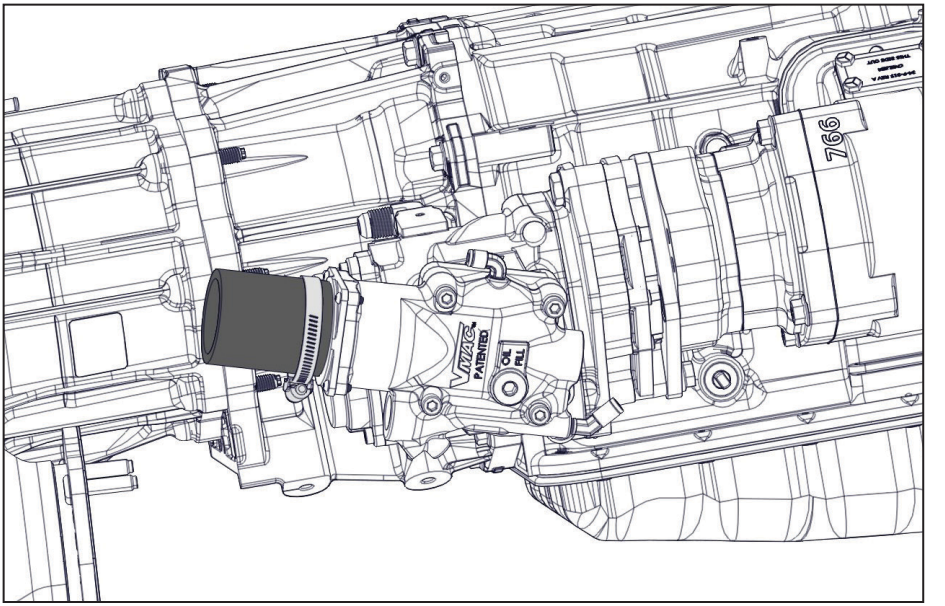


Figure 19 — Install intake hose

☐ Install the compressor side metal intake tube and secure the intake tube to the support bracket using a gear clamp (Figure 20).

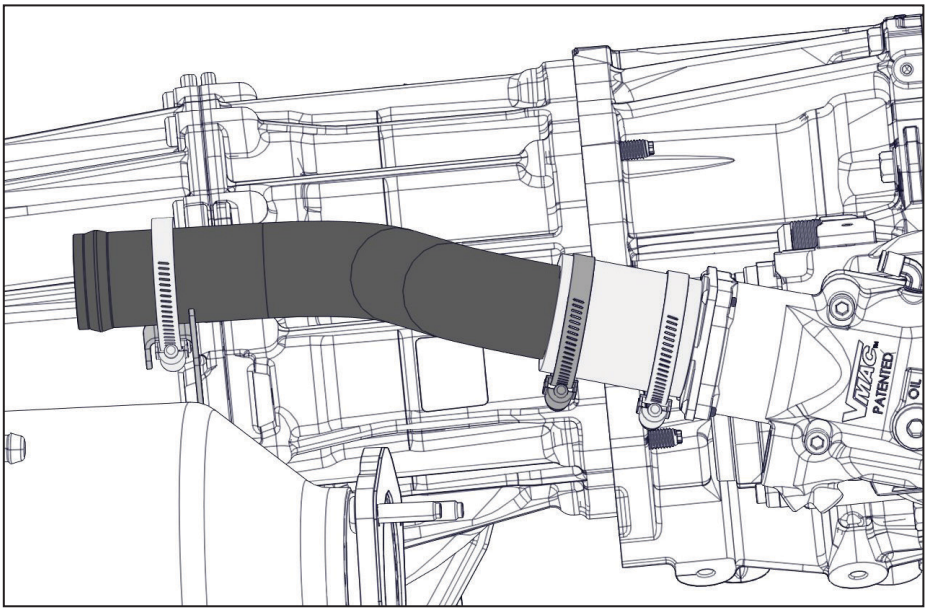


Figure 20 — Install compressor side metal intake tube

☐ Install the rubber air intake hose coupler onto the compressor side intake tube and secure it with a gear clamp (Figure 21).

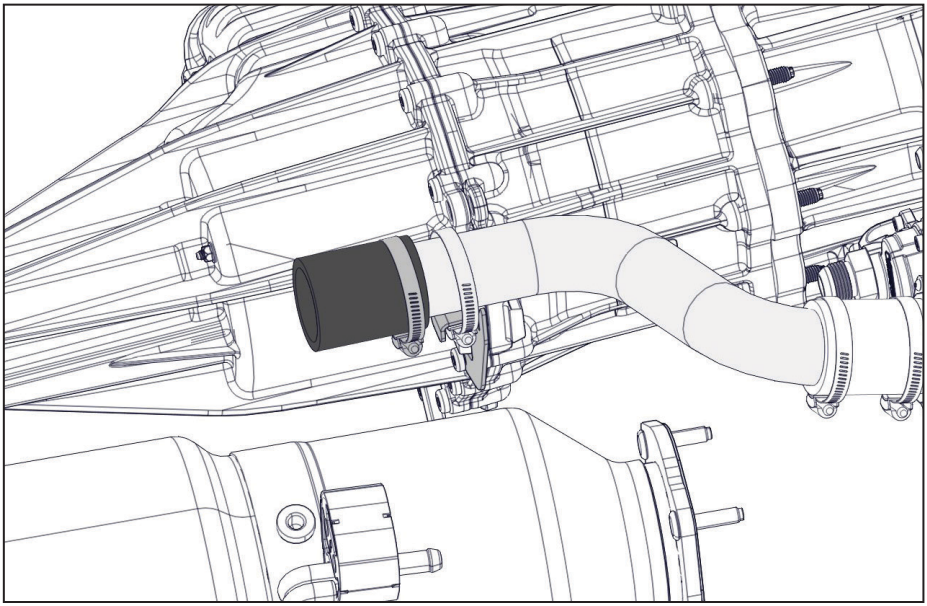


Figure 21 — Install intake hose

Standard Cab

☐ Install the filter side metal intake tube and secure it using a gear clamp (Figure 22).

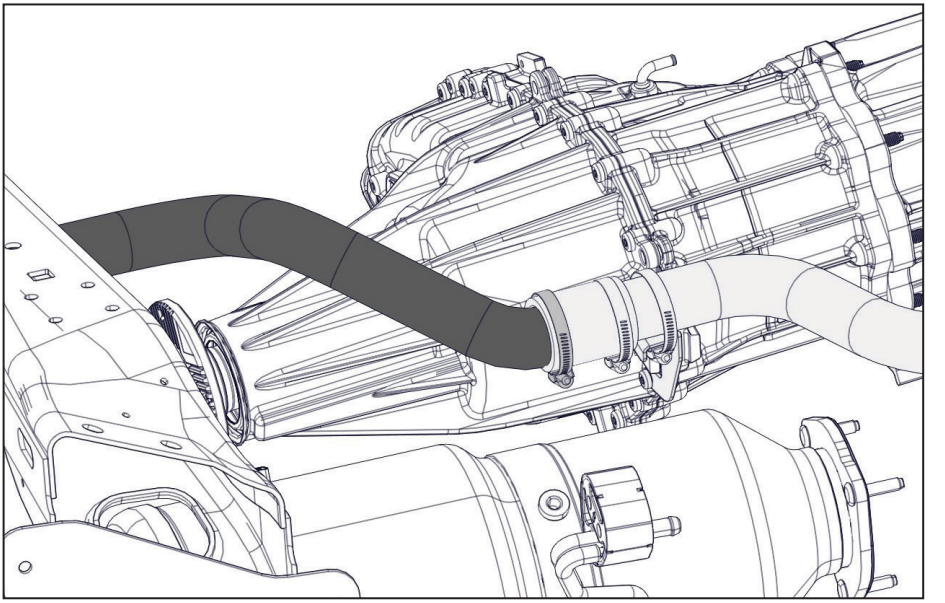


Figure 22 — Install filter side metal intake tube

☐ Secure the filter side intake tube to the cross member using the supplied P-clip, bolt, and washer (Figure 23).

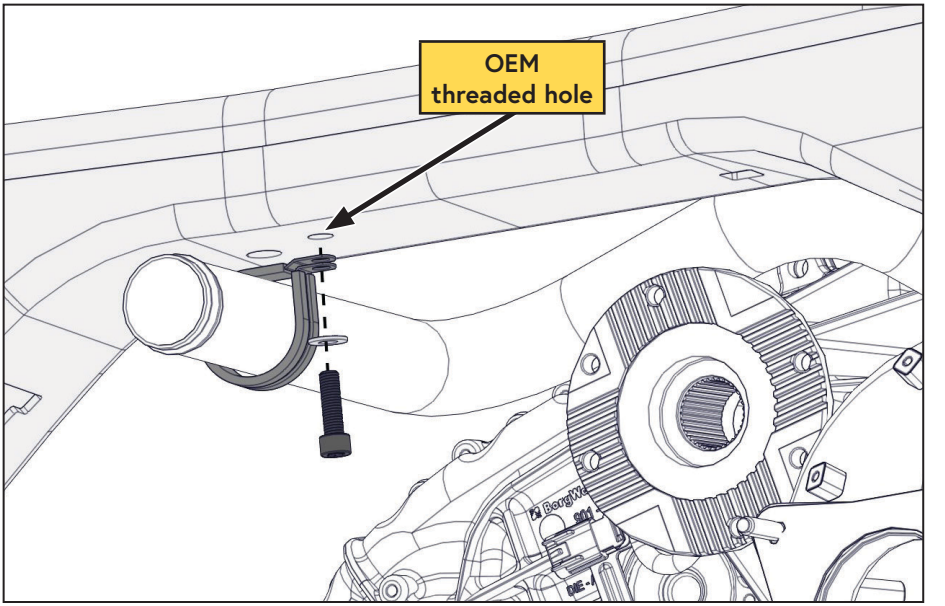


Figure 23 — Secure filter side intake tube

Extended Cab and Crew Cab

☐ Install the filter side metal intake tube and secure it using a gear clamp (Figure 24).

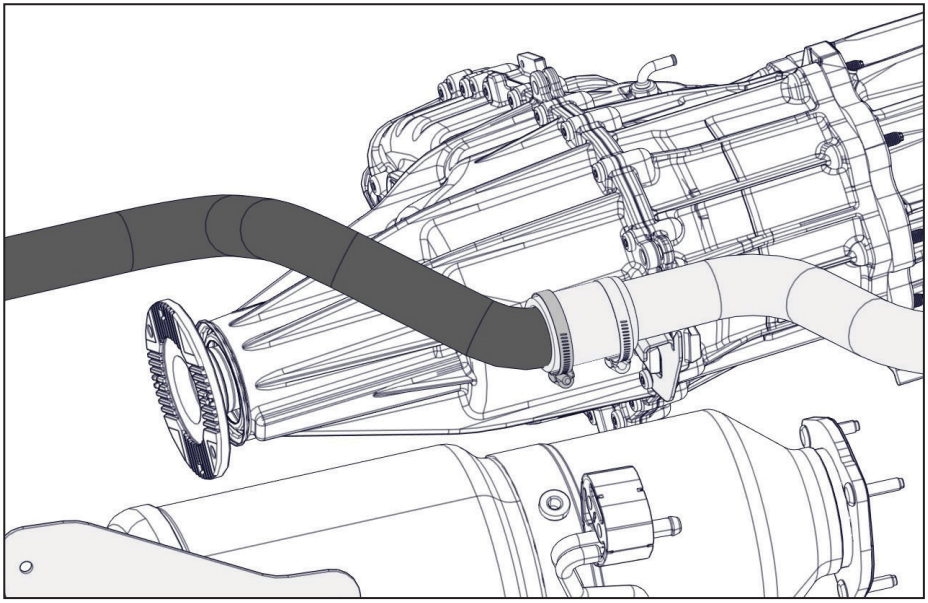


Figure 24 — Install filter side metal intake tube

☐ Install the rubber air intake hose coupler onto the intake tube and secure it with a gear clamp (Figure 25).

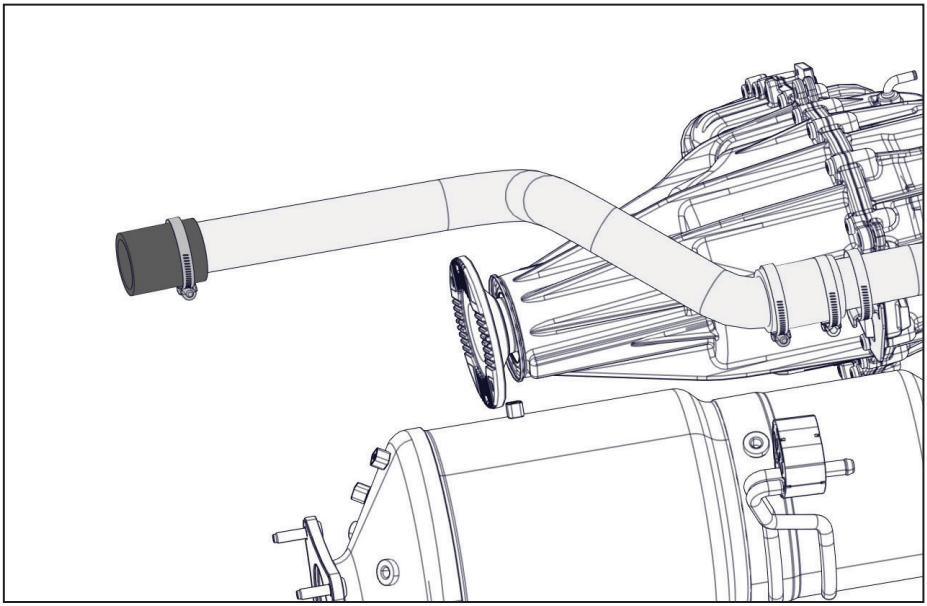


Figure 25 — Install intake hose extension

☐ Install the metal intake tube extension and secure it using a gear clamp (Figure 26)

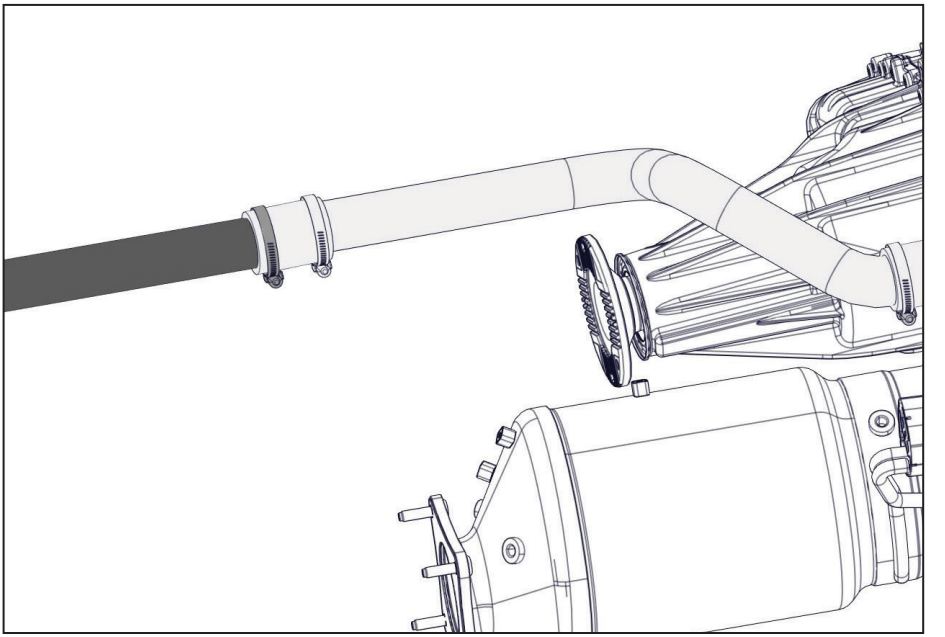


Figure 26 — Secure filter side intake tube extension

☐ Secure the intake tube extension to the cross member using the supplied P-clip, bolt, and washer (Figure 27).

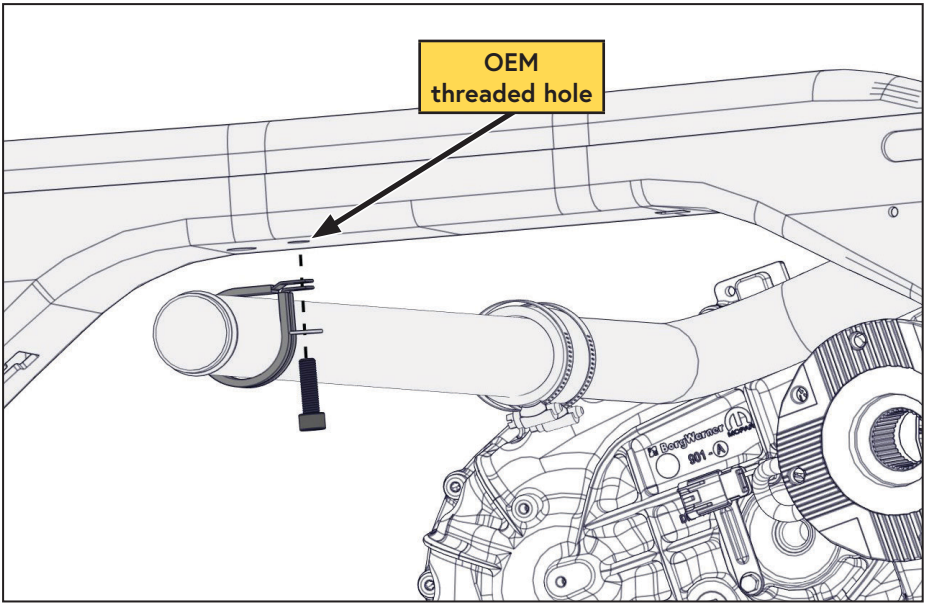


Figure 27 — Secure filter side intake tube

Installing the Oil Cooler

Apply Loctite 242 (blue) to all fasteners.

☐ Install the supplied 4.5 in hose onto the short oil cooler spigot using one of the supplied hose camps. Leave the hose clamp loose to allow adjustment (Figure 28).

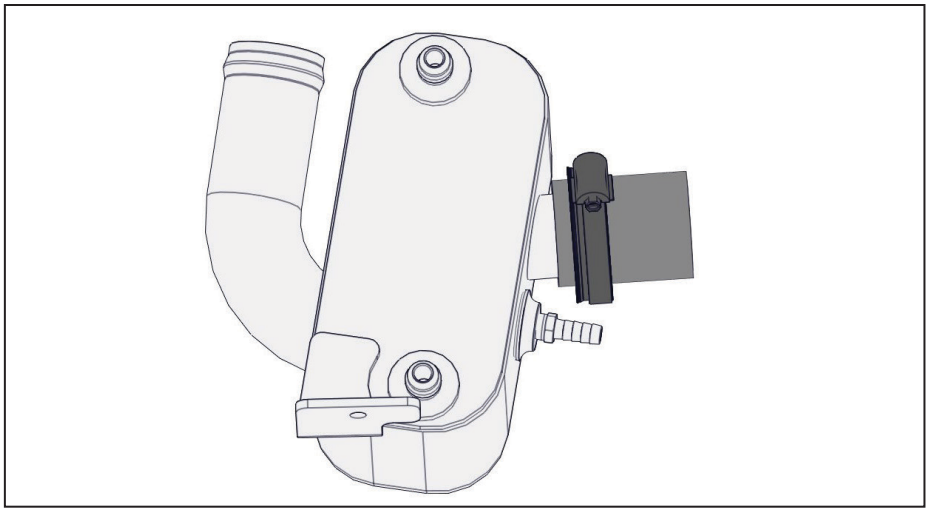


Figure 28 — Install modified hose

☐ Fit the other hose clamp onto the hose, leaving it loose.

☐ Remove the OEM fastener securing the radiator brace and set it aside (Figure 29).

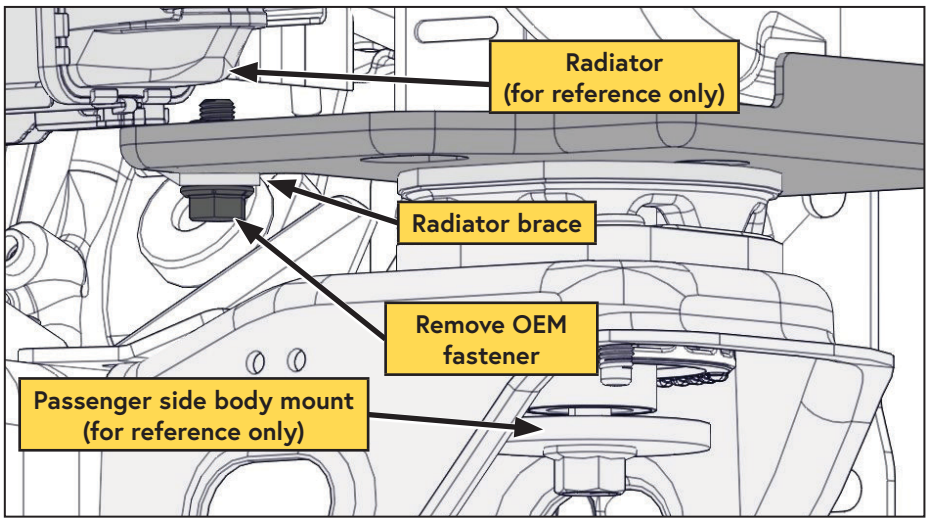


Figure 29 — Remove OEM fastener

☐ Install the radiator brace and oil cooler bracket using the OEM fastener retained from the previous step; leave the fastener finger tight (Figure 30).

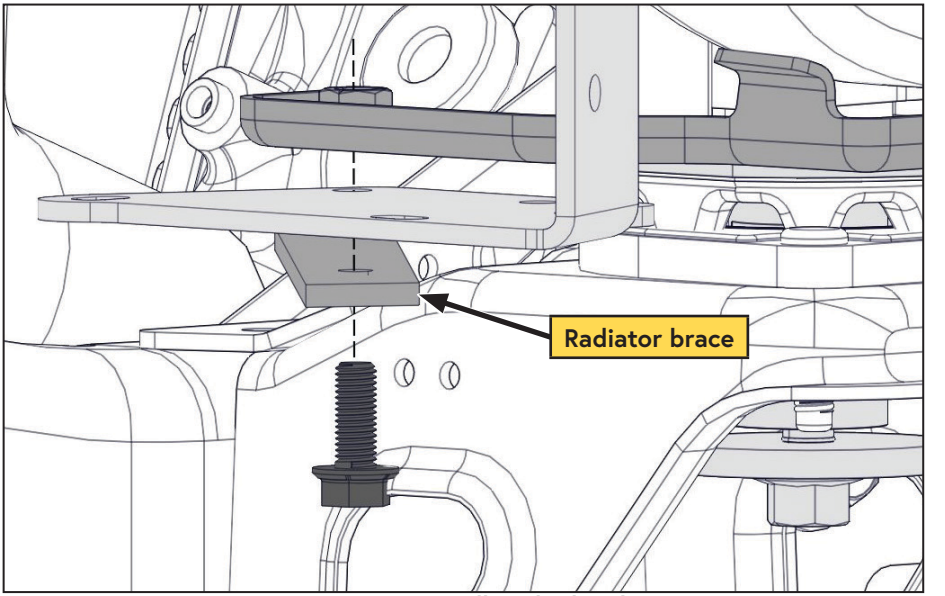


Figure 30 — Install cooler bracket

☐ Install the bottom fastener into the backing strap, leaving the nut finger tight (Figure 31).

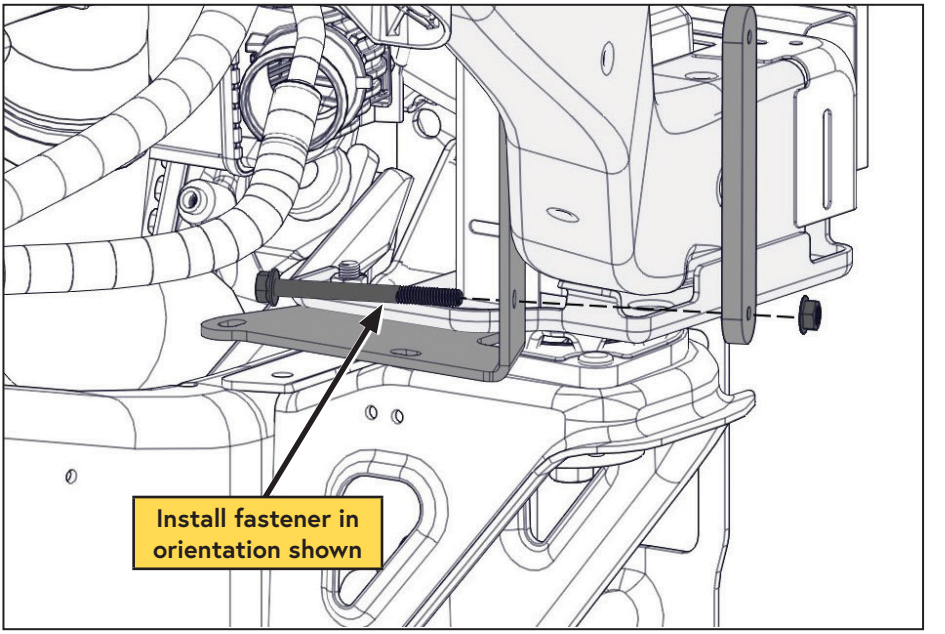


Figure 31 — Install backing strap

Use extreme care while deflecting the transmission cooler hoses to prevent damaging them, or the radiator.

☐ While stabilizing the transmission cooler hoses at the radiator, gently deflect the hoses upward to provide room for the oil cooler (Figure 32).

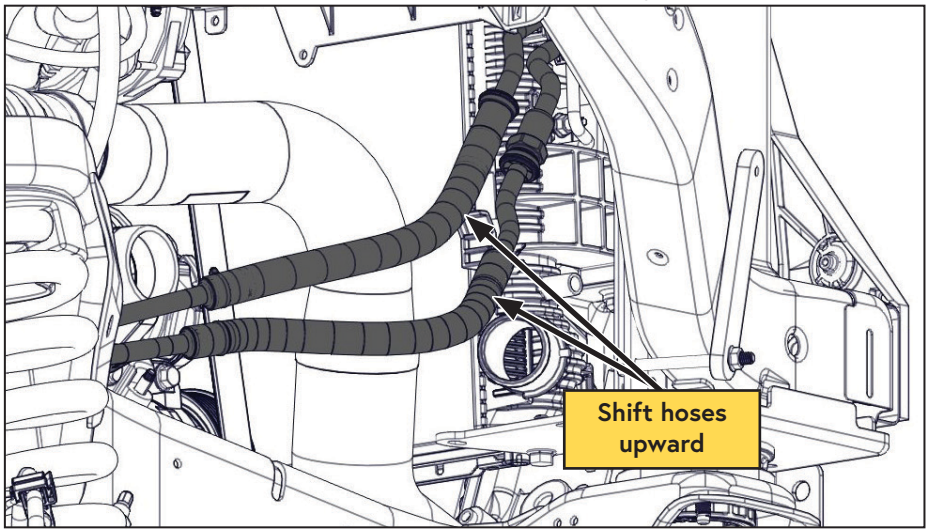


Figure 32 — Deflect hoses

☐ Install the supplied flex hose onto the engine spigot (Figure 33).

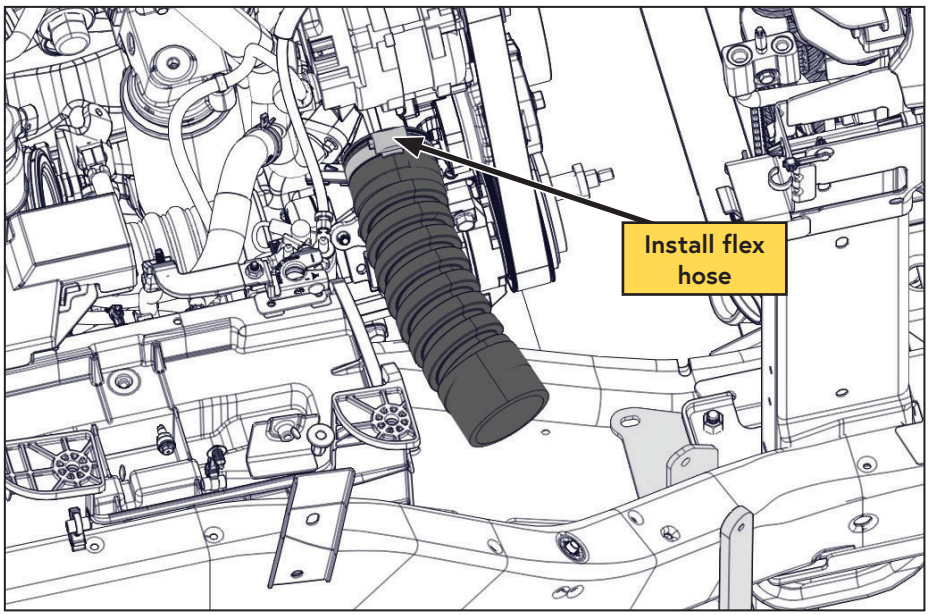


Figure 33 — Install flex hose

☐ Mount the cooler onto the cooler bracket, fitting the hoses loosely onto the cooler spigots (Figure 34).

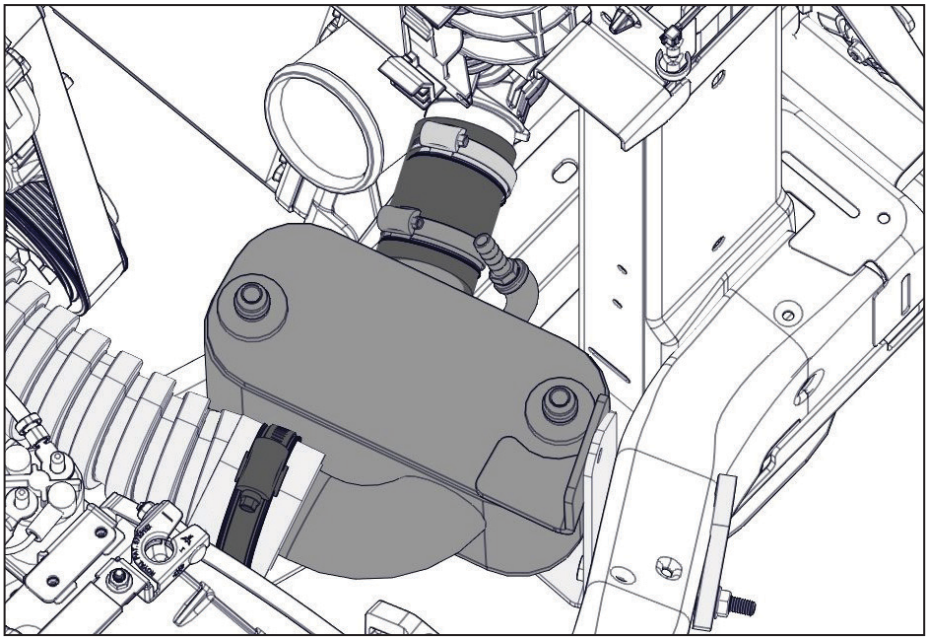


Figure 34 — Mount cooler

☐ Install the top cooler bracket fastener finger tight (Figure 35).

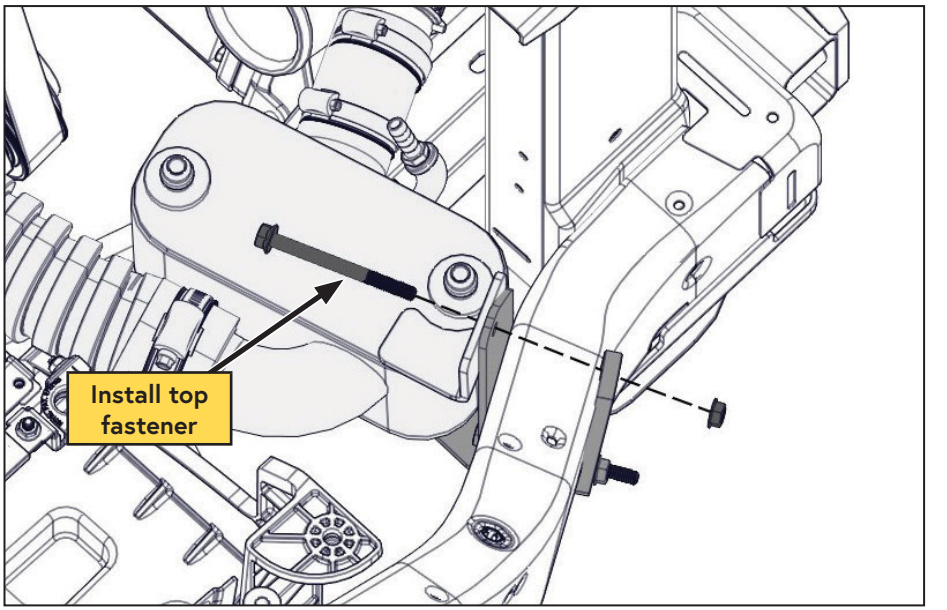


Figure 35 — Install top fastener

☐ Install the (×2) bottom cooler fasteners (Figure 36).

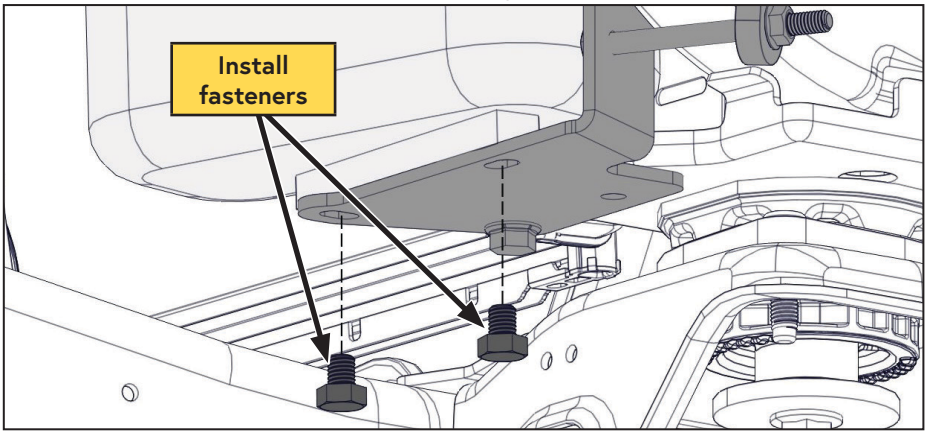


Figure 36 — Install bottom cooler fasteners

Once the cooler has been mounted, verify that there is adequate clearance between the cooler and the fender, and/or the charge air cooler ducting.

If the cooler is contacting either of these components, ensure adequate vibration isolation (such as a length of coolant hose secure in place) is used to prevent wear to any VMAC and/or OEM components.

☐ Adjust the coolant hoses to ensure they are not kinked or restricted, and tighten the hose clamps.

☐ Torque the fasteners securing the cooler and bracket to specification.

☐ Remove and discard the plug from the passenger side of the cylinder head (Figure 37).

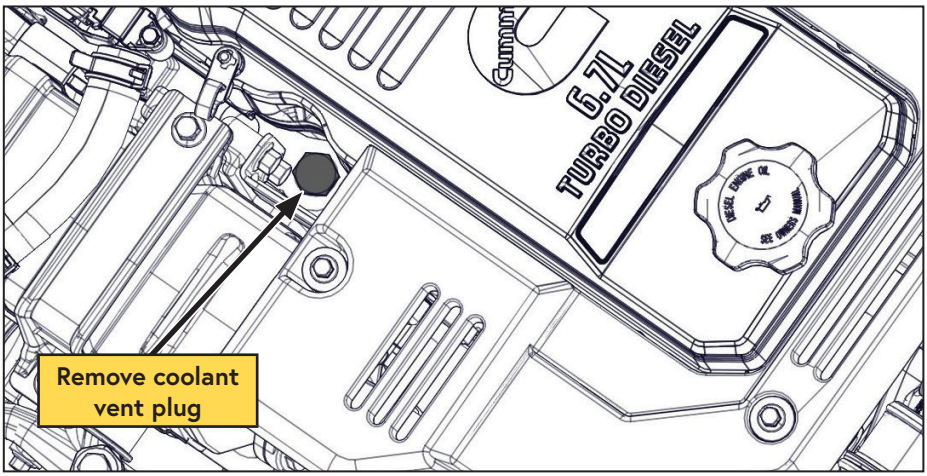


Figure 37 — Coolant vent plug

☐ Apply Loctite 567 (thread sealant) to each end of the pipe nipple and install the brass bushing and the tee fitting.

☐ Apply Loctite 567 (thread sealant) to the threads of the brass bushing and install the assembly into the cylinder head with the tee facing toward the passenger side of the vehicle (Figure 38).

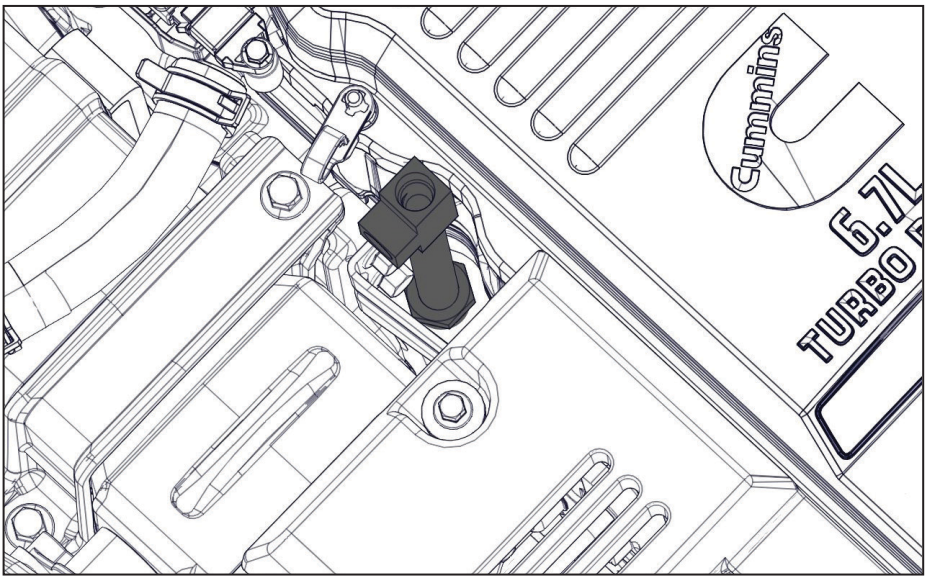


Figure 38 — Install pipe nipple

☐ Apply Loctite 567 (thread sealant) to the hose barb and install it onto the tee fitting (Figure 39).

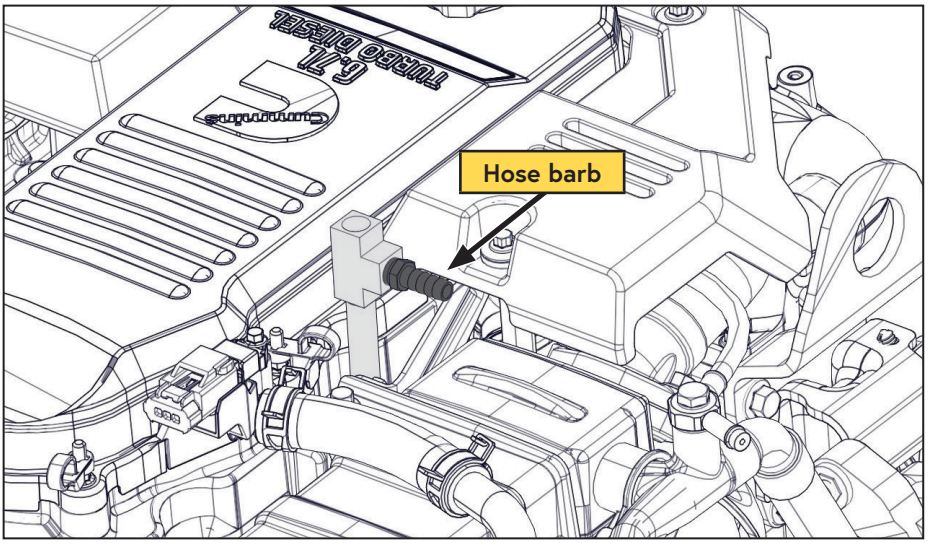


Figure 39 — Install hose barb

☐ Connect the supplied 10 mm ID coolant hose to the hose barb and secure it using the supplied gear clamp (Figure 40).

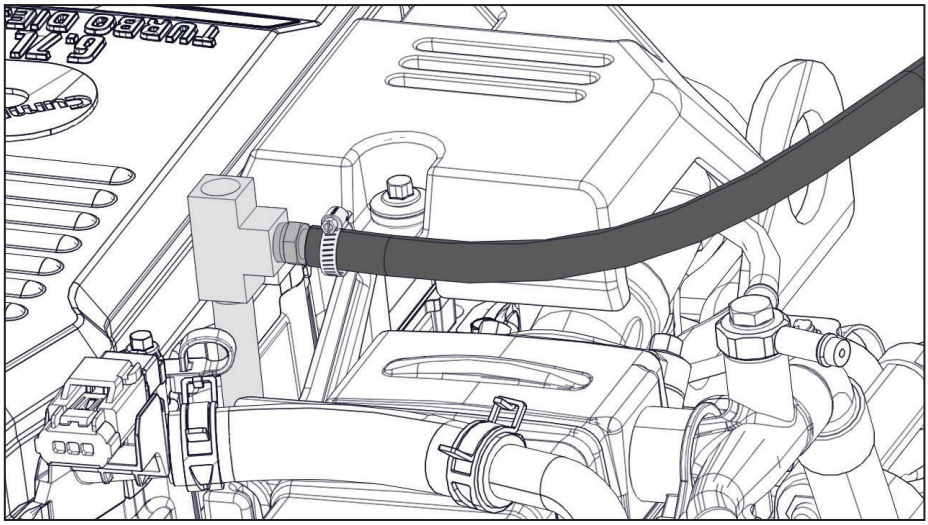


Figure 40 — Install coolant hose

☐ Route the hose forward to the corner of the air box, then down toward the frame mount on the passenger side.

☐ Secure the hose to the barb connector on the VMAC oil cooler using the supplied gear clamp.

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.

Installing the AOST

The AOST will mount to the passenger side frame rail behind the body mount (Figure 41).

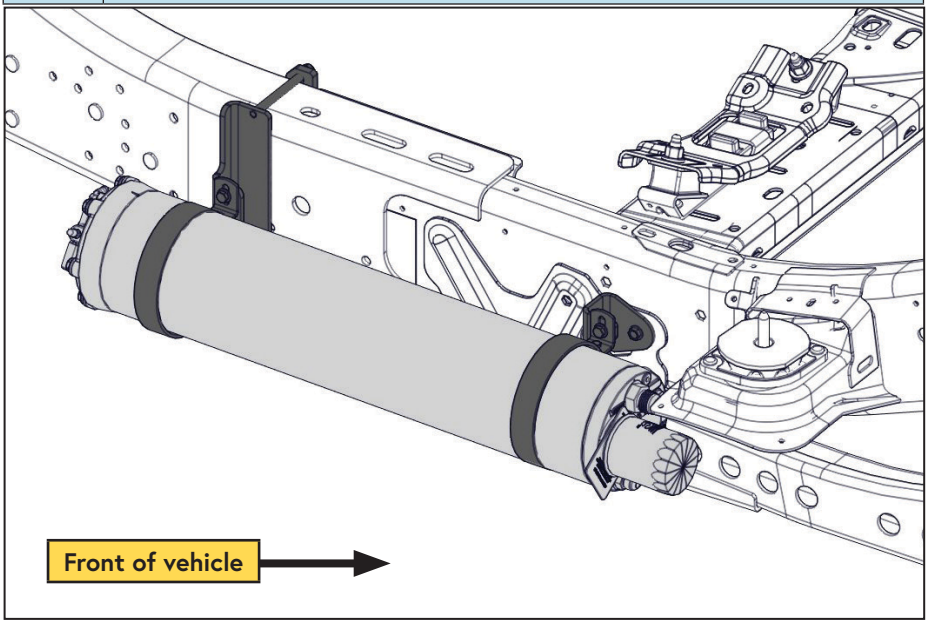


Figure 41 — AOST installed
(Standard Duty Chassis Shown)

The AOST mounting hardware and instructions are chassis specific. This kit includes the hardware required for both installations, Any parts not called out may be discarded.

Visually identify whether the vehicle is equipped with the "standard duty" or "heavy duty" chassis.

☐ For "standard duty" chassis, turn to page 32 (Figure 42).

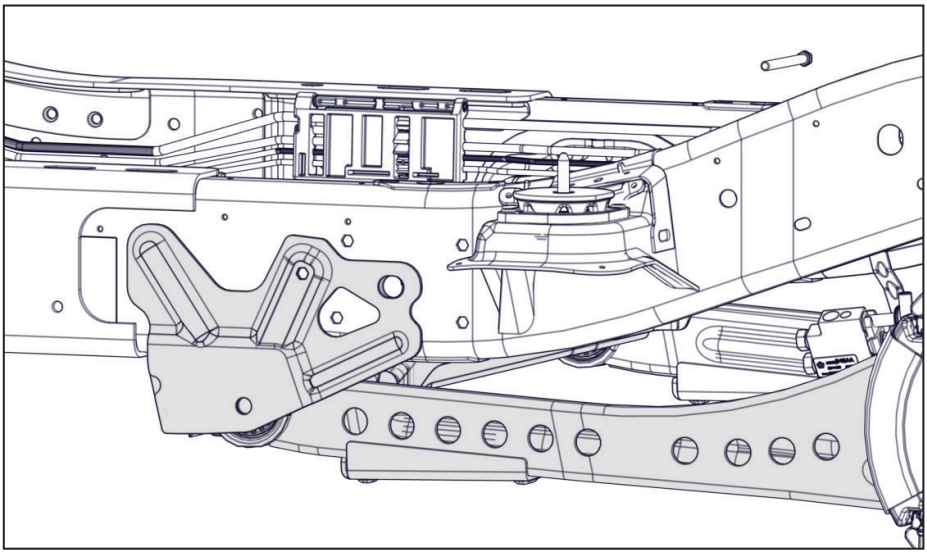


Figure 42 — Standard Duty Chassis

☐ For "heavy duty" chassis, turn to page 34 (Figure 43).

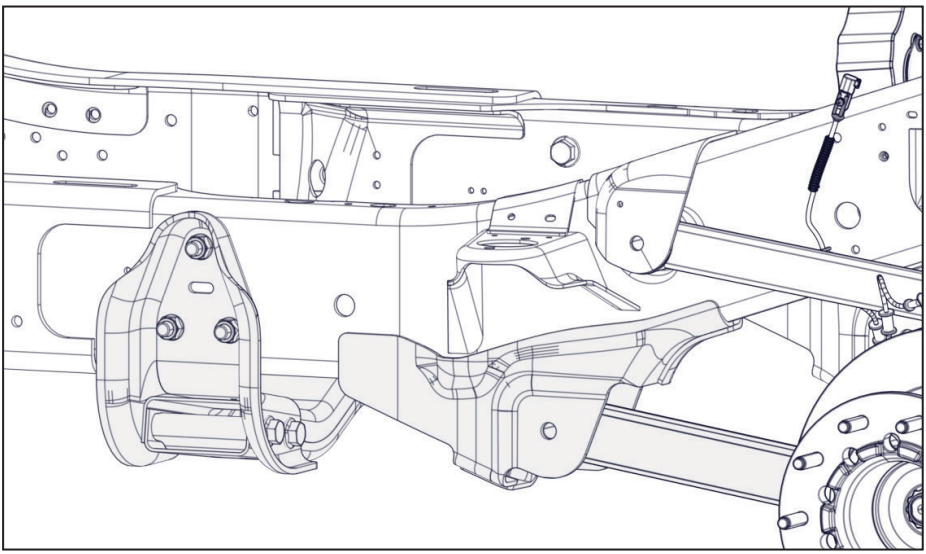


Figure 43 — Heavy Duty Chassis

Standard Duty Chassis

☐ Insert one of the M10 × 1.5 × 30 fasteners into the bracket and thread the through frame spacer onto it. Using the remaining M10 fastener and snubbing washer, mount the front tank bracket to the vehicle frame (Figure 44).

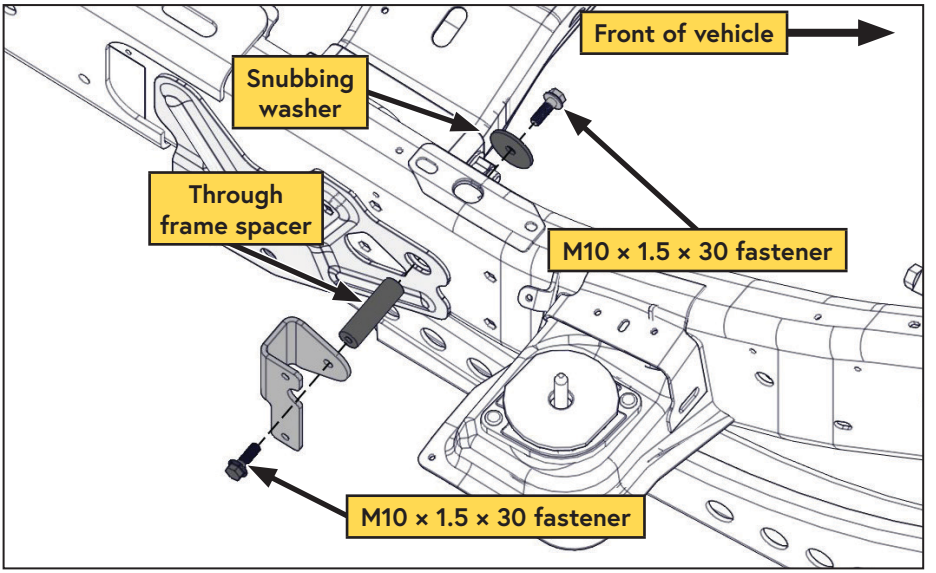


Figure 44 — Installing the AOST

☐ Using the (×2) 3/8 in × 6 in bolts, install the rear tank mount and backing strap where the frame begins to narrow, behind the transmission cross member. Leave the bolts finger tight to allow for minor adjustments (Figure 45).

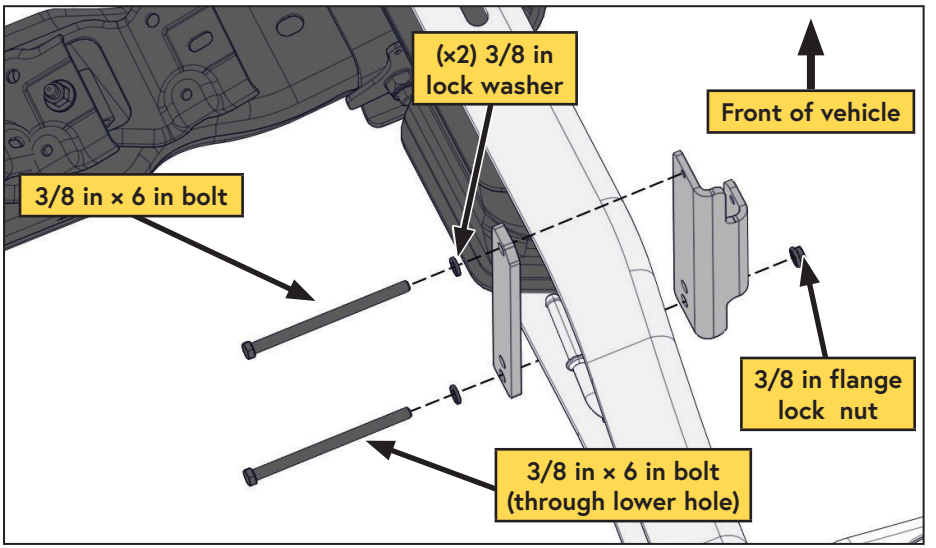


Figure 45 — Installing the AOST

☐ Remove the tank clamp pinch bolts (Figure 46).

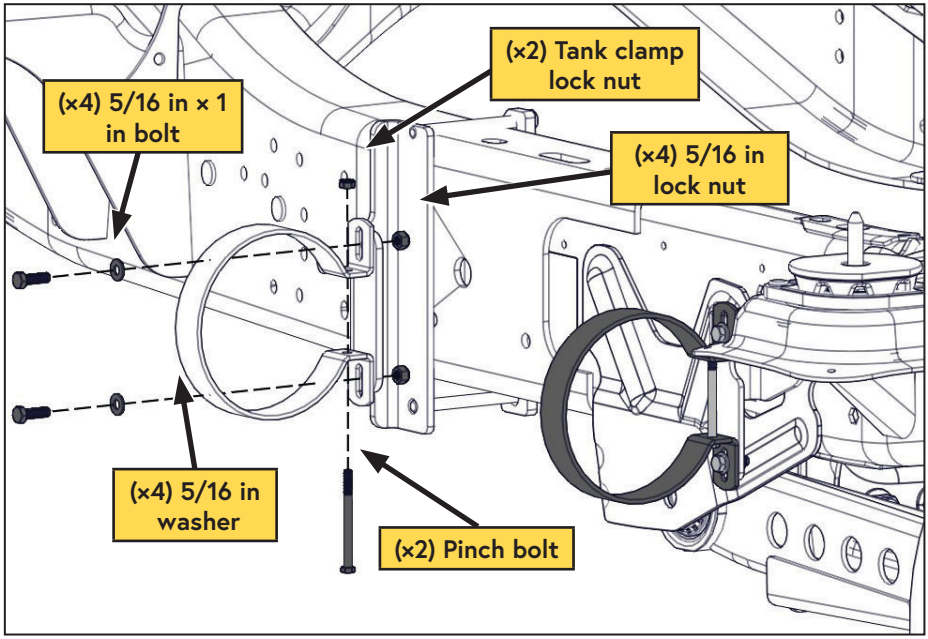


Figure 46 — Install AOST
(AOST not shown for clarity)

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

Install the tank onto the tank mounts (Figure 46)*:

- ☐ *Adjust the tank in the straps to bring the front of the tank close to (but not touching) the cab mount.
- ☐ *Install the (×2) 3 in × 1/4 in pinch bolts into the mounting clamps.

☐ Rotate the tank so that the directional arrow on the blowdown cap, at the rear of the tank, is pointing upward.

⚠	***AOST orientation is critical. The arrow on the blowdown cap at the rear of the tank must be pointing up to prevent compressor failure due to oil starvation, or oil in the discharge air.***

Heavy Duty Chassis

☐ Using the (×2) 3/8 in × 4 1/2 in bolts, install the front tank mount and backing strap (the lower fastener is installed between the radius arm and the frame). Leave the bolts finger tight to allow for minor adjustments (Figure 47).

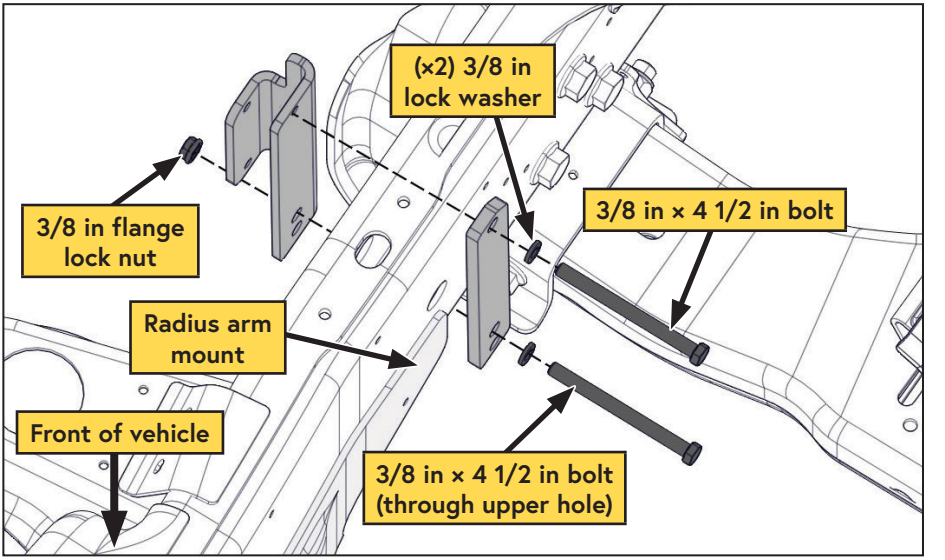


Figure 47 — Installing the AOST

☐ Using the (×2) 3/8 in × 6 in bolts, install the rear tank mount and backing strap where the frame begins to narrow, behind the transmission cross member. Leave the bolts finger tight to allow for minor adjustments (Figure 48).

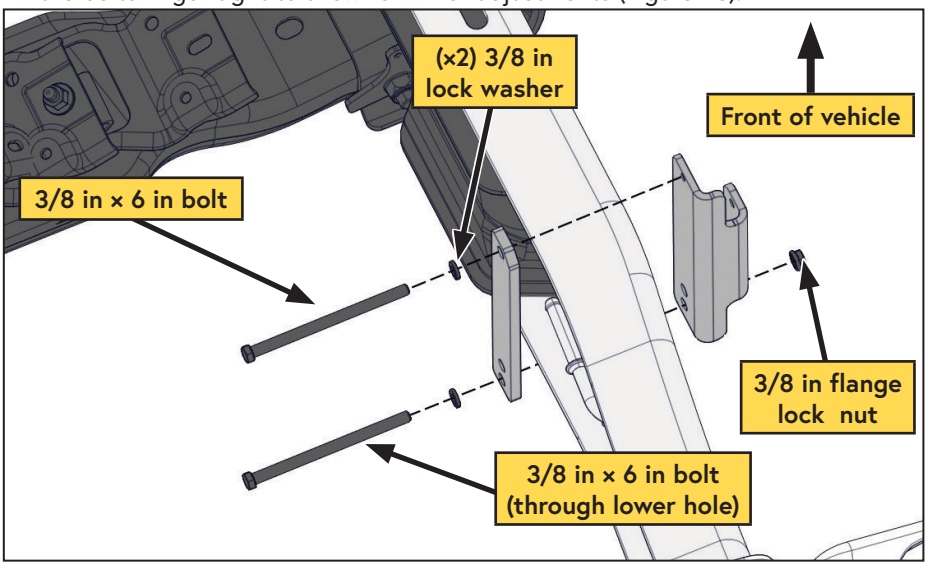


Figure 48 — Installing the AOST

☐ Remove the tank clamp pinch bolts (Figure 49).

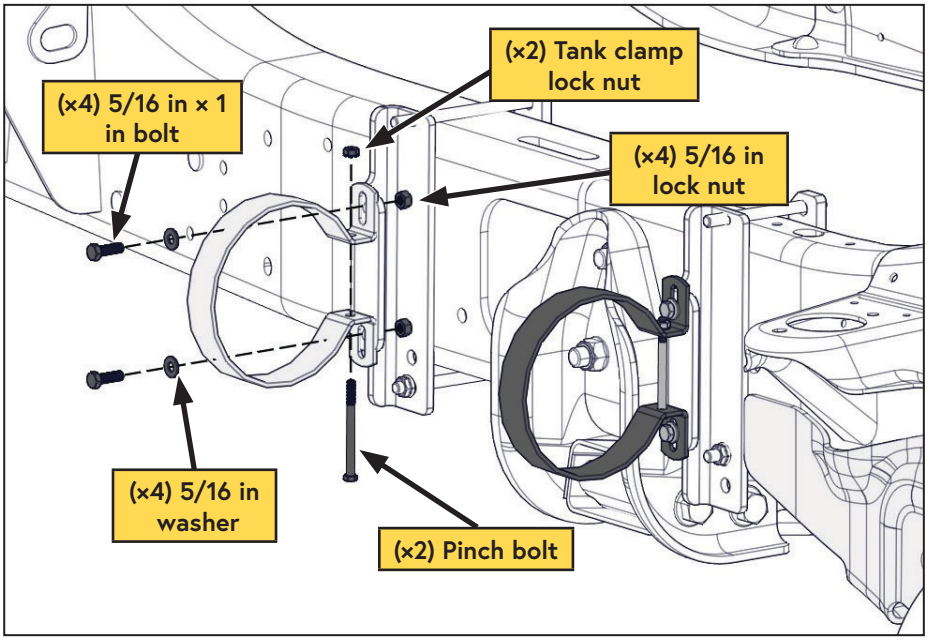


Figure 49 — Install AOST
(AOST not shown for clarity)

☐ 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 49)*:

- ☐ *Adjust the tank in the straps to bring the front of the tank close to (but not touching) the cab mount.
- ☐ *Install the (×2) 3 in × 1/4 in pinch bolts into the mounting clamps.

☐ Rotate the tank so that the directional arrow on the blowdown cap, at the rear of the tank, is pointing upward.

⚠	***AOST orientation is critical. The arrow on the blowdown cap at the rear of the tank must be pointing up to prevent compressor failure due to oil starvation, or oil in the discharge air.***

Installing the Regulator

☐ Remove the OEM nut from the passenger side brace and set it aside (Figure 50).

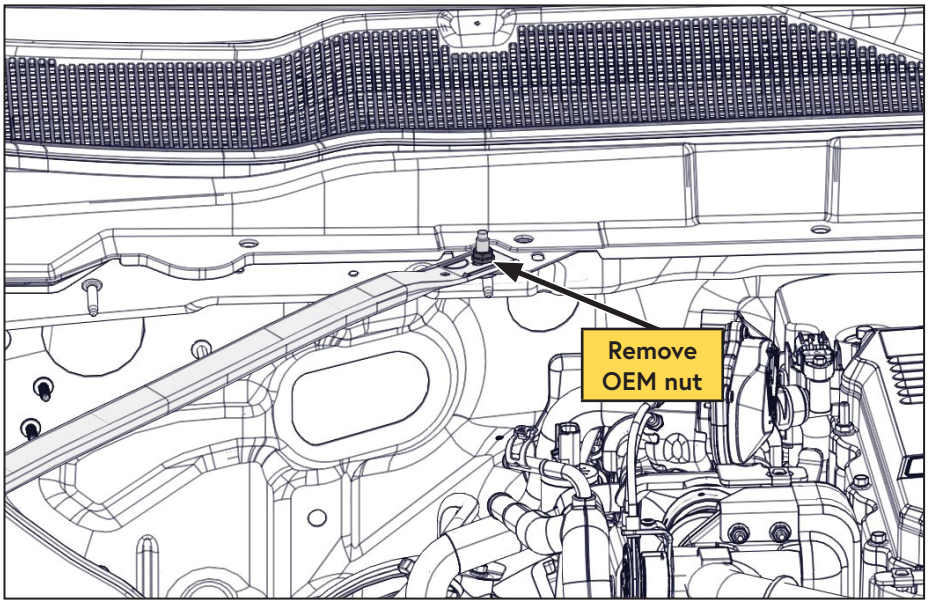


Figure 50 — Install regulator

☐ Gently lift the brace and install the regulator assembly onto the OEM stud (Figure 51).

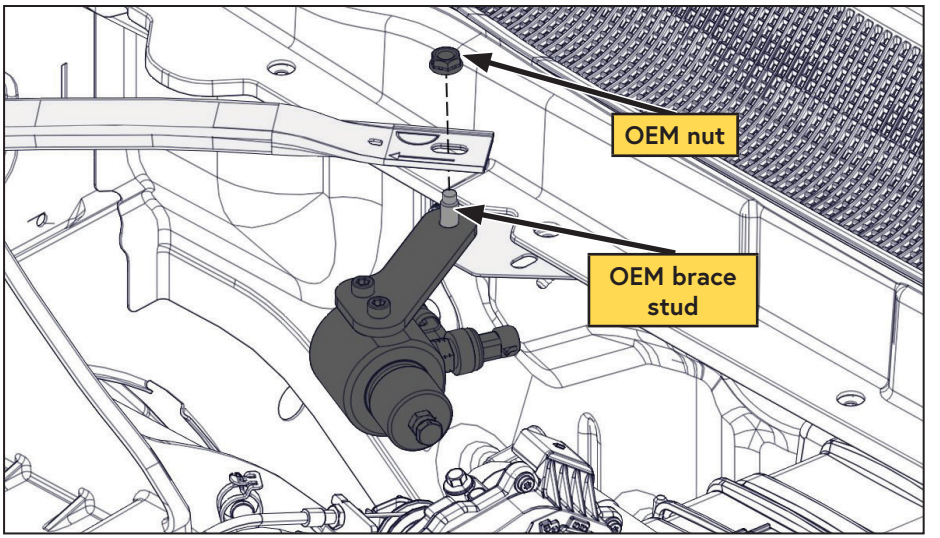


Figure 51 — Install regulator

☐ Reinstall the brace and secure it using the OEM nut retained earlier (Figure 51).

Hose Requirements

Only attempt to shorten the supplied hose if there is access to the appropriate equipment. Do not 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 × 76 in (oil fill hose).
- 3/4 in × 89 in (discharge hose).
- 3/4 in × 20 in (discharge hose extension for extended cab).
- 3/4 in × 33 in (discharge hose extension for crew cab).
- 1/2 in × 68 in (oil return hose).
- 1/2 in × 99 in (oil supply hose).
- 1/4 in (PTFE tube) × 47 in.
- 1/4 in (black air brake tube) × 62 in.
- 3/16 in (PTFE tube) × 87 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.

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 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.

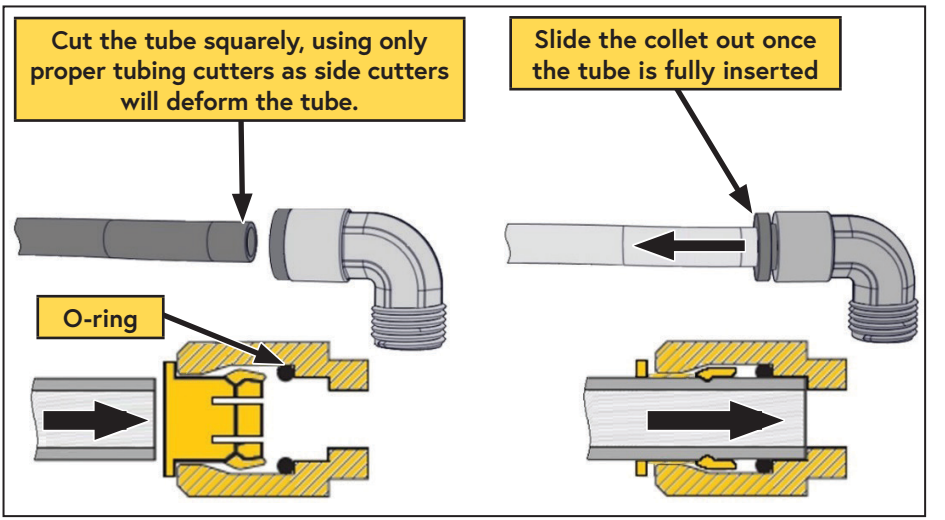


Figure 52 — Push-to-connect fittings

☐ Install the supplied fitting onto the AOST (Figure 53).

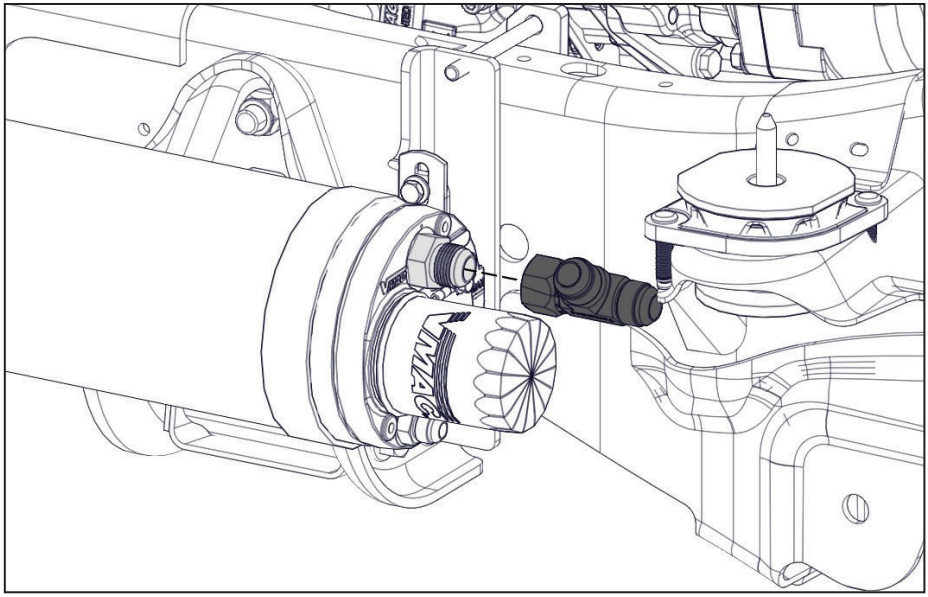


Figure 53 — Install fittings

Beginning at the straight fitting, apply the supplied heat wrap to*:

- ☐ *The longest 3/4 in hose.
- ☐ *The longer 1/2 in hose.

☐ Connect the 90° fitting on the longer 1/2 in hose to the driver side fitting of the oil cooler (Figure 54).

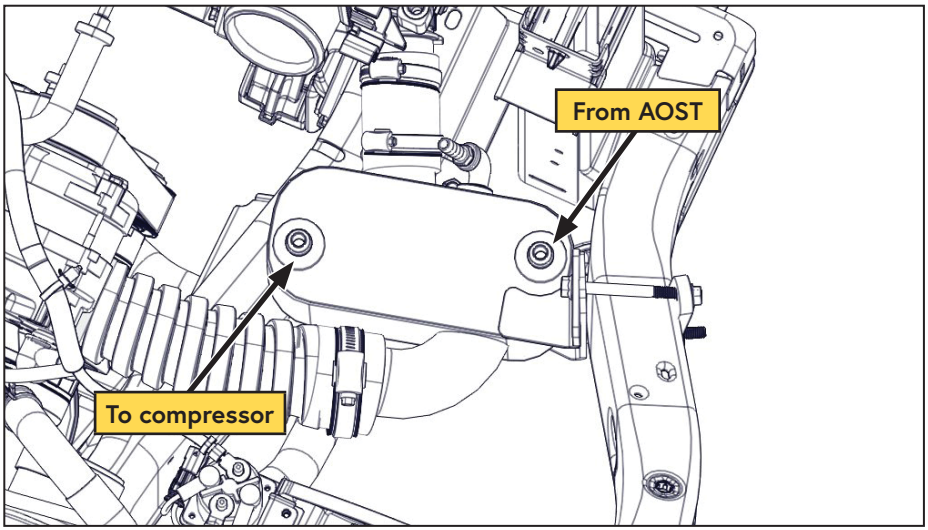


Figure 54 — Install hoses

☐ Route the hose along the top of the frame rail, to the inside of the inner fender, and connect it to the compressor (Figure 55).

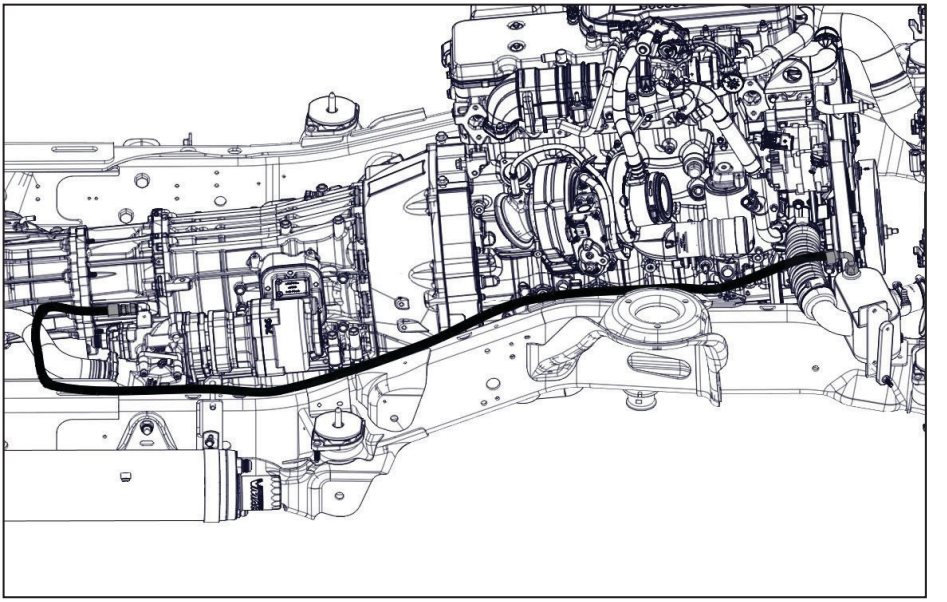


Figure 55 — Connect compressor oil supply hose

To prevent damaging the compressor temperature sensor, use care when tightening the oil supply line.

☐ Connect the 90° fitting on the longer 3/4 in discharge hose to the fitting on the front of the AOST and route it toward the rear of the vehicle (Figure 56).

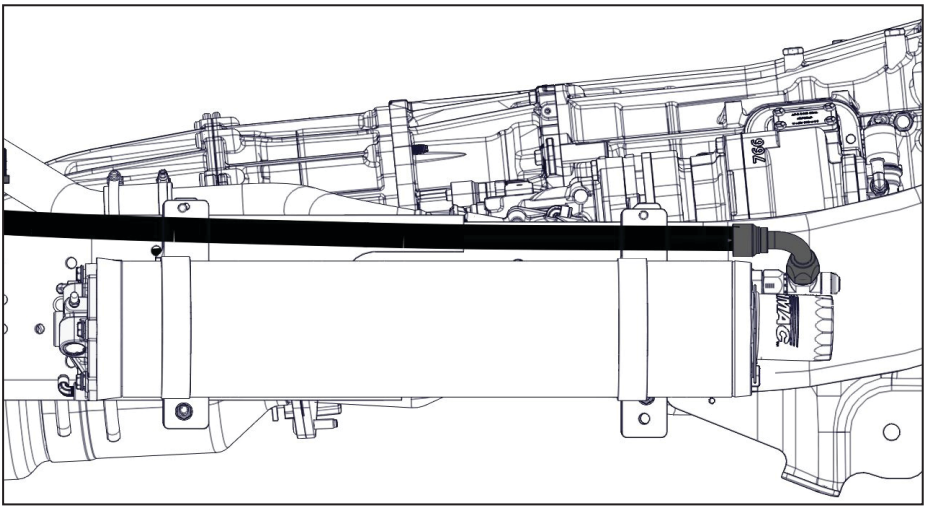


Figure 56 — Install discharge hose

☐ Install the M12 to M6 adapter into the threaded hole in the body cross member (Figure 57).

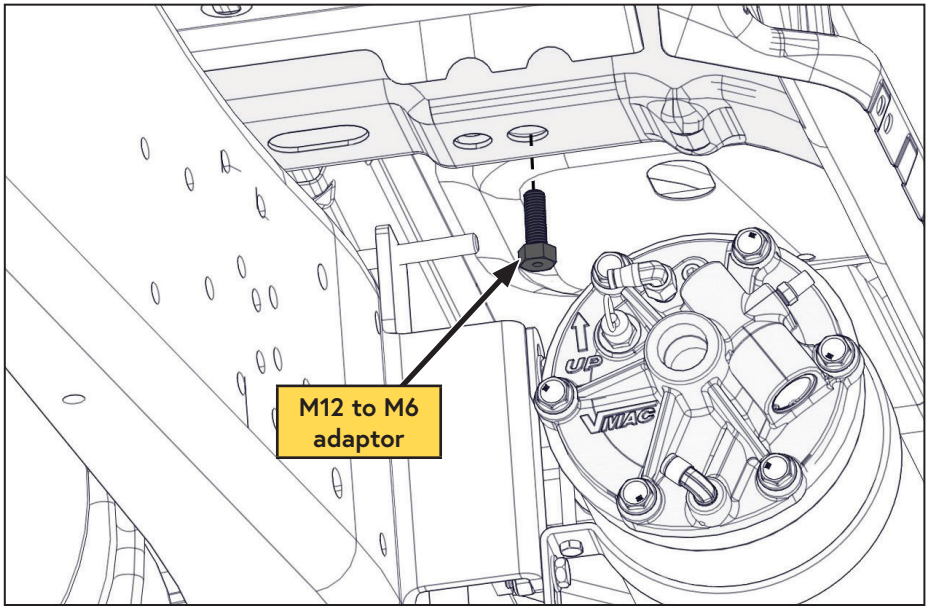


Figure 57 — Install adaptor bolt

☐ Route the discharge hose over the frame and secure the hose to the cross member using one of the supplied P-clips, the washer, and the M6 fastener (Figure 58).

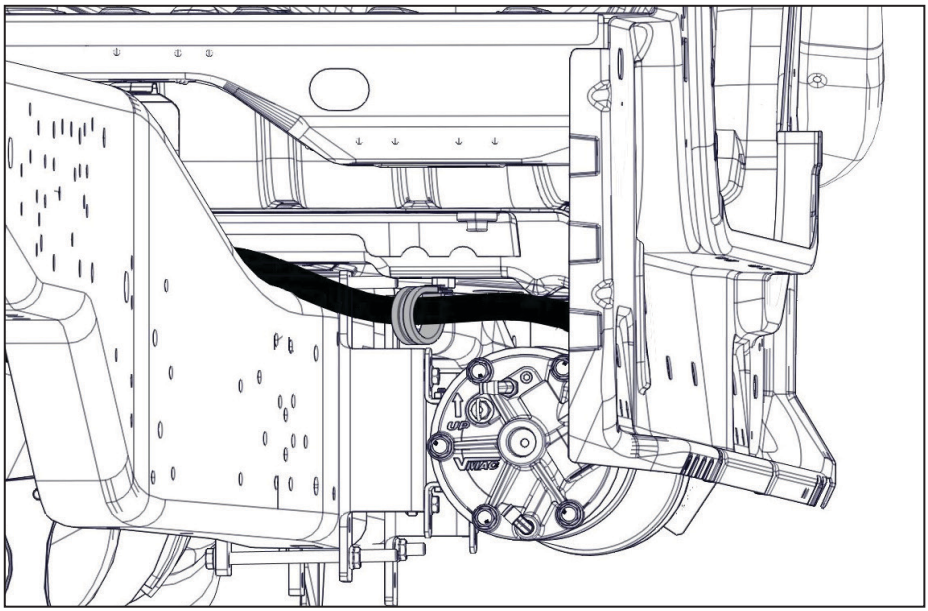


Figure 58 — Route discharge hose

☐ Route the hose over the air intake tube, securing it to the OEM frame mounting tab using the remaining P-clip, M8 fastener, and M8 nut (Figure 59).

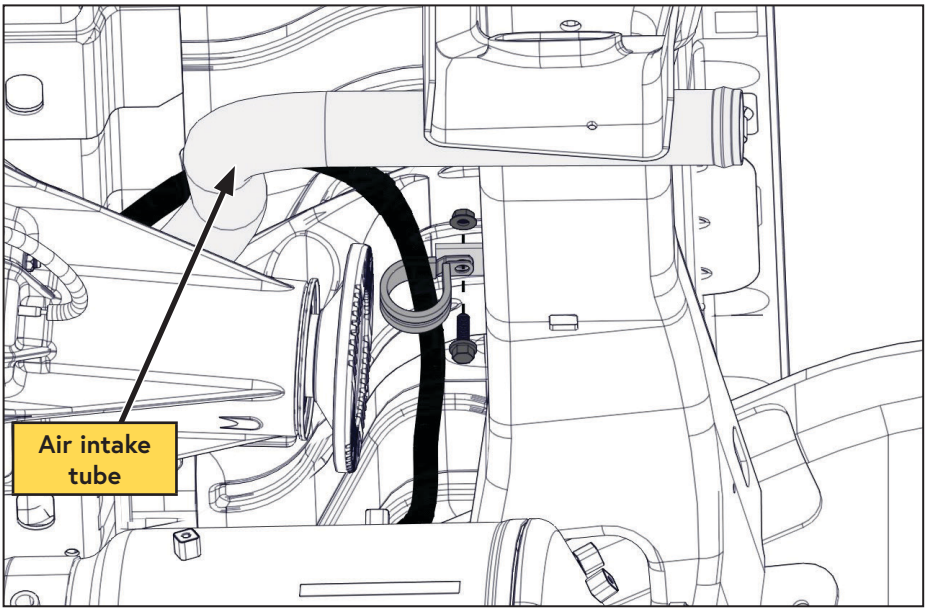


Figure 59 — Route discharge hose

☐ Connect the discharge hose to the 45° fitting on the compressor (Figure 60).

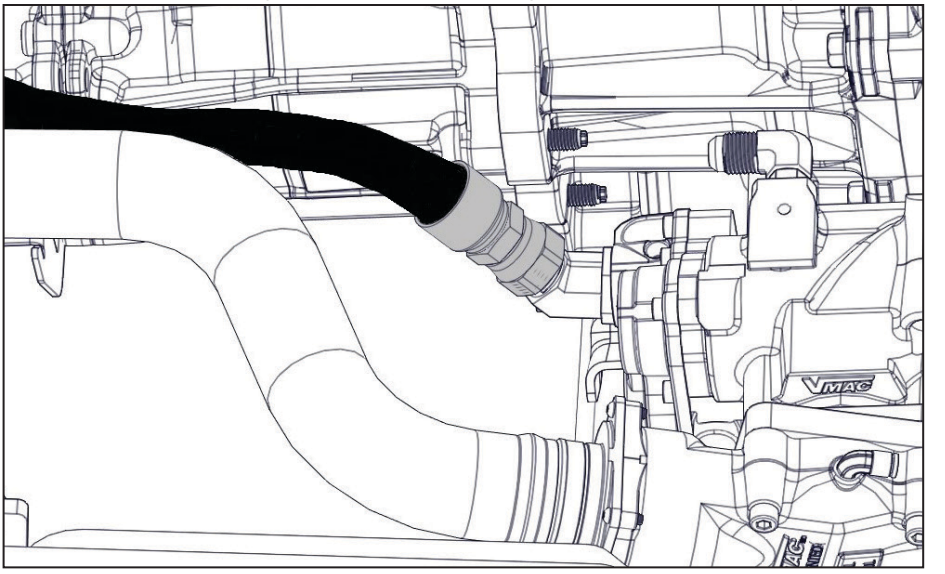


Figure 60 — Connect discharge hose

☐ Using cable ties, apply heat wrap to the oil return and discharge hoses where they connect to the compressor.

☐ Connect the 90° fitting on the shorter 1/2 in hose to the passenger side fitting of the oil cooler.

☐ Route the hose along the frame, behind the inner fender, then down the inside of the frame. Pass the hose to the outside of the frame near the lower radius arm mount and connect it to the lower fitting on the AOST (Figure 61).

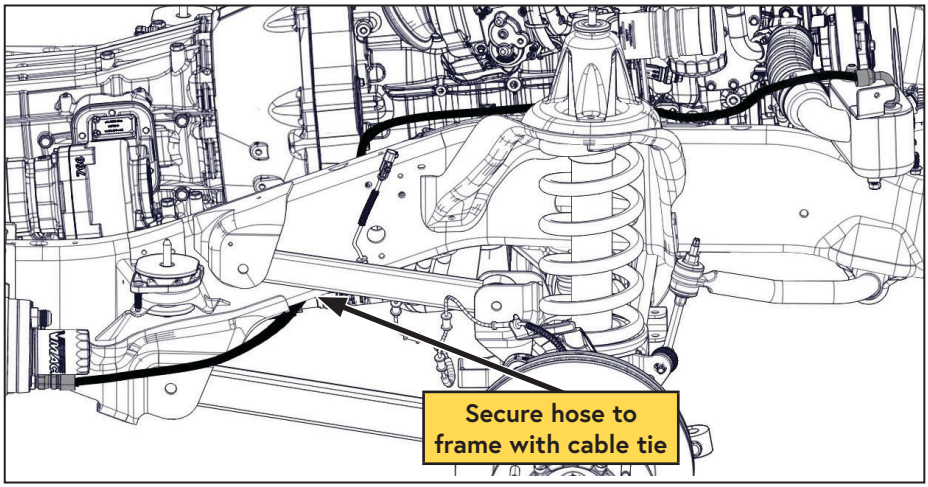


Figure 61 — Install oil return hose

☐ Using cable ties, secure the hose to the frame near the lower radius arm .

☐ From under the vehicle at the AOST, route the straight end of the shorter 3/4 in hose toward the oil cooler, following the same path as the 1/2 in hose.

☐ From the oil cooler, route the 3/4 in hose up toward the top of the radiator (Figure 62).

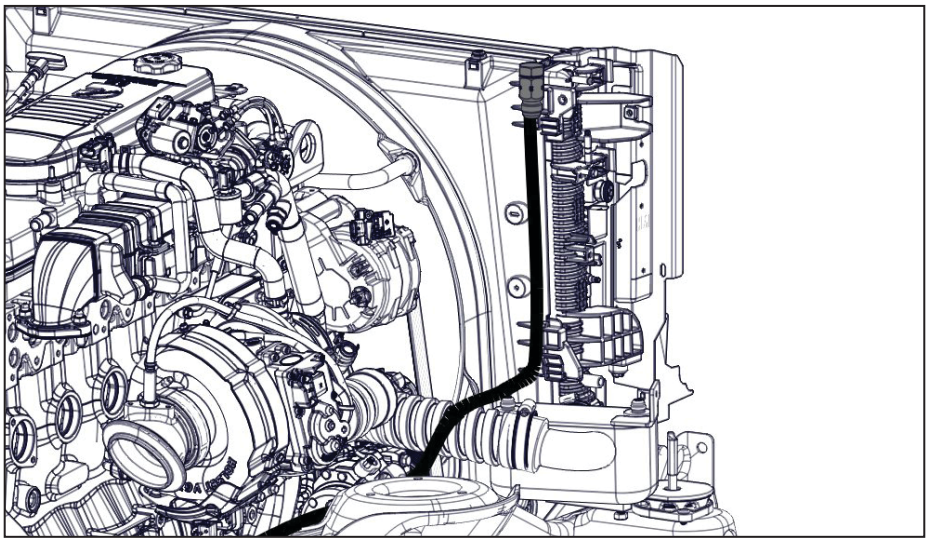


Figure 62 — Install oil fill hose

☐ Remove and discard the OEM fastener at the top passenger side of the radiator (Figure 63).

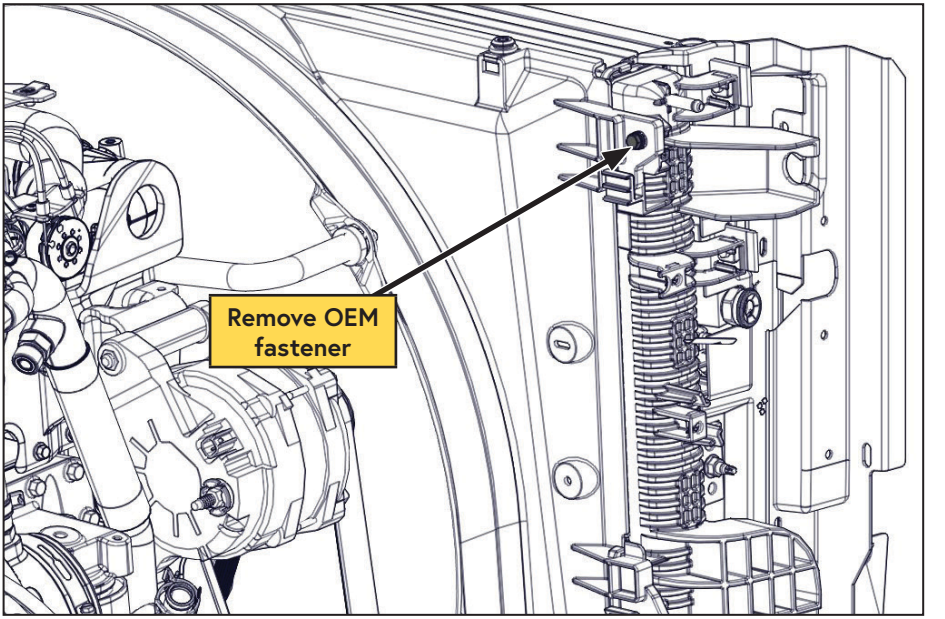


Figure 63 — Oil fill hose

☐ Using the supplied P-clip and fastener, secure the oil fill hose to the to the radiator (Figure 64).

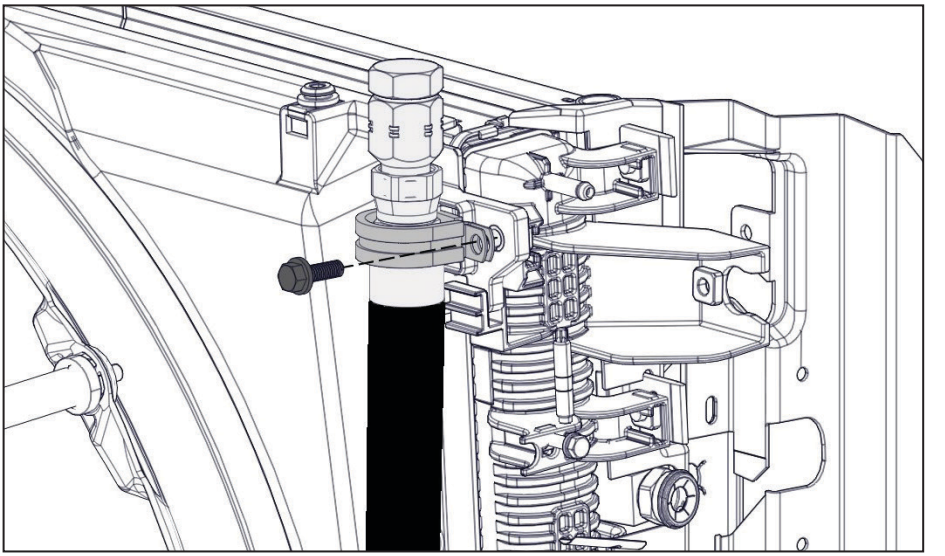


Figure 64 — Oil fill hose

☐ Affix the oil fill decal in a conspicuous area near the oil fill plug.

A 3/4 in 45° fitting is supplied with this kit and can be used as necessary to assist in routing the discharge hose.

☐ Routing the 3/4 in oil fill hose around the body mount, connect the 45° fitting to the Tee on the AOST (Figure 65).

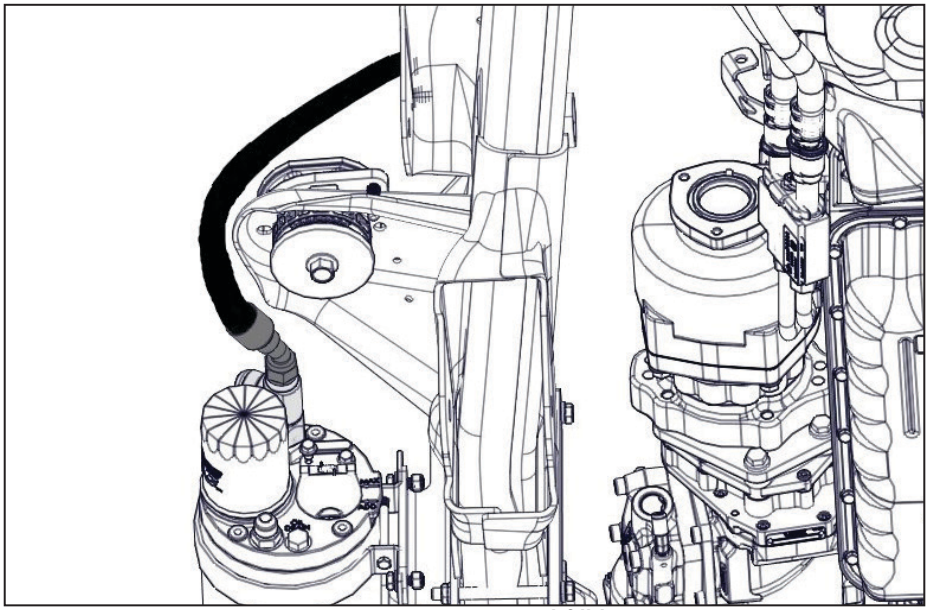


Figure 65 — Connect oil fill hose

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

☐ Install the black air brake tube 1/4 in PTFE tube onto the straight fitting on the remote regulator (Figure 66).

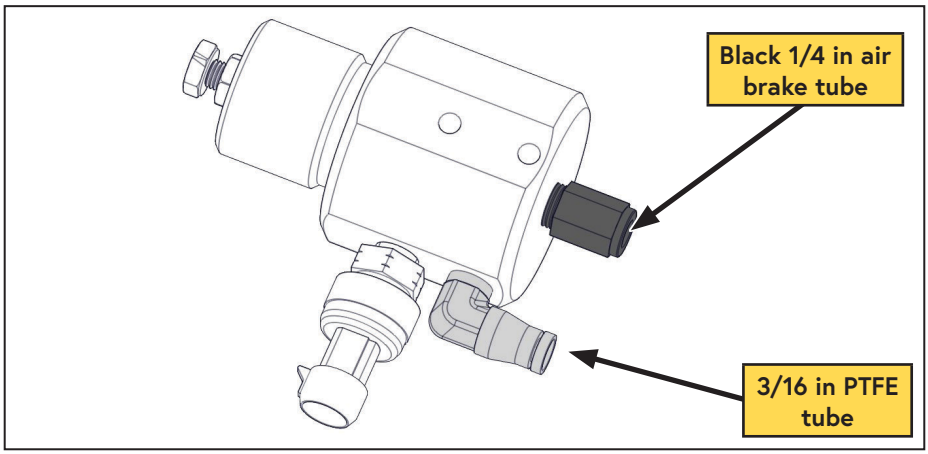


Figure 66 — Connect remote regulator tubes

- ☐ Install the translucent 3/16 in PTFE tube onto the 90° fitting on the remote regulator (Figure 66).
- ☐ Route the PTFE tubes along the firewall toward the passenger side fender; securing the PTFE tubes to the degas bottle coolant hoses.
- ☐ From the degas coolant hoses, route the PTFE tubes down the inner fender to the VMAC oil hoses.
- ☐ Once the PTFE tubes reach the frame, route them alongside the oil supply hose installed earlier. Secure the PTFE tubes to the oil supply hose using cable ties.
- ☐ Using the supplied P-Clip and nut, secure the 3/4 in oil fill hose to the shock tower stud to keep it away from the turbocharger (Figure 67).

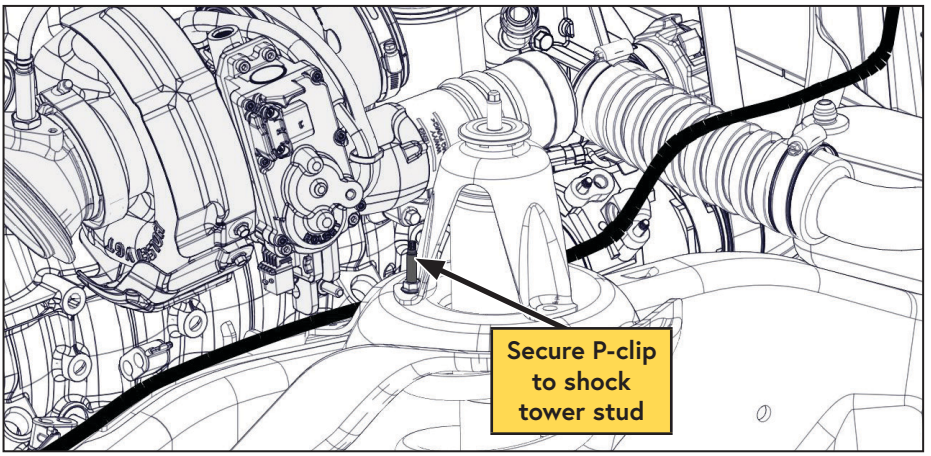
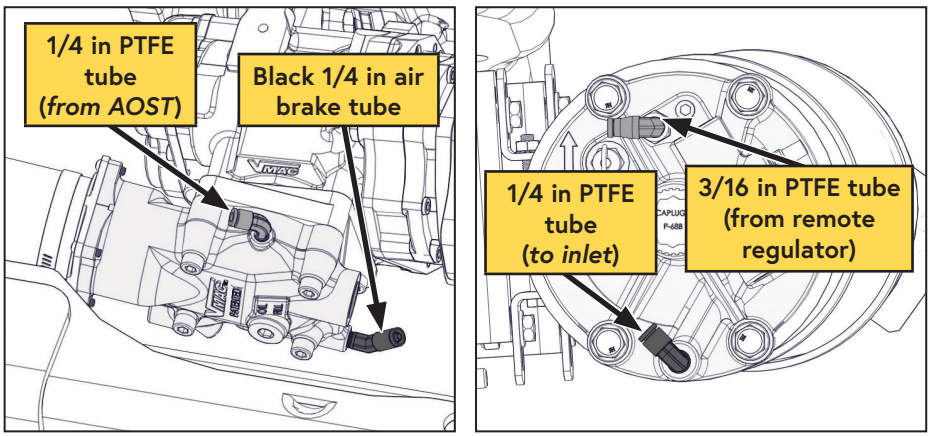


Figure 67 — Secure hoses away from turbocharger

- ☐ Bundle the rest of the VMAC hoses together and secure them to the 3/4 in oil fill hose, keeping them away from the turbocharger using cable ties.
- ☐ Connect the PTFE tubes to the indicated fittings (Figure 68).



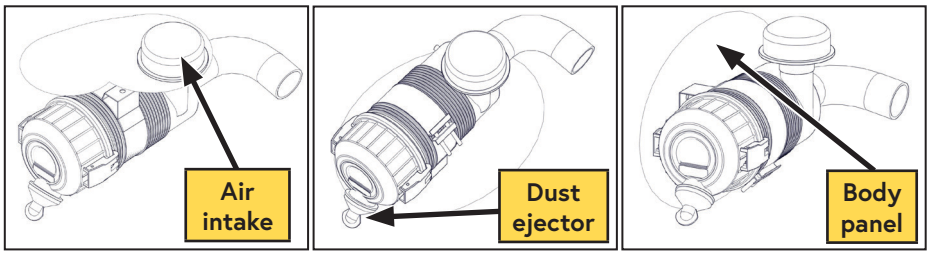
Inlet ***AOST***

Figure 68 — Connect remote regulator tubes

Installing the Air Intake

☐ Locate a suitable location to mount the air filter body and identify the routing for the flexible hose. This location should be:

- Away from heat sources, pinch points, moving components or components that might have to be removed for vehicle maintenance.
- Higher than the inlet control valve (where possible).
- Where cool air will enter the filter (high temperature air reduces compressor performance).
- Away from water, exhaust, flammable or explosive gases, fuel tank breathers, fuel lines, fuel tanks or propane lines.
- Where holes drilled in the vehicle (or equipment panels) do not compromise safety or weather protection.
- In a position where there is enough room to service the air cleaner.
- Where the air filter dust ejector (short spigot with a split rubber boot) points downward and where ejected dust will not build up or compromise any other equipment (Figure 69).



Mounting option "A" Mounting option "B" Mounting option "C"

Figure 69 — Installing the remote air intake housing

☐ Clean the selected mounting location.

☐ Drill the remote air filter mounting holes (Figure 70).

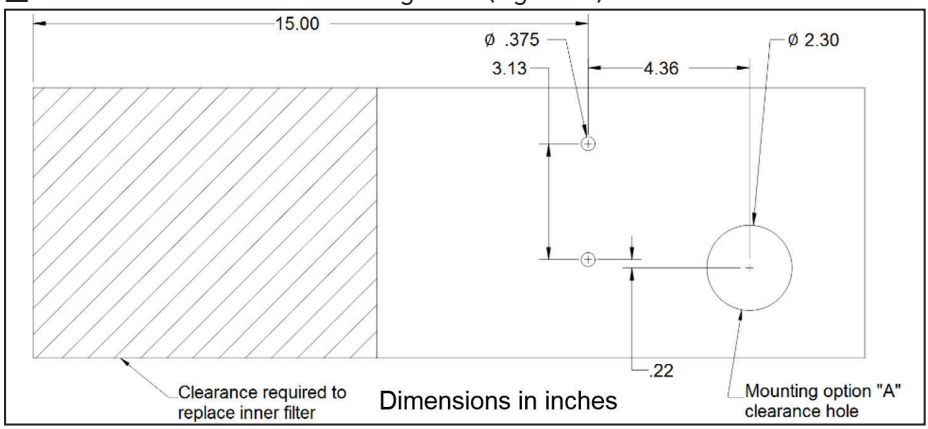


Figure 70 — Installing the remote air intake housing

☐ Mount the remote air filter onto the vehicle using suitable fasteners.

☐ Align the air cleaner for best fit and ensure the dust ejector port on the cleaner body (short spigot with a split rubber boot) is pointing down.

☐ Tighten the mounting clamp bolts.

☐ Reinstall any air cleaner parts removed for installation.

☐ Install the supplied rain hat.

☐ Install the flexible hose onto the intake tube using the supplied gear clamp (Figure 71).

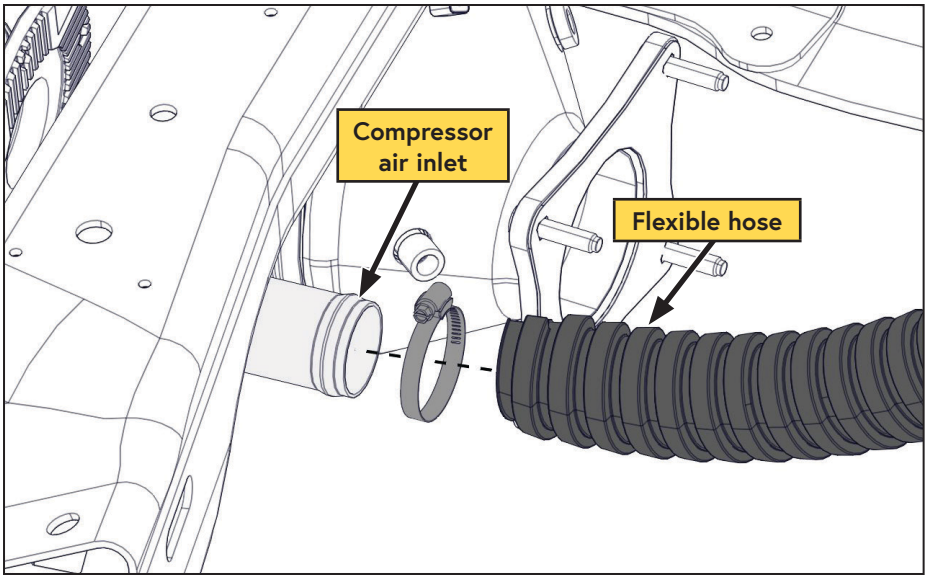


Figure 71 — Installing the air intake

☐ Route the flexible hose to the remote air filter assembly.

Ensure the hose is adequately supported to prevent it from being snagged by road hazards. Secure the hose away from hot, sharp or moving components using rubber coated P-clips or cable ties (not supplied) as required.

☐ Secure the hose to the remote air filter assembly using the supplied gear clamp.

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.
- ☐ Remove the oil filter from the AOST and discard the cardboard warning tag.
- ☐ 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 radiator (Figure 72).

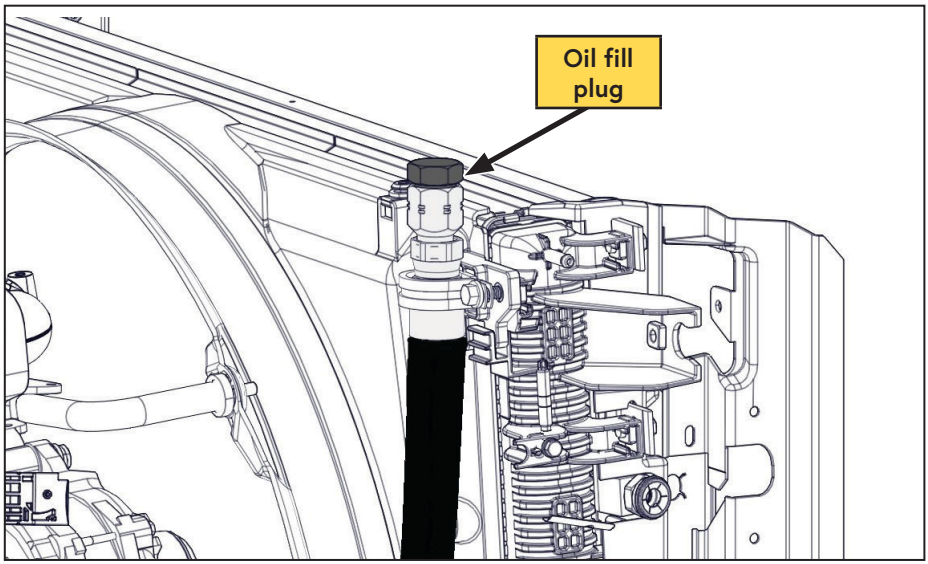


Figure 72 — Oil fill hose location

- ☐ Using a funnel, fill the AOST with the supplied oil. When dry, the system will take approximately 5 L (5.2 qt) of oil.
- ☐ Allow a few minutes for the oil to drain into the AOST. Check the level at the sight glass at the front of the AOST. Continue adding oil until the level is correct.
- ☐ Replace the oil fill cap and tighten.

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.

Tying into OEM connectors

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

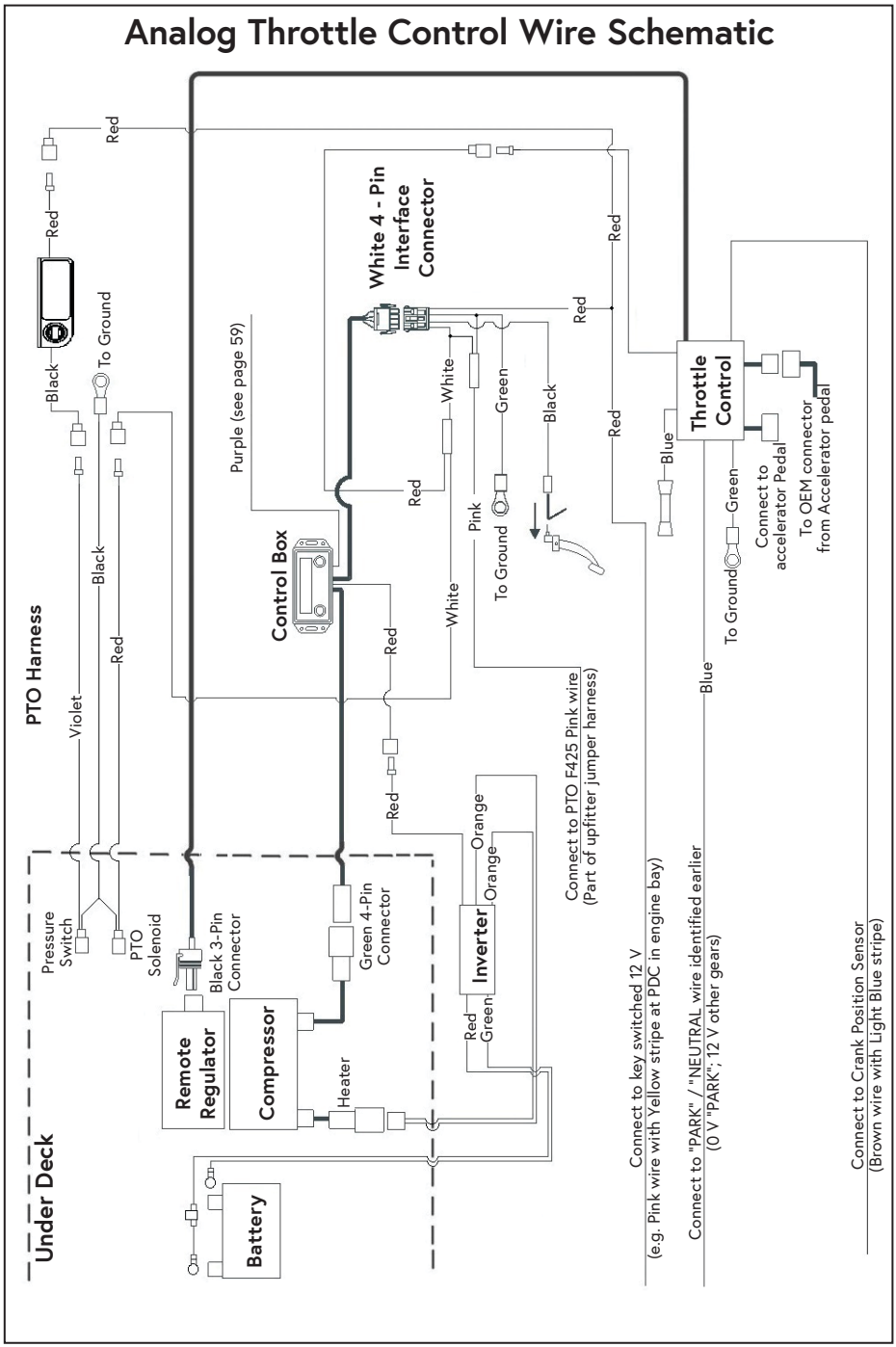


Figure 73 — Analog throttle control and interface cable connections

Digital Throttle Control Wire Schematic

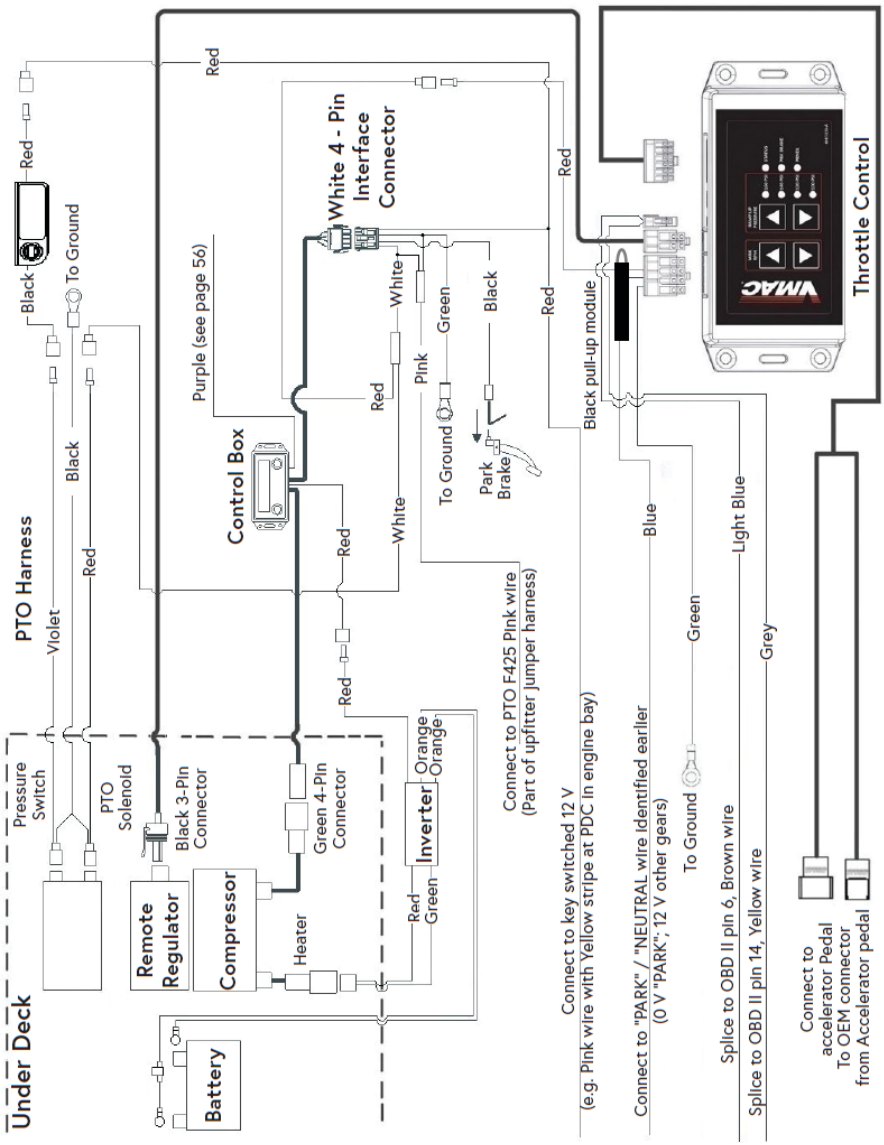


Figure 74 — Digital throttle control and interface cable connections

Control Box and PTO Indicator Panel

- ☐ Mount the PTO indicator panel on the dashboard or beside the Control Box.
- ☐ Install the control box in a convenient location in the cab, positioned so that the wire harness will reach the compressor. The most common location for the control box is between the driver side seat and the door.
  - ☐ ***If mounting in the standard location:*** Remove the plastic trim panel from the doorsill and the kick panel on the driver side.

Throttle Control

- ☐ Plug the 4 harnesses into the throttle control.
- ☐ Using cable ties, secure the throttle control under the dashboard, to the right of the steering column, ensuring the connectors easily reach the accelerator pedal and the adjusting screws, or the buttons and LED lights, are accessible.
- ☐ ***Digital throttle control only:*** Cut the loop of grey wire from the black module on the DTC main harness (Figure 75).

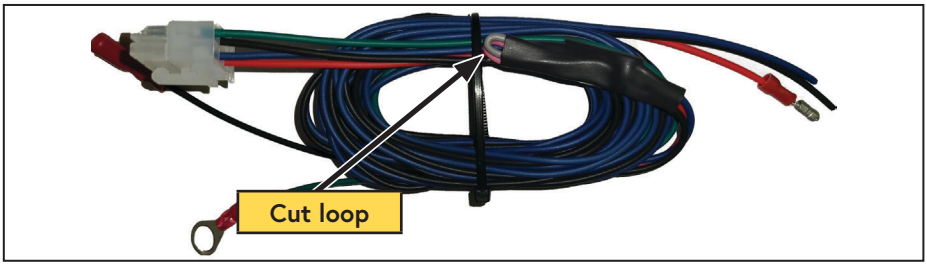


Figure 75 — Disable pull up harness

Inverter

Due to slight variances in manufacturing and/or optionally installed equipment, it may be necessary to mount the inverter in an alternate location.

If an alternate location is required, ensure the selected location will provide adequate clearance for ventilation, and that the supplied harnesses can be routed to the compressor without contacting hot, sharp, or moving parts (including the park brake mechanism, steering column, and pedals).

- ☐ Loop the cable ties through the inverter bracket, leaving them as loose as possible (Figure 76).

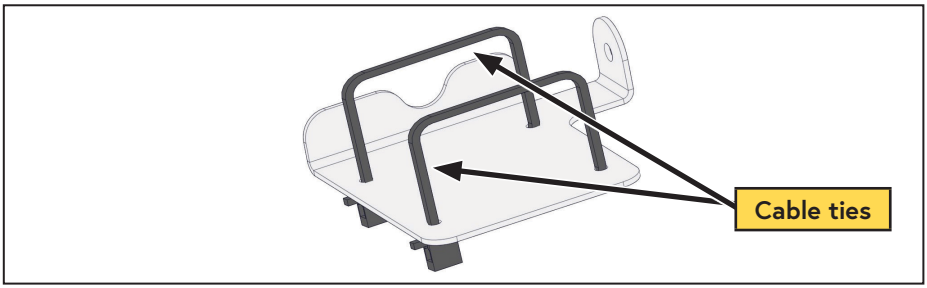


Figure 76 — Prepare inverter bracket

☐ Locate the mounting stud on the driver side of the steering column under the dashboard, remove the nut and set it aside (Figure 77).

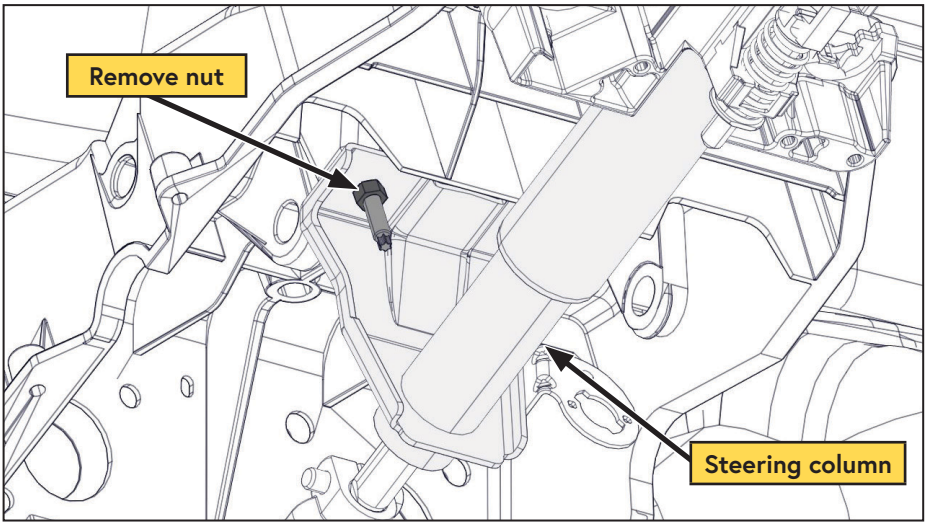


Figure 77 — Mount inverter onto bracket

☐ Install the bracket in the orientation shown using the OEM nut (Figure 78).

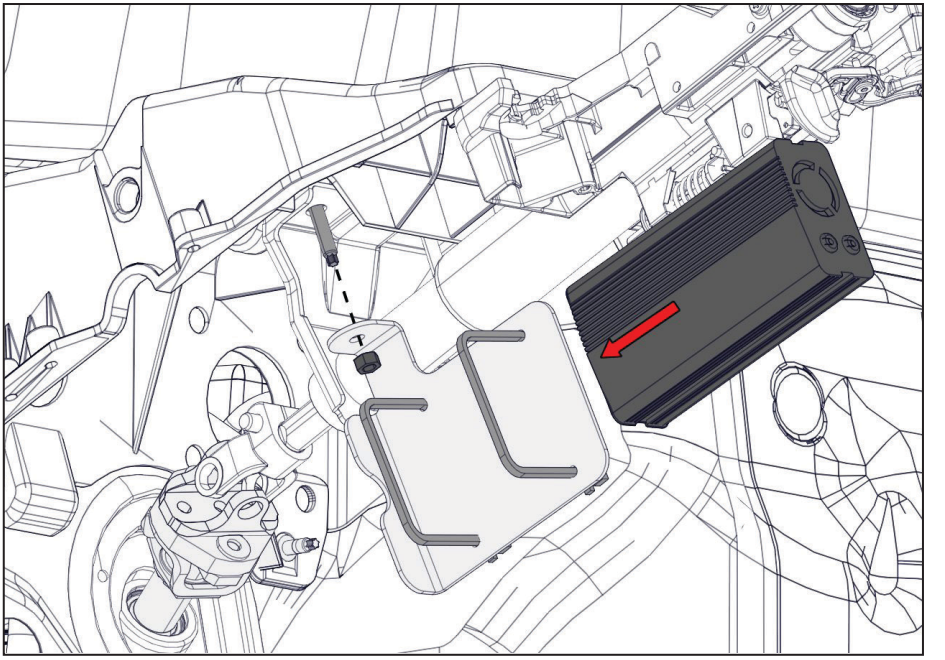


Figure 78 — Mount inverter onto bracket

☐ Slide the inverter into the bracket and tighten the cables ties to secure it (Figure 78).

See the Ram body builder bulletin for specific instructions on circuit F425 and the upfitter jumper harness: PTO Quick Start Information

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).
- ☐ *Red wire from the white 4 pin interface (key switched 12 V).
- ☐ *Orange wires, with black 3-pin connector (PTO heater cable).
- ☐ *Red and green 14 AWG wires (PTO inverter power wires).
- ☐ ***Analog throttle control only:** White wire from the throttle control (tachometer signal).
- ☐ ***Vehicles not equipped with VSIM only:** Long blue wire (disregard if connecting via VSIM).

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

Connecting the Wiring

☐ Route the bundled wires downward from the firewall grommet and along the frame.

☐ Once at the frame, route the orange harness, and the grey cable with green connector, to the air compressor following the transmission cross member toward the air discharge hose.

☐ Connect the orange harness to the heater in the compressor body.

☐ Connect the grey cable with green connector to the temperature sensor in the compressor.

☐ Route the PTO pressure switch, and solenoid power harness, over the transmission, securing them as necessary with cable ties.

☐ Connect the PTO pressure switch and solenoid plugs to the solenoid and pressure switch at the top of the PTO. 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.

☐ Route the red and green wires running from the inverter to the driver side battery.

☐ Connect the green wire to the negative battery terminal clamp.

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

☐ Route the bundled wires along the firewall, over the engine, toward the remote regulator assembly installed earlier.

☐ Secure the wire bundle to the cowl using cable ties.

☐ Connect the black 3 pin connector to the pressure sensor on the remote regulator.

Vehicles not equipped with VSIM:

☐ Unplug the connector from the park brake switch.

☐ Connect the black wire with the piggyback connector from the interface cable to the connector on the park brake switch.

☐ Connect the OEM park brake connector to the piggyback connector.

☐ Route the long blue wire to the transmission range sensor on the driver side of the transmission.

Splice the blue wire to the "PARK/NEUTRAL" wire identified near the beginning of the installation*:

☐ *Aisin AS69RC Transmission: Pin 9.

☐ *68RFE Transmission: Pin 4.

VSIM equipped vehicles

☐ Splice the black wire from the VMAC 4 pin interface connector to the dark green wire with white stripe at pin 11 of the brown 16 cavity VSIM connector.

☐ Splice the blue wire from the VMAC throttle control to the yellow wire with dark blue stripe at pin 7 of the grey 24 cavity VSIM connector.

Analog Throttle Control:

☐ Route the white wire running from the throttle control to the Crank Position Sensor (CKP sensor) on the driver side of the engine near the crank pulley (Figure 79).

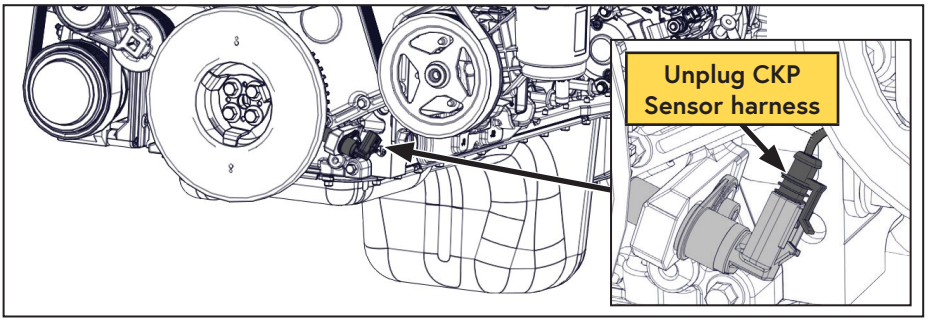


Figure 79 — Crank Position Sensor Location

☐ Splice the white wire from the throttle control to the brown wire with light blue stripe that is connected to the CKP sensor plug (Figure 80).

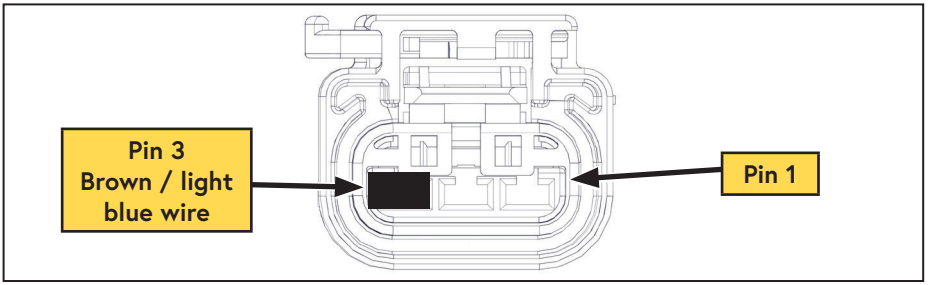


Figure 80 — Crank Position Sensor Connector
(looking into front of connector)

Digital Throttle Control:

- ☐ Locate the OBD II port (generally located under the dashboard, beneath the steering wheel column).
- ☐ Remove the fasteners securing the OBD II port to the dashboard; this provides easier access to the wires at the back.
- ☐ Peel back the tape on the harness a few inches.

> ***The wires populating pins 6 and 14 are a twisted pair (brown and yellow wires).***

- ☐ Splice the light blue wire from the throttle control to the wire at pin 6 (brown wire at the time of writing) of the OBD II port (Figure 81).

Figure 81 — OBD II connector

- ☐ Splice the grey wire from the throttle control to the wire at pin 14 (yellow wire at the time of writing) of the OBD II port (Figure 81).

Connecting to Key Switch 12 V Supply

> ***The instructions provided below can be used in cases where no upfitter switched power circuits (minimum 10 A free) are available.***

- ☐ Locate the Power Distribution Center (PDC) fuse box under hood of the vehicle (Figure 82).

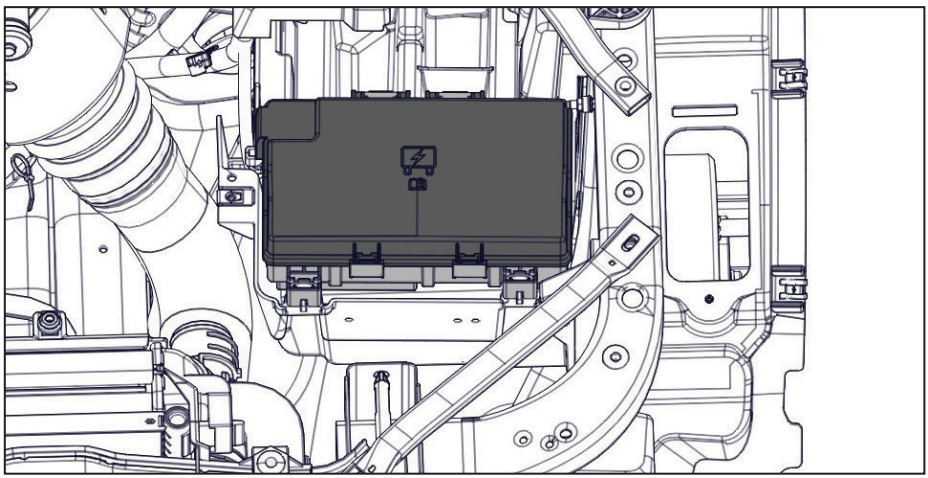


Figure 82 — Locate PDC

☐ Remove the PDC housing from the bracket by simultaneously squeezing the (×4) latches and pulling the PDC housing up out of the bracket (Figure 83).

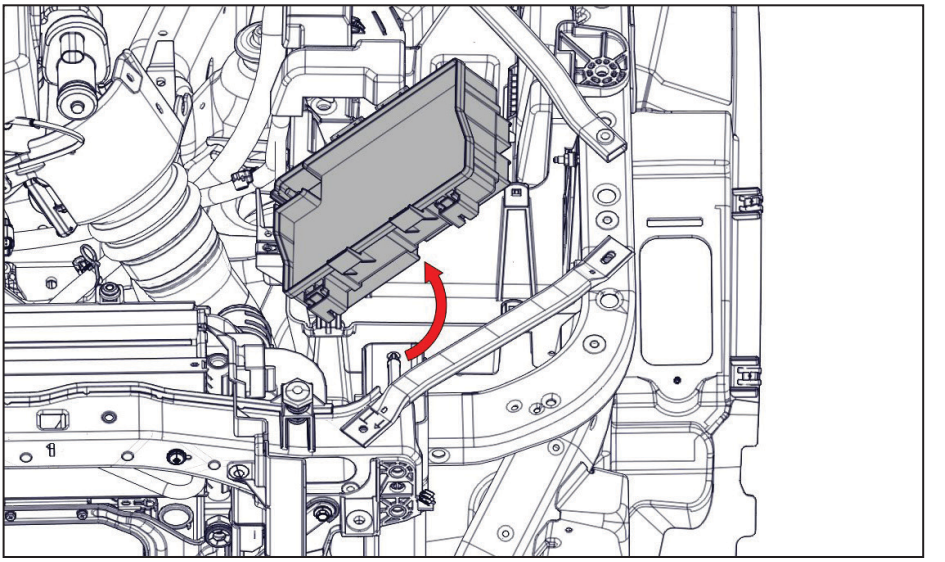


Figure 83 — Remove PDC

The OEM recommended key switched power source is a pink wire with yellow stripe. Dependant on the vehicle's date of manufacture, this wire may be located on connector C7 at pin 9, or on connector C5 at pin 7.

☐ Locate the connector containing the pink wire with yellow stripe on the bottom of the PDC housing. While holding the release, pull the locking lever down and pull the connector out of the fuse box.

☐ Splice the red wire from the control box to the pink wire with yellow stripe (pin 7 / connector C5, or pin 9 / connector C7).

☐ Use 1/4 in wire loom (not supplied) or equivalent protection to cover the wires, and secure the VMAC key switched wire to the OEM harness with a cable tie.

☐ Reinstall the PDC into its holder.

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 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 51 or page 52.

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.

On vehicles with additional control systems (such as crane remotes), the DTM70 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.

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 84).

Drain the condensed water from the receiver tank daily.

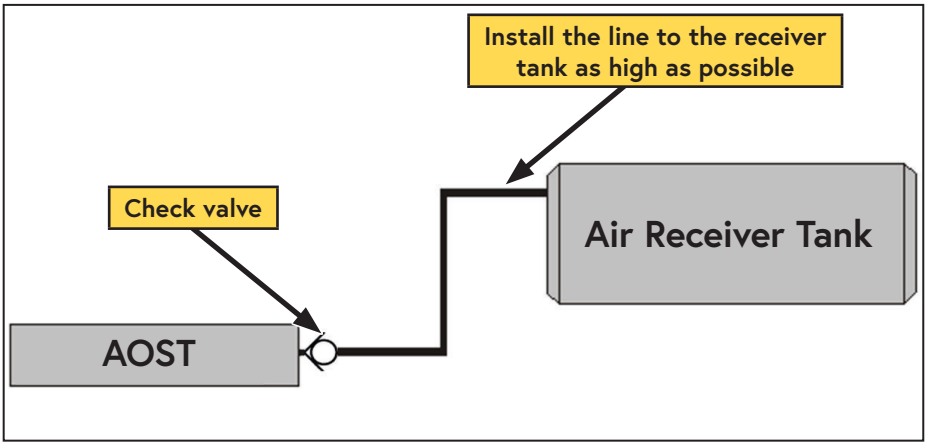


Figure 84 — Air receiver tank

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 70 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 (1206 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.

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. Secure all wiring, hoses and tubes with cable ties and loom as required.
- ☐ 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.
- ☐ Reinstall the exhaust components disconnected earlier in the installation.
- ☐ Reinstall the air box, ensuring the electrical connector is reconnected.
- ☐ Fill the radiator with the saved coolant.
- ☐ Connect the batteries.

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 see if it is illuminated. If there is no display, there is no power to the control box.
- ☐ Press the "ON" button. The green LED should come on.

On systems equipped with VMAC's Digital Throttle Control, the "PRK BRAKE" LED will remain illuminated at all times, regardless of park brake position.

- ☐ Release the park brake. The green LED on the display box should flash and the display will flash "PARK BRAKE". Apply the park brake again and press the "ON" button. The green LED 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".
- ☐ Start the engine.

After Starting the Engine Checklist

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

Analog Throttle Control

☐ When the VMAC system is first engaged, the engine speed should increase to between 1,600 rpm and 2,000 rpm, then decrease to between 1,000 rpm and 1,100 rpm.

Digital Throttle Control

The VMAC digital throttle is a "slow ramp" throttle. Each time the system is powered on, it will quickly increase engine speed to 1,500 rpm; then increase to maximum VMAC rpm over 8 seconds (provided the system has not reached full system pressure before maximum VMAC rpm is reached).

After the initial slow ramp, the throttle will respond normally to air demand

☐ When the VMAC system is first engaged, the engine speed should increase to 1,500 rpm and then drop down to VMAC base idle (approximately 1,000 rpm) once system pressure is reached.

With the system running, check for*:

- ☐ *Coolant leaks.
- ☐ *Compressor oil leaks.

☐ Allow the compressor to run until the system reaches full system pressure.

☐ Engine speed should reduce to between 900 rpm to 1,100 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 "FULL" 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.

Analog Throttle Control:

With the brake pedal firmly depressed, shift the truck into "REVERSE"*:

- ☐ *The engine speed reduces to OEM base idle (Approximately 650 rpm).
- ☐ *The green LED on the control box remains illuminated.
- ☐ *The orange PTO indicator remains illuminated.
- ☐ Repeat these steps in all gear selector positions to ensure the engine speed does not increase unless the gear selector is in "PARK" or "NEUTRAL"

Digital Throttle Control:

With the brake pedal firmly depressed, shift the truck into "REVERSE"*:

- ☐ *The engine speed reduces to OEM base idle (Approximately 650 rpm).
- ☐ *The green LED on the control box remains illuminated.
- ☐ *The orange PTO indicator remains illuminated.
- ☐ *The "STATUS" and "PRNDL" LED's on the digital throttle control will turn off and engine speed will reduce to base idle.
- ☐ *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 does not increase unless the gear selector is in "PARK" or "NEUTRAL".

☐ Allow the compressor to run until the system reaches full system pressure.

☐ Confirm all air valves are closed and the system has no air leaks.

☐ Turn off the compressor.

☐ Ensure any stored air is drained from the system.

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 DTM operation to ensure that 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 Adjustments

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 85).

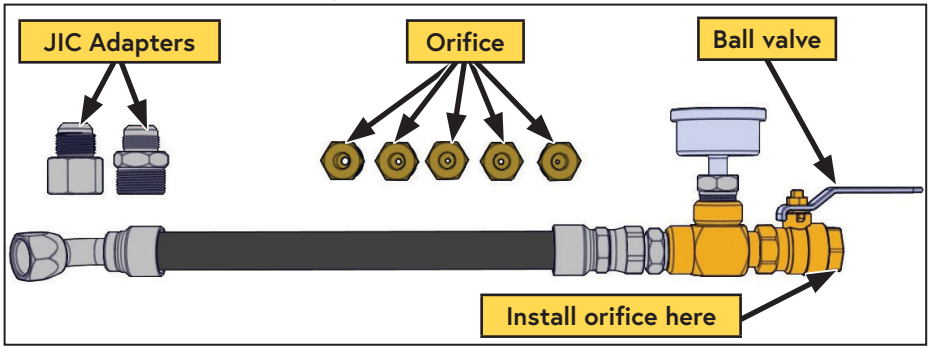


Figure 85 — A700052 VMAC Air Test Tool

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) 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*:

- ☐ *Analog throttle control: Engine speed should increase to approximately 2,000 rpm – 2,500 rpm.
- ☐ *Digital throttle control: Engine speed should increase to approximately 2,600 rpm.

- ☐ Close the air valve slowly to allow the system pressure to rise. When the pressure reaches 150 psi (factory setting), the system will close the inlet valve poppet and reduce the engine speed to VMAC base idle (approximately 1,000 rpm).
- ☐ Once the system pressure is at maximum, slowly open the ball valve on the test tool until the pressure on the gauge begins to drop. Engine speed should ramp up when the pressure drops to approximately 140 psi. This value can be adjusted via the "IDLE DOWN PRESSURE" (analog throttle) / "RAMP UP PRESSURE" (digital throttle) adjustment.

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 86).
- ☐ 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.

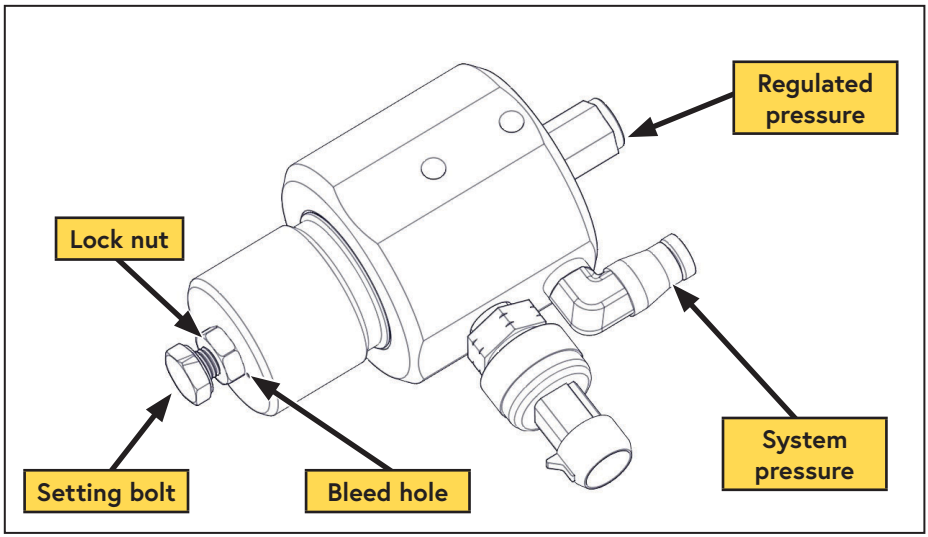


Figure 86 — Air regulator

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

Digital Throttle Control Operation and Adjustments

The VMAC digital throttle is a "slow ramp" throttle. Each time the system is powered on, it will quickly increase engine speed to 1,500 rpm; then increase to maximum VMAC rpm over 8 seconds (provided the system has not reached full system pressure before maximum VMAC rpm is reached).

After the initial slow ramp, the throttle will respond normally to air demand.

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.

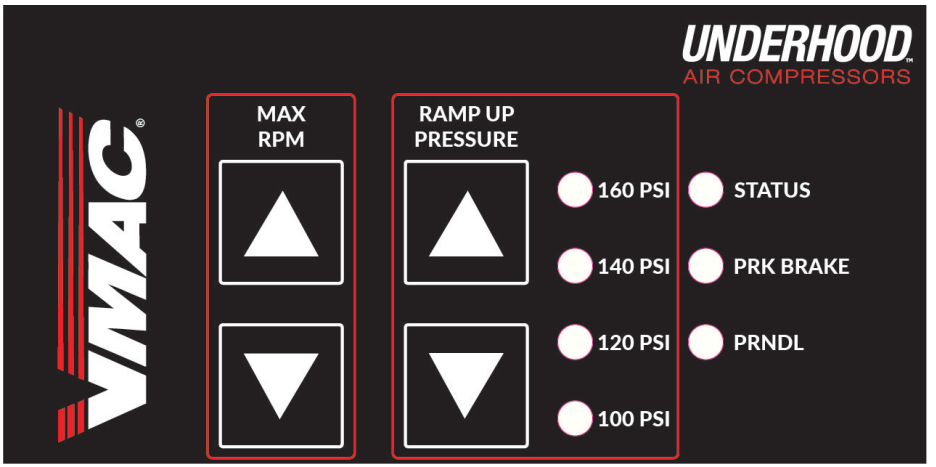


Figure 87 — Throttle control

If the vehicle is placed into gear, the "STATUS" LED and the PRNDL 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.

The "PRK BRAKE" LED will remain illuminated at all times, regardless of park brake position.

MAX RPM

The cfm produced by the system is directly related to engine speed; this system delivers 70 cfm at 2,600 rpm.
Maximum VMAC rpm can be adjusted between 1,000 rpm and 2,650 rpm (in 50 rpm increments) via the "▲" or "▼" buttons in the "MAX RPM" column.

If the system is at full system pressure while the rpm is being adjusted, the engine speed will increase to the new value for 4 seconds, then return to base idle.

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.

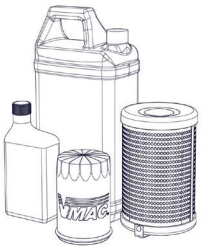
Factory Reset

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 system is ready for use again.

Accessory Products from VMAC

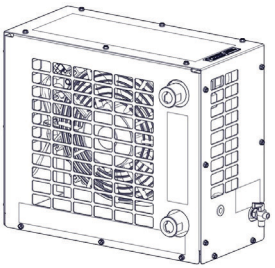
Compressor Service Kits



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.

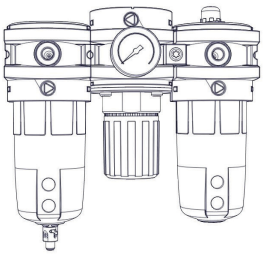
Air Aftercooler



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).

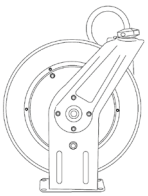
Filter Regulator Lubricator (FRL) – 70 cfm



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).

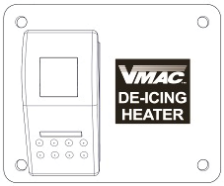
- Max air flow: up to 70 cfm / 150 psi.
- Port size: 3/4 in NPT inlet and outlet.

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



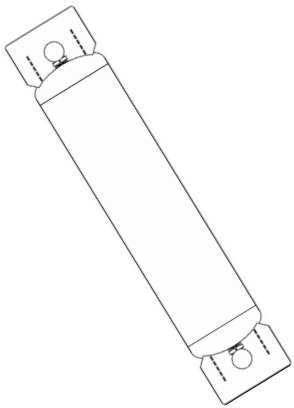
Part number: A700031
Cold climate heater package for operating VMAC compressors in cold climates; proven at temperatures of -30 °C (-22 °F). Requires 12V DC at 10A.

10 Gallon, 200 psi 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 (including Green Series Air Compressors), DTM70/ DTM70-H, 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, 200 psi 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 (including Green Series Air Compressors), DTM70/DTM70-H, 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

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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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