UNDERHOOD® 40
AIR COMPRESSORS

Installation Manual for VMAC System

V400018

2019 – 2023 Ford Transit Connect

2.0 L Gas (I4)

www.vmacair.com

Table of Contents

Safety 3
Warranty 4
General Information 6
Preparing for Installation 8
Installing the Main Bracket, Compressor, and Drive Belts 13
Installing the Bulkhead Fittings 17
Hose Requirements 22
Connecting the Hoses 23
Installing the Waste Heat Air Separator Package (WHASP) Tank . . . 28
Adding Oil to the System 34
Installing the Control System 35
Air Receiver Tank 50
Recommended Accessories 51
Completing the Installation 52
Testing the Installation 54
Performance Testing and System Adjustments 57
Digital Throttle Control Operation and Adjustments 58
Accessory Products from VMAC 60
Warranty Registration 68

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Additional Application Information

- Use of an air receiver tank (minimum 6 USG) is required with this application.
- 2019 – 2023 Ford Transit Connect 2.0 L gas (I4).
- Not compatible with 2.5 L engine.

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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

- Stretch Belt Remover / Installer (Lisle 59370 or equivalent).
- Torx driver set.
- Trim removal tools.

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.***

When dissembling engine components, cover the openings to prevent debris from entering the system.

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

Due to the variety of possible WHASP tank installation locations, VMAC cannot specify a mounting location for the WHASP tank. This VMAC kit includes 50 in of hose to run from the bulkhead fittings to the WHASP tank. If your application requires longer hoses, refer to "Hose Requirements" on page 22.

☐ Determine the distance from the (×5) bulkhead fittings in the floor to the desired WHASP tank location (refer to "Installing the Bulkhead Fittings" on page 17). Include sufficient additional length to account for the width of the sub floor as well as routing around any upfitter accessories such as cabinets, benches or shelving.

- The kit includes sufficient hose to connect the compressor to the recommended bulkhead location.
- For optimum performance, the hose length should be minimized.
- Contact a VMAC dealer to order the custom length of discharge hose, oil return hoses and the scavenge tube.

To remove the dashboard later in the installation, the shifter will need to be moved to the rear most position. The battery will need to be connected to allow the shifter to move. Ensure the vehicle wheels are properly chocked and the park brake is applied to prevent the vehicle from moving.

☐ With the vehicle wheels chocked and the park brake engaged, shift the gear selector into the rear most position.

☐ Disconnect the battery.

☐ Raise the front of the vehicle and support it on jack stands.

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

☐ Remove the lower engine cover. This cover uses a mixture of (×6) Torx bolts and (×2) push fasteners.

☐ Drain the engine coolant into a clean container and set it aside for reuse later (Figure 1).

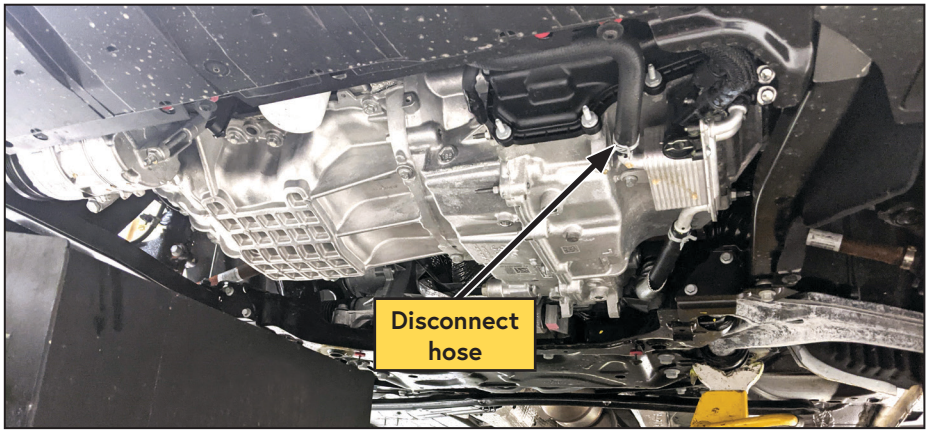


Figure 1 — Drain coolant

☐ Reconnect the coolant hose (Figure 1).

☐ Remove the passenger side front wheel.

☐ Remove the fasteners securing the front of the passenger side fender liner.

☐ Fold the front of the fender liner back to expose the stretch belt.

☐ Remove the OEM stretch belt and set it aside for use later.

☐ Remove and discard the FEAD tensioner cover and fastener.

☐ ***If equipped:*** Remove the lifting eye (this will not be reused in the installation) (Figure 2).

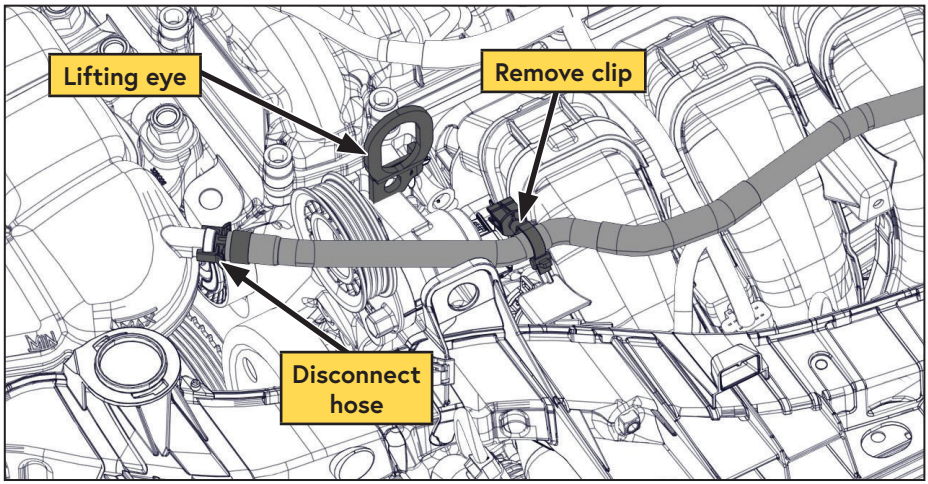


Figure 2 — Disconnect coolant hose

☐ Disconnect the barbed clip securing the coolant hose to the intake manifold (Figure 2).

☐ Disconnect the coolant hose from the degas bottle (Figure 2)

☐ From the mount point in the middle of the intake manifold, measure approximately 3 in along the hose, toward where the degas bottle is mounted, and cut the hose (Figure 3).

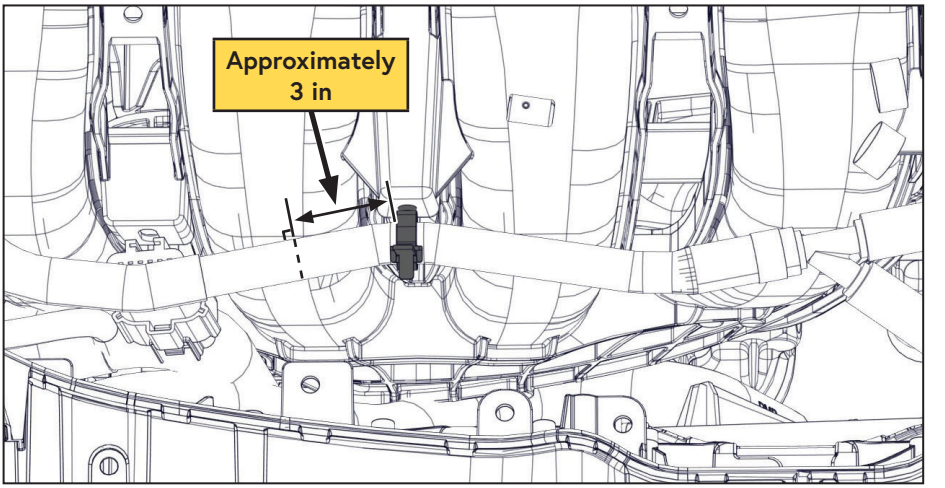


Figure 3 — Modify upper degas hose

☐ Using the supplied precut length of hose, barbed fittings, and gear clamps, join the upper degas hose together.

☐ Fold the lengthened hose toward the driver side, out of the way.

☐ Using a clean container to catch the remaining coolant, disconnect the lower degas hose (Figure 4).

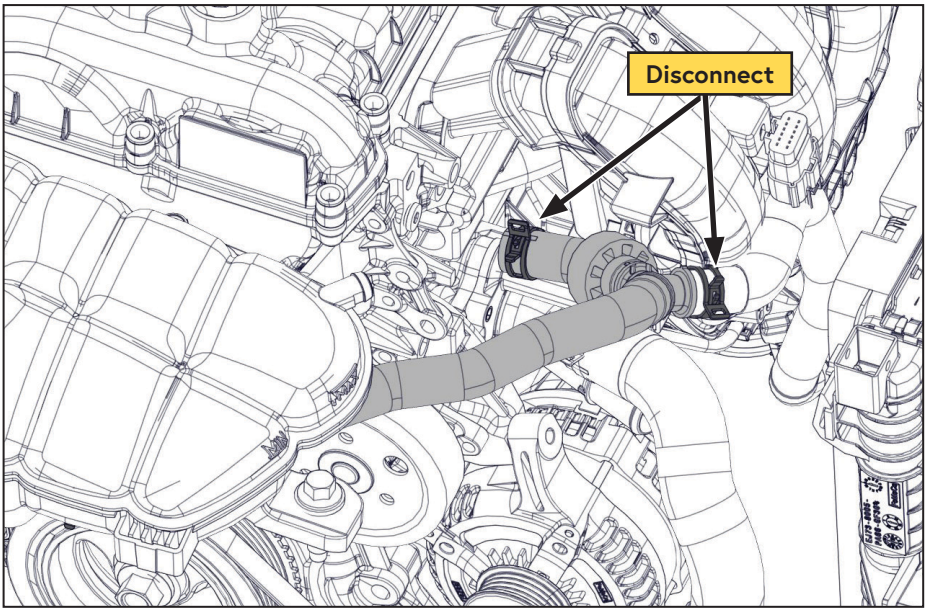


Figure 4 — Disconnect lower degas hose assembly

- [ ] Remove the degas bottle and lower degas hose assembly.
- [ ] Note the orientation of the hose assembly.
- [ ] Remove the degas hose from the degas bottle.
- [ ] Leaving the anti abrasion sheath in place, cut the hose along the straight section indicated. Each section of hose should provide approximately 1 1/4 in for the barbed fittings to be inserted (Figure 5).

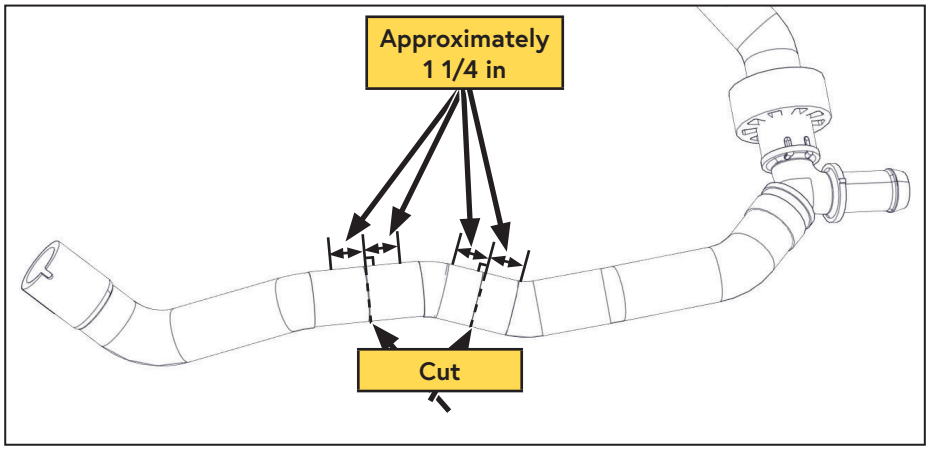


Figure 5 — Modify lower degas hose

Applying coolant to the hoses will assist in inserting the barbed fittings.

- [ ] Apply coolant to the barbs and insert the (x2) barbed fittings into the hose sections, leaving approximately 1 1/2 in of the fittings showing (Figure 6).

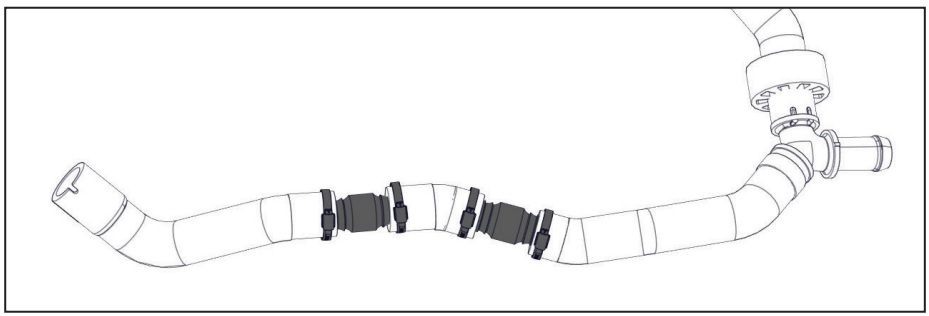


Figure 6 — Modify lower degas hose

- [ ] Rotate the hose as required to ensure the hose retains the same overall shape, and secure it in place using the supplied gear clamps (Figure 6).
- [ ] Attach the lower degas hose to the degas bottle.
- [ ] Position the degas bottle in place in the engine bay, and press firmly down until the degas bottle clicks into place.
- [ ] Re-connect both hoses at the "Y" and at the degas bottle.

☐ Release the belt tension and remove and discard the OEM main belt.

☐ Remove the OEM tensioner (Figure 7).

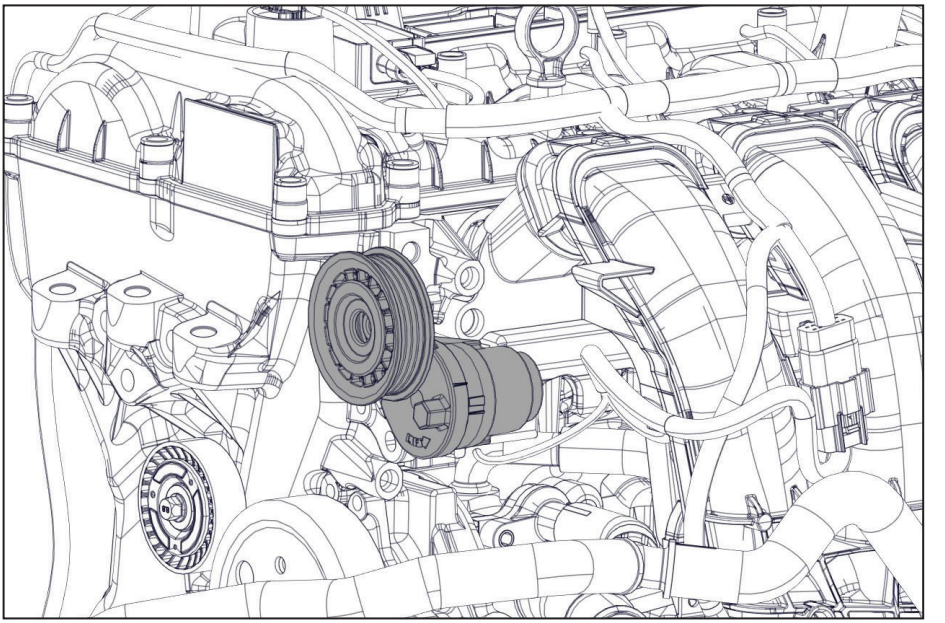


Figure 7 — Remove OEM tensioner

☐ Remove the ribbed idler from the OEM tensioner and set it aside.

☐ Using the OEM fastener and dust shield, install the supplied back idler (in cases where there is a fender washer attached to the idler, cut the cable tie and discard the larger washer) (Figure 8).

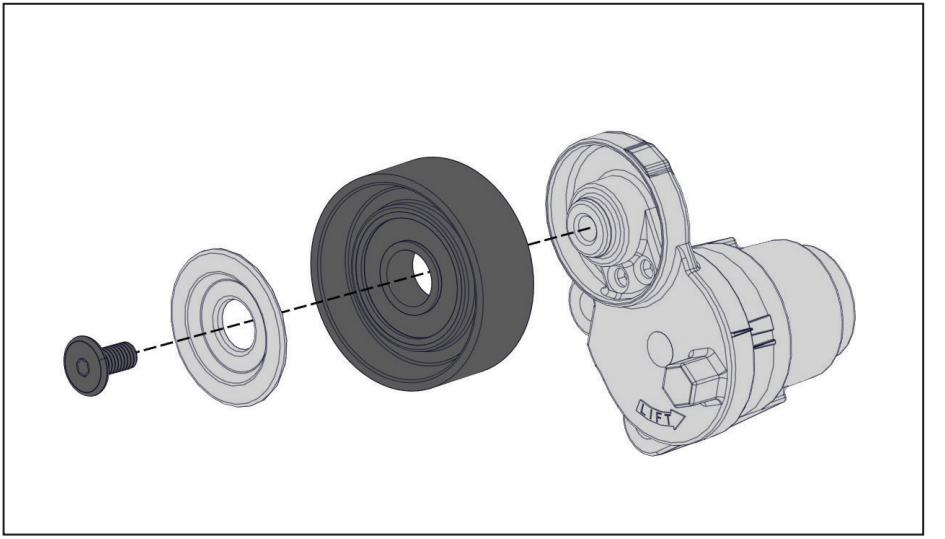


Figure 8 — Mount back idler

Installing the Main Bracket, Compressor, and Drive Belts

☐ Install the main bracket, leaving the fasteners finger tight (Figure 9).

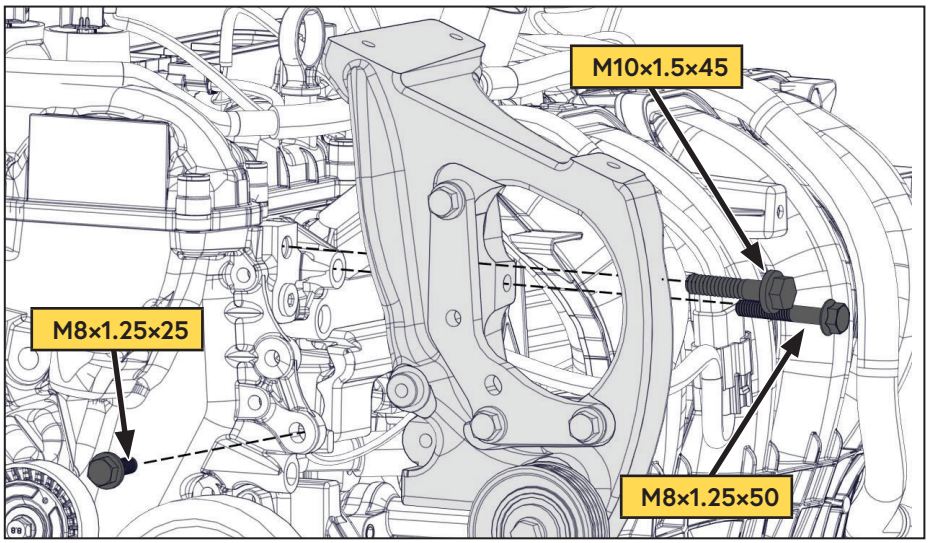


Figure 9 — Install main bracket

☐ Once the fasteners are installed and the bracket fits snug, torque the (×3) fasteners to specification (Figure 9).

☐ Using the OEM fasteners, install the OEM tensioner onto the tensioner bracket (Figure 10)

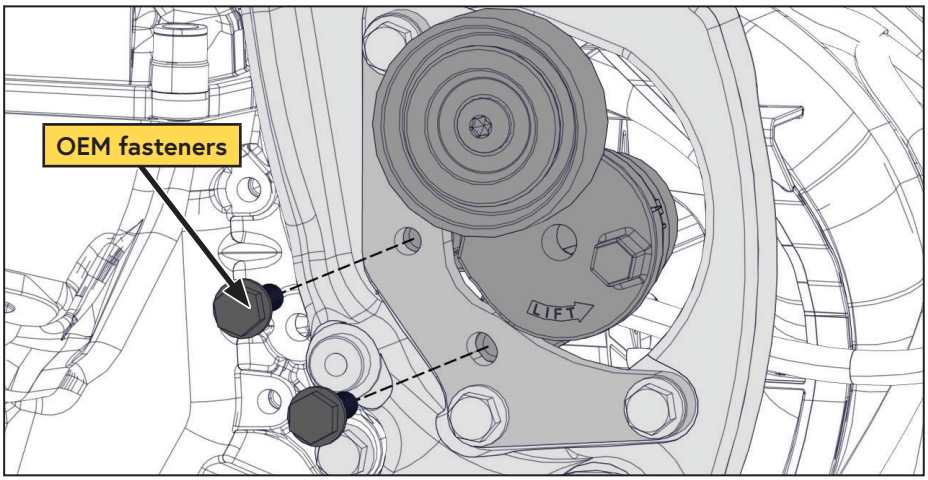


Figure 10 — Install tensioner onto bracket

☐ Torque the tensioner fasteners to specification.

☐ Using the supplied fasteners, install the idler (removed from the tensioner earlier) onto the VMAC main bracket (Figure 11).

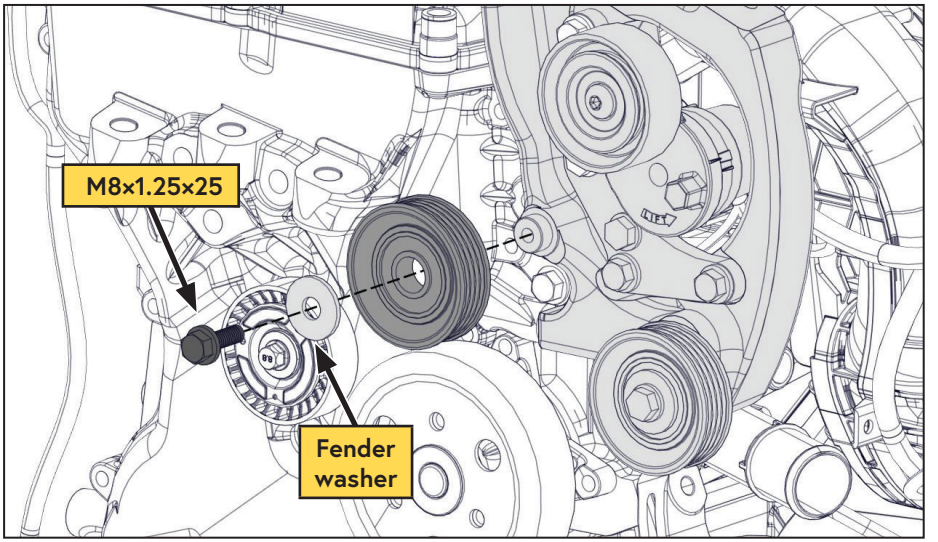


Figure 11 — Install idler

☐ Using the (×3) supplied M8 fasteners, mount the compressor and pressure switch bracket onto the main bracket and torque to specification (Figure 12).

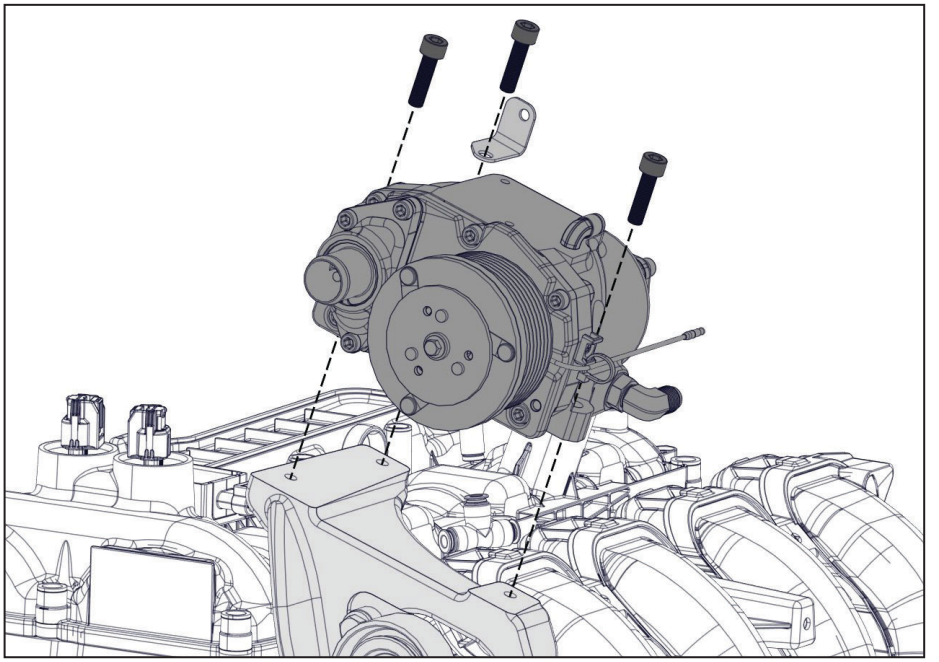


Figure 12 — Mount compressor

☐ Install the VMAC belt on the inside track of the crank pulley. Two clutch ribs should be visible on each side of the belt (Figure 13).

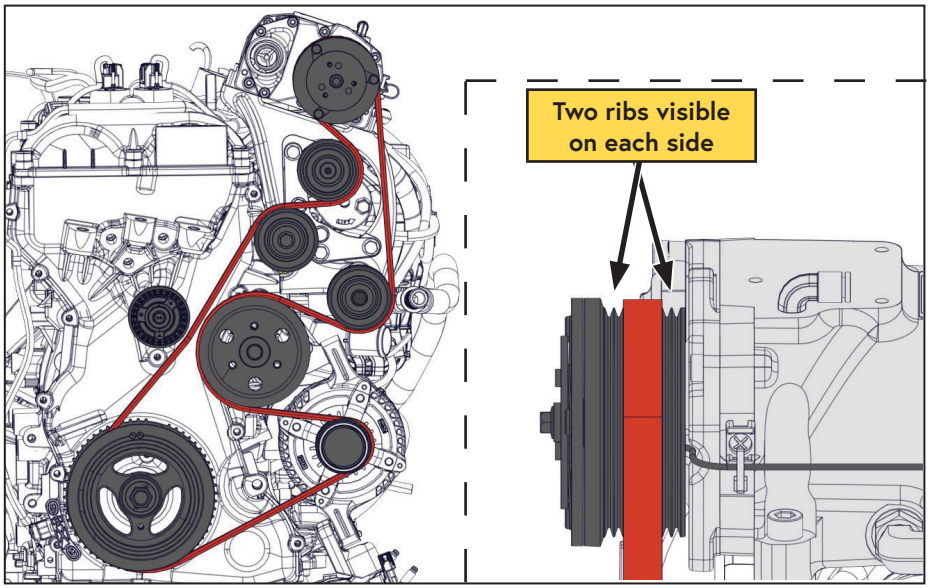


Figure 13 — VMAC belt routing

☐ Install the compressor intake air filter assembly (Figure 14)*.

- ☐ *Attach the hose to the air filter spigot.
- ☐ *Slide the gear clamps onto the hose.
- ☐ *Attach the hose onto the compressor inlet spigot, then rotate the bracket into place.
- ☐ *Attach the bracket to the compressor (do not over tighten).

☐ Secure the gear clamps.

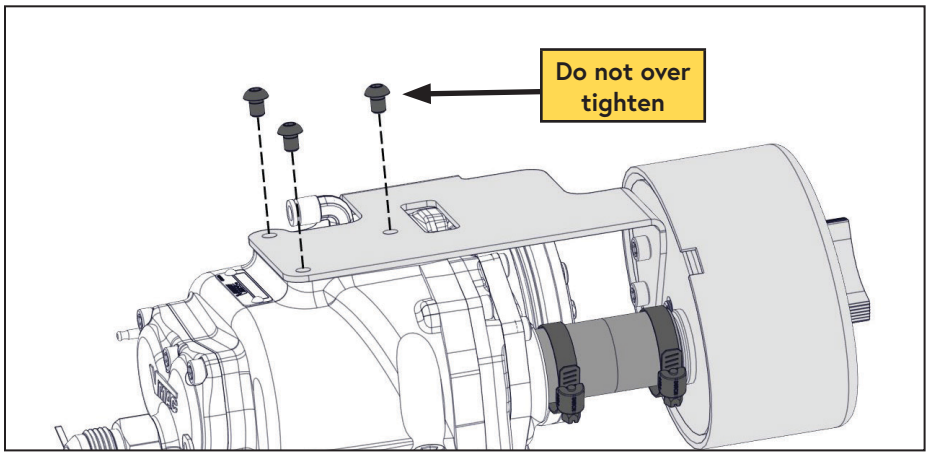


Figure 14 — Intake air filter

☐ Attach the OEM hose clip to the air filter bracket. (Figure 15).

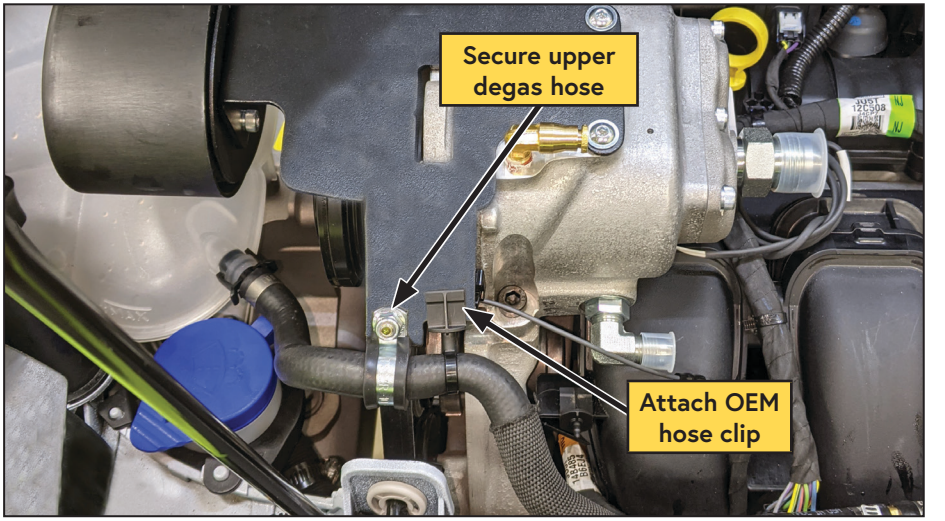


Figure 15 — Secure upper degas hose

☐ Using the supplied P-clip and fasteners, secure the upper degas hose to the air filter bracket (Figure 15).

☐ Connect the hose to the degas bottle.

To prevent the pooling/accumulation of water in the switch, and subsequent damage from freezing, mount the pressure switch as close to vertical as possible.

☐ Using the supplied fasteners and P-clip, mount the pressure switch on the bracket (Figure 16).

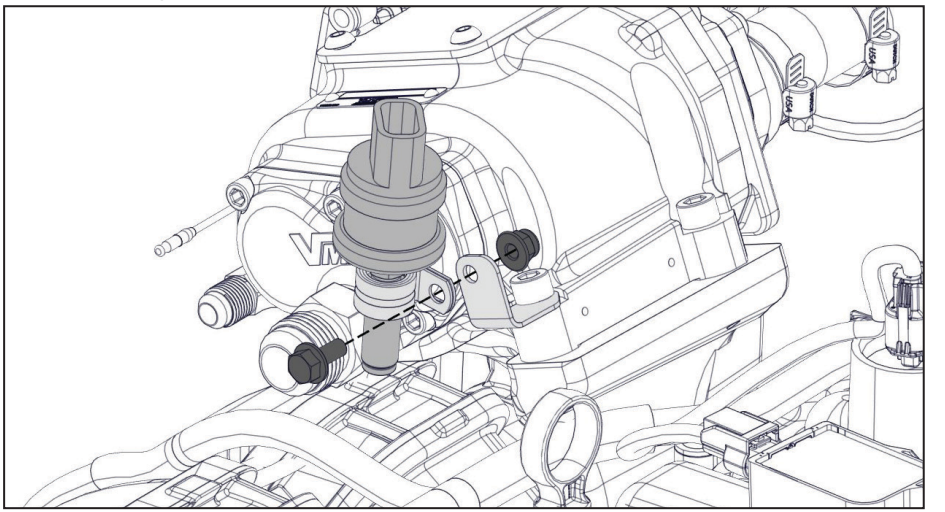


Figure 16 — Install pressure switch

Installing the Bulkhead Fittings

(×4) bulkhead fittings are supplied with the system (Figure 17):

- (×3) bulkhead fittings are used to pass the compressor discharge and oil supply hoses, and the scavenge tube, into the body of the vehicle.
- (×1) bulkhead fitting is used to locate the blowdown muffler outside of the vehicle.

This kit includes hoses of a fixed length to run from the compressor to the bulkhead fittings, and from the fittings to the WHASP Tank.

To maximize compressor performance, hose lengths should be kept as short as possible; if longer hoses are required please follow the hose requirements listed on page 22 of this manual.

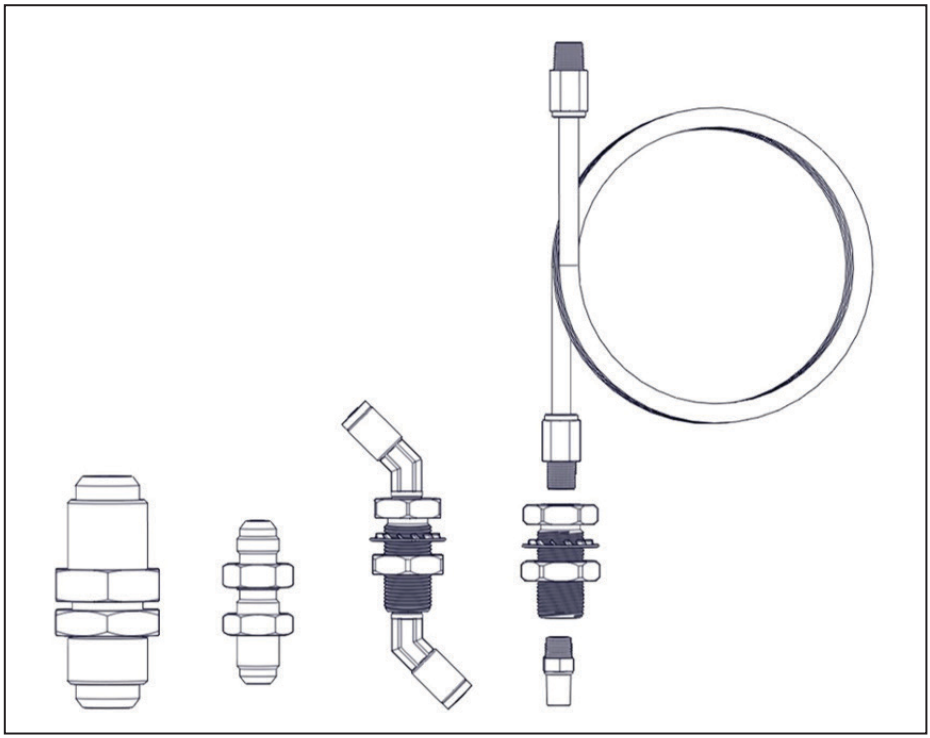


Figure 17 — Bulkhead fittings

Good judgment must be used during installation. Prior to drilling any holes in the vehicle, confirm the installation location of the WHASP Tank and the bulkhead fittings. Confirm that the supplied hoses will reach from the compressor to the bulkhead fittings, and from the bulkhead fittings to the WHASP Tank. Also ensure that there are no wires, hoses, or other components on the other side of the panel that may be damaged when drilling holes.

☐ Remove the weather stripping from the plastic step in the passenger side sliding door well (Figure 18).

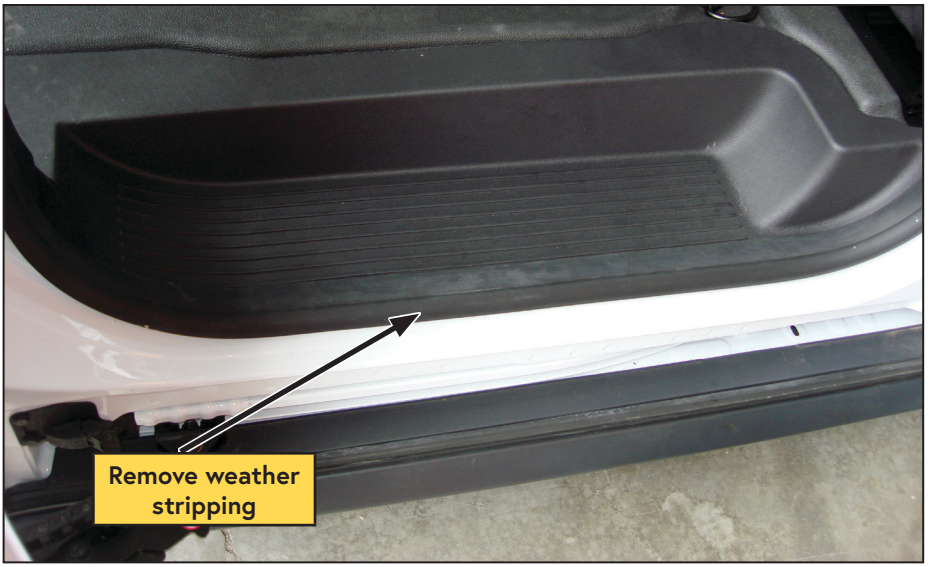


Figure 18 — Remove plastic step

☐ Remove the plastic step to provide access to the sub floor (Figure 19).

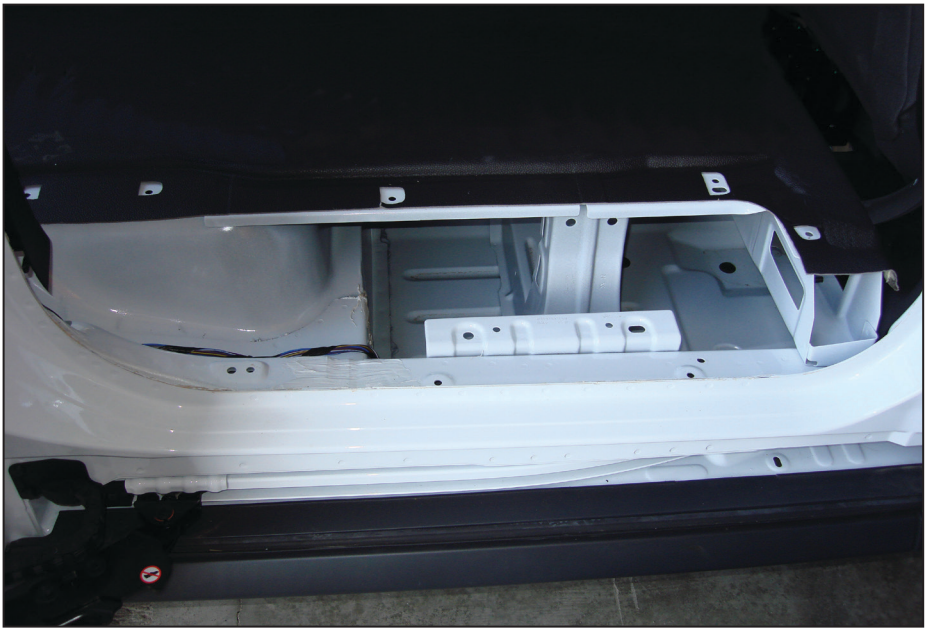


Figure 19 — Access the sub floor

☐ If there is a floor liner in the sub-floor, modify it to provide access to the floor tunnel (Figure 20).

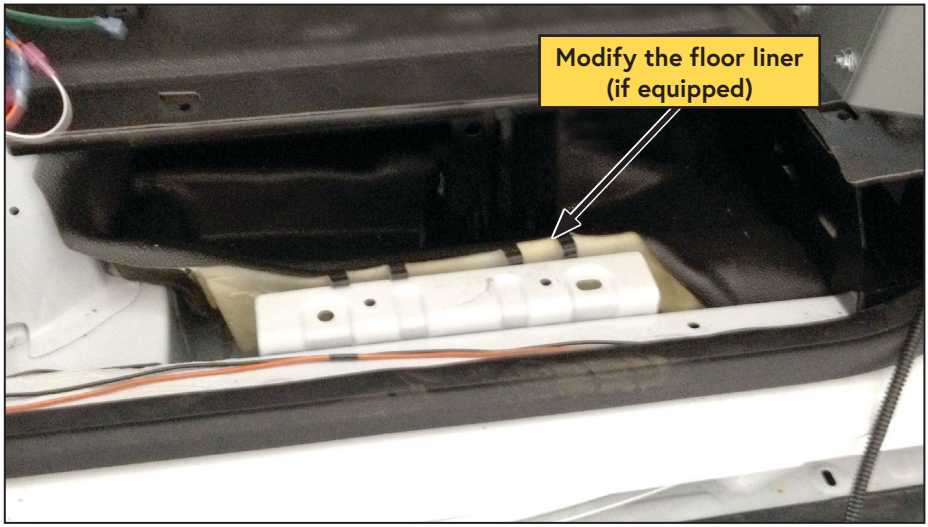


Figure 20 — Sub floor liner

☐ Install the bulkhead fittings in the floor tunnel. These instructions are continued on the next page (Figure 21).

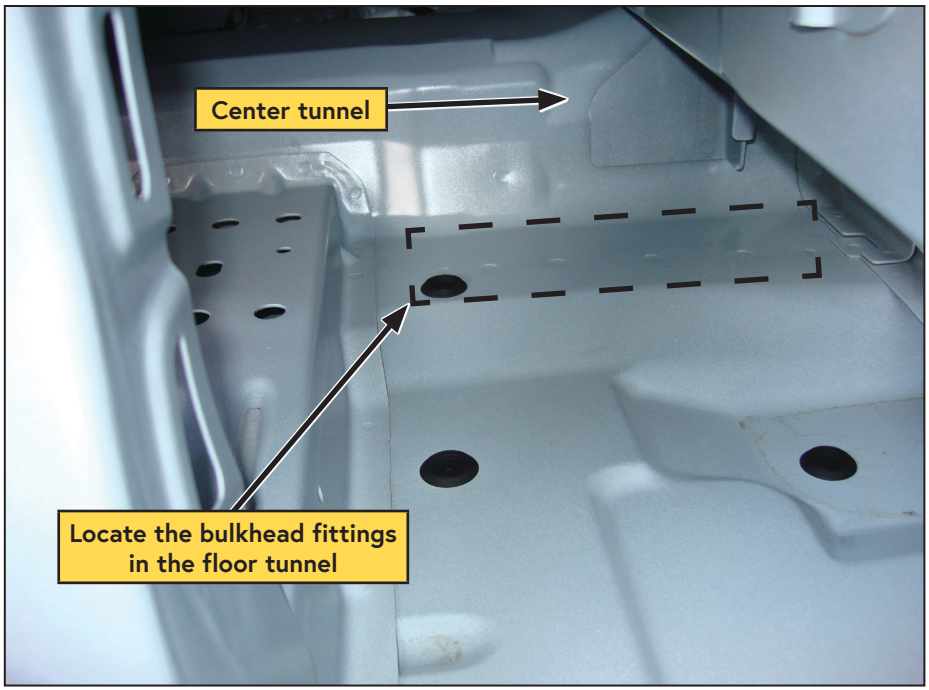


Figure 21 — Floor tunnel

☐ Drill the bulkhead fitting holes using a drill, step drill or hole saw. Leave enough room between the fittings to allow access for a wrench (Figure 22, Figure 23, Figure 24).

- Discharge from the compressor: ø1 1/8 in.
- Oil return: ø9/16 in.
- Oil scavenge: ø5/8 in.
- Remote blowdown: ø5/8 in.

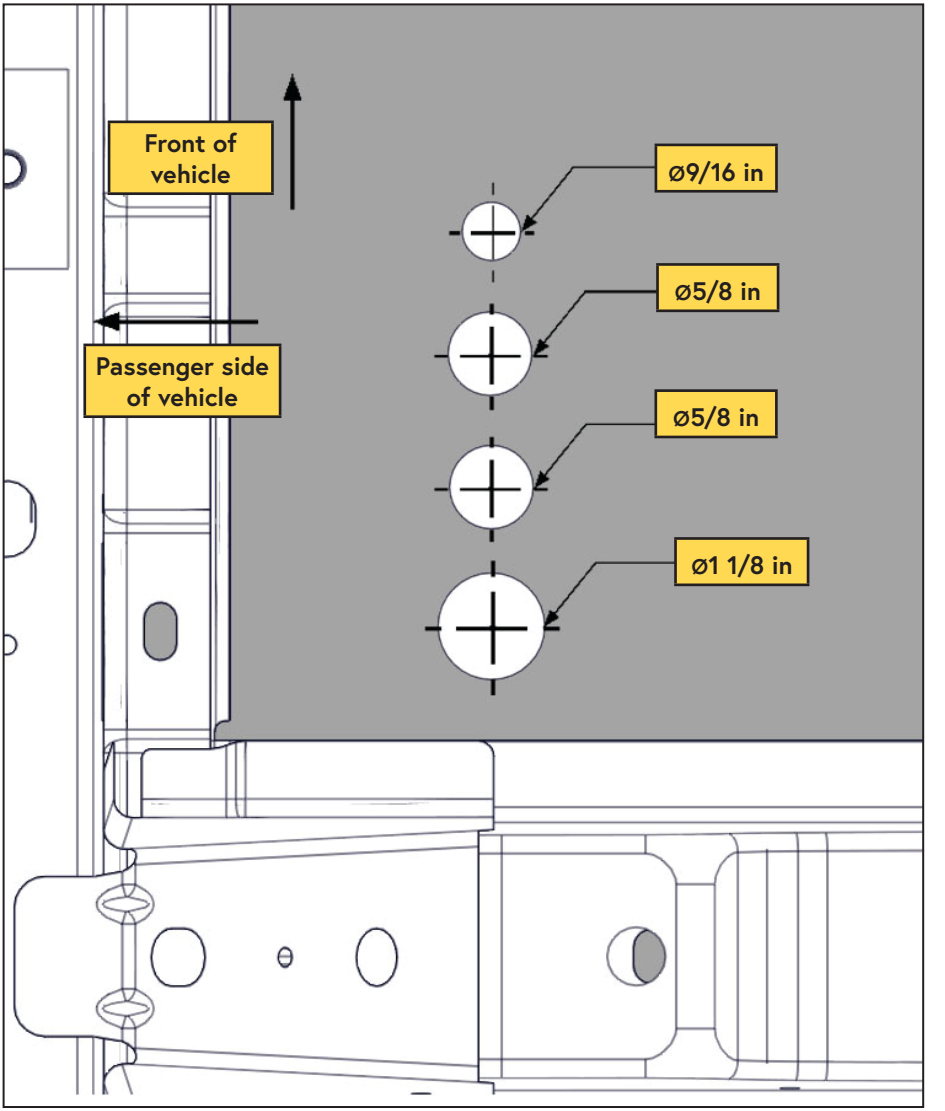


Figure 22 — Vehicle chassis (bottom view)

To provide additional PTFE tube routing options, a 90° push-to-connect fitting has been supplied in the hose routing fast pack.

☐ Fit the bulkhead fittings from the bottom of the hole to provide maximum ground clearance. Secure from the top with the supplied nuts (Figure 23, Figure 24)

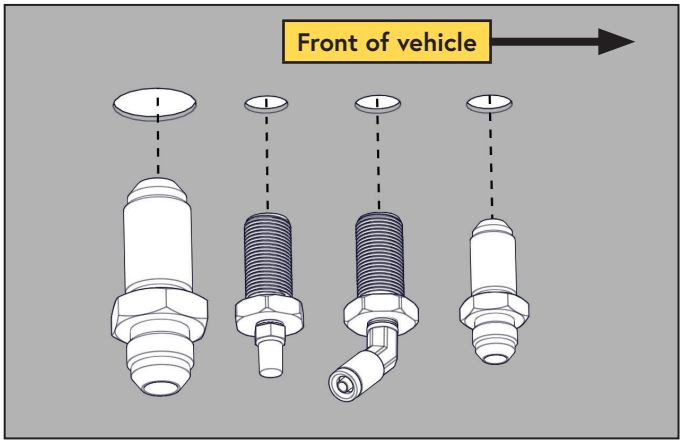


Figure 23 — Bulkhead fittings (bottom view)

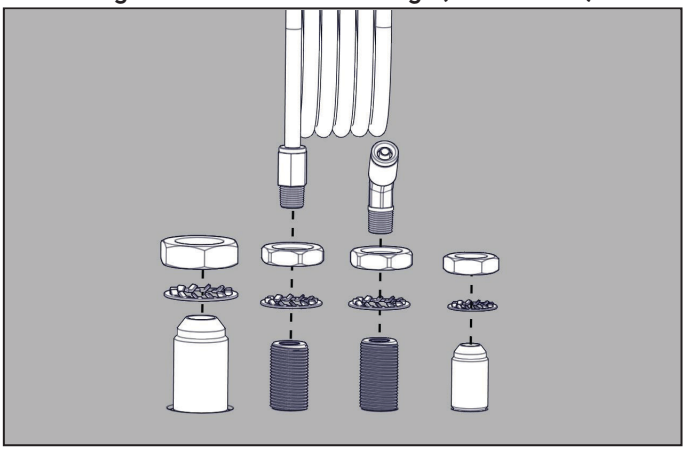


Figure 24 — Bulkhead fittings (top view)

VMAC includes bulkhead fittings to connect the hoses from the engine compartment to the interior of the van.

While it is necessary to provide a secure transition from the sub floor to the cargo bay, individual layout designs preclude VMAC from recommending specific bulkhead fixtures. VMAC suggests routing the hoses into the cargo area via bulkhead fittings (not supplied). If this is not practical, VMAC strongly recommends using grommets to protect the hoses, and careful routing the hoses away from any hot or sharp components, and high traffic areas.

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 1/4 in PTFE tube, and the 3/8 in and 3/4 in hoses with AQP elastomer liner, are specifically designed to work with VMAC compressor oil and at compressor operating temperatures.

Based on the desired location of the WHASP Tank, the hose lengths provided with this system may not be ideal. They can be shortened or replaced as necessary, or hose extenders can be used. In the event that the hoses are too long, 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:

From the compressor to the bulkhead fittings:

- 3/4 in × 108 in.
- 3/8 in × 112 in.
- 1/4 in (PTFE Tube) × 120 in.

From the WHASP Tank to the bulkhead fittings:

- 3/4 in × 50 in.
- 3/8 in × 50 in.
- 1/4 in (PTFE Tube) × 50 in.

If longer hoses are required:

To order parts, contact a VMAC dealer. The dealer will ask for the VMAC System ID, 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.

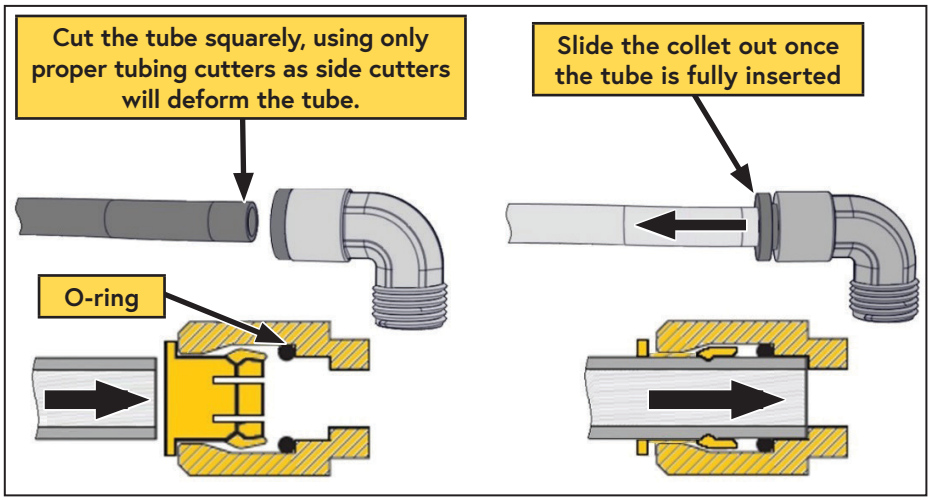


Figure 25 — Push-to-connect fittings

- [ ] Apply high temperature loom to the 1/4 in × 120 in PTFE scavenge tube.
- [ ] Route the straight fitting of the 3/4 in discharge hose toward the passenger side firewall, and down toward the steering rack.
- [ ] Pass the hose over the rack and through the gap in the sub frame (Figure 26).

Figure 26 — Hose routing

- [ ] From under the van, pass the straight fitting on the 3/8 in hose, and 1/4 in PTFE tube through the same crossmember gap.
- [ ] Route the 3/8 in hose and 1/4 PTFE up to the compressor, following the same routing as the 3/4 in hose.

☐ Connect the 90° end of the 3/4 in × 108 in hose to the discharge fitting on the compressor (Figure 27).

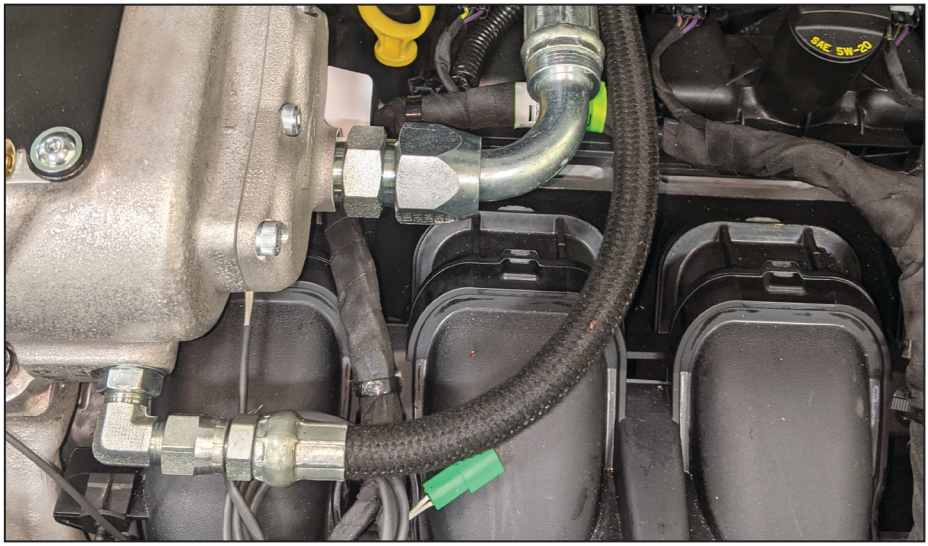


Figure 27 — Hose routing

☐ Cut a 1 1/2 in length, and a 12 in length from the 24 in spool of 1/4 in PTFE tubing.

☐ Connect the straight fitting on the 3/8 in × 112 in hose to the oil return fitting on the compressor (Figure 27).

☐ Connect the 1/4 in PTFE scavenge tubes between the compressor, pressure switch, and Tee union (Figure 28).

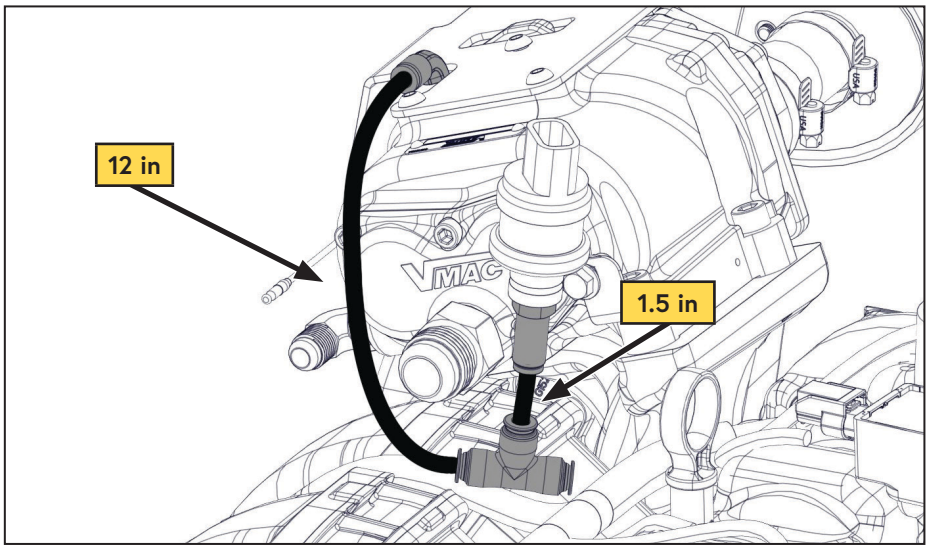


Figure 28 — Connect PTFE tubes

- ☐ Connect the 1/4 PTFE tube (routed up from underneath the vehicle) to the Tee union.
- ☐ Using the supplied cable ties, secure the PTFE to the hose bundle.
- ☐ Using the supplied P-clip and fasteners, secure the hose bundle to the sheet metal flange near the firewall (Figure 29).

Figure 29 — Hose routing

- ☐ Observe where the hoses pass over the steering gear and near the subframe mount, and apply the spiral loom to the 3/8 in and 3/4 in hose to protect them from any sharp areas or abrasion (Figure 30 and Figure 31).

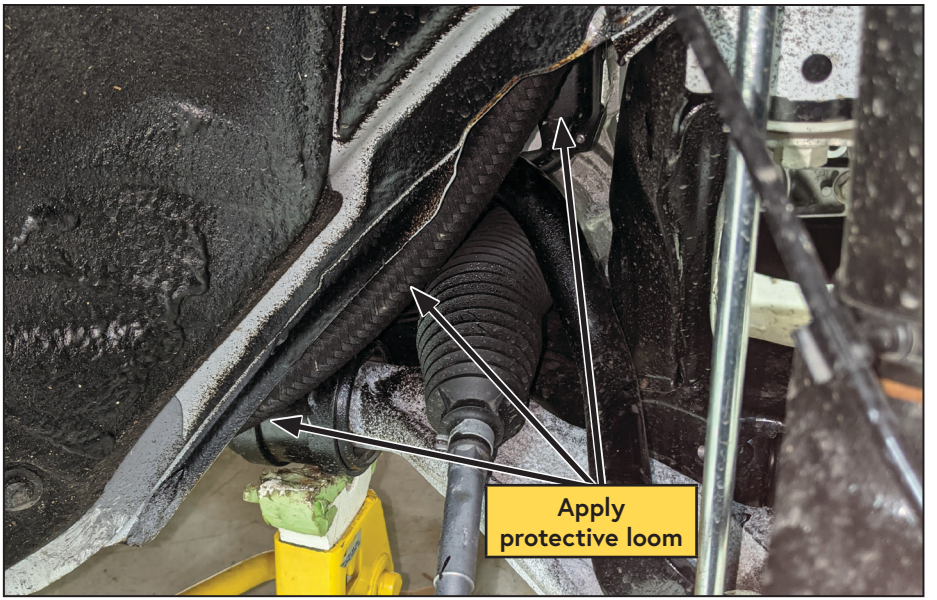


Figure 30 — Hose routing

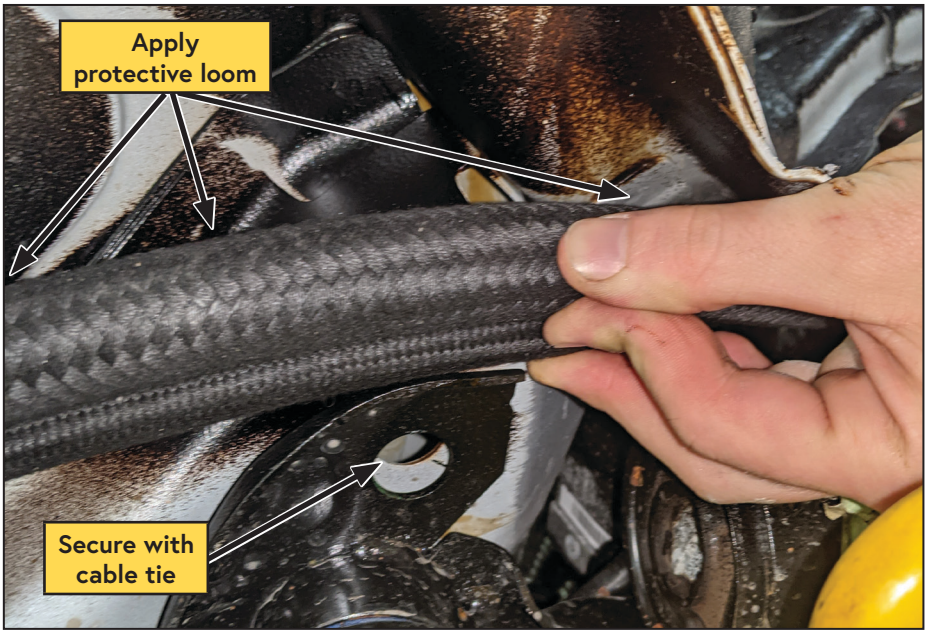


Figure 31 — Hose routing

- ☐ Pull the hoses tight, and secure the hoses to the subframe mount using cable ties (Figure 31).
- ☐ Connect the 90deg curved end of the 3/8 hose to the bulkhead fitting
- ☐ Attach the supplied 90 elbow fitting to the corresponding bulkhead fitting, then connect the 3/4in hose
- ☐ Install the brass 90deg elbow in the corresponding bulkhead fitting
- ☐ Trim the clear tubing to length and insert in the brass elbow fitting
- ☐ Additional p-clips and self-tapping screws are provided to further secure the hoses between the crossmember and the bulkhead fittings. Attach these to the vehicle floor as required.

Installing the Waste Heat Air Separator Package (WHASP) Tank

WHASP Tank location guidelines

When determining a mounting location for the WHASP Tank, ensure the following conditions are met:

- Adequate supply of fresh air and venting for the cooling fan.
- Minimum of 12 in of clearance at the front of the cooling fan.
- Minimum of 6 in clearance at the rear of the unit.
- Hose connections and wiring are accessible.
- Mounted on a level surface.
- Impact protection.
- The oil level sight glass is easily accessible.
- The oil fill and drain ports are accessible for servicing.
- Minimize the hose lengths to maximize performance.

Mounting the WHASP Tank

Refer to (Figure 32) for mounting dimensions.

Special consideration must be made to ensure the WHASP Tank will be protected from damage and to ensure that it has adequate ventilation.

In some cases, it may be necessary to fabricate a mounting bracket to position the tank in an appropriate location.

Secure the WHASP Tank by bolting the mounting feet to the installation surface, use M8 or 5/16 in fasteners (not supplied).

Mounting in an Enclosure or Body

Mounting the WHASP Tank in an enclosure will limit access to cooling air or restrict the escape of hot air from around the unit and will have an adverse effect on cooling.

Ensure adequate ventilation is provided for the cooling system to function properly.

It is not possible to make absolute recommendations regarding ventilation because of the widely differing configurations that are possible. Duty cycle, ambient temperature and enclosure shape are some of the important variables that need to be taken into account when determining the suitability of enclosure mounting.

Cool air ducted to the cooler and installing an exhaust fan to remove hot air is recommended.

Confirm the hose lengths included in this kit when determining the location of the WHASP Tank and bulkhead fittings. Hose lengths can be found in the Illustrated Parts List (IPL). If the WHASP Tank or bulkhead fitting location requires longer hoses, contact a local VMAC dealer. See page 6 for ordering information .

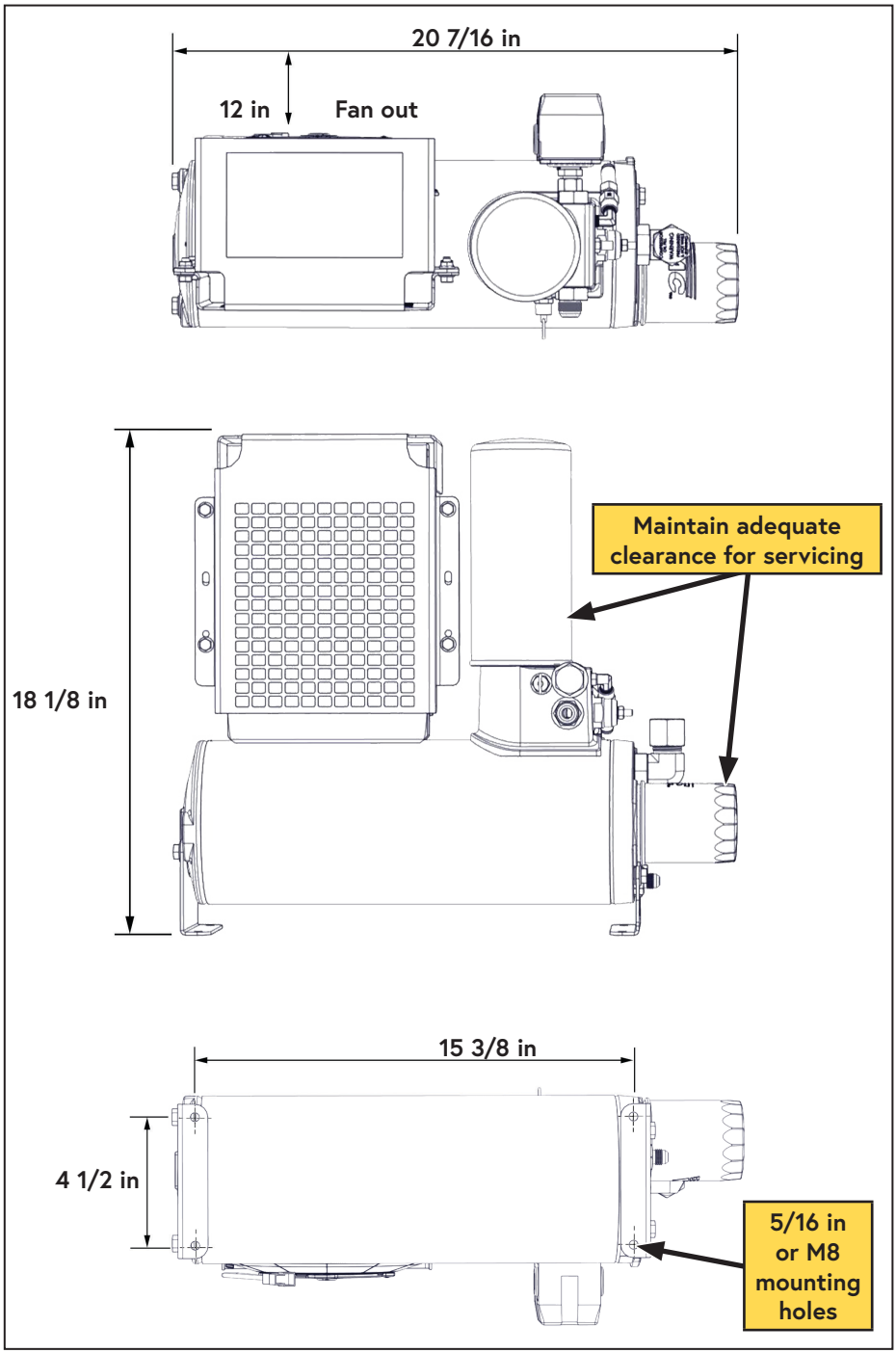


Figure 32 — Minimum WHASP Tank mounting clearances

Mounting the WHASP Tank

The WHASP Tank uses a "puller" fan to cool the air/oil mixture. Position the WHASP Tank to ensure there is adequate air flow and so that the fan is blowing out toward the cargo door. During operation, the door should be kept open to ensure there is a constant supply of cool air to prevent the system from overheating (Figure 33).

Provide ample space to check the oil level, as well as access to the filters and compressor oil drain to facilitate servicing.

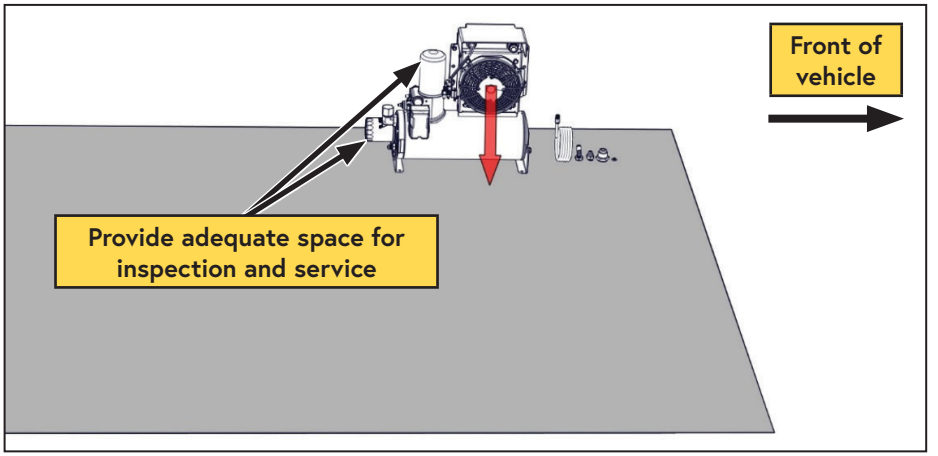


Figure 33 — WHASP ventilation

A minimum of 6 in of clearance is recommended around the radiator (intake) side of the WHASP Tank to allow fresh, cool air to circulate into the cooler and fan (Figure 34).

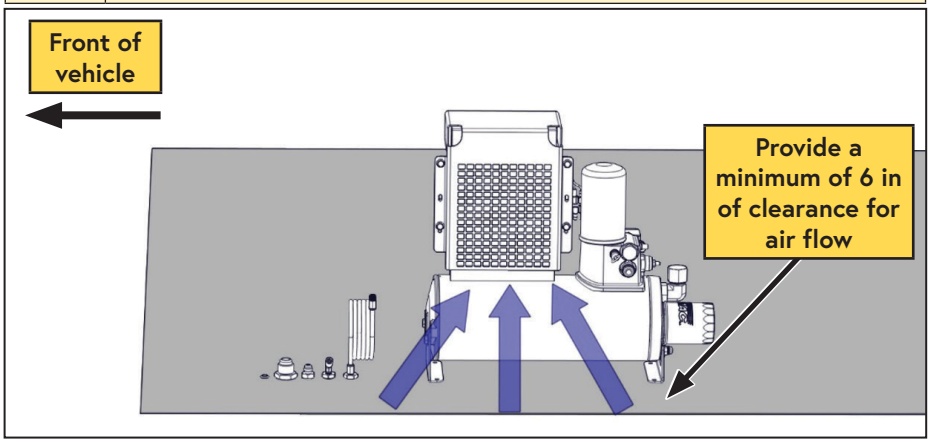


Figure 34 — WHASP ventilation

Connecting the Interior Hoses (Figure 35)

- ☐ Connect the straight ends of the 3/4 in × 36 in and 3/8 in × 36 in hoses to the top side of the bulkhead fittings.
- ☐ Connect the 1/4 in × 36 in PTFE tube to the top side of the bulkhead fitting.
- ☐ Bundle the PTFE tube and hoses together and route them to the WHASP Tank.
- ☐ Connect the 90° fitting on the 3/4 in hose to the #12 JIC fitting (air/oil inlet) on the cooler above the fan.
- ☐ Connect the 90° fitting on the 3/8 in hose to the #6 JIC fitting (oil return fitting) beneath the oil filter on the tank.
- ☐ Connect the 1/4 in PTFE tube to the 1/4 in push-to-connect (oil scavenge) fitting near the coalescing filter.
- ☐ Connect the discharge fitting (#8 male JIC) to the customer's air system (hose not supplied).
- ☐ Secure all hoses, tubes, and wires with P-clips and/or cable ties.

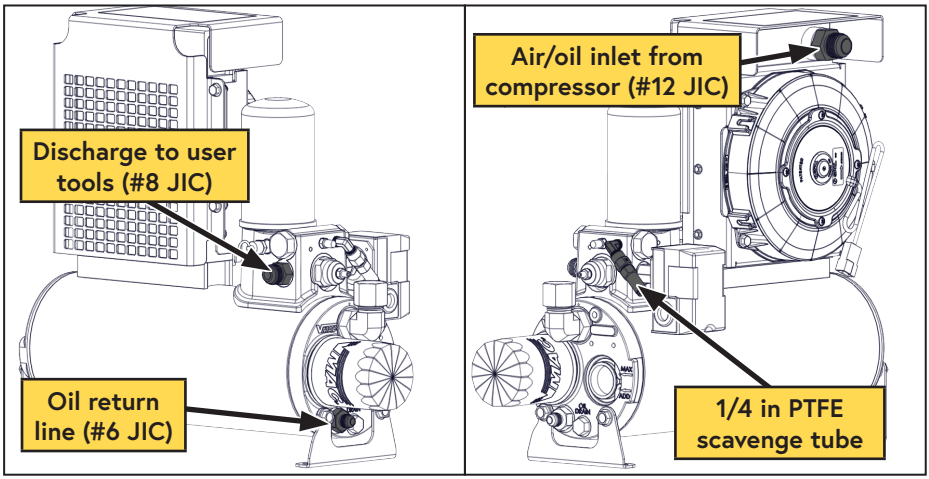


Figure 35 — WHASP Tank connections

Use of an air receiver tank (minimum 6 USG) is required with this application.

Follow the instructions on page 50 of this manual to prevent damage to the system.

Remote Muffler Installation

The WHASP Tank automatically depressurizes when the clutch disengages. This prevents damage to the compressor on the next start up.
Installing the blowdown muffler outside of the vehicle will reduce cabin noise during blowdown, and will ensure any oil vapor will be safely discharged outside of the vehicle.

☐ Remove the blowdown muffler from the side of the WHASP Tank (below the coalescing filter) (Figure 36).

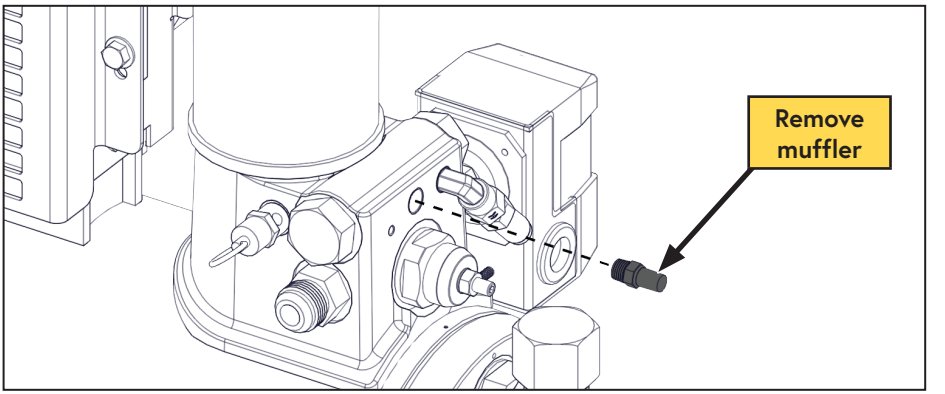


Figure 36 — Remove blowdown muffler

Ensure no debris enters the WHASP Tank manifold. Contamination of the assembly may cause erratic performance.

☐ Separate the PTFE tube from the fittings.

☐ Apply the supplied 1/4 in split loom to the 1/4 in PTFE tube.

☐ Apply Loctite 567 (thread sealing) compound to the 1/4 in push-to-connect fitting and install it into the threaded hole which previously held the blowdown muffler (Figure 37).

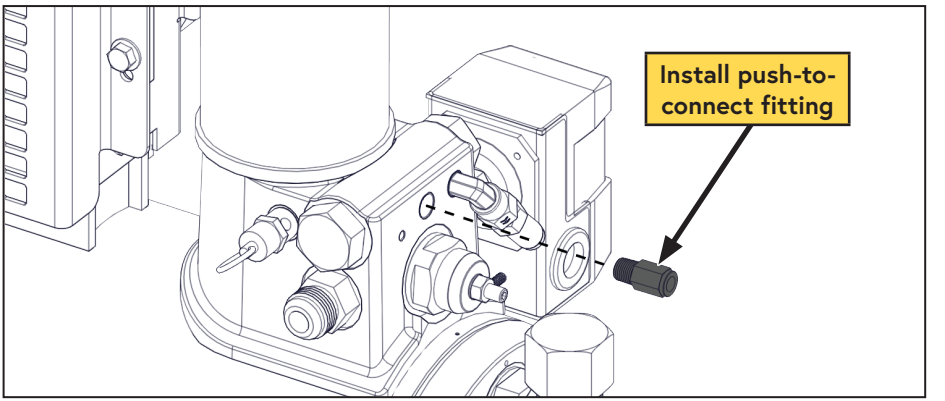


Figure 37 — Install push-to-connect fitting

☐ Connect the 1/4 in PTFE tube into the push-to-connect fitting installed in the WHASP Tank (Figure 38).

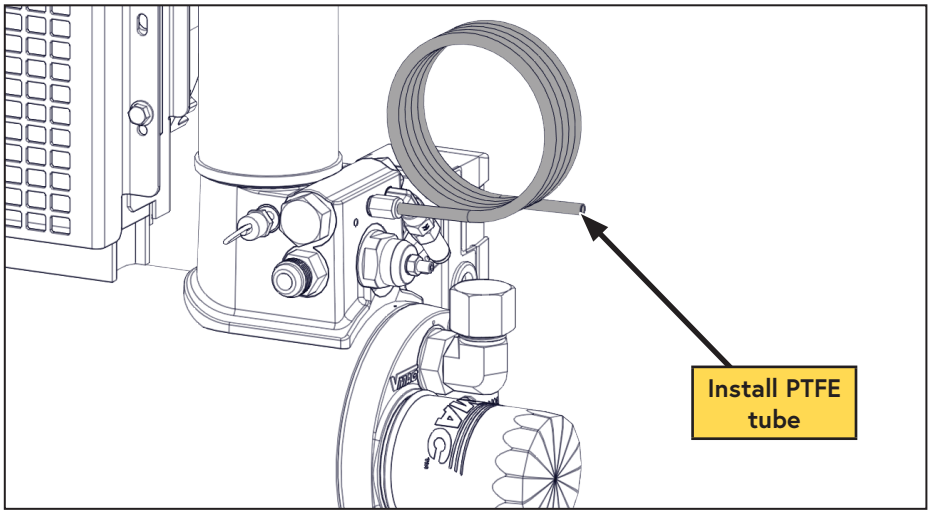


Figure 38 — Tubing Installation

☐ Route the 1/4 in PTFE tube to the bulkhead fitting, ensuring the tube will not kink, and cut the hose to length.

Ensure the tube is cut square and that there are no sharp edges. Do not use side cutters as this will deform the hose.

☐ Install the tube into the push-to-connect bulkhead fitting (Figure 39)

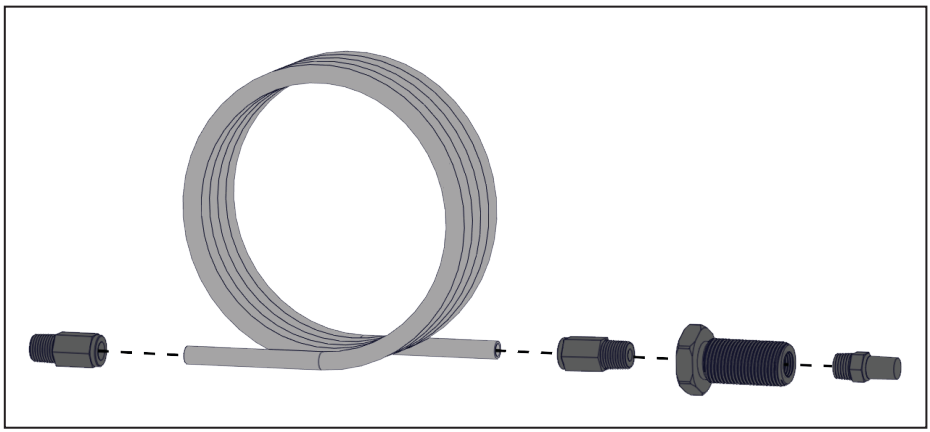


Figure 39 — Tubing Installation Remote Blowdown Muffler assembly

☐ Secure the tube with the supplied cable ties.

Adding Oil to the System

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

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

- ☐ Remove the fill cap on the WHASP Tank (above the sight glass) (Figure 40).
- ☐ Using a funnel, pour oil into the tank until the oil level in the sight glass reaches the "MAX" line. **The system capacity is 4 L** (Figure 40).
- ☐ Reinstall the fill cap and tighten it securely. Ensure the fill port remains accessible as it will be necessary to check and top up the oil after the first compressor start.

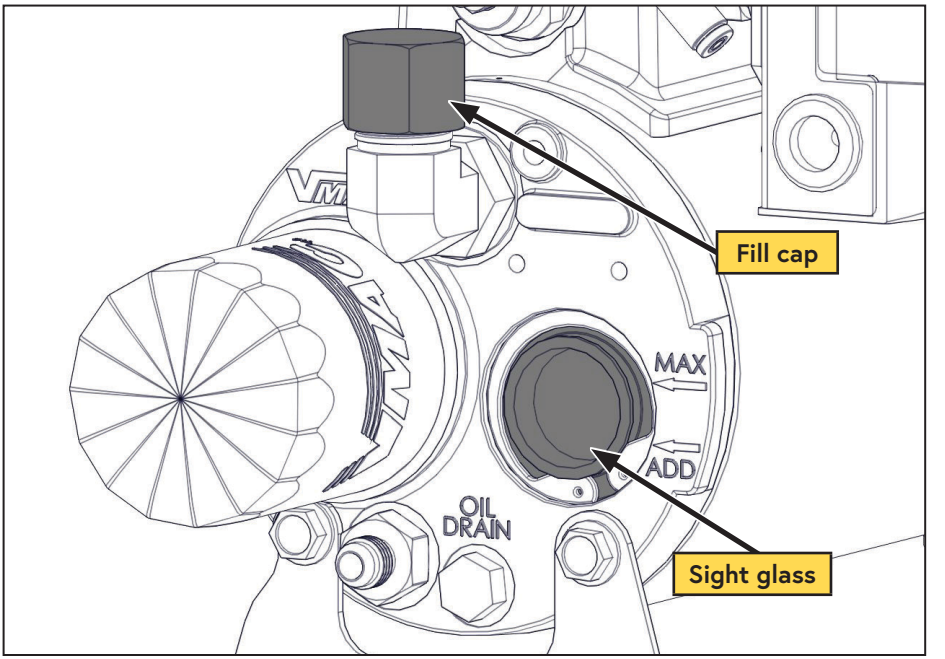


Figure 40 — Filling the WHASP Tank

Installing the Control System

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.

Electrical Modules

- The Throttle Control, Control Module, and Interface Panel are not weather proof; ensure they are mounted where they will be protected from rain, snow, mud, direct sunlight, etc. (e.g. inside the cab, service body or cabinet).
- Keep the rear of the Interface Panel protected.
- Ensure the Control Module and Throttle Control are mounted away from the pedals, park brake mechanism, or where they could be inadvertently knocked by occupants.

Control Components Overview

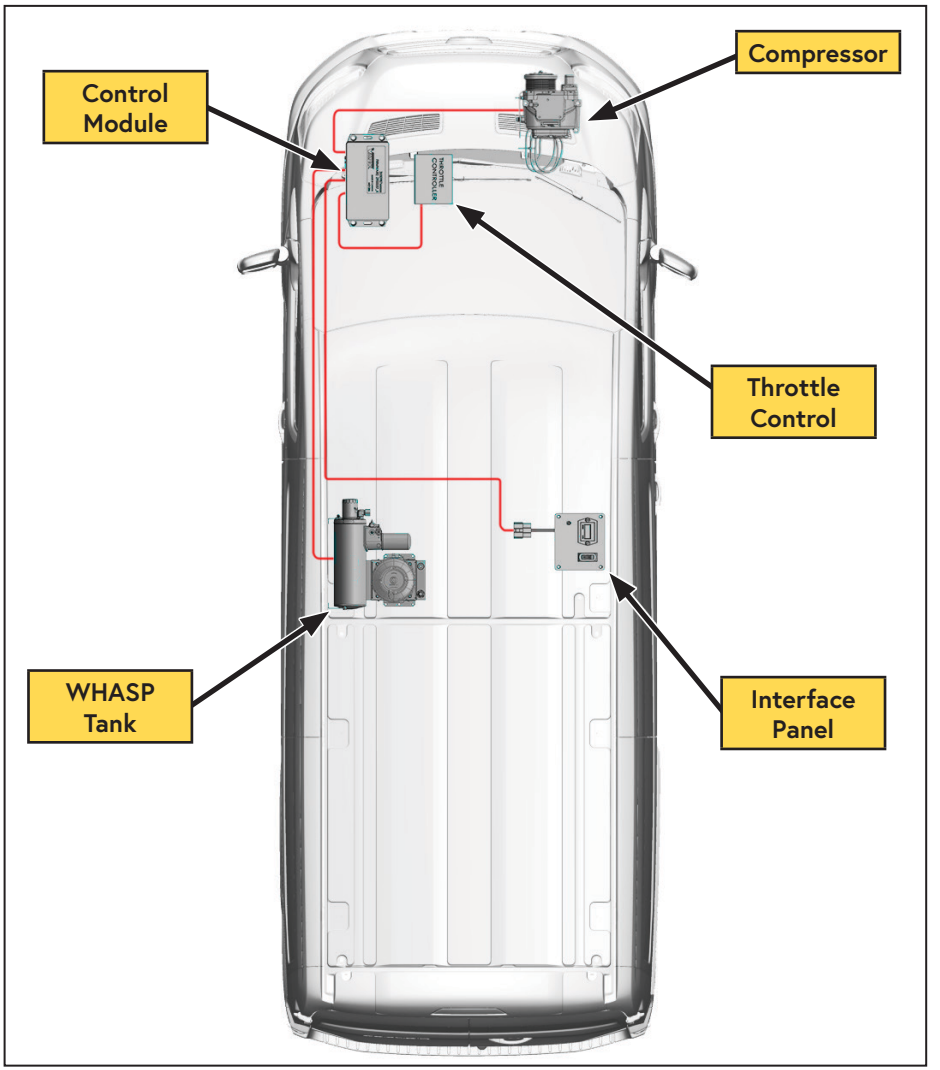


Figure 41 — General component overview
(Actual installation locations may vary)

Control Module (Figure 42)

The Control Module serves as the primary input/output interface between the vehicle and the various VMAC components (compressor, Throttle Control, WHASP Tank, Control Interface, etc.).

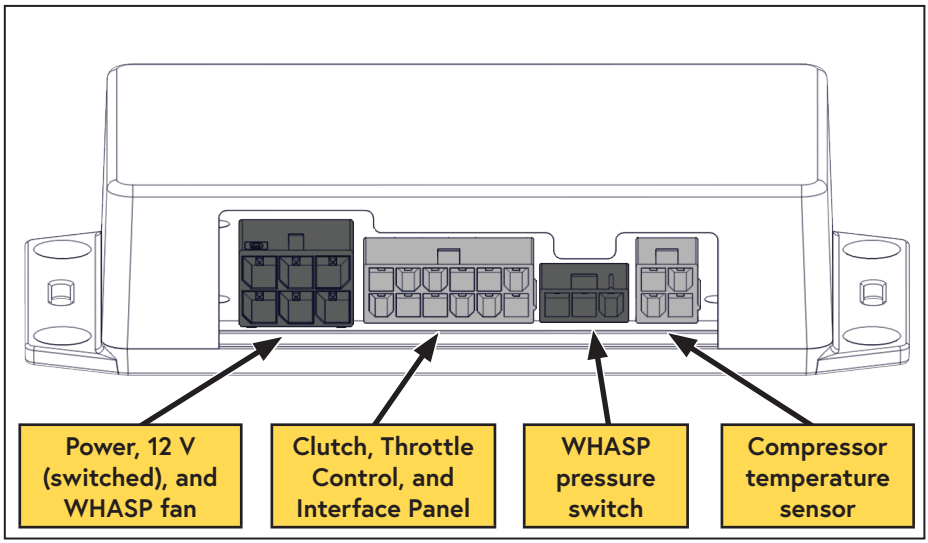


Figure 42 — Control Module

Interface Panel (Figure 43)

The Interface Panel serves as the operator's control panel and contains the "ON/OFF" switch, compressor status light, and the compressor hour meter.

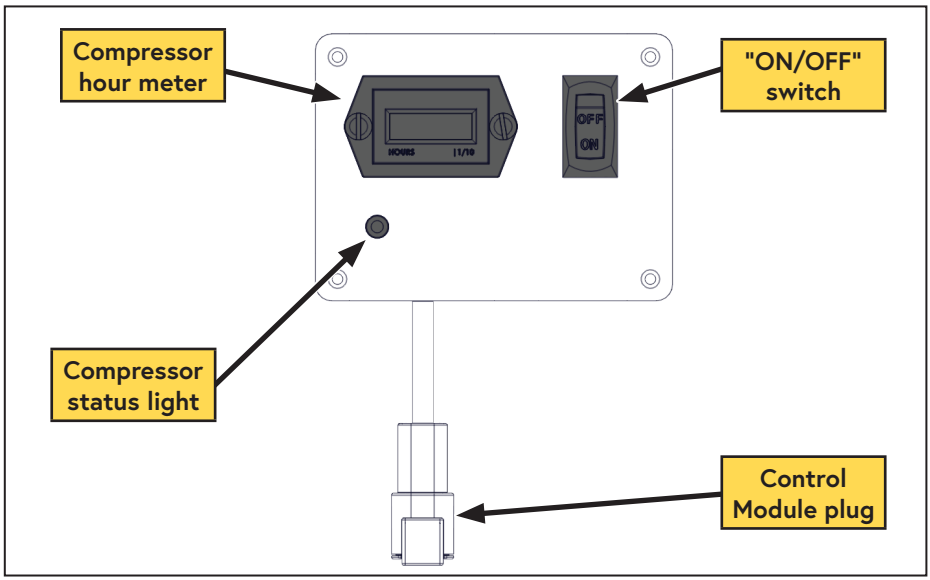


Figure 43 — Interface Panel

Throttle Control (Figure 44)

The throttle control responds to signals from the control module and commands the vehicle's throttle to increase or decrease engine speed in response to air demand.

The throttle control also allows the operator to configure the vehicle's engine speed (when air is demanded) to their needs (maximum cfm, specific tool requirements, fuel efficiency, or a combination of these factors).

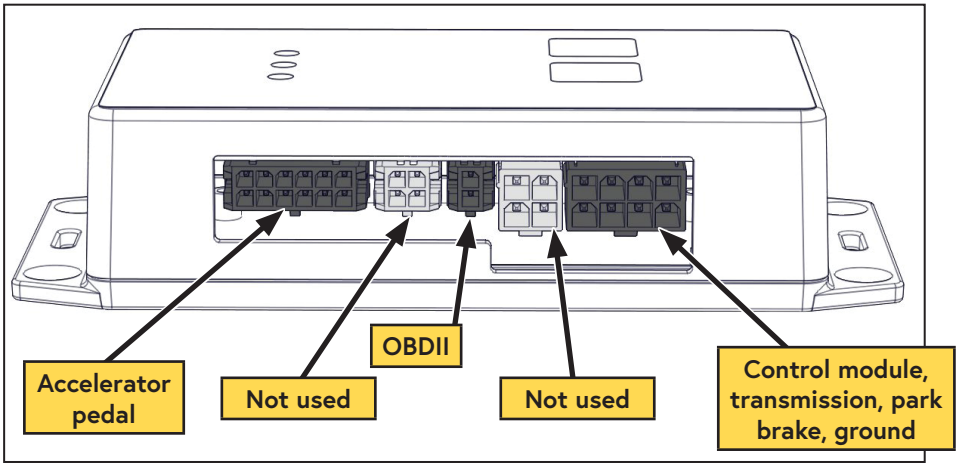


Figure 44 — VMAC digital throttle control

Mechanical Pressure Switch (Figure 69)

The mechanical pressure switch is mounted on the side of the WHASP Tank and limits the maximum pressure to a safe amount by disengaging the clutch once system pressure is achieved.

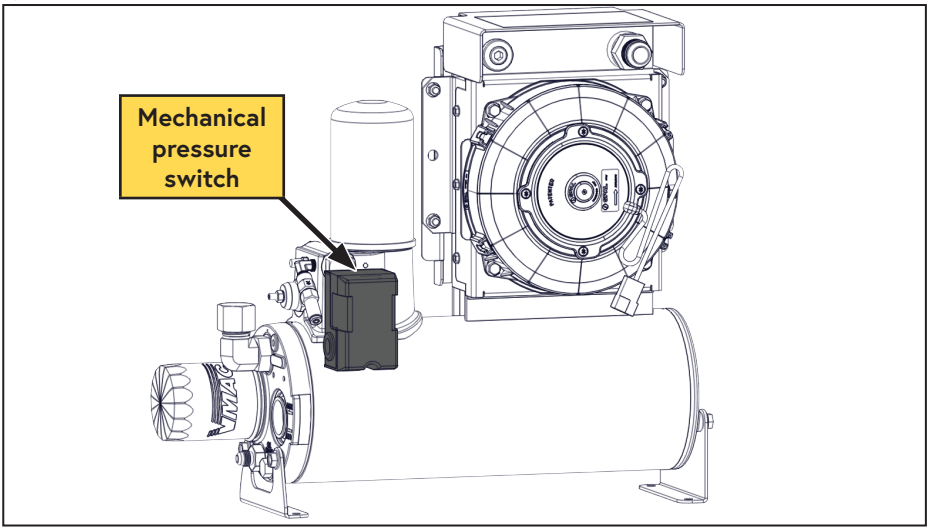


Figure 45 — WHASP Tank pressure switch

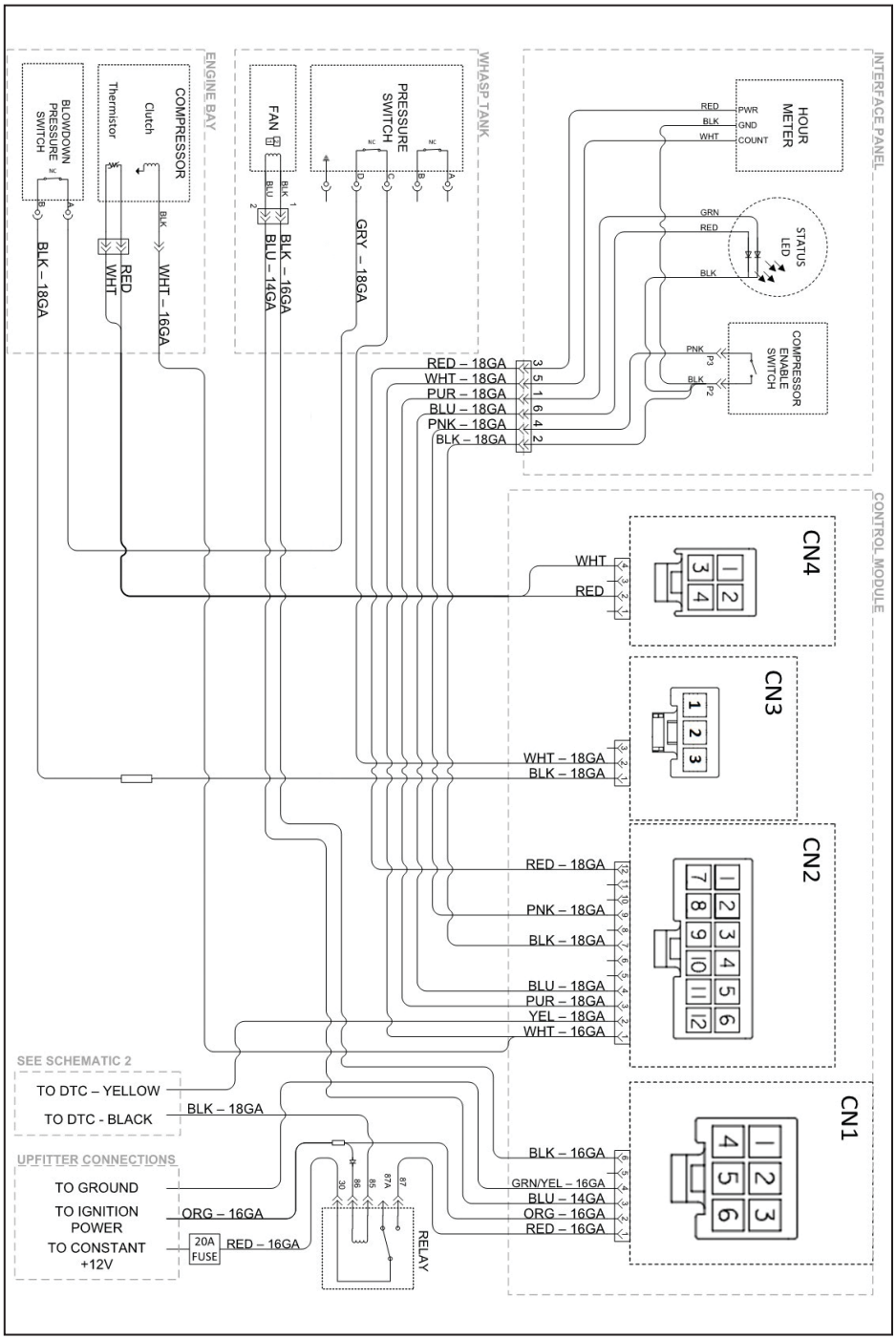


Figure 46 — Electrical schematic

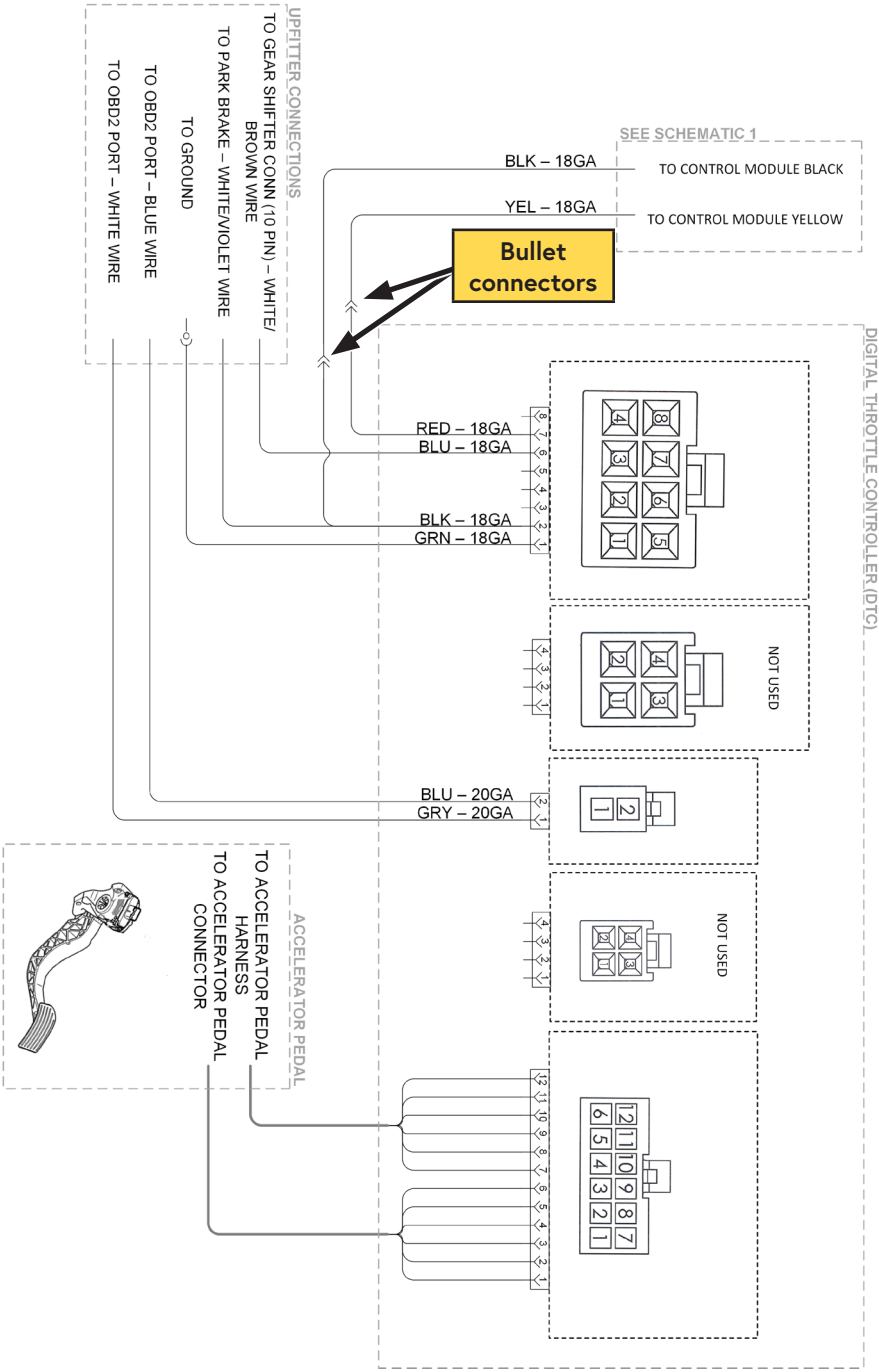


Figure 47 — Wire schematic

☐ Pry up the plastic cover at the base of the park brake lever. Pull the cover up the lever to the extent of the boot (Figure 48).

Figure 48 — Remove centre console

☐ Move both of the seats forward and remove the (×4) Torx screws located at the front and rear of the console beside both the driver and passenger seats (Figure 49).

Figure 49 — Remove centre console

☐ Lift the console up and shift it back as far as space allows.

☐ Remove the kick panel below the steering column (Figure 50).

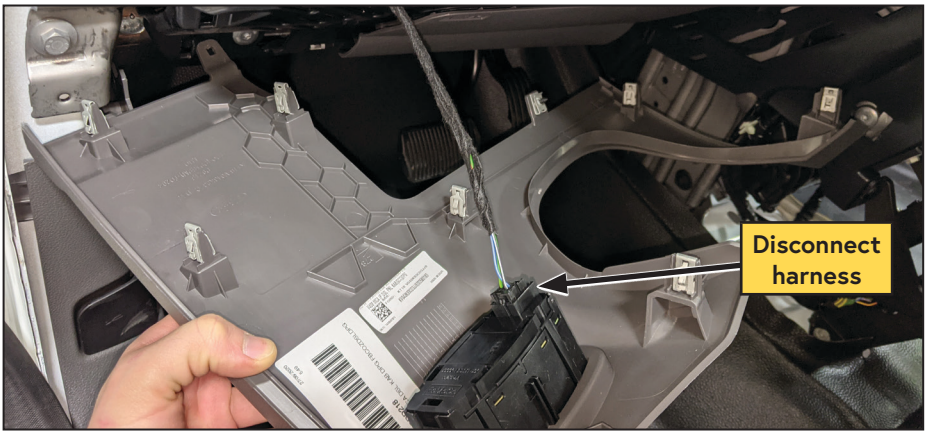


Figure 50 — Remove steering column kick panel

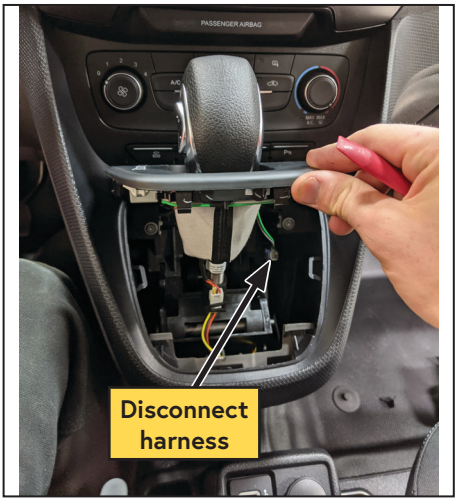
☐ Disconnect the harness and set the panel aside (Figure 50).

Airbags should only be removed by technicians that have been properly trained.

☐ ***Optional:*** To provide more room to route the wires, the airbag can be disconnected and removed.

☐ Move the gear selector to the "S" position.

☐ Gently pry the gear indicator plate up, reach underneath and disconnect the plug (on the passenger side) to allow enough room to pull the boot up the shifter (Figure 51).



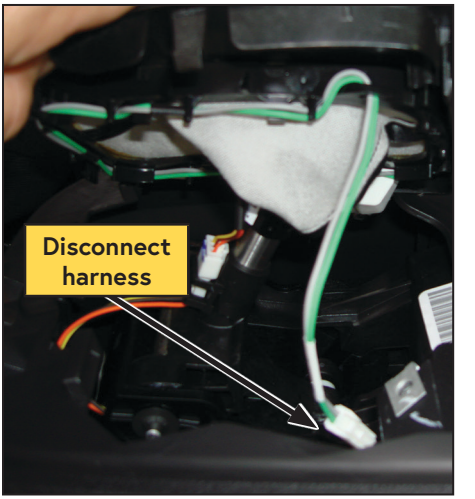


Figure 51 — Remove gear selector insert

☐ Remove the fasteners securing the checkered dashboard insert, starting from the steering column, and moving towards the glove box (Figure 52).

Figure 52 — Remove dashboard insert

☐ Remove the fasteners securing the lower dashboard (Figure 53).

Figure 53 — Remove dashboard insert

☐ Remove the push fasteners from both sides of the lower dashboard panel (Figure 54).

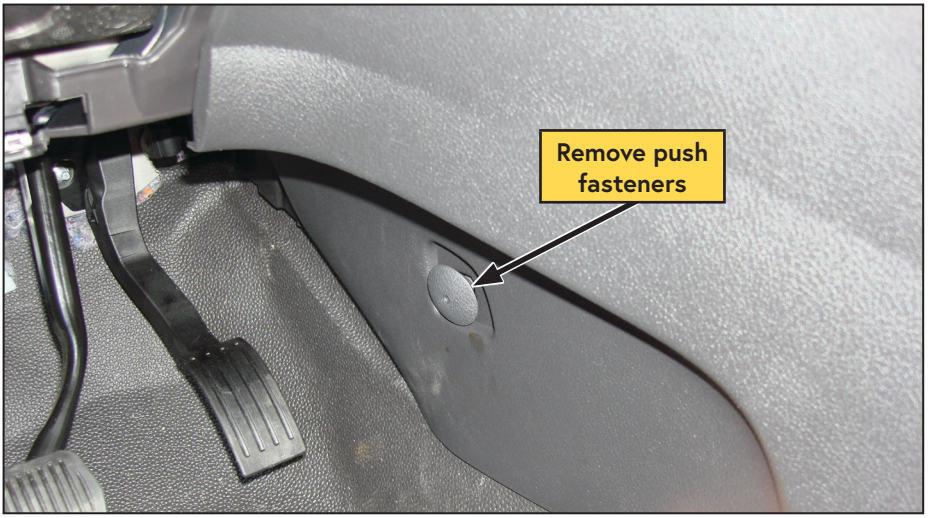


Figure 54 — Remove lower dashboard

☐ Remove the lower dashboard from vehicle (shown removed) (Figure 55).

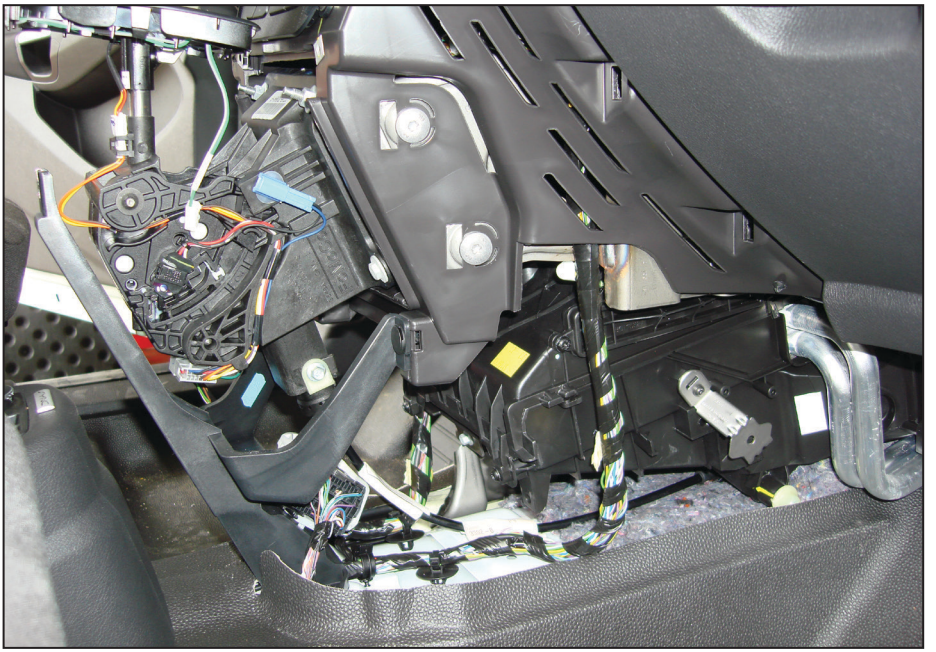


Figure 55 — Remove lower dashboard (shown removed)

☐ Remove the kick plate to the left of the foot pedals.

☐ Remove the doorsill trim panel.

☐ Remove the lower steering column cover (Figure 56).

Figure 56 — Remove steering column cover

Control Module

☐ Plug the 4 harnesses into the control module.

☐ Mount the control module under the dashboard, up and out of the way of the pedals, steering column, and the park brake mechanism.

☐ Mount the control module power harness relay near the control module.

☐ Connect the ground wire (green wire with yellow stripe) running from the control module to a good ground.

Throttle Control

☐ 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 bullet connector from the yellow wire, running from the control module, to the matching connector on the red wire running from the throttle control.

☐ Connect the green ground wires from the throttle control and control module to a chassis ground point.

☐ 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 19 and 20 on the back of the OBD II are a twisted pair (blue wire and white wire).

☐ Splice the light blue wire from the throttle control to the wire at pin 20 (blue wire at the time of writing) of the OBD II port (Figure 57).

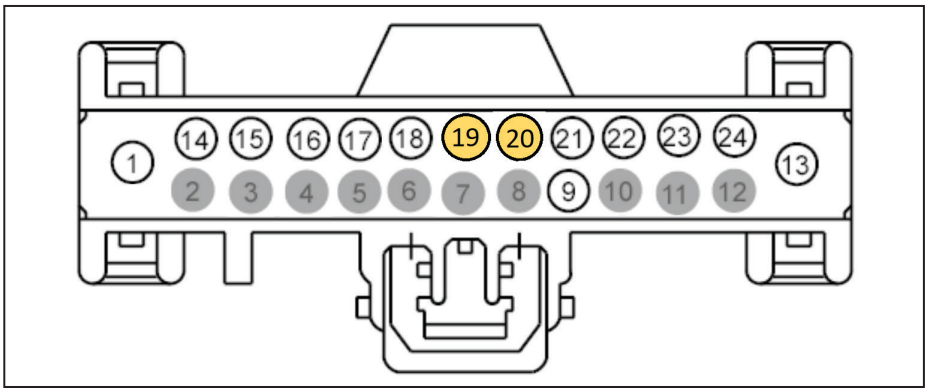


Figure 57 — OBD II connector

☐ Splice the grey wire from the throttle control to the wire at pin 19 (white wire at the time of writing) of the OBD II port (Figure 57).

☐ Apply protective loom to the black and blue wires from the throttle control.

☐ Route the wire bundle from the throttle control toward the gear selector.

☐ Unplug the connector at the bottom of the gear selector and splice the blue wire from the Throttle Control to the white/brown wire at pin 10 on the harness. Plug the connector back into the gear selector (Figure 58).

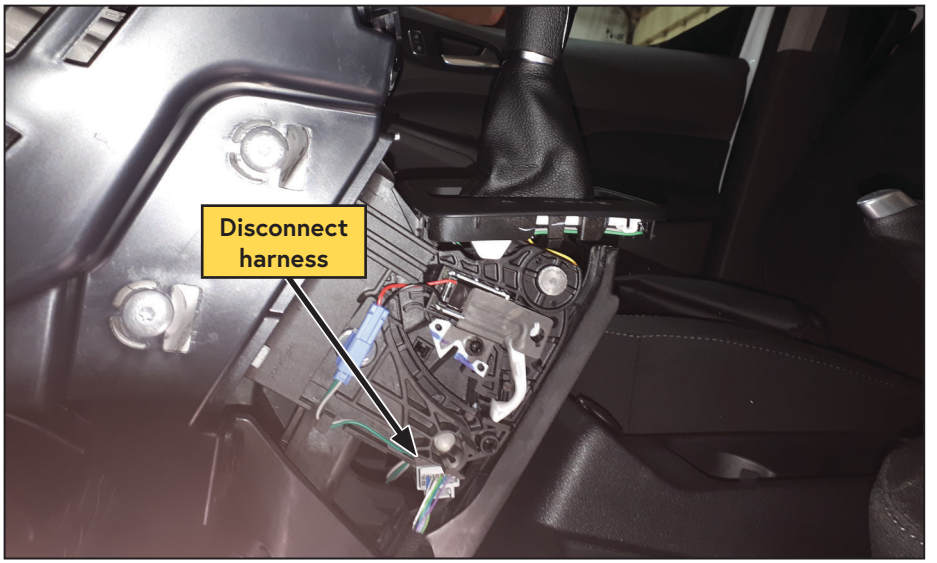


Figure 58 — Park interlock wire

☐ Unplug the ignition harness connector from the side of the steering column (Figure 59).

Figure 59 — Connect key switched power

☐ Splice the orange wire from the power harness running from the control module, to the violet wire with green stripe at pin 6 (IGN Switched 12 V) on the OEM harness.

☐ Plug the connector back into the ignition.

☐ Route the black wire from the throttle control to the park brake.

☐ Unplug the connector from the park brake switch (Figure 60).

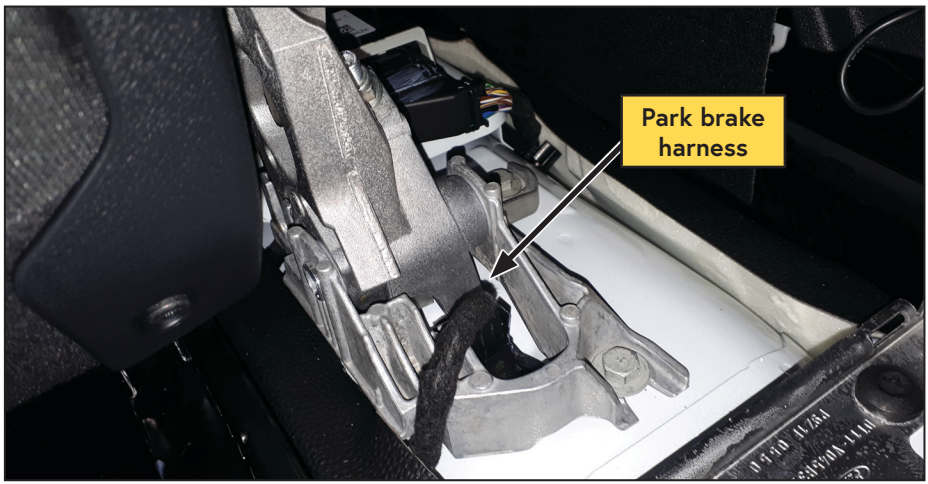


Figure 60 — Route wires

☐ Splice the black wire running from the throttle control to the white with violet stripe on the park brake connector

☐ Connect the bullet connector on the black wire running from the throttle control to the matching bullet connector on the control module harness.

☐ Cut the loop of grey wire from the black module on DTC main harness the (Figure 61).

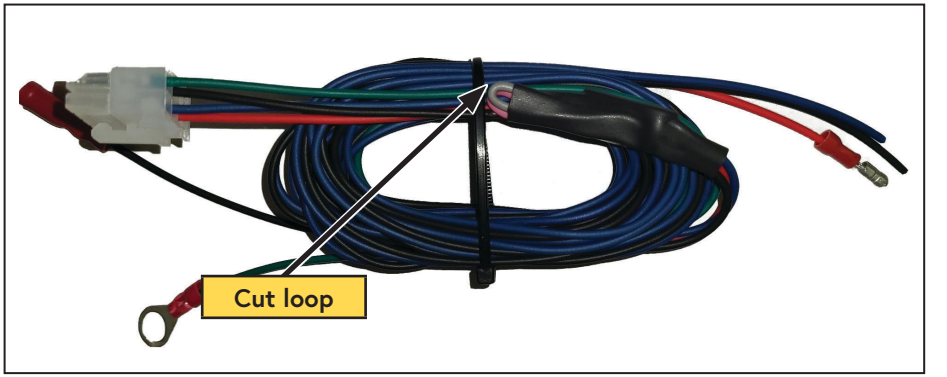


Figure 61 — Disable pull up harness

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

- ☐ *White 16 AWG wire with bullet connector from the control module (clutch wire).
- ☐ *Grey cable with the green connector from the control module (temperature sensor).
- ☐ *Red wire from the control module (constant power). Cover all of the engine compartment wires with plastic loom.

Engine Bay Connections

- ☐ Route the grey cable and white wire running from the control module along the OEM wiring harness, and around the degas bottle.
- ☐ Crimp the supplied fuse holder to the red wire running from the control module. Ensure the fuse holder is installed as close to the power source as possible.
- ☐ Connect the other end of the fuse holder to the positive battery terminal.
- ☐ Connect the green connector on the grey cable to the matching connector on the compressor.
- ☐ Connect the bullet connector on the white wire to the matching connector on the compressor.
- ☐ Connect the 2 pin connector on the pressure switch harness into the pressure switch.
- ☐ Route the black 18 AWG, and grey 18 AWG wires from the pressure switch into the cab.
- ☐ Route the black 18 AWG wire from the pressure switch to the to the control module.
- ☐ Using the butt supplied with the pressure switch harness, splice the black wire running from the pressure switch to the black wire running from pin 1 of the CN3 connector.
- ☐ Route the grey 18 AWG wire from the pressure switch to the WHASP Tank.

Interface Panel

☐ Install the Interface Panel in a suitable location (Figure 63).

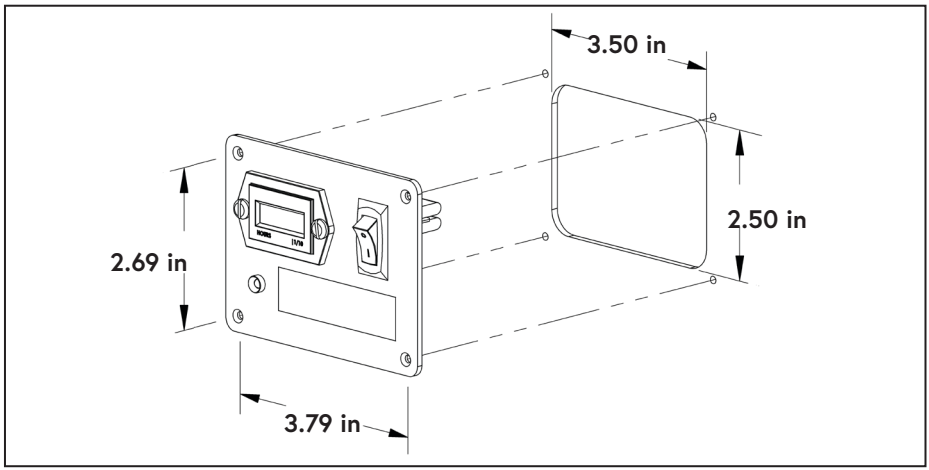


Figure 63 — Interface Panel mounting dimensions

☐ Connect the harness from the control module to the interface panel.

☐ Connect the fan connector from the control module to the plug on the WHASP Tank.

☐ Connect the ring terminals from the white wire running from CN3 of the control module, and the grey wire running from the pressure switch (at the compressor), to the pressure switch on the WHASP Tank (these are not polarity dependent) (Figure 62).

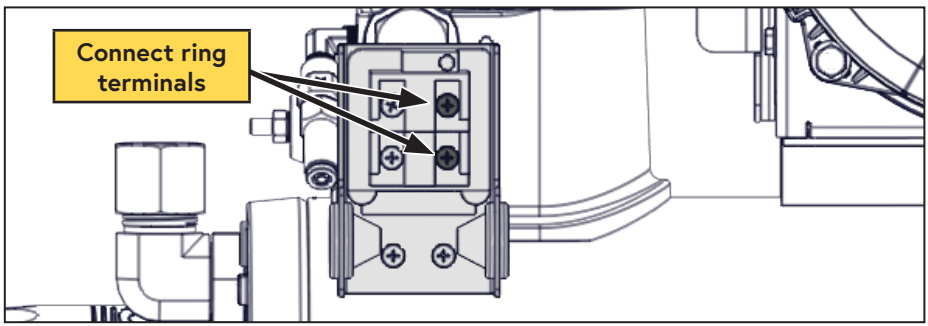


Figure 62 — Connect pressure switch

☐ Replace the cover when finished.

The WHASP Tank harnesses are made to a generic length. Any excess harness should be coiled up and secured out of the way.

There are 2 extra ring terminals included with the pressure switch harness; if desired, cut the harness to length and crimp the spare ring connectors to it.

☐ Ensure all wires and harnesses are protected with loom and routed away from sharp, hot, or moving components and away from high traffic areas.

Air Receiver Tank

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

The VMAC WHASP Tank has a built-in check valve. Use of an additional check valve is not required and may cause erratic performance.

The VMAC compressor system will automatically depressurize when it is shutdown. The WHASP Tank has a built in check valve which prevents blow back and moisture from the receiver tank entering the WHASP Tank. Installation of an additional check valve will cause erratic performance.

While the air receiver tank can be installed at any height in relation to the WHASP, the discharge hose running from the WHASP 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 64).

Drain the condensed water from the receiver tank daily.

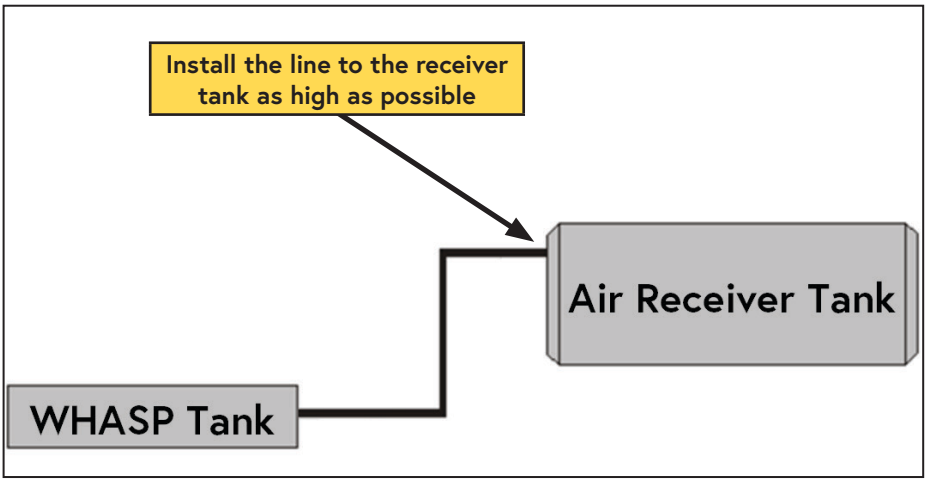


Figure 64 — Air receiver tank

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 60 for a list of products available for purchase through VMAC.

Larger Air Receiver Tank

A larger capacity air receiver tank provides a larger 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.

(This application requires a minimum air receiver tank size of 6 USG).

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 150 psi (1035 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.

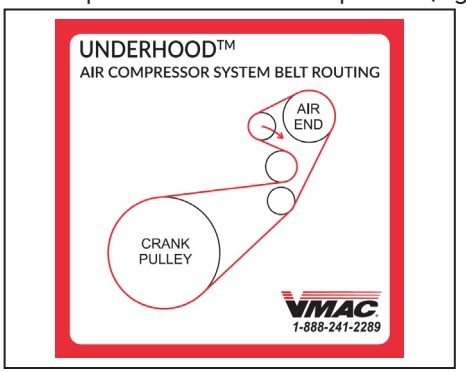
An appropriate air pressure regulator and lubricator can be installed downstream of the air discharge valve. Failure to regulate the air pressure may cause damage to the tool.

Completing the Installation

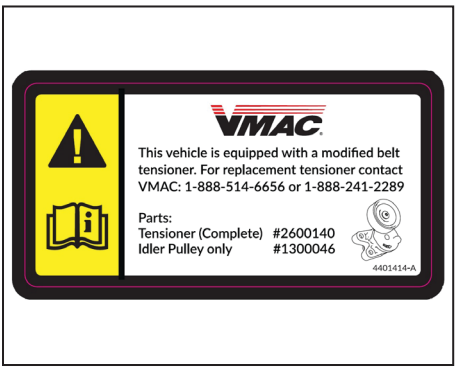
- ☐ Check all VMAC and OEM wiring to ensure that it will not contact any hot, sharp or moving components and will not interfere with the operation of the vehicle. Secure all wiring with rubber coated P-clips, cable ties and loom as required.
- ☐ Check all VMAC and OEM hoses and tubes to ensure that they will not contact any hot, sharp or moving components and will not interfere with the operation of the vehicle. Secure all hoses and tubes with rubber coated P-clips, cable ties and loom as required.
- ☐ Install the interior dashboard panels.
- ☐ Using the coolant retained earlier, refill the coolant reservoir.
- ☐ Install the lower engine cover.
- ☐ Install the OEM stretch belt on the outside track of the crank pulley.
- ☐ Install the passenger side inner fender.
- ☐ Install the passenger side front wheel.
- ☐ Connect the battery.
- ☐ 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 65).

Figure 65 — Advisory label

- ☐ Install the belt routing label and tensioner service label in the engine compartment near the compressor (Figure 66).



Belt routing label
(actual belt routing label may differ)



Tensioner service label

Figure 66 — Belt routing and tensioner service label

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 67).

Figure 67 — 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 68).

Figure 68 — Operating Instruction label

- ☐ Check all VMAC and OEM wiring to ensure it will not contact any hot, sharp or moving components and will not interfere with the operation of the vehicle. Secure all wiring with rubber coated P-clips, cable ties and loom as required.
- ☐ Check all VMAC and OEM hoses and tubes to ensure they will not contact any hot, sharp or moving components and will not interfere with the operation of the vehicle. Secure all hoses and tubes with rubber coated P-clips, cable ties and loom as required.

Testing the Installation

Lift the vehicle, ensuring the driven wheels are off of the ground. Support the vehicle securely with appropriately rated jack stands. Ensure there are no people around the vehicle before beginning the test.

If the vehicle fails the test, ensure the wiring to all of the connections are correct and secure. If additional assistance is required, contact your local VMAC dealer or call VMAC Technical Support 1-888-241-2289 or 250-740-3200.

Safety Test

Ensure the following has been completed:

- ☐ Place the transmission in "PARK" and apply the park brake. Turn the ignition key to "ON" but do not start the engine.
- ☐ Turn on the compressor and listen for the compressor clutch to engage.
- ☐ Observe the hour meter, and ensure the hourglass icon is blinking.
- ☐ Turn off the compressor switch and ensure the clutch has disengaged.

Before Starting the Engine Checklist

Ensure the following has been completed:

- ☐ Check that the compressor oil level at the tank sight glass is correct.
- ☐ Verify that the vehicle coolant level is correct.
- ☐ Complete a final inspection of the installation to ensure everything has been completed.
- ☐ Perform a final belt alignment check.
- ☐ Check all wiring for security and protection. Ensure nothing is touching the compressor body.
- ☐ 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

- ☐ Allow the vehicle to reach operating temperature.
- ☐ Turn on the compressor. The compressor clutch should engage, and the engine speed should increase in response to the throttle control. The vehicle's tachometer should indicate approximately 2,900 rpm.
- ☐ Once the engine speed reduces to base idle, 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.
- ☐ Install the VMAC Air Test Tool (P/N: A700052) with the 40 cfm (5/32 in) orifice installed and the ball valve closed.
- ☐ Start the engine. Assistance may be required for the next steps.

The following tests confirm that the drive disable system is working correctly. The drive disable system prevents the VMAC throttle from increasing engine rpm unless the transmission is in "PARK" and the park brake is engaged (it does not disengage the clutch!).

2 people are required to perform this safety test. 1 person must remain in the driver seat and be prepared to actuate the service (foot) brake if necessary.

The second person will actuate the compressor switch and ball valve as necessary.

- ☐ With the engine running and the vehicle in "PARK", release the parking brake.
- ☐ Start the compressor via the switch.*
  - ☐ *The compressor clutch should not engage.
  - ☐ *Engine speed should remain at OEM base idle.
  - ☐ *The VMAC digital throttle control should not be active at all (no LED's illuminated).
- ☐ Turn the compressor off via the switch.
- ☐ Reapply the park brake.

The steps marked with asterisks will be repeated.

- ☐ *With the engine running, depress the service (foot) brake and shift the transmission out of "PARK".

*Turn on the compressor and open the ball valve.

  - ☐ The clutch should engage, but engine speed should NOT increase.
  - ☐ *The "STATUS" and "PRNDL" LED's on the digital throttle control ***will turn off.***

- ☐ *Close the ball valve.
- ☐ *Turn off the compressor.
- ☐ *Drain any accumulated air from the system.
- ☐ *Shift the transmission into "PARK".
- ☐ Repeat the steps marked with asterisks for all transmission selector positions, returning the gear selector to "PARK" and cycling the compressor "OFF", then "ON" after each gear is tested.

Engine speed should not increase unless the vehicle is in "PARK".

- ☐ Drain any air that may have accumulated during the previous tests.
- ☐ Ensure the parking brake is engaged.
- ☐ Turn on the compressor and open the ball valve.
- ☐ Release the park brake.*
  - ☐ *The compressor clutch should disengage.
  - ☐ *Engine speed should drop to OEM base idle.
  - ☐ *The VMAC digital throttle control should be deactivated (no LED's illuminated).
- ☐ Reapply the park brake.*
  - ☐ *The system should remain off.
  - ☐ *Turn the compressor off.
- ☐ Close the ball valve.
- ☐ Start the compressor via the switch.*
  - ☐ *The system should start and build air normally. Allow the system to build to full system pressure.
- ☐ Turn off the compressor.
- ☐ Shut down the engine.
- ☐ Drain any accumulated air 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).

The WHASP Tank cooling fan is thermostatically controlled, and may start or stop without warning.

- ☐ Road test the vehicle for approximately 20 km (14 miles).
- ☐ Observe the compressor while it is operating to ensure the belts rotate properly, pulleys rotate smoothly and nothing is rubbing or contacting hot parts.

Once the engine is turned off and the system has cooled:

- ☐ Check all components, connections and fasteners.
- ☐ Check the compressor oil level.
- ☐ Check the coolant level.

Performance Testing and System Adjustments

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 40 cfm (5/32 in) orifice in the outlet to simulate tool use (Figure 51).

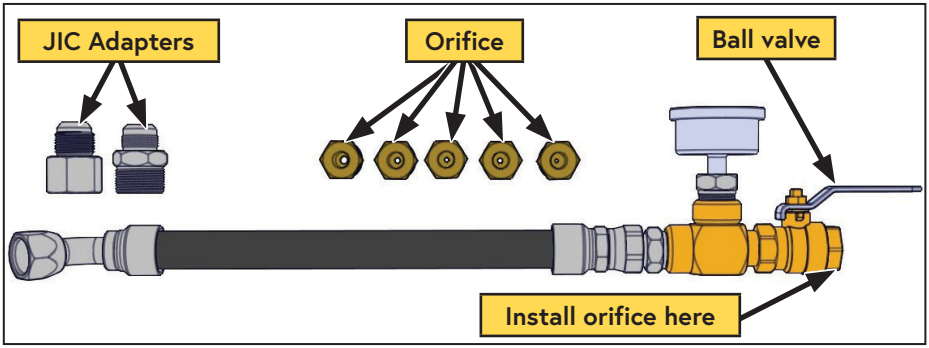


Figure 69 — A700052 VMAC Air Test Tool

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

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 system outlet with the 40 cfm (5/32 in) orifice.
- ☐ Ensure 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 2,900 rpm.
- ☐ Close the air valve slowly to allow the system pressure to rise. When the pressure reaches the pressure switch set-point of 150 psi, the system will disengage the compressor clutch and reduce the engine speed to base idle.
- ☐ Once the system pressure is at maximum pressure, slowly open the ball valve on the test tool until the pressure on the gauge begins to drop. Engine speed should ramp up to approximately 2,900 rpm when the pressure drops approximately 40 psi below the pressure switch set-point.

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.

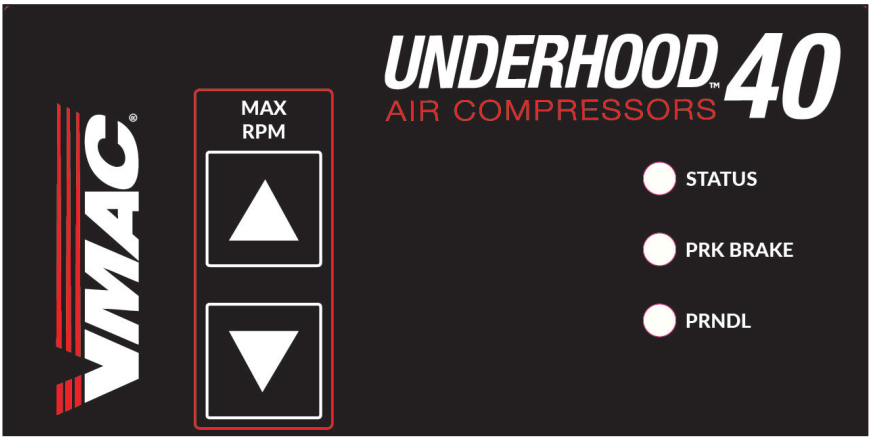


Figure 70 — Throttle control

	If the vehicle is placed into gear, or the park brake disengaged, the "STATUS" LED and the "PRNDL" or "PRK BRAKE" 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.***
	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***

In order to perform a factory reset, or adjust the "MAX RPM", the throttle needs to be active and engine rpm elevated; VMAC recommends installing the VMAC Air Test Tool (P/N: A700052) with the 40 cfm (5/32 in) orifice. Turn the system on and open the ball valve, allowing the engine speed to increase.

MAX RPM

The cfm produced by the system is directly related to engine speed; this system delivers 40 cfm at 2,900 rpm.

Maximum VMAC rpm can be adjusted between 2,000 rpm and 3,200 rpm (in 50 rpm increments) via the "▲" or "▼" buttons in the "MAX RPM" column.

Factory Reset

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

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 (Figure 23).

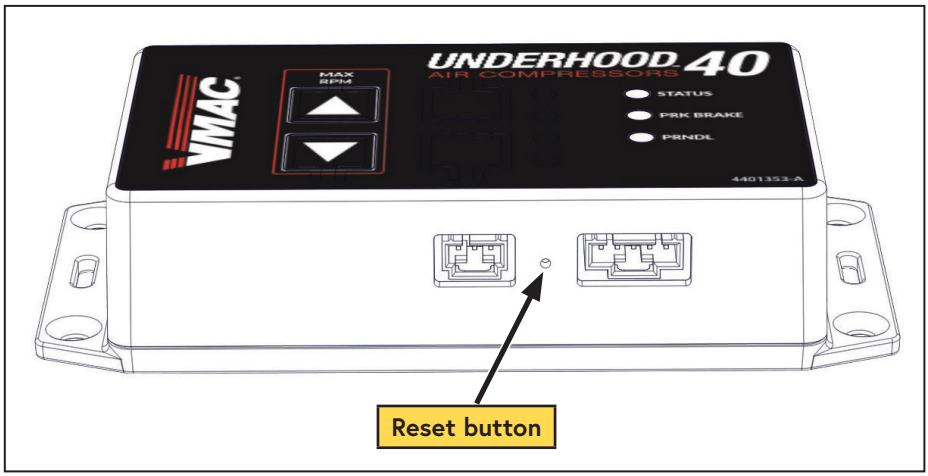


Figure 71 — Reset button

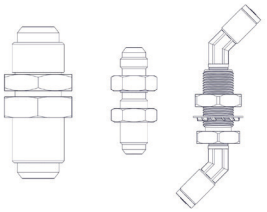
Accessory Products from VMAC

Compressor Service Kits

200 Hour or 6 Month Service Kit -
Part number: A700263
Includes 4 L VMAC high performance compressor oil, oil filter, air filter, and next service due decal.

400 Hour or 1-Year Service Kit -
Part number: A700264
Includes 4 L VMAC high performance compressor oil, oil filter, air filter, spin-on oil separator, safety valve, muffler, and next service due decal.

Bulkhead Fittings



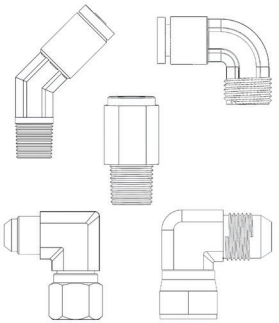
Part number: 3801095

Includes:

Bulkhead fittings are used for passing the system discharge, oil, and scavenge hoses through the floor or body panels.

- 3/4 in JIC bulkhead fitting P/N: 4900170.
- 3/8 in JIC bulkhead fitting P/N: 4900209.
- 1/8 in NPT bulkhead fitting P/N: 5000178.
- 2 × 45° 1/4 push-to-connect fittings P/N: 5000158.

Hose Fittings



45° 1/4 push-to-connect fitting P/N: 5000158.
1/4 in push-to-connect fitting For PTFE scavenge tube.

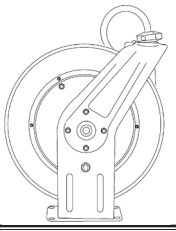
90° 1/4 push-to-connect fitting P/N: 5000020.
1/4 in push-to-connect fitting For PTFE scavenge tube.

Straight 1/4 in push-to-connect fitting P/N: 5000012.
1/4 in push-to-connect fitting For PTFE scavenge tube.

90° 3/8 in hose fitting P/N: 4900117.
3/8 in hose fitting for Oil Return Hose.

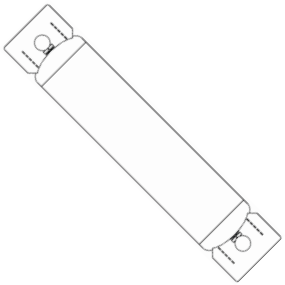
90° 3/4 in hose fitting P/N: 4900043.
3/8 in hose fitting for Compressor Discharge Hose.

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.

6 Gallon Air Receiver Wing Tank



Part number: A300056
Air receiver tanks are used for lowering compressor duty cycle and removing water from compressed air; recommended for optimum operation of all VMAC Gas Driven, Diesel Driven, Hydraulic, and UNDERHOOD40 air compressors. Manufactured to FMVSS 121 standard; includes fittings, 170 psi pressure relief valve, and tank drain.

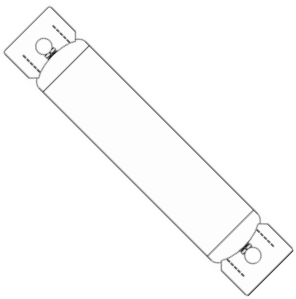
- Max pressure: up to 170 psi.
- Dimensions: 32 in (81.3 cm) L × 8 in (20.3 cm) D.
- Weight: 23 lb (10.4 kg).

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).

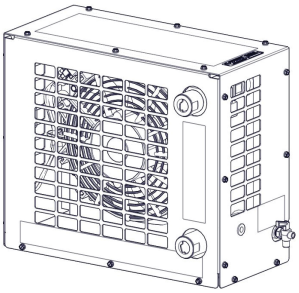
35 Gallon Air Receiver Wing Tank



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).

UNDERHOOD 70 Air Aftercooler

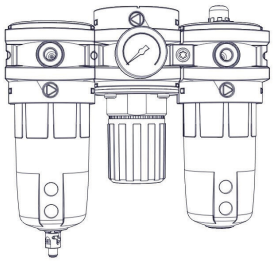


Part number: A800070

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

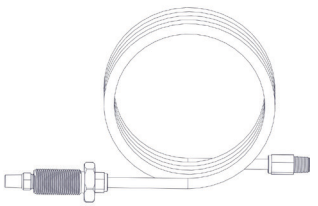


Part number: A700151

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.

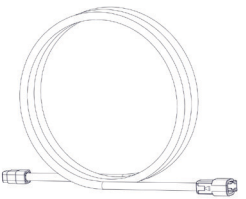
Remote Muffler



Part number: A700224

The A700224 WHASP remote mount muffler kit is designed to relocate the blowdown muffler to an external location. This is recommended for applications where the WHASP Tank will be located inside of a van or service body, the remote mounted muffler will reduce cabin noise when the compressor blowdown operates, and will ensure any oil vapor will be safely discharged outside of the vehicle.

Interface Harness Extension



Part number: A700265

This interface harness extension provides an additional 10 ft of cable which allows for greater flexibility in locating the Interface Panel.

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: **V** _ _ _ _ _ _ _ _ _ _ _ _ _
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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