VMAC®

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Transmission Mounted Air Compressor with Hydraulic Pump (DTM70 – H) Owner's Manual

VMACAIR.com

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Revision	Revision Details	Revised by	Checked by				Implemented
			Eng.		Tech.	Qual.	
			Mech.	Elec.			
D	ECN: 24-153 Add Out Of Park information.	BDJ	N/A	CAB	BDJ	N/A	23 Oct. 2024

Additional Application Information

- This manual applies to DTM70-H systems equipped with a hydraulic pump only (DM2xxxx). For information related to standalone DTM systems (DM0xxxx), please refer to the DTM owner's manual.

Registered Trademarks

All trademarks mentioned in this manual are the property of their respective owners. VMAC's use of manufacturers' trademarks in this manual is for identification of the products only and does not imply any affiliation to, or endorsement of said companies.

Important Information

The information contained in this manual is based on sound engineering principles, research, and extensive field experience. Information is constantly changing with the addition of new models, assemblies, service techniques and unannounced OEM changes. If a discrepancy is found in this manual, contact VMAC prior to initiating or proceeding with installation, service, repair or operation. Current information may clarify the issue. Any person 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 assure 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 any person to properly adhere to standard safety practices or the procedures set out in this manual. Safety should be the first consideration when operating, or performing any service to the equipment. If there are any questions concerning the procedures in this manual, or more information is required, please contact VMAC before beginning repairs.

Notice

Printed in Canada

General Information

Introduction

This manual provides operating instructions, specifications, adjustment, maintenance and warranty information for VMAC Direct Transmission Driven Air Compressor systems. Read this manual prior to servicing or operating the compressor system.

Follow all safety precautions when servicing or operating the VMAC system as moving drive belts, fan blades and other rotating components pose an extreme hazard.

Proper service and repair are important to the safety of the operator and the safe, reliable operation of the equipment. Always use genuine VMAC parts.

The procedures described in this manual are the only approved methods of service and operation.

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 specific installation 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.

Ordering Parts

To order parts, contact a VMAC dealer. The dealer will ask for the VMAC System ID (see page 11), part number, description and quantity. Locate the nearest dealer online at www.vmacair.com/dealer-locator or call 1-877-912-6605.

Additional Support

Additional resources such as installation manuals, illustrated parts lists, the VMAC Knowledge Base, air tool consumption guides, etc. are available at https://www.vmacair.com/support/.

Safety

Safety Messages

This manual contains various warnings, cautions and notices that must be observed to reduce the risk of personal injury during operation or service, and the possibility that improper operation or service 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.

Safety Precautions

As the VMAC compressor system is an industrial grade compressor, it is assumed that the operator has been trained in industry specific safety practices.

Read this information before operating the compressor for the first time. Follow the information and procedures in this manual for operation, maintenance and repair.

Follow all safety precautions for safe operation or service. Moving belts and rotating components are an extreme hazard. Stay clear of all moving parts when the system is operating. Only qualified personnel should perform maintenance and repair on system components and only while the system is properly shut down and depressurized.

Proper service and operation are important to the safety of the operator and the safe, reliable operation of the equipment. Always use genuine VMAC parts.

The procedures described in this manual are effective methods of service and repair. Some procedures may require the use of special tools designed for a specific purpose. Anyone using a replacement part, service procedure or tool must ensure that neither their safety, nor the safe operation of the equipment will be compromised by the replacement part, service procedure or tool selected.

Harmful Vapours

Breathing fuel vapours or engine exhaust can expose you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well ventilated area.
- Do not breathe engine exhaust, internal combustion engines produce carbon monoxide, a poisonous odorless gas which can cause death. Do not start or operate this compressor in an enclosed area.
- If in an enclosed area, vent the exhaust to the outside and ensure there is adequate access to fresh breathable air..

Burn Hazard

- The compressor system gets very hot during operation, contact with the components or the oil can cause serious injury. Allow sufficient time for the system to cool before performing service.
- Never allow any part of your body to contact the engine or compressor components.
- Do not attempt to service the compressor until it has sufficiently cooled.

Personal Safety

- Follow all safe work practices.
- Do not breathe the compressor air. Vaporized oil is a respiratory hazard.
- Service should only be performed by qualified personnel.
- Always use the appropriate personal protective equipment, particularly eye and hearing protection when operating or servicing air powered equipment.
- Do not leave the vehicle unattended.

Fire and Explosion Hazard

- Vaporized oil propelled by high pressure air is a potentially explosive mixture.
- Fire in the compressor can cause an explosion and flame projection. Should this occur, there is potential for serious injury or death.
- Operate the compressor system in a well ventilated area free of flammable vapors, dust, or other combustible materials.
- Never place objects against or near the compressor components.
- Never expose the AOST or compressor to extreme heat.

- Serious injury or death may result from an air tank explosion.
- Never exceed manufacturer's maximum air pressure rating.
- Do not repair components, only replace with approved parts.
- Do not tamper with or disable factory safety equipment.

Compressor Air and Oil Hazard

- The compressor system is under sufficient pressure that a leak could force the air/oil mixture through the skin directly into the bloodstream. This could cause serious injury or death.
- Ensure the system is completely depressurized before attempting maintenance or repair.
- Do not use compressed air to clean off clothing or skin, compressed air can penetrate the skin causing serious injury or death.
- Do not service the compressor while it is pressurized or operating.
- Components and hoses under pressure could separate suddenly, causing serious injury or death. If equipped, the air receiver tank must be drained before servicing any components in the compressor system.
- Never adjust or attempt to make any repairs to the system while the engine is running.

Moving Parts Hazard

- Before performing service, disconnect the negative battery cable.
- Avoid contact with drive belts and other moving parts while the system is in operation.

General Warnings

- Be attentive for unexplained changes in operation and record any changes.
- Check the compressor oil level and condition before starting the system. Do not add or change oil while the system is running. Use only approved oil.
- The compressor operates anytime the engine is running.
- Keep hoses and wiring away from hot, sharp, or moving components.
- Use only approved hoses and replacement parts.
- Do not modify the equipment.
- Do not operate the air compressor when fatigued or under the influence of alcohol or drugs.
- Know how to operate the compressor, read this manual prior to operation.
- Inspect equipment before every use.
- Never bypass or disable any of the safety equipment.
- Never adjust or attempt to make any repairs to the compressor system while the engine is running or the air system pressurized. Components and hoses under pressure could fail and cause serious injury or death.
- The vehicle must be in "Park" (for automatic transmissions) or "Neutral" (for manual transmissions) with the park brake or air spring brake fully applied before starting the compressor and at all times during compressor operation.
- Use a regulator in the output line to precisely control the final air delivery pressure.
- Run the system at idle speed under no-load conditions for 1 minute before turning the system off, to allow system cooling and lubrication.

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, 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 "Standard" 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).

System Specifications

Model
- Transmission Mounted Air Compressor (DTM70-H).

Compressor Type
- Flooded lobe, rotary screw.

Drive System
- Power Take Off (PTO) on transmission.

Control
- Electric on/off 12 V control.

Maximum Air Delivery
- Up to 70 cfm and 175 psi (1207 kPa).

Pressure Regulation
- Mechanical inlet control valve with remote regulator (modulates flow in response to demand).

Engine Control (electronic throttle control)
Dependent upon the DTM model, the system will be equipped with either a variable speed throttle or a 2 speed throttle. Refer to the installation manual to determine which throttle is included in the kit.

2 Speed Throttle:
- 2 fixed speed settings. Engine speed set points can be adjusted for air or hydraulic flow requirements.

Variable Speed Throttle:
- **"Fixed RPM":** Engine speed is preset to meet hydraulic requirements and remains constant.
- **"VARIABLE RPM"** Engine speed modulates to meet air demand. Hydraulic flow is regulated via the hydraulic priority valve.

Hydraulic Gear Pump
- Multiple hydraulic pump options are available dependent upon flow requirements.

Some vehicles have onboard computers that must be programmed by the OEM to permit operation of the electronic throttle control.

Safety Features
- 200 psi (1380 kPa) pressure relief valve in the Air Oil Separation Tank (AOST).
- Thermal monitoring and electronic control.
- Rapid blowdown valve to relieve system pressure on shutdown.
- Drive Disable Circuit.

Lubrication
- VMAC High Performance Compressor Oil.

Filters
- Air filter: Paper element.
- Oil filter: High pressure spin-on.
- Coalescing separator element (in AOST).

Identifying Your System

The System ID will be requested any time that parts are ordered, when calling for technical support or submitting a warranty claim.

The system ID is the preferred method of identifying the system as it serves as a master record of all of the components in the system. The system ID plate is generally found on the radiator cross member, or in some instances, the inner fender or firewall (Figure 1).

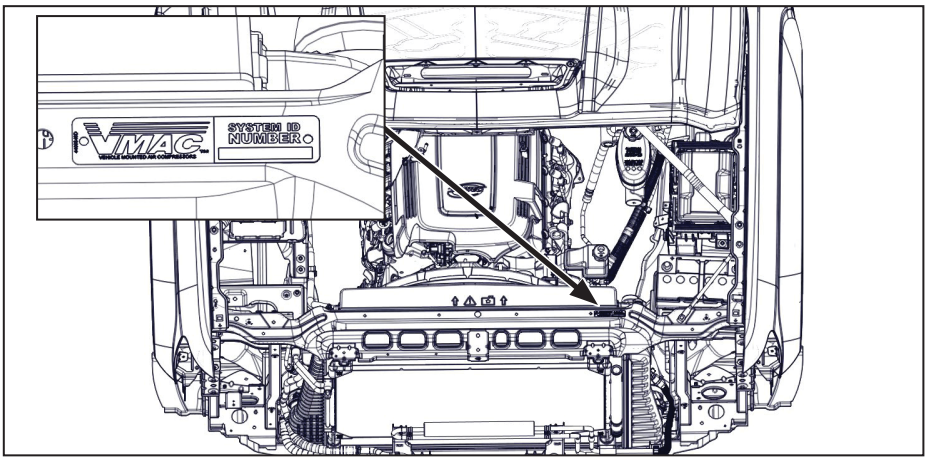


Figure 1 — System ID location

An alternative method of identifying the system is via the compressor serial number which is found on a plate attached to the compressor. This is a less desirable method of identifying the system as it may not link back to the original system if it has been replaced.

System ID breakdown

The system ID provides specific information about the system such as the model, revision, production date and the unique identifier (Figure 2).

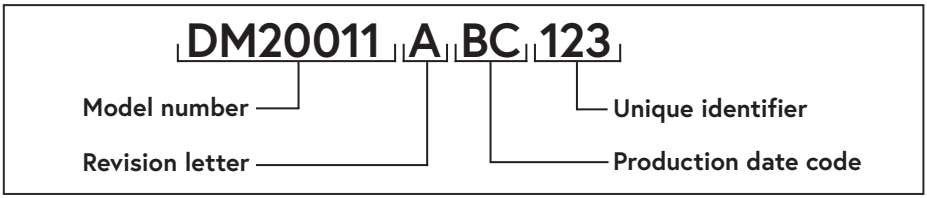


Figure 2 — System ID breakdown

System Components

The Transmission Mounted Air Compressor system consists of the following components:

- Air Oil Separator Tank (AOST).
- Compressor with hydraulic pump.
- Oil return, Air/Oil discharge hoses.
- PTFE oil scavenge and pressure control tubes.
- Black air brake pressure control tube.
- Digital Control Box.
- Throttle Control (Analog or Digital).
- Liquid to liquid oil cooler.
- PTO indicator panel.
- Priority valve (only included with select models).

AOST

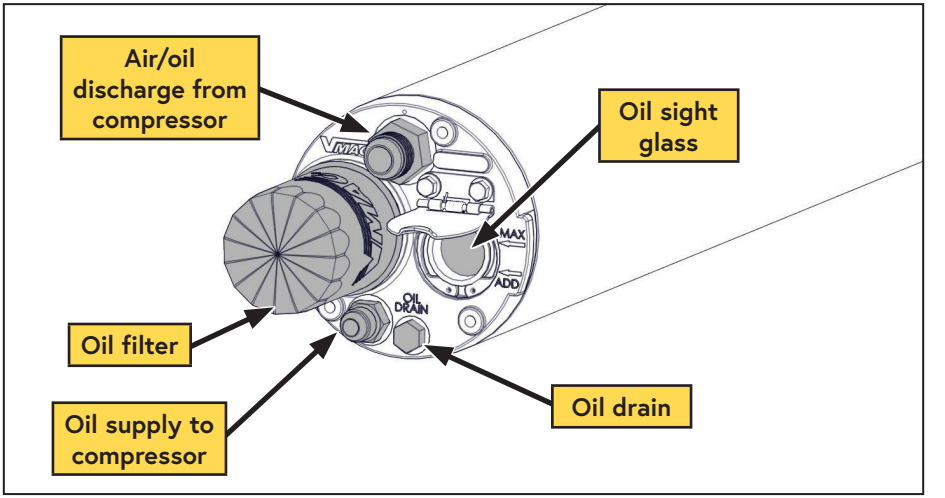


Figure 3 — AOST (front)

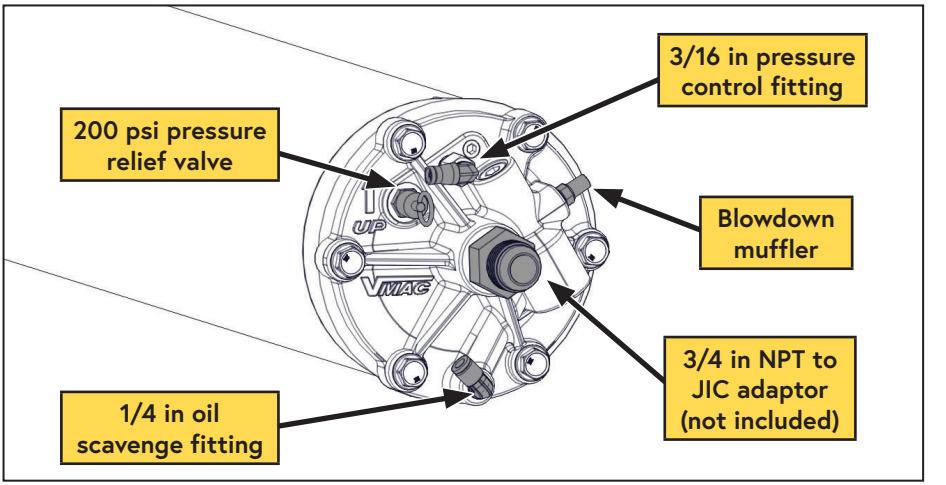


Figure 4 — AOST blowdown cap (back)

Compressor

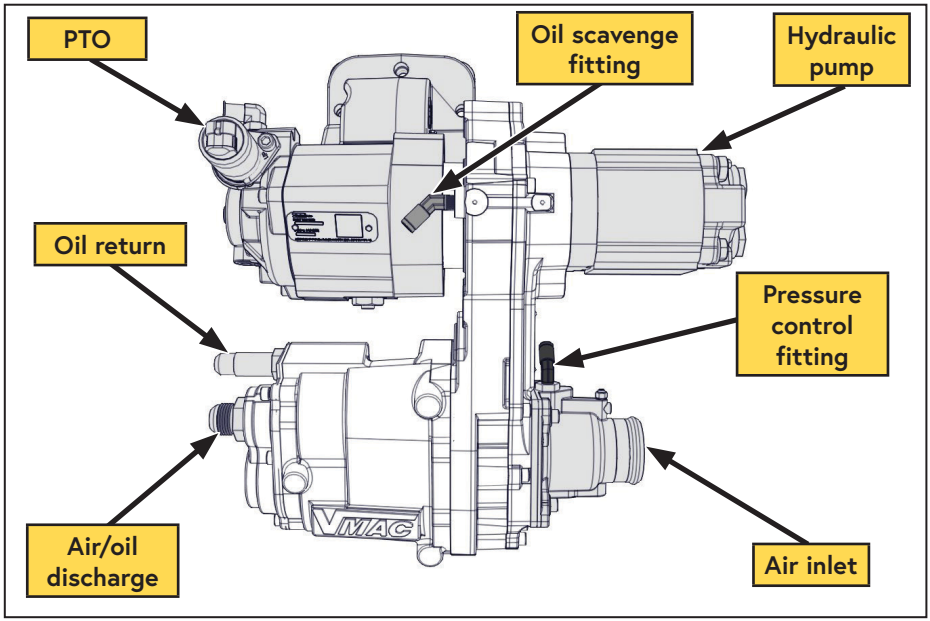


Figure 5 — Compressor assembly

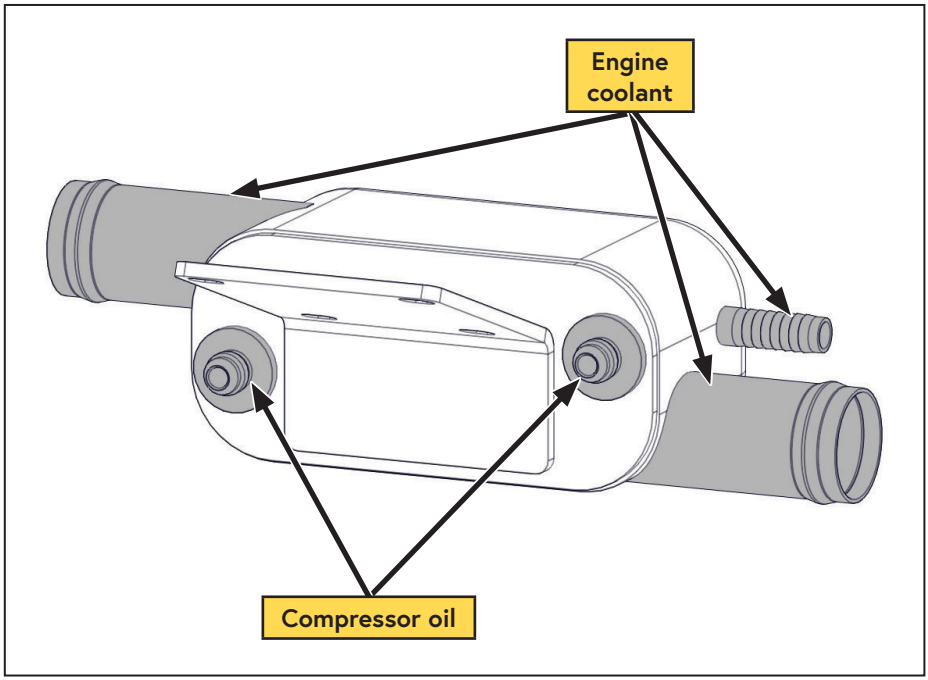


Figure 6 — Oil cooler

PTO Indicator Panel

The PTO light indicates to the operator when the PTO is engaged. The PTO mode selector switch* is used to toggle the VMAC throttle control between "FIXED MODE" (when hydraulic output is required but air is not needed) and "VARIABLE MODE" (when maximum compressed air output is needed) (Figure 7).

The PTO selector switch is only included with select models of DTM70-H.

Figure 7 — PTO indicator panel and selector switch

Hydraulic Priority Valve

The priority valve allows the system to generate more air while ensuring the hydraulic circuit receives the correct hydraulic flow (Figure 8).

The hydraulic priority valve is only included with select models of DTM70-H.

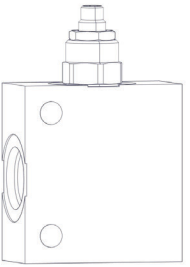


Figure 8 — Hydraulic priority valve

Hoses / Tubes

The hoses used in VMAC compressor systems have an AQP inner liner that is compatible with VMAC compressor oil. The PTFE tubes used in VMAC systems are rated for the high temperatures VMAC compressors generate. Use of hoses or tubes other than those supplied or recommended by VMAC may cause compressor damage and may void your warranty. Please contact VMAC for replacement hoses/ tubes or for further information.

- Hoses must have an AQP liner.
- Oil scavenge tubes must be PTFE.
- The black air brake tube is only suitable for use in the remote pressure control.

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.

Throttle Control (Analog / Digital)

The VMAC throttle control interfaces with the vehicle's throttle and will increase engine speed when the VMAC is engaged. Dependent upon the model, VMAC DTM70-H systems include either a 2 speed throttle or a variable speed throttle,

2 speed throttles will increase engine speed to a set speed when the compressor is engaged; this engine speed is set based on a balance between hydraulic output needs and the volume of compressed air required. The optional second speed can be configured to offer higher compressor output but provisions must be put in place to prevent providing too much hydraulic flow to the hydraulic circuit.

The variable speed throttle control responds to signals from the pressure sensor and commands the vehicle's throttle to increase or decrease engine speed in response to air demand. It utilizes a priority valve to prevent the hydraulic system from receiving too much hydraulic flow.

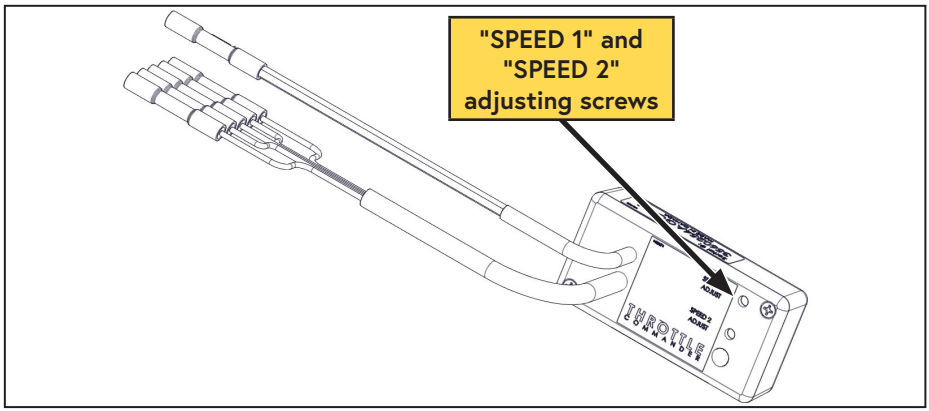


Figure 9 — Analog throttle control (2 speed)

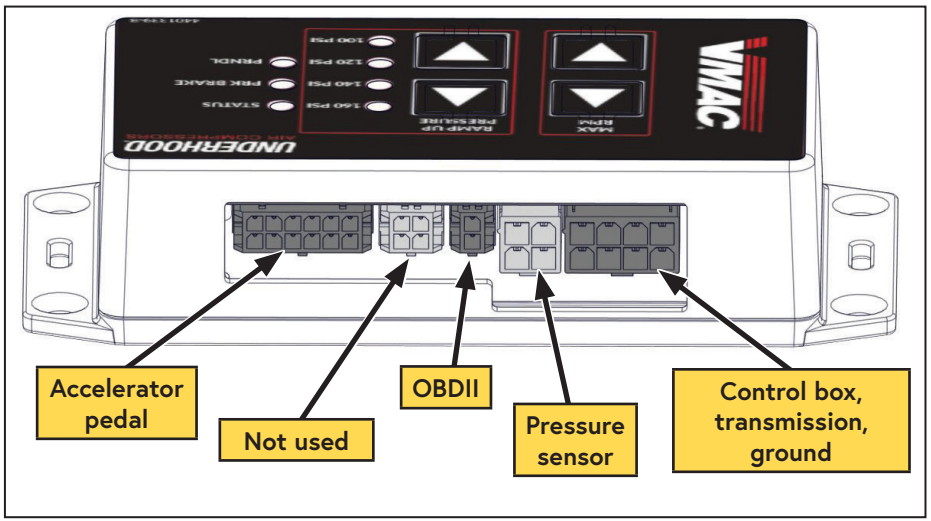


Figure 10 — Digital throttle control

Digital Control Box

The Control Box serves as the operator's control panel and contains the "ON/OFF" button, "READY" and "WARNING" lights, and the display LED which includes information such as compressor hours, service reminder, warning messages, error codes, and diagnostic information.

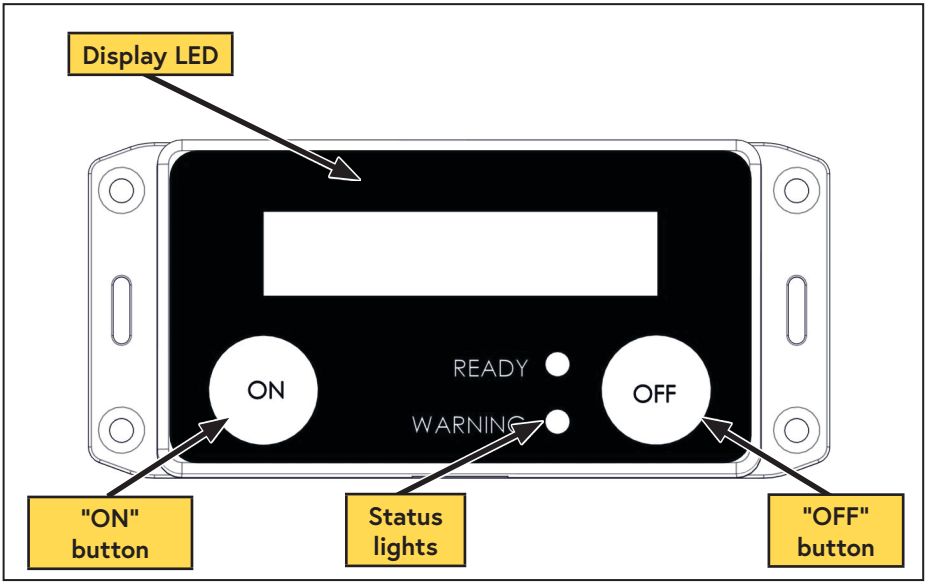


Figure 11 — Control Box

Digital Control Box Features and Operation

In addition to turning the compressor on and off, the digital control box also:

- Monitors compressor system temperature.
- Monitors battery voltage.
- Monitors the park brake signal.
- Monitors the PTO solenoid current.
- Monitors air temperature and automatically enables/disables the power inverter and the compressor heater as required.
- Logs errors.
- Displays error messages.
- Provides 200 hour and 400 hour service reminders.

Component Placement Overview

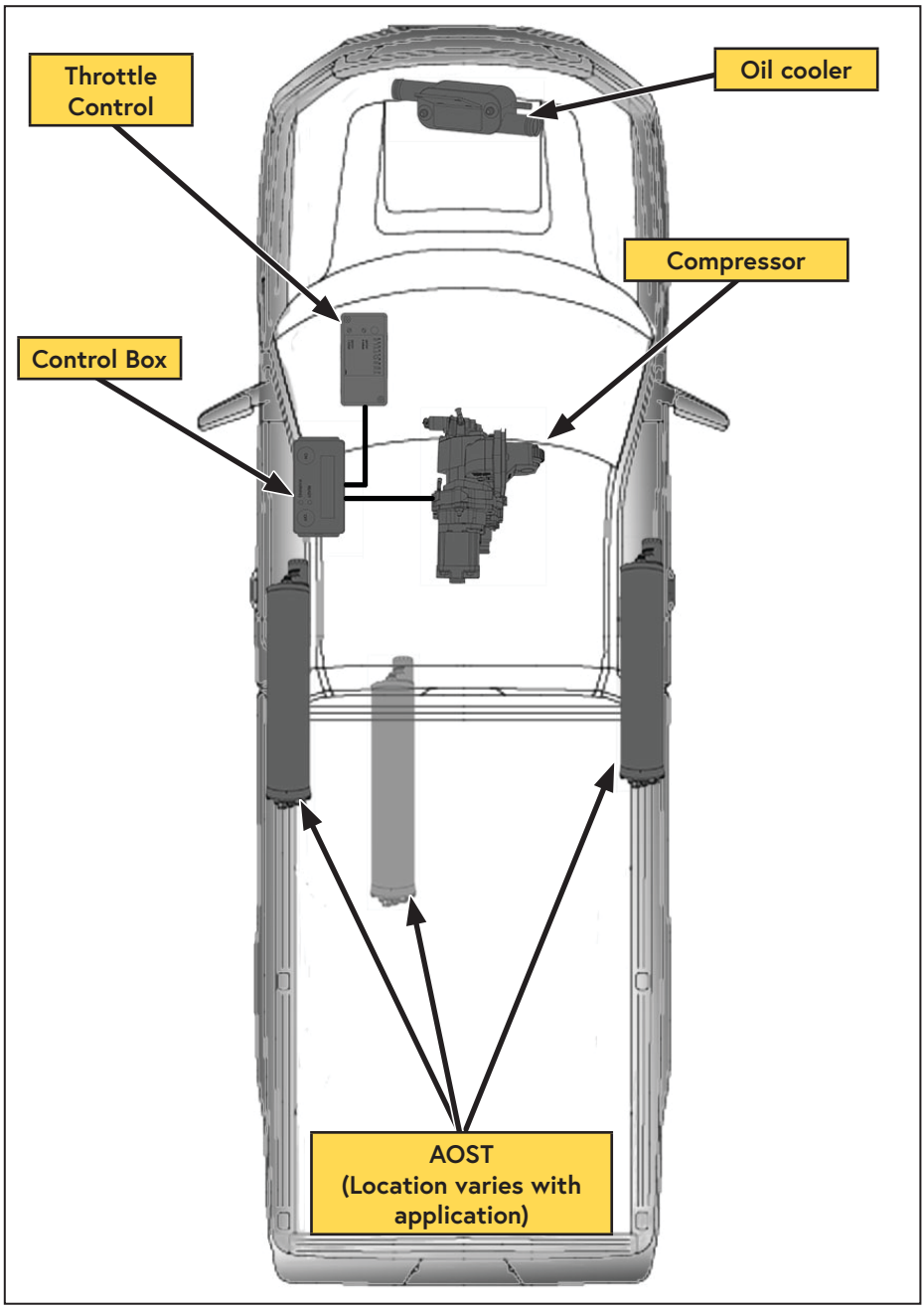


Figure 12 — General component overview
(Actual installation locations may vary)

Operating Principles

Air Compression

At the heart of VMAC's Transmission Mounted Air Compressor systems is a flooded lobe, rotary screw compressor.

Compression occurs when filtered air, at normal atmospheric pressure, enters the chamber where it is trapped between meshing rotor lobes. Cooled oil is injected into the compressor housing during compression to seal the rotor lobes for maximum compression efficiency. The oil also lubricates the rotors and bearings and absorbs some of the heat generated during compression. As the rotors rotate, the meshing lobes compress the volume of air before sending the air/oil mixture down the discharge hose to be separated and cooled by the AOST.

Oil Separation and Cooling

The system uses a proprietary 2 stage air/oil separator. The hot air/oil mixture from the compressor enters the first stage of the AOST and is mechanically separated with baffles. The second stage uses an integral coalescing element to remove the remainder of the oil from the air stream.

The hot compressor oil is directed to VMAC's liquid to liquid cooler (which is tied into the vehicle's engine coolant system) before being returned to the compressor.

The small amount of oil recovered from the coalescing filter is returned directly to the compressor via the 1/4 in PTFE scavenge tube.

Filtration

VMAC rotary screw compressors are designed and machined to exacting standards. Foreign particles entering the compressor can damage components such as rotors, bearings, seals, and the housing resulting in performance, efficiency loss, and reduced system life.

The system is equipped with a replaceable paper element air filter, a high pressure spin-on oil filter, scavenge screen and a coalescing filter in the back of the AOST.

Pressure Regulation and Engine Speed Control

When shut down, the VMAC system "blows down" or discharges all air stored in the AOST. When the system is started, the PTO engages and signals the Throttle Control to increase engine speed. Once the system has built to full system pressure (150 psi/1030 kPa), the pressure regulator signals the inlet to close. On systems equipped with the variable speed throttle, the engine speed will reduce to base idle; systems with 2 speed throttles will remain at elevated engine speed to maintain hydraulic pressure and flow. The mechanical pressure regulator detects air use and will send a signal to open the inlet. On systems with variable speed throttles, engine speed will increase once a 10 psi drop in pressure is detected.

The VMAC control system offers the following benefits:

- Reduced fuel consumption when not using air (variable speed throttle only).
- Reduced load on the compressor cooling system.
- Reduced noise when not using air (variable speed throttle only).
- Quick response to airflow demands.

The elevated engine speed, and maximum pressure are adjustable. Higher engine speeds will yield higher compressor output (cfm) and hydraulic flow (gpm) but will generate more noise and consume more fuel. See the "Performance Testing and System Adjustments" chapter on page 54 for instructions.

Safety Features

A 200 psi (1380 kPa) pressure relief valve is installed in the AOST to prevent over pressurization. The AOST is also equipped with an integrated rapid blow down system that automatically discharges pressure from the AOST upon shutdown.

The DTM70-H system's control logic utilizes built in safety circuits, in addition to OEM safety controls (if present), to prevent increasing engine rpm when certain conditions are not met. This helps to protect both the operator/occupants and the vehicle should the VMAC system be inadvertently activated at an inappropriate time.

In the event that the air/oil temperature increases above a safe temperature, the temperature sensor in the compressor will disengage the PTO and signal the Throttle Control to return the engine speed to base idle. The "WARNING" light on the Control Box will also illuminate and the error message will be logged.

Do not disable or bypass the over-temperature shutdown circuit. Failure of the shutdown system could result in equipment damage, injury or death.

VMAC recommends connecting to fused circuits that are adequate to our requirements. In installations where VMAC directs the installer to connect directly to the battery, an inline fuse is included.

If alternate power connections are used, VMAC recommends installation on a fused circuit rated for 10 A.

Hydraulic Pump

The hydraulic gear pump delivers continuous hydraulic flow at pressures up to 3,600 psi. The DTM70-H allows simultaneous operation of both the air and hydraulic systems. The hydraulic pump supplied with the DTM70-H operates exactly the same as one mounted directly to the PTO.

When the PTO is engaged, the gear pump spins and produces flow.

It is the responsibility of the installer or upfitter to ensure the hydraulic circuit is adequately protected from excessive flow or overpressurization.

Refer to "Performance Testing and System Adjustments" on page 54 for more information.

Hydraulic system parameters:

- Open center, continuous flow.
- Hydraulic reservoir appropriately sized for system components.
- Include a pressure relief valve rated below the maximum pressure rating of the gear pump.
- Appropriately sized hydraulic hoses to meet flow demands.
- Maintain the appropriate hydraulic temperature.

Remote Operation (Optional)

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

The remote wires are tucked into the heat shrink tubing at the base of the control box (Figure 13).

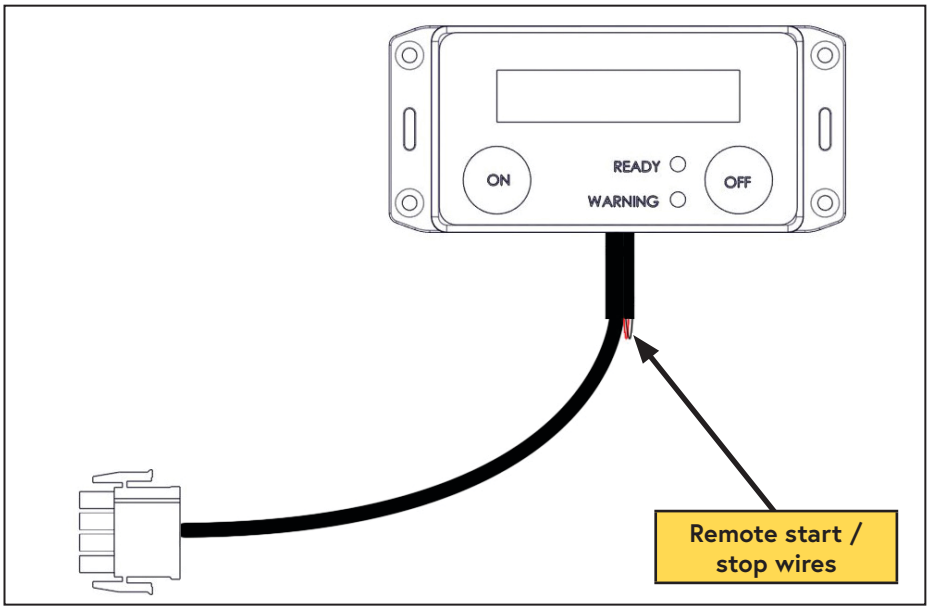


Figure 13 — Remote start / stop wires

Installation

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

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

Starting the Compressor via Remote Start

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

Shutting Down the Compressor via Remote Shutdown

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

Upfitter Vehicle Controls

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

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

All third party vehicle control systems intended to activate the PTO system must do so via the VMAC Control Box. Refer to the electrical schematic in the installation manual.

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

The following information is only applicable to vehicles equipped with third party vehicle control systems (such those included with hydraulic cranes).

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

Control systems which include a high/low speed function (High Idle) can also be configured to toggle the VMAC throttle control between high and low rpm settings (or between "FIXED MODE" and "VARIABLE MODE" operation).

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

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

For operators who prefer to have separate "ON" and "OFF" switches, refer to "Remote Operation (Optional)" on page 20.

Before Running the DTM70-H **Compressor System**

- Ensure the vehicle is not parked on grades exceeding 20° as this will affect lubrication and air/oil separation (Figure 14).

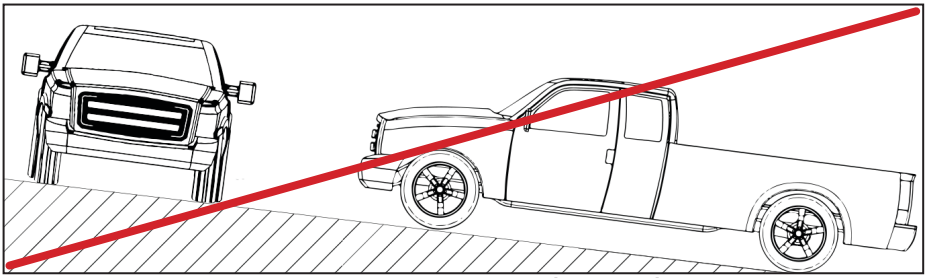


Figure 14 — Do not exceed 20° grade

- Place the vehicle transmission in "PARK" and fully apply the parking brake.
- Start the engine and allow the vehicle to reach operating temperature.
- Ensure the oil level in the AOST is above the "ADD" line (this should be checked while parked on level ground).
- Ensure the vehicle hood is closed.
- Ensure all compressor outlets are closed.
- Set the PTO selector switch to either "VARIABLE RPM" or "FIXED RPM".

Starting the Compressor / Normal Operation

- Turn on the compressor using the "ON" button on the Control Box.
- *If configured, the system can be turned on via the crane remote.

Once the compressor is turned on, the engine speed will increase while the compressor system builds pressure.

The system will continue to build pressure until it reaches full system pressure (150 psi factory setting). Once system pressure is achieved, the inlet will close. On systems with a variable speed throttle, the engine speed will reduce to base idle; systems equipped with a 2 speed throttle will remain at elevated engine speed to maintain hydraulic pressure and flow.

Shutting Down the Compressor

- Close all open air valves/tools and allow the system to build to full pressure (factory default: 150 psi).
- Shut down any hydraulically operated equipment.
- Allow the engine speed to reduce to VMAC base idle for at least 10 seconds.
- Press the "OFF" button on the control box.

Once the system is shut down, the digital Control Box will delay restart for 20 seconds to prevent the system from restarting under pressure.

Ensure the blowdown muffler is not blocked as this may prevent the system from completing the blowdown within 20 seconds.

Digital Throttle Control (DTC) Operation

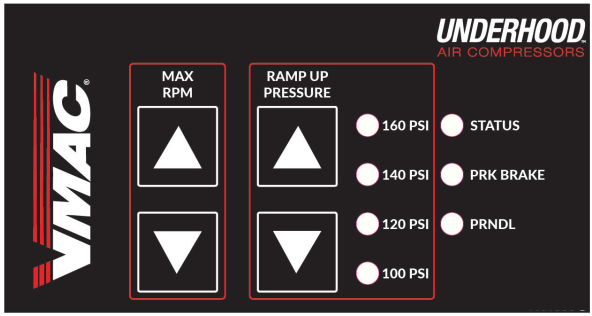


Figure 15 — Throttle control

Indicator LED	LED State	Description
RAMP UP PRESSURE	Green	Indicates the ramp up pressure setting.
STATUS	Green	Throttle controller is active and the system is operating normally.
	Red	Throttle control is not operating normally (throttle control is deactivated until the issue is resolved (See "Digital Throttle Control (DTC) Error Codes" on page 47).
	Off	Indicates the vehicle is not in park or neutral and/ or the park brake is not engaged (throttle control is deactivated).
PRK BRAKE	Green	Park brake is engaged.
PRNDL	Green	Gear selector is in "PARK" or "NEUTRAL".
	Off	Vehicle is in gear (throttle control is deactivated).

If the vehicle is placed into gear the "STATUS" LED and the "PRNDL" will turn off and the throttle control will deactivate. This will reduce engine speed to OEM 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.

Safety features

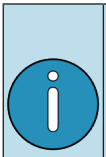
The throttle control has built in safety features that will disable the system if an unsafe condition is detected, or either of the lock out parameters is not met (the vehicle must be in "PARK" and the park brake must be engaged).

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.

Cold Environment Operation

DTM70-H systems include a heater cartridge installed in the compressor. When the vehicle ignition switch is on, the system monitors compressor temperature and will automatically enable the heater cartridge when it detects that the compressor temperature is below -10 °C (14 °F). If operating the system in temperatures below -10 °C (14 °F), ensure the following conditions are met prior to starting the system:

- Allow the vehicle to reach operating temperature.
- Turn on the compressor system and operate as normal.



The VMAC DTM70-H heater cartridge and VMAC De-Icer Kit are designed to heat VMAC components and will not heat hydraulic fluid.

On vehicles that are consistently used in cold climates, the vehicle upfitter should ensure the hydraulic system is designed with hydraulic fluid heaters.

Diesel Particulate Filter (DPF) Warning

When engine, or PTO driven equipment is run on vehicles with a DPF for extended periods of time, particulates may build up in the filter triggering a DPF warning (located in the instrument panel or notification in the message center).

It is impossible to make recommendations regarding run time before the DPF system will require a "regeneration" cycle as this is affected by many variables. It is therefore the responsibility of the operator to monitor and take the necessary action to maintain the DPF system.

It is recommended to check the DPF warning system after 1 hour of stationary operation and every 15 minutes thereafter. If the DPF warning light/message appears, refer to the vehicle owner's manual for methods of cleaning or regenerating.

Ford Stationary Elevated Idle Control (SEIC) Restart Delay

To prevent engine damage, the Engine Control Module (ECM) will deactivate the SEIC system if any of the vehicle's parameters fall outside of normal operating specification.

OEM programming for the SEIC system maintains elevated idle for approximately 2.5 seconds after the high idle request is removed.

If air is requested during this time, the SEIC system will not recognize the high idle request. Should this occur, turn off the compressor system via the button on the Control Box. Once the 30 second restart delay countdown has completed, turn the compressor system on and the system should operate normally.

Engine Shut Down Timers

Some newer vehicle's are equipped with automatic engine shut down timers. These systems are designed to shut the engine off under certain conditions (generally after a set length of time without operator input).

As the VMAC system is designed to only operate while the vehicle is in "PARK", some manufacturers' shut down timers may be trigged while the VMAC is in use. For more information related to engine shut down timers, refer to the vehicle's owner manual or dealer.

General Maintenance Information

Routine Maintenance

In order to maintain the VMAC warranty, VMAC's maintenance schedule must be followed. Only genuine VMAC parts can be used to maintain the system.

With proper maintenance, the likelihood of premature failure or component replacement can be drastically reduced.

The most critical aspect of maintenance is proper air filtration and clean oil. If any particles enter the compressor, they can score the rotors and contaminate the roller bearings in the compressor. Any contamination will cause rapid and severe damage to components.

The DTM70-H must be run a minimum of once every 30 days for at least 30 minutes to provide lubrication and to prevent premature bearing failure in the compressor due to vibration from the vehicle. Regularly running the system will also help to vaporize and exhaust any water that has condensed and accumulated in the AOST.

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

Inspecting the Hoses and PTFE Tubes

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

All hoses, tubes and wires that are replaced, rerouted or shifted must be secured so that they do not contact any hot, sharp or moving parts. Use rubber coated P-clips wherever possible.

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

☐ Inspect all hoses and tubes for damage and wear.

☐ Ensure the hoses and tubes have not shifted and remain secured away from hot, sharp, or moving parts.

If any hoses or tubes need to be replaced, see "Hoses / Tubes" on page 14 for important information related to VMAC hoses.

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 no 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.

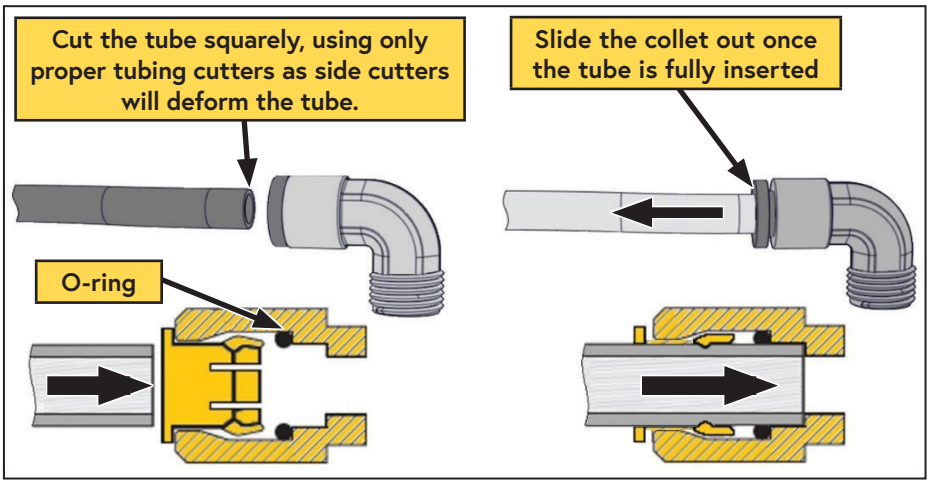


Figure 16 — Push-to-connect fittings

Installation Manuals and Illustrated Parts Lists (IPL)

The installation manual and illustrated parts list are an invaluable resource for when inspecting, diagnosing or repairing the system. The installation manuals and IPL's are available free of charge from VMAC.

VMAC Installation Manuals

https://www.vmacair.com/support/manuals/

VMAC IPL's

https://www.vmacair.com/support/ipl/

Maintenance and Repair Safety

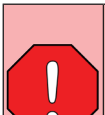
Prior to performing any service, ensure the transmission in "PARK" with the parking brake applied and the wheels chocked.

It is impossible to warn of all the possible hazards that may result from operating, servicing, or repairing this system.

Wear all appropriate Personal Protective Equipment and follow all industry standard safety practices.

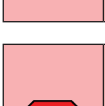
Confirm that the system is depressurized and has cooled prior to performing any service work.

Never use flammable solvents to clean any components. If a flammable solvent has been used, rinse the component thoroughly with water and dry it before reinstalling it to prevent the possibility of explosion.



Use only genuine VMAC parts to maintain the system.

Genuine VMAC parts are designed to work with the high pressure and heat generated by the compressor. Substituting genuine VMAC parts may void the warranty and could cause equipment damage, injury, or death.



This information is intended for people with mechanical trade certification who have the tools and equipment to properly and safely perform the service or repair. Do not attempt to service or repair this system without the appropriate mechanical training, knowledge and experience.

Follow all safety precautions and industry standard "best practices".

Safety Check List

- ☐ Open the ball valve or connect an air tool to the system to ensure all the stored air is released.
- ☐ Gently pull up on the ring on the pressure relief valve to confirm the system is depressurized.

Do not use the pressure relief valve as a means of depressurizing the compressor system. Doing so will prematurely wear the internal spring or the seat, preventing the valve from maintaining normal system pressure.

Maintenance Schedule

The following maintenance schedule must be observed to maintain both the "Standard" and "Lifetime" VMAC warranties and to assure proper performance and long service life of the system. In the event of a warranty claim, VMAC may request service records.

The hours indicated are those displayed on the Control Box. Service should be performed at the indicated hours, or the semi-annual schedule (whichever occurs first).

To order service kits, see the ordering information on page 3.

In order to maintain the warranty on the Transmission Mounted Air Compressor, use only genuine VMAC parts to service the system.

Check the Illustrated Parts List for replacement part numbers or contact VMAC for more information.

Daily	
• Check compressor oil level. • Check system for leaks.	• Check pressure relief valve condition.

Every 6 months or 200 hours	
• Change compressor oil. • Change compressor oil filter.	• Change compressor air filter. • Check pressure relief valve condition.

Every 12 months or 400 hours	
• Change compressor oil. • Change compressor oil filter. • Change compressor air filter. • Clean, inspect, and grease compressor splines.	• Change pressure relief valve. • Change coalescing filter element. • Change blowdown muffler. • Clean, inspect, and grease PTO splines.

Parts List

Transmission Mounted DTM70 -200 Hour / 6 Month (A700229)		
QTY	**Part #**	**Description**
1	9500061	Air Filter
1	4400631	"Next Service Due" Decal
1	9200039	Oil Filter
2	A700091	VR High Performance Oil – 1 L
1	A700094	VR High Performance Oil – 4 L
1	3600037	Air Filter

Transmission Mounted DTM70 -400 Hour / 1 Year (A700230)		
QTY	**Part #**	**Description**
1	9500061	Air Filter
1	4400631	"Next Service Due" Decal
1	9200039	Oil Filter
2	A700091	VR High Performance Oil – 1 L
1	A700094	VR High Performance Oil – 4 L
1	A700152	Coalescing Filter Assembly
1	3600037	Air Filter
1	A700313	15 ml Shell Alvania CG grease
1	**3800587**	**Fast Pack (Contents listed below)**
1	3600054	Valve, safety, 200 psi
1	3600064	Tank Seal
1	3600090	Thimble Screen
1	4400631	"Next Service Due" Decal
1	4500104	Muffler, sintered exhaust, 1/8
1	5830007	O-ring, Viton, 4 1/2 ID X 1/8
1	5830066	O-ring, Viton, 4 3/4 ID X 1/8
1	5830080	O-ring, Viton, 1/4 ID X 1/16
1	5830106	O-ring, Viton, 7/16 ID X 1/16
1	5840069	Spring

†The VMAC Universal Flush Kit (A700214) (sold separately) consists of 4 L (1.0 USG) VMAC Compressor oil (P/N: A00094) and (x2) VMAC oil filters (P/N: 9200039).

Regular Inspection Instructions

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

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.

Inspecting and Adding Compressor Oil

- ☐ Ensure the vehicle is parked on level ground and that the compressor system is depressurized and cool to the touch.
- ☐ Check the oil level in the sight glass and ensure that it is between the "MAX" arrow and the "ADD" arrow.

If the level is below the "ADD" mark, perform the following steps*:

- ☐ *Remove the fill cap. This will be mounted in the engine bay near the firewall or near the driver side step. If not, locate the "Tee" in the oil discharge hose running from the compressor to the Air Oil Separator Tank and trace the branch to the oil fill.
- ☐ *Using a funnel, pour oil into the fill fitting until the oil level in the sight glass reaches the "MAX" arrow.
- ☐ *Replace the fill cap and tighten securely.

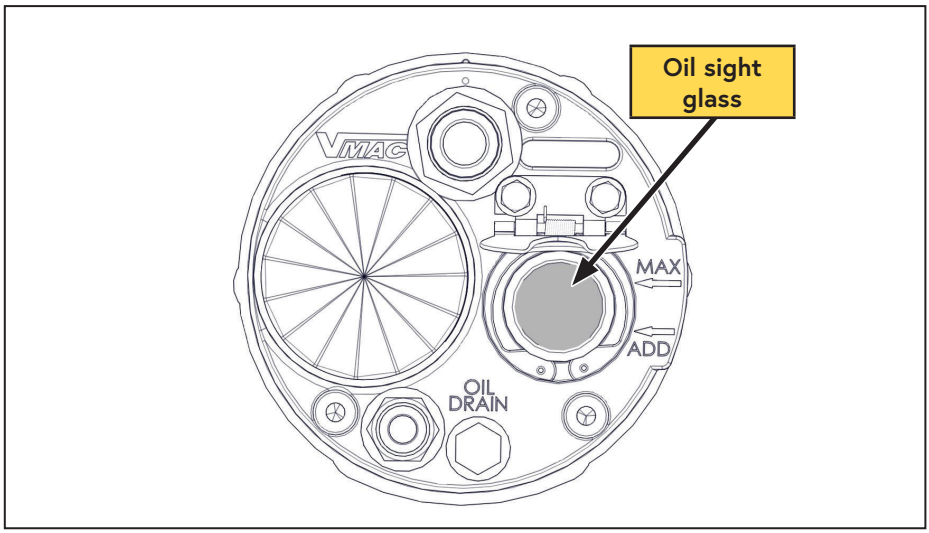


Figure 17 — Inspecting the oil

Inspecting and Replacing the Blowdown Muffler

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

The Blowdown Muffler (or remote blowdown muffler) is a regular service item and must be replaced every 400 hours or 1 year, whichever interval occurs first.

Visually inspect the blowdown muffler for evidence of corrosion or loss of functionality. Ensure the muffler allows the system to depressurize. To test the blowdown system and muffler:

- ☐ Turn the system on and allow it reach full system pressure (factory setting 150 psi).
- ☐ Turn off the system.
- ☐ Listen for the pressurized air to blowdown through the muffler on the AOST. Blowdown should be completed in approximately 20 seconds.
- ☐ If the muffler is showing signs of blockage, contact a local VMAC dealer for a replacement.

A replacement blowdown muffler is included with the VMAC 400 hour service kit.

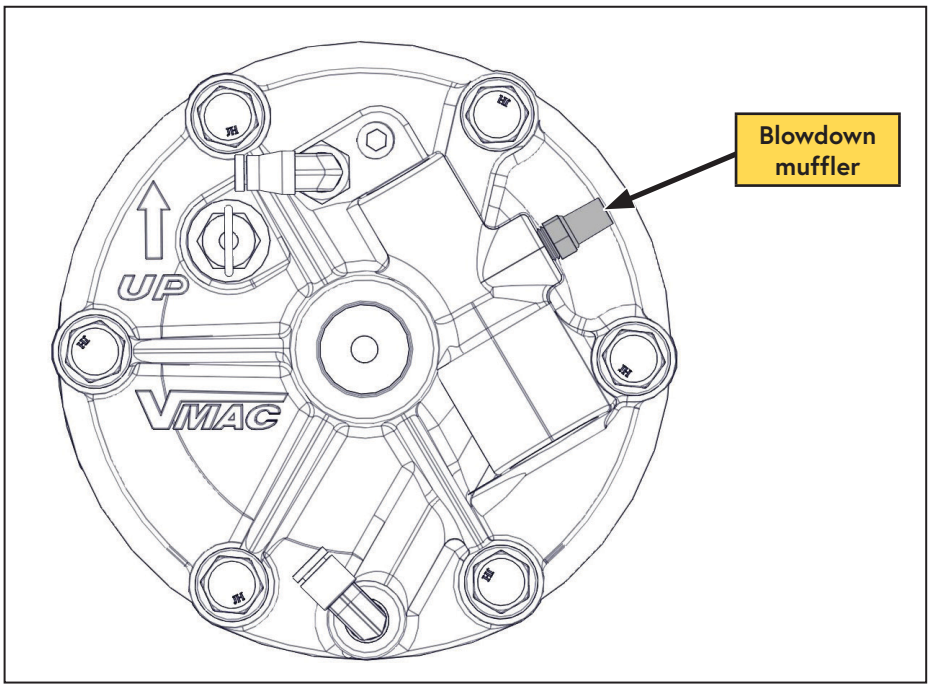


Figure 18 — Blowdown muffler

Inspecting and Replacing the Pressure Relief Valve

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

Do not use the pressure relief valve as a means of releasing pressure from the system. Doing so will prematurely wear the internal spring or the seat, preventing the valve from maintaining normal system pressure.

The Pressure Relief Valve is a regular service item, and must be replaced every 400 hours or 1 year, whichever interval occurs first.

- ☐ Visually inspect the valve and ensure it is not corroded and that the vent holes are not plugged.
- ☐ Turn the system on and allow it reach full system pressure (factory setting 150 psi).
- ☐ Ensure that air does not leak out of the valve. Air leaking from the pressure relief valve when system pressure is at or below 150 psi indicates that the spring or seat in the valve is worn and the valve must be replaced.
- ☐ If the pressure relief valve is showing loss of functionality, contact a local VMAC dealer for a replacement.

A replacement pressure relief valve is included with the VMAC 400 hour service kit.

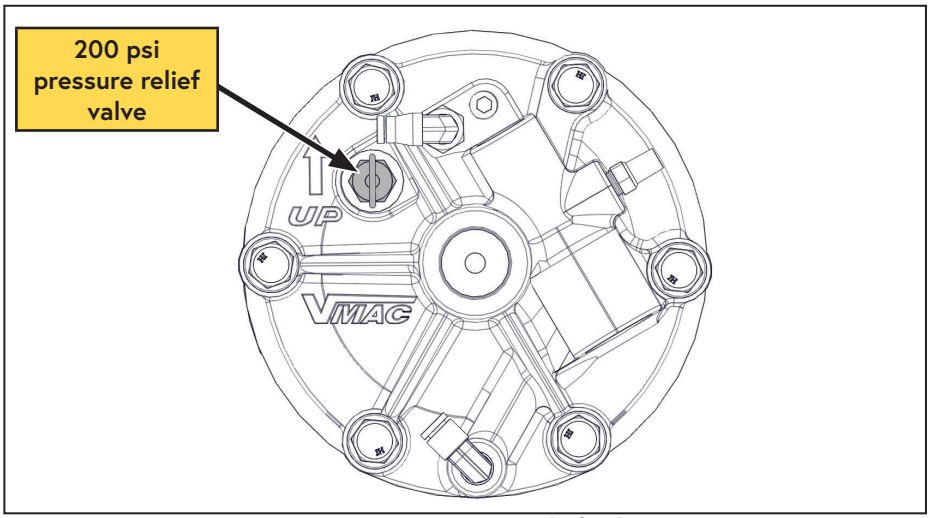


Figure 19 — Pressure relief valve

Replacing the Air Filter

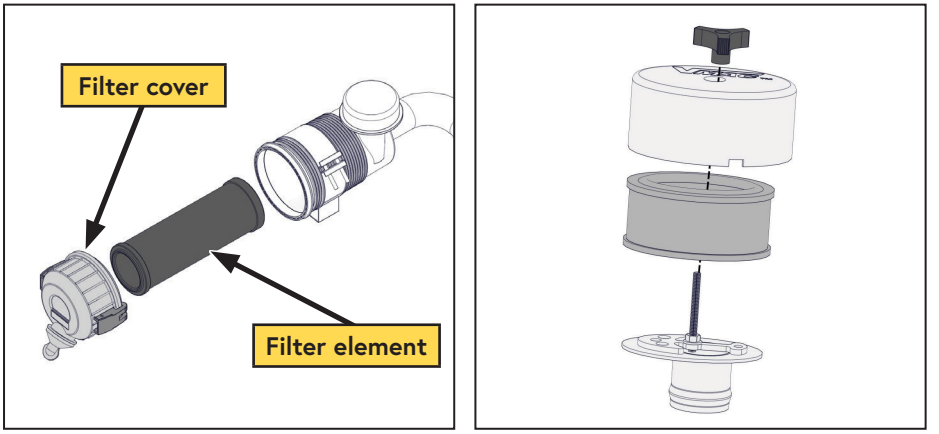
Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

To avoid any possibility of contamination, ensure the air inlet is covered with masking tape or a clean cloth whenever the air filter cover is removed.

Do not attempt to clean the filter element, or use compressed air to perform any tasks around the compressor until the filter and cover are replaced.

- ☐ Clean any loose debris from around the air filter housing to prevent any contamination from entering the system.
- ☐ Remove the filter cover and the filter element.
- ☐ Immediately cover the air inlet opening with masking tape or a clean cloth to prevent any contamination from entering the system.
- ☐ Clean the inside of the filter cover with a clean, dry cloth.
- ☐ Remove the cloth or masking tape from the air inlet and install the new air filter element.
- ☐ Ensure the filter element fits securely onto the inner mounting tube (heavy duty filter) or over the machined step on the housing (oval style filter) (Figure 20).



Heavy duty remote filter *Oval style filter*

Figure 20 — Install air filter element

- ☐ Replace the air filter cover and secure it with the cover latches.

200 Hour / 6 Month Service

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

Do not use compressed air or perform any other tasks around the air filter and cover until both are replaced. Never clean the filter element with compressed air as this may allow contaminants to enter the compressor system. Always replace the air filter element during this service.

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

- ☐ Inspect the blowdown muffler (page 32).
- ☐ Inspect the pressure relief valve (page 33).
- ☐ Inspect the hoses and PTFE tubes (page 26).
- ☐ Replace the air filter (page 34).
- ☐ Clean the area around the front of the AOST and the oil filter to prevent contamination.
- ☐ Remove the oil drain plug and drain the oil into a container with a capacity of at least 6 L (1.6 USG) (Figure 21).

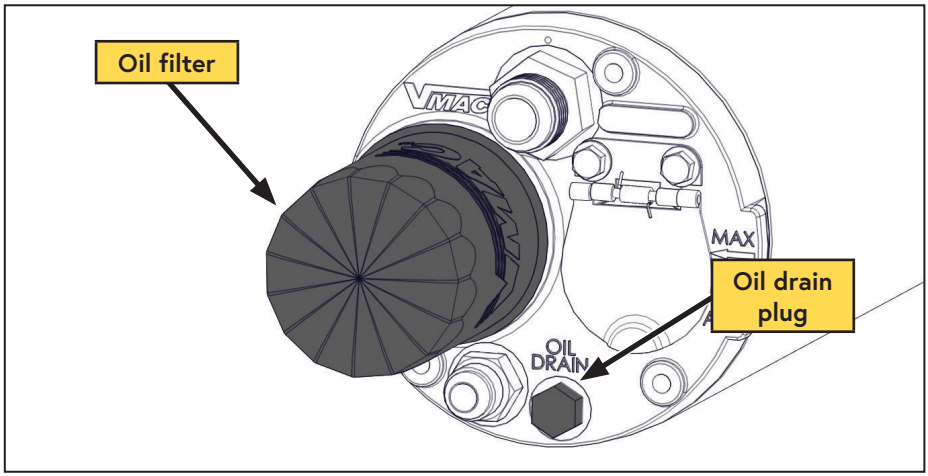


Figure 21 — Compressor oil filter

- ☐ Inspect the Viton® O-ring on the oil drain plug for damage, hardness or defects and replace if necessary.
- ☐ Install and tighten the oil drain plug.
- ☐ Remove the oil filter (Figure 21).

☐ Ensure the threaded nipple did not unscrew with the oil filter.

If the nipple came out with the oil filter:

- ☐ *Remove it from the filter, being careful to avoid damaging the threads*.
- ☐ *To reinstall the nipple, thoroughly clean the threads and apply Loctite 242 (blue) to the end with the short threads and replace it in the AOST (Figure 22).

☐ Clean the gasket sealing surface on the front of the AOST and inspect it for damage. The surface must be free of old gasket material and smooth to ensure a good seal (Figure 22).

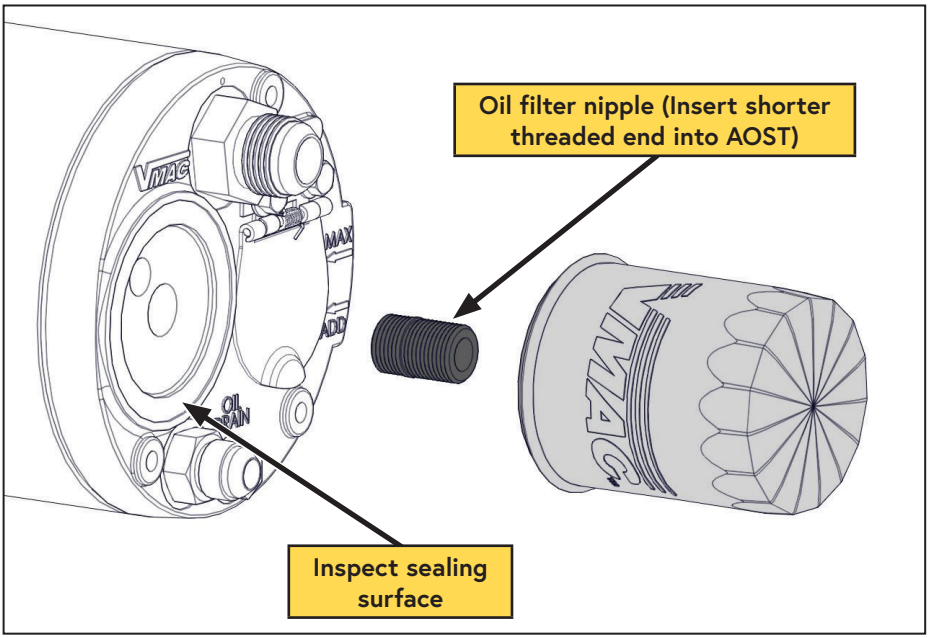


Figure 22 — Compressor oil filter

☐ Apply a thin coat of compressor oil to the rubber gasket on the oil filter.

☐ Spin the filter onto the threaded nipple until the gasket contacts the sealing surface on the tank, then tighten the filter an additional 3/4 to 1 turn to seat the gasket.

☐ Remove the oil fill cap. This will be mounted in the engine bay near the firewall or near the driver side step. If not, locate the "Tee" in the oil discharge hose running from the compressor to the AOST and trace the branch up to the oil fill.

☐ Add VMAC compressor oil to the AOST (RAM: 4 L (1.0 USG) / Ford: 5 L (1.3 USG)).

☐ Allow 5 minutes for the oil to reach the AOST then verify that compressor oil is visible in the AOST sight glass (actual level will be corrected later).

☐ Reinstall the fill cap.

☐ Start the system and check for oil leaks.

☐ Allow the system to build to full system pressure (factory setting 150 psi) and allow the engine speed to decrease to base idle.

- ☐ Turn the system "OFF".
- ☐ Once the system has sat for 5 minutes, check the oil level through the sight glass and add oil as necessary.
- ☐ Verify there are no oil leaks.

Clearing Service Reminders

For systems that show a message "HRSxxx200HRSVC" or "HRSxxx400HRSVC" on the control box*:

- ☐ *Press and hold the "OFF" button for approximately 5 seconds until "DIAGNOSTICS" appears on the display.
- ☐ *Press and hold the "OFF" button (approximately 5 seconds) until "200 HR CLEAR" appears in the display.
- ☐ *Continue holding the "OFF" button until "CLEAR OK" appears in the display.

400 Hour / 1 year Service

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

Do not use compressed air or perform any other tasks around the air filter and cover until both are replaced. Never clean the filter element with compressed air as this may allow contaminants to enter the compressor system. Always replace the air filter element during this service.

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

- ☐ Apply thread sealant and replace the blowdown muffler (page 32).
- ☐ Apply thread sealant and replace the pressure relief valve (page 33).
- ☐ Inspect the hoses and PTFE tubes (page 26).
- ☐ Replace the air filter (page 34).
- ☐ Clean the area around the AOST and the oil filter to prevent contamination.
- ☐ Remove the oil drain plug and drain the oil into a container with a capacity of at least 6 L (1.6 USG) (Figure 23).

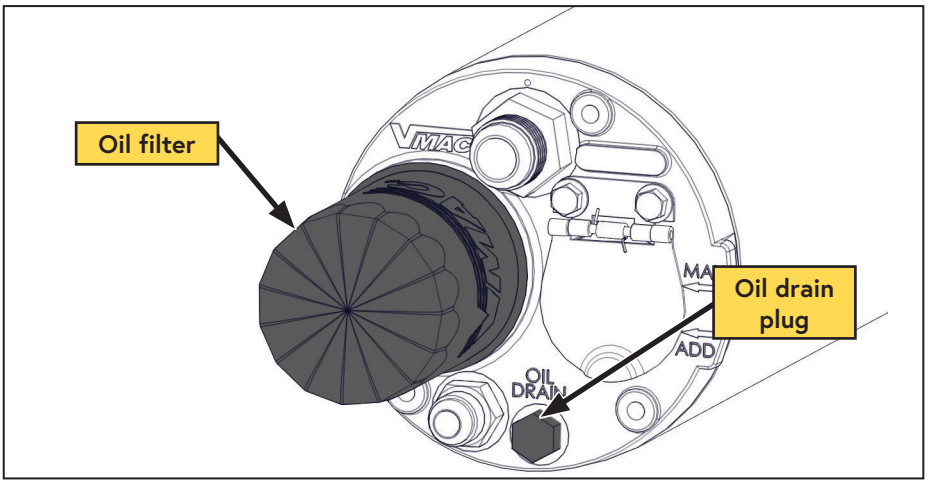


Figure 23 — Compressor oil maintenance

- ☐ Inspect the Viton O-ring on the oil drain plug for damage, hardness or defects and replace if necessary.
- ☐ Install and tighten the oil drain plug.
- ☐ Remove the oil filter (Figure 23).

Ensure the threaded nipple did not unscrew with the oil filter*:

- ☐ *If the nipple came out with the oil filter, remove it from the filter, being careful to avoid damaging the threads.
- ☐ *To reinstall the nipple, thoroughly clean the threads and apply Loctite 242 (blue) to the end with the short threads and replace it in the AOST (Figure 24).

☐ Clean the gasket sealing surface on the front of the AOST and inspect it for damage. The surface must be free of old gasket material and smooth to ensure a good seal (Figure 24).

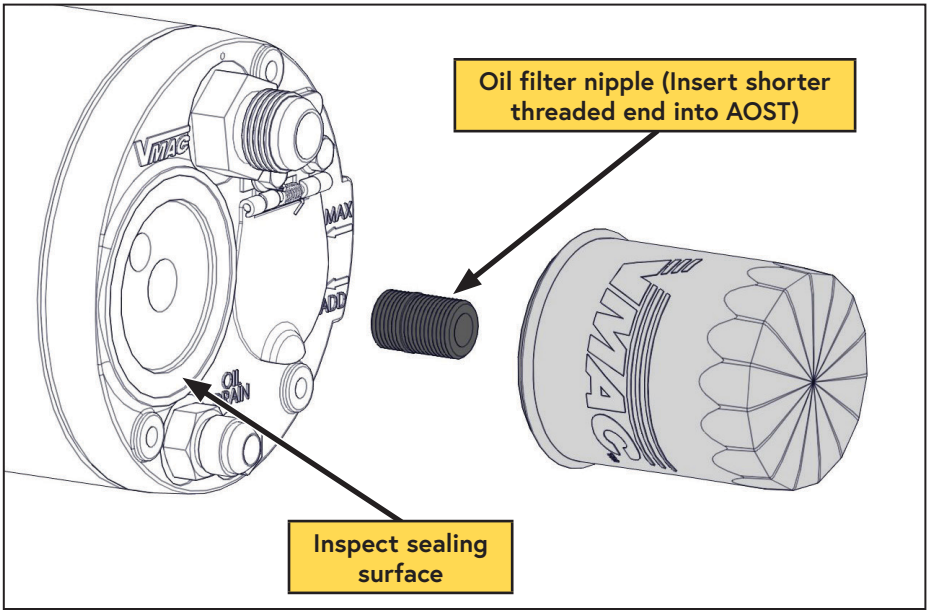


Figure 24 — Compressor oil filter

☐ Apply a thin coat of compressor oil to the rubber gasket on the oil filter.

☐ Spin the filter onto the threaded nipple until the gasket contacts the sealing surface on the tank, then tighten the filter an additional 3/4 to 1 turn to seat the gasket.

☐ Clean the blowdown cap at rear of the AOST to prevent contamination.

☐ Remove the air outlet hose and the PTFE scavenge and system pressure tubes from the blowdown cap. Carefully move the scavenge and system pressure tubes out of the way, ensuring that they do not twist or kink. Cap the air outlet and PTFE fittings to prevent contamination.

The coalescing separator element is spring-loaded against the blowdown cap; to prevent damage to the AOST, remove all of the bolts completely while holding the blowdown cap firmly in place.

☐ Remove the bolts retaining the blowdown cap. Unscrew the bolts evenly to avoid damaging the blowdown cap as the coalescing element is spring-loaded against the inside of the end cap.

☐ Remove the blowdown cap.

☐ Remove the Viton O-ring, coalescing element and wave spring from the AOST (Figure 25).

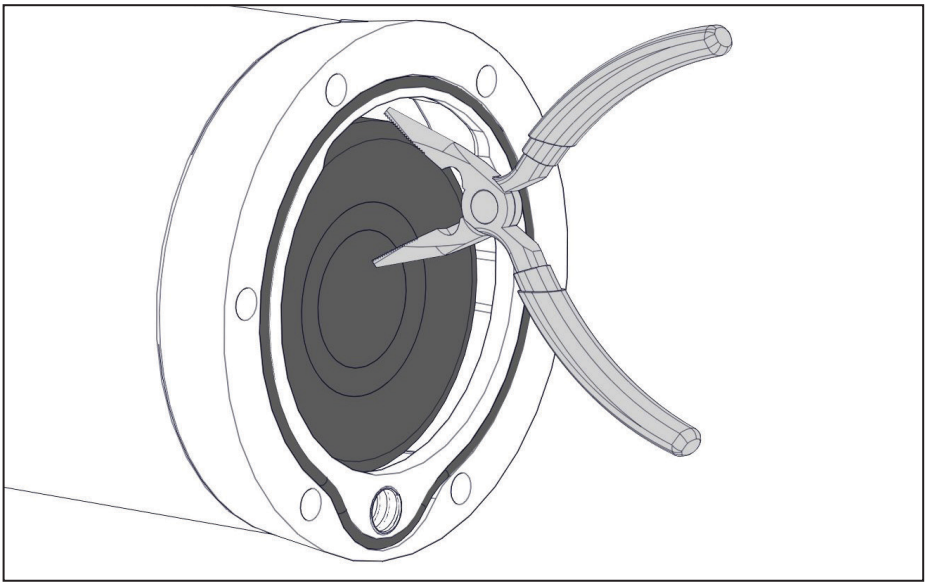


Figure 25 — Replacing the Coalescing filter spring

☐ Remove the small spring and thimble screen. The screen can be removed by carefully pushing it out of the oil scavenge hole from the inside of the AOST (Figure 26).

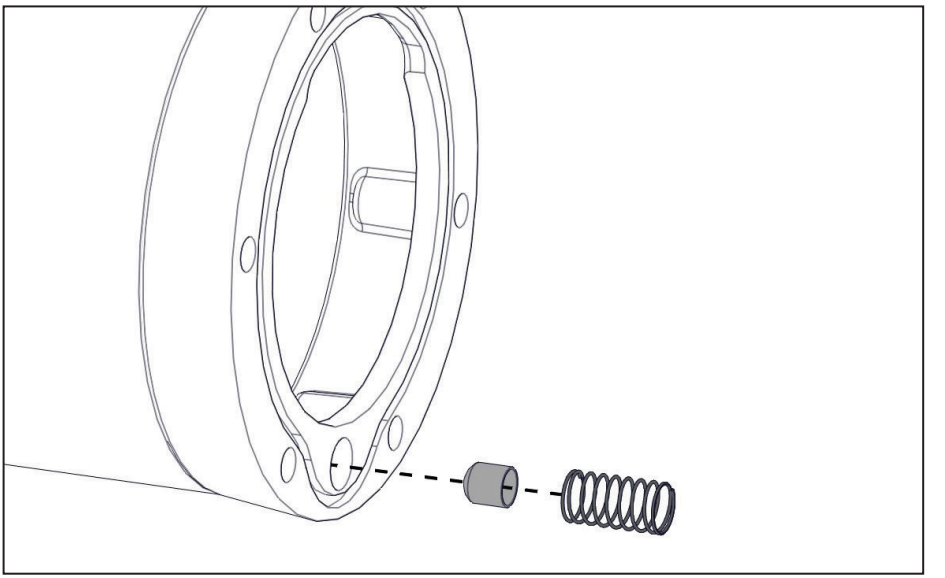


Figure 26 — Remove small spring and thimble screen

☐ Wipe out the inside of the AOST.

☐ Install the new thimble screen and spring (Figure 27).

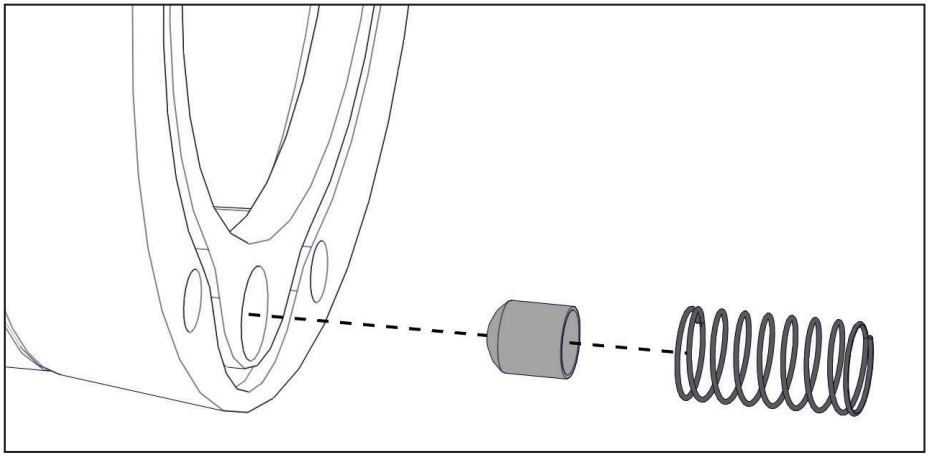


Figure 27 — Install thimble screen and spring

☐ Verify the wave spring is installed on the coalescing element (Figure 28).

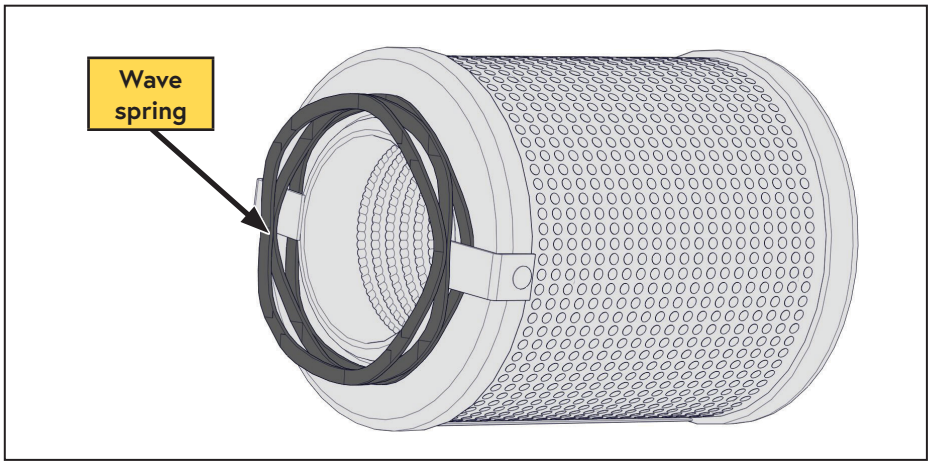


Figure 28 — Install wave spring

In addition to keeping the coalescing filter properly seated, the wave spring also prevents electrostatic buildup by grounding the coalescing filter. Failure to install the wave spring may cause an electric arc which could result in an explosion, tank rupture or fire.

☐ Install the coalescing element into the AOST (Figure 29).

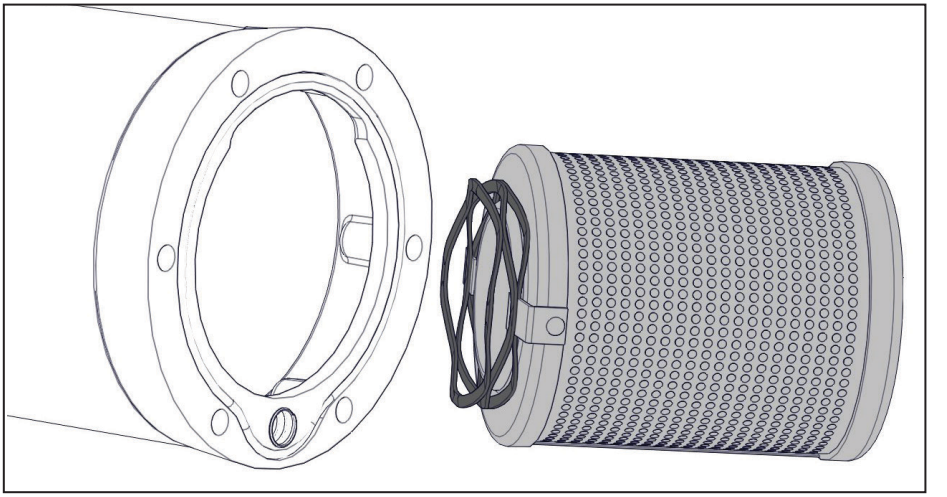


Figure 29 — Install coalescing filter

☐ Install the Blowdown cap seal in the blowdown cap (Figure 30).

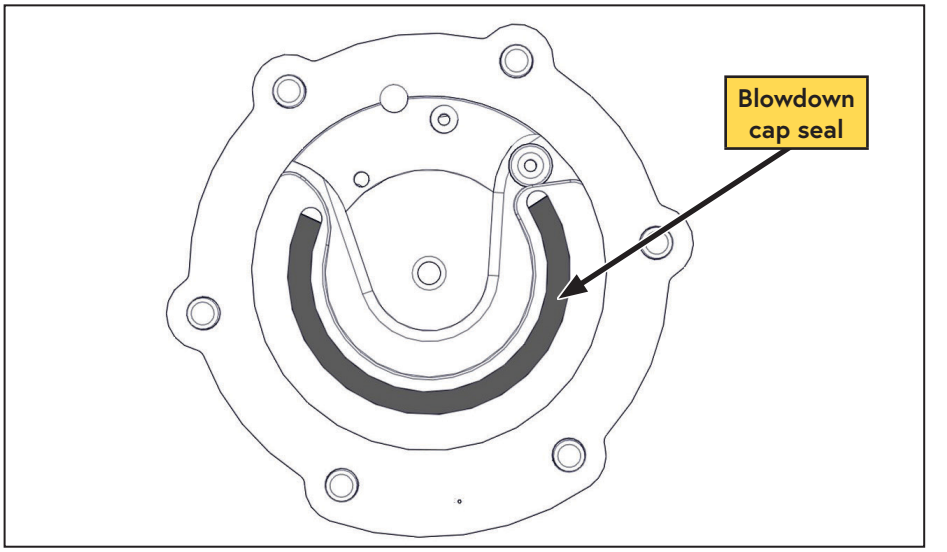


Figure 30 — Rear cap seal

☐ Install the blowdown cap Viton O-ring in the AOST (Figure 31).

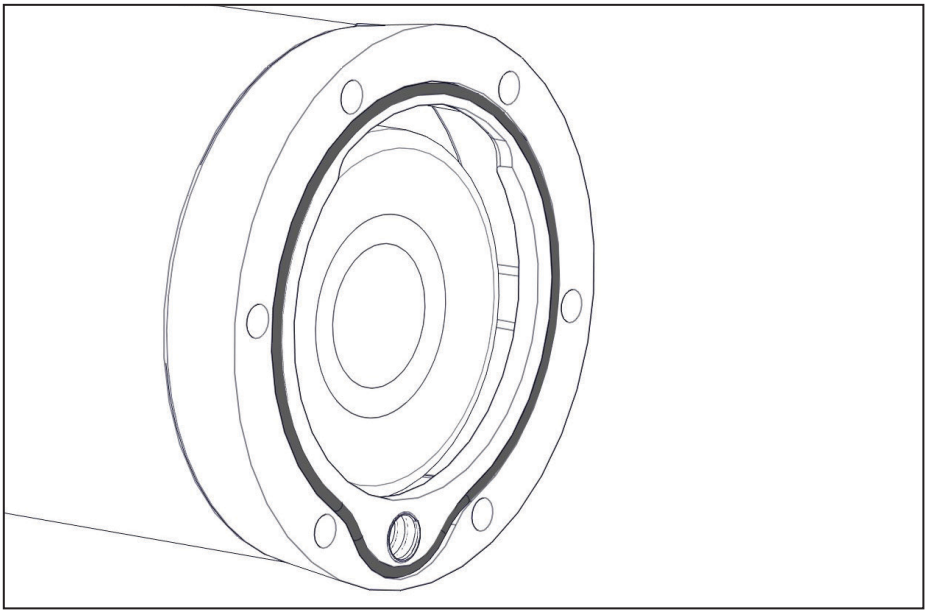


Figure 31 — Blowdown cap O-ring

☐ Reinstall the blowdown cap onto the AOST.

☐ Install the air outlet hose and the PTFE scavenge and pressure control tubes.

☐ Mark the location of the PTFE tubes where they connect to the Compressor.

☐ Disconnect the PTFE tubes connected to the compressor.

☐ Remove the air intake hose from the compressor.

Dependent upon the hose routing and the amount of slack on the oil return hose, and the main discharge hose connected to the compressor, the following procedure may be accomplished without having to remove the hoses from the compressor.

☐ With the compressor fully supported, remove the compressor from the PTO.

☐ Thoroughly remove the old grease from the PTO and compressor splines.

☐ Inspect the PTO and compressor splines for wear.

☐ Apply a generous amount of the supplied spline grease to the PTO and compressor splines. Ensure the grooves of each are fully filled.

☐ Slide the compressor forward onto the PTO until it is fully mated.

Proper compressor to PTO torque values are critical, a torque wrench must be used when securing the compressor to the PTO.

☐ Using a torque wrench, torque the fasteners to 40 ft•lb.

☐ Connect the PTFE tubes to the compressor.

☐ Install the air intake hose on the compressor.

- ☐ Remove the Oil fill cap. This will be mounted in the engine bay near the firewall or near the driver side step. If not, locate the "Tee" in the oil discharge hose running from the compressor to the AOST and trace the branch to the oil fill.
- ☐ Add VMAC compressor oil to the AOST (RAM: 4 L (1.0 USG) / Ford: 5 L (1.3 USG)).
- ☐ Allow 5 minutes for the oil to drain into the tank, then check th oil level via the sight glass (actual level will be corrected later).
- ☐ Reinstall the fill cap.
- ☐ Inspect all wire harnesses for any signs of wear. If signs of wear are present, apply protective loom as necessary and secure with rubber coated P-clips or cable ties.
- ☐ Inspect all hoses and tubes for any signs of wear. If signs of wear are present, take appropriate action to prevent further wear.
- ☐ Start the system and check for oil leaks.
- ☐ Allow the system to build to full system pressure (factory setting 150 psi) and for the engine speed to decrease to base idle.
- ☐ Turn the system "OFF".
- ☐ Once the system has sat for 5 minutes, check the oil level through the sight glass and add oil as necessary.

Clearing Service Reminders

For systems that show a message "HRSxxx200HRSVC" or "HRSxxx400HRSVC" on the control box*:

- ☐ *Press and hold the "OFF" button for approximately 5 seconds until "DIAGNOSTICS" appears on the display.
- ☐ *Press and hold the "OFF" button (about 5 seconds) until "400 HR CLEAR" appears in the display.
- ☐ *Continue holding the "OFF" button until "CLEAR OK" appears in the display.

Diagnostics and Trouble Shooting

Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 28).

Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.

For the following tests, isolate the AOST from all downstream (customer supplied) equipment.

If the Transmission Mounted Air Compressor system is still within the warranty period, see the warranty claim process on page 9 prior to commencing with any diagnostics or repairs.

Problem diagnosis should follow sound, recognized practices. Quick and accurate diagnosis of problems should involve the following:

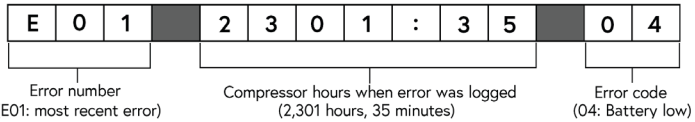
- Follow industry standard safety practices.
- Accurately identify the problem by operating the system (provided it is safe to do so).
- Determining the possible causes for the problem by understanding how the system operates.
- Isolating the potential causes by accurate testing using the correct and recognized procedures.
- Performing proper repairs using the correct procedures and the recommended replacement parts.
- Performing proper post repair testing to ensure that the repairs were effective.
- Electrical testing should be performed according to the processes described in the troubleshooting charts and in conjunction with any documentation provided by VMAC.

Accessing Diagnostic Mode and Retrieving Logged Error Messages

- ☐ Turn the vehicle ignition "ON" but do not start the engine.
- ☐ Press and hold the "OFF" button on the control box until "DIAGNOSTICS" is displayed.
- ☐ Press "OFF" button to scroll down. Press the "ON" button to scroll up.
- ☐ When the end is reached, "NO SVC NEEDED" will be displayed.
- ☐ To exit diagnostic mode, press both the "OFF" and "ON" buttons simultaneously.

Digital Control box Information and Warning Messages

Warning/Information Message	Warning/Information Description	Compressor State
HRS:XXXX:XX	Main screen hour meter.	On/Off.
"PARK BRAKE" ***or*** "OUT OF PARK"	Park brake is not applied or bad signal ***or*** Gear selector not in PARK or bad signal.	Off.
HRS:XXXX200HRSVC	200HR service is needed.	On/Off.
HRS:XXXX400HRSVC	400HR service is needed.	On/Off.
COMP TOO COLD	Compressor too cold for operation.	On.
TEMP XXXF/XXXC	Displays elevated temperature 130°C (266°F) to 150°C (300°F).	On/Off.
Wait xx Seconds	A 30 second delay to allow for compressed air blow down.	Off.



Error Code	Display	Fault	Possible Problem(s)
01	OVER TEMP	Compressor is too hot.	• Low compressor oil level. • Faulty or crushed cooler hoses. • Exceeded cooling capacity of the compressor cooling system. • OEM changes in cooling. • Non-standard application.
02	TEMP PROBE SHORT	Compressor temperature probe wires shorted or failed.	• Faulty temperature probe. • Crushed temperature probe wires. • Pinched or bare wires that are grounded.
03	TEMP PROBE OPEN	Compressor temperature probe disconnected or failed.	• Disconnected temperature probe. • Faulty temperature probe. • Broken temperature probe wires.
04	BATTERY LOW.	Vehicle battery voltage detected is less than 11 V.	• Faulty power wire connection. • Bad fuse. • Broken or poorly crimped electrical connectors. • Vehicle charging system issues.
05	SOLENOID HIGH	Current draw on the solenoid is too high (4 A – 6 A).	• Faulty PTO solenoid. • Broken or pinched solenoid wire.
06	SOLENOID LOW	Current draw on the solenoid is too low (below 0.5 A).	• Faulty PTO solenoid. • Broken or pinched solenoid wire. • Disconnected solenoid wire.
07	SOLENOID SHORT	Current draw on the solenoid is too high (above 6 A).	• Faulty PTO solenoid. • Solenoid wire shorted to ground or pinched.

Digital Throttle Control (DTC) Error Codes

If an error is encountered, the "STATUS LED" will blink a set number of pulses corresponding to the respective error code. If multiple error codes exist, the throttle controller will cycle through all error codes repeatedly. To clear an error code, turn the system OFF, fix the problem, and then turn the system ON again.

The DTC is located under the dashboard panel near the steering wheel.

Error Number	Error	Description	Possible causes
2	Rpm error.	No rpm detected via the OBD II port.	• DTC connected to the incorrect OBD II harness wires. • Poor crimp between the DTC and the OBD II harness. • Faulty or damaged DTC.
3	Pressure sensor error.	Pressure sensor signal is either too high or too low.	• Repair pressure sensor harness. • Pressure sensor damaged • Poor crimp between the DTC and the pressure sensor harness. • Faulty or damaged DTC.
4	Rpm too high.	The DTC rpm threshold has been exceeded.	• Compressor clutch not engaging. • Attempting to engage the VMAC system when the engine speed is high. • DTC not calibrating to vehicle engine. • Incorrect DTC for vehicle application. • Faulty or damaged DTC.
5	Voltage too high/ low.	The battery voltage is either too high or too low (The system will continue to operate with this error). The normal operating range for the DTC is between 9.8 V and 16 V.	• Vehicle battery is discharged, damaged, or worn. • Alternator is damaged and voltage output is too low or too high • Faulty or damaged DTC.

Limp Mode

Limp mode was created to provide a way to bypass the temperature sensor in case of a sensor failure. This mode is an emergency mode and should be used with extreme caution.

How to activate

Press and hold the "OFF" button on the Control Box until the "DIAGNOSTICS" screen appears (approximately 5 seconds). Release the "OFF" button and the screen will display "E01 xxxx xx xx". Press the "OFF" button again. The screen "NO TEMP PROBE?" will appear. To disable the temperature probe, press the "ON" button. "TEMP PROBE DIS" will appear. This indicates that the temperature probe has been disabled. Press both "ON" and "OFF" keys simultaneously to exit.

While in "Limp Mode", the main menu screen will display "NO TEMP PROBE?" with a red LED then "CHECK OIL" and the green LED and then the hours. The display will toggle between messages approximately every second. The PTO solenoid and throttle will be on for 1 minute then off for 1 minute while in "Limp Mode". Once the system is shut off via the "OFF" button, the Control Box will operate normally.

Automatic Shutdown

If the compressor oil gets too hot, the over-temperature circuit will disengage the PTO solenoid, preventing operation of the system. The red indicator light on the Control Box will illuminate, indicating a problem.

- ☐ Press the "OFF" button on the Control Box.
- ☐ Allow a few minutes for the system to vent pressure and for the oil to drain back to the tank, then check the oil level through the sight-glass on the tank. The oil level must be checked with the vehicle on a level surface.
- ☐ If the oil level is low, check for and repair any leaks, then add oil until the correct level is reached.

Symptom	Possible Cause	Corrective Action
Compressor does not run.	Oil temperature too high.	Turn compressor off, allow to cool for 30 minutes, retry.
	Oil level too low.	Add oil as necessary. See page 31.
	No power to PTO solenoid.	• Repair wiring according to diagram. • Check/replace fuse.
	Poor PTO solenoid ground.	Check the ground connection from the PTO solenoid for breaks and repair as necessary.
	Faulty PTO solenoid.	With the compressor button "OFF" and the PTO wire disconnected, check the resistance between the 2 pins on the solenoid. Resistance should be between 6 Ω – 9 Ω at 25 °C (77 °F). If outside of this range, replace the solenoid.

Symptom	Possible Cause	Corrective Action
Vehicle engine speed does not increase when compressor is engaged.	Throttle Control adjusted incorrectly.	Adjust Throttle Control. See Performance Testing and System Adjustments chapter starting on page 54.
	Throttle Control not connected properly.	Repair wiring according to diagram.
	Throttle Control not functioning.	Replace Throttle Control.
	SEIC restart delay (Ford only).	Turn off compressor, allow to blowdown, restart compressor.
	Pressure sensor detects system is already pressurized.	• Test system blowdown function. See page 32. • Connect pressure sensor. • Replace pressure sensor.

Symptom	Possible Cause	Corrective Action
Vehicle engine speed does not return to base idle once system pressure is reached.	Wiring fault.	Repair wiring according to installation instructions.
	Throttle Control not adjusted correctly.	Adjust Throttle Control. See Performance Testing and System Adjustments chapter starting on page 54.

Symptom	Possible Cause	Corrective Action
Vehicle engine overspeeds when compressor is engaged.	Throttle Control not connected properly.	Repair wiring according to diagram.
	Throttle Control not adjusted correctly.	Adjust Throttle Control. See Performance Testing and System Adjustments chapter starting on page 54.
		Recalibrate DTC. See page 59.
	Pressure Sensor disconnected or defective.	• Connect pressure sensor. • Replace pressure sensor.

Symptom	Possible Cause	Corrective Action
Vehicle engine speed excessive on initial start up and during operation.	Maximum rpm setting is too high.	Reduce maximum rpm setting throttle control.
	Idle-down pressure is too high.	Reduce idle-down setting of the Throttle Control.

Symptom	Possible Cause	Corrective Action
Vehicle engine speed stays at VMAC maximum rpm.	Idle-down setting is too high.	Reset idle-down pressure.

Symptom	Possible Cause	Corrective Action
Objectionable noise level.	Vehicle engine speed set higher than necessary to meet air demand requirements.	Adjust Throttle Control. See Performance Testing and System Adjustments chapter starting on page 54.
	Excessive gear wear.	Contact a VMAC dealer or VMAC Technical Support.

Symptom	Possible Cause	Corrective Action
Oil present in the remote air intake hose.	Normal operation.	It is normal for a small amount of oil to be present in the remote air filter hose once the compressor is shut down. This oil will be drawn back into the compressor upon startup.
	Shutting the engine off or high air demand before system has built to full system pressure.	Stop air demand prior to turning the compressor off. On variable speed systems, allow engine speed to drop to base idle.

Symptom	Possible Cause	Corrective Action
Excessive oil in the air stream (oil carry over).	Compressor was shut down while building air.	Stop air demand prior to turning the compressor off. On variable speed systems, allow engine speed to drop to base idle.
	Vehicle parked on grade greater than 20°.	Level the vehicle and run the system. Oil carry over may take up to 20 minutes to dissipate.
	High oil level.	Correct oil level.
	Failed coalescing filter.	Replace coalescing filter.
	Clogged scavenge screen.	Clean scavenge screen. See page 40.
	Poor fit between coalescing filter and AOST/poor seal at O-rings.	Replace parts as necessary.

Symptom	Possible Cause	Corrective Action
Power fuse blows.	Short to ground in the control circuit.	Locate and correct short. Replace control system components.
	Incorrectly rated fuse.	Install the proper fuse.
	System wired incorrectly.	Repair wiring according to installation instructions.

Symptom	Possible Cause	Corrective Action
Low air pressure.	Air demand too high.	Reduce air consumption. Install air receiver tank. See accessories on page 64.
	Engine speed too low.	Adjust Throttle Control. See Performance Testing and System Adjustments chapter starting on page 54.
	Pressure regulator set too low.	Adjust pressure regulator to 150 psi. See page 63.

Symptom	Possible Cause	Corrective Action
Excessive air pressure (significantly greater than 170 psi.)	Pressure regulator set too high.	Reduce system pressure by adjusting pressure regulator. See page 63.
	Pressure control tube blocked or frozen.	Clear PTFE tube. Install VMAC De-icer kit (A700031).

Symptom	Possible Cause	Corrective Action
System pressure higher than tool requires.	No downstream pressure regulator installed.	Install downstream pressure regulator. See accessories on page 64.
	Aftermarket pressure regulator set too high.	Adjust pressure regulator to desired pressure.

Symptom	Possible Cause	Corrective Action
Frequent shut down due to over temperature.	Oil level is too low.	Add oil as necessary. See page 31.
	Restriction in the compressor oil hoses.	Check for kinked or pinched hoses. Check hoses for internal rupture.
	Compressor oil filter plugged.	Replace oil filter.
	Engine cooling system has failure (high engine temperature).	Correct engine cooling issues.
	VMAC oil cooler not functioning or fouled with deposits.	Clean or replace VMAC cooler.
	Engine fan clutch slipping	Replace fan clutch.
	High ambient temperature.	Reduce duty cycle.
	Oil temperature probe failure.	Replace temperature probe.
	System requires service.	Perform recommended service.

Symptom	Possible Cause	Corrective Action
Vehicle engine stalls when compressor is activated.	System is under pressure.	Allow sufficient time for blow-down.
	Blowdown valve not working.	Replace blow-down valve.
	Engine rpm setting too low or throttle not set correctly.	Readjust rpm and throttle settings for optimum operation.
	Throttle control not connected properly at foot pedal.	Check for proper connections.

Symptom	Possible Cause	Corrective Action
No air is generated when PTO is engaged and system is turned on.	Internal gear box problem.	Contact a VMAC dealer or VMAC Technical Support.

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 Air/Oil Separator Tank (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 32).

Drain the condensed water from the receiver tank daily.

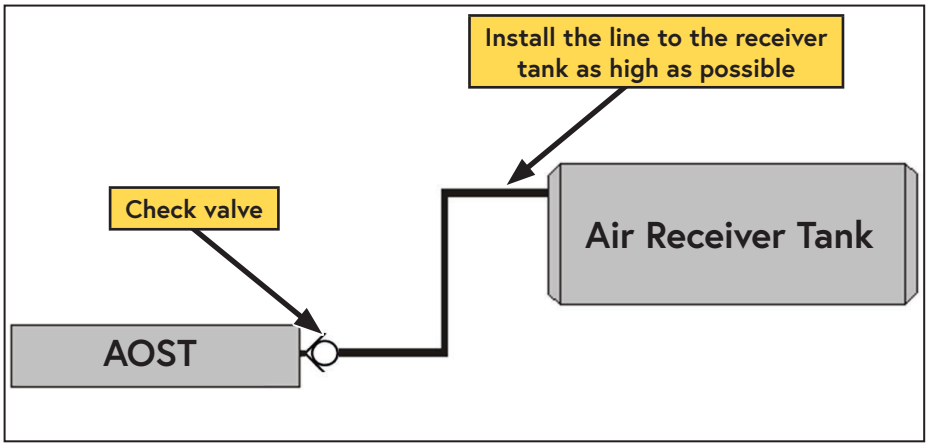


Figure 32 — Air receiver tank

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 53 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 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.

Performance Testing and System Adjustments

If insufficient airflow is developed under high demand conditions, check the engine rpm. Some applications may require adjustments to provide the necessary airflow and pressure.

Engine rpm adjustments can be made to match the amount of air delivered by the system to the requirements of the tools or equipment that will be used.

Airflow and system pressure are related. If airflow demands on the system are low, the operating pressure will remain high. As airflow demands increase, the operating pressure will decrease. Adjustments to engine rpm affect cfm while maximum system pressure is adjusted via the pressure regulator.

By making adjustments to the engine speed while operating a specific tool, optimum performance will be achieved.

If the system must be set-up without knowing the demands on the system, make engine speed adjustments by using an orifice in the outlet to simulate tool use.

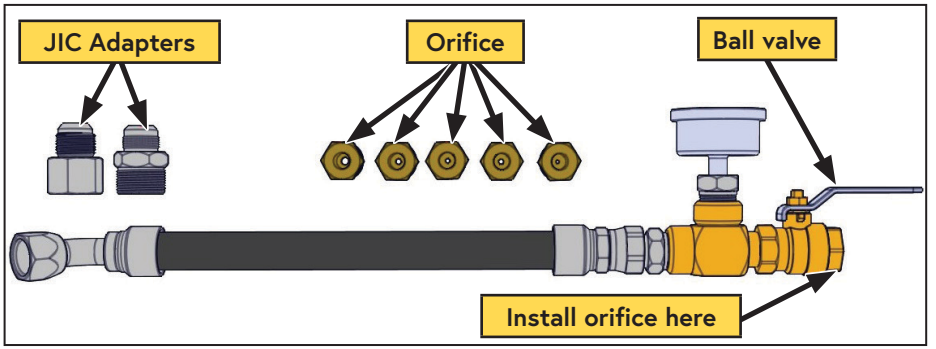


Figure 33 — A700052 VMAC Air Test Tool

Hydraulic Pump Specifications (Variable Speed Systems)

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

VMAC Model: DM2A021 (Hydraulic Pump P/N: 4500162)
Maximum engine speed: 2,500 rpm.
Hydraulic flow in "FIXED RPM" (1,250 rpm): 2.5 gpm - 3.2 gpm.
Air output in "FIXED RPM" (1,250 rpm): 32 cfm.
Hydraulic flow in "VARIABLE RPM" (2,500 rpm): 6.8 gpm.
Air output in "VARIABLE RPM" (2,500 rpm): 65 cfm.

VMAC Model: DM2B021 (Hydraulic Pump P/N: 4500163)
Maximum engine speed: 2,300 rpm.
Hydraulic flow in "FIXED RPM" (1,250 rpm): 4.3 gpm - 6.0 gpm.
Air output in "FIXED RPM" (1,250 rpm): 32 cfm.
Hydraulic flow in "VARIABLE RPM" (2,300 rpm): 11.0 gpm.
Air output in "VARIABLE RPM" (2,300 rpm): 60 cfm.

VMAC Model: DM2C021 (Hydraulic Pump P/N: 4500164)
Maximum engine speed: 2,100 rpm.
Hydraulic flow in "FIXED RPM" (1,250 rpm): 6.5 gpm - 8.0 gpm.
Air output in "FIXED RPM" (1,250 rpm): 32 cfm.
Hydraulic flow in "VARIABLE RPM" (2,100 rpm): 13.6 gpm.
Air output in "VARIABLE RPM" (2,100 rpm): 55 cfm.

Hydraulic Priority Valve Adjustment and Flow Testing (Variable Speed Systems Only)

- ☐ Install a hydraulic flowmeter between the regulated flow port on the priority valve, and the crane.
- ☐ Start the engine.
- ☐ Set the PTO mode selector switch on the PTO indicator panel to "FIXED RPM".
- ☐ Turn on the compressor. The engine speed should increase to 1,250 rpm.
- ☐ Loosen the adjustment locknut (Figure 34).

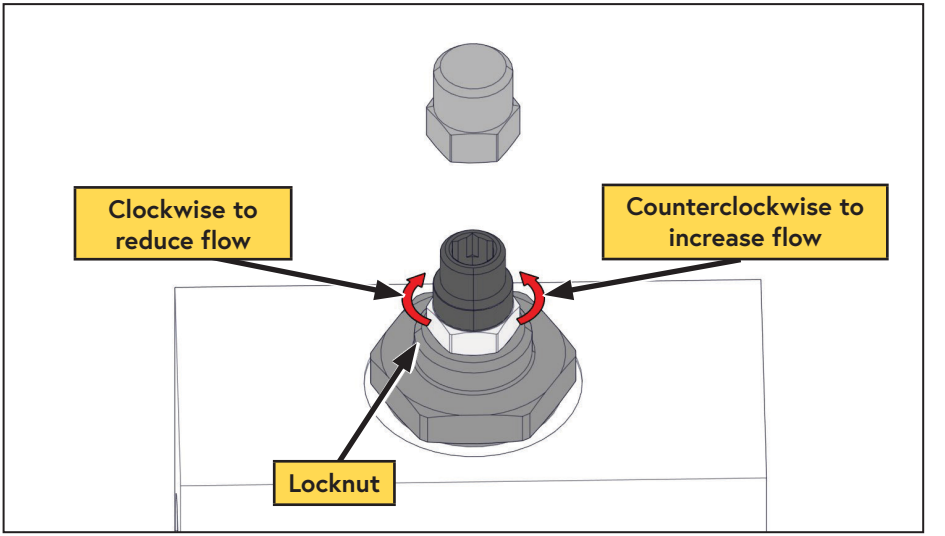


Figure 34 — Adjust priority valve

- ☐ Adjust the priority valve to the desired flow rate via the adjustment spigot (counterclockwise to increase flow, clockwise to decrease flow) (Figure 34).
- ☐ Once the adjustment has been completed, tighten the locknut.
- ☐ Set the PTO mode selector switch on the PTO indicator panel to "VARIABLE RPM" and open the ball valve on the air test tool*.
  - ☐ *Vehicle engine speed should increase to meet the demand for air.

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

- ☐ Verify that the vehicle's maximum engine speed does remains below 1.44 Ensure max RPM is lower than 1.44X top speed of the pump max speed (see table)
- ☐ Ensure steady hydraulic flow at any truck rpm.
- ☐ Remove flowmeter.

Throttle Control Operating Principles and Adjustments (Variable Speed Systems Only)

When system air pressure is low, the throttle control will signal the engine to increase rpm to generate more air. As the air pressure approaches maximum system pressure (150 psi factory default), the throttle control will signal the engine to start decreasing rpm.

Maximum RPM (MAX RPM)

The cfm produced by the system is directly related to engine speed. The "MAX RPM" on the throttle control is set from the factory provide optimum cfm (not necessarily maximum cfm) when the throttle is engaged. See the specific VMAC installation manual for default rpm settings as it will vary dependent upon vehicle manufacture as well as the engine type and size).

Ramp Up Pressure

The idle down pressure refers to the amount of air that can be used before the throttle control signals the engine to increase rpm. VMAC recommends setting idle down pressure at 10 psi – 15 psi (69 kPa – 103 kPa) below maximum system pressure (e.g. if maximum system pressure is set to 150 psi, the rpm would start to increase when system pressure drops to 135 psi). This prevents the engine from responding to small amounts of air use or nominal air leaks such as those found at quick connect couplings.

The throttle control is normally located under the dashboard panel near the steering wheel.

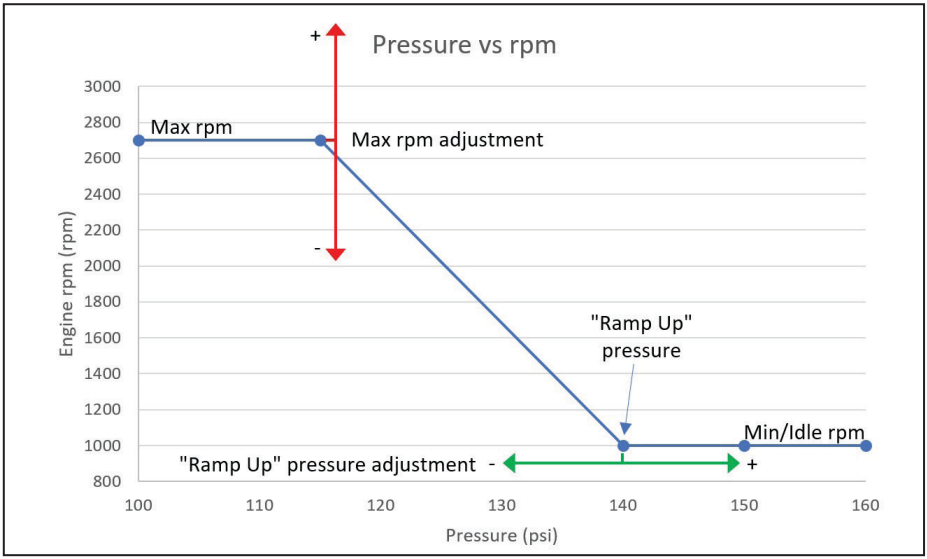


Figure 35 — Throttle control operation graph

Adjusting the Digital Throttle Control (DTC)

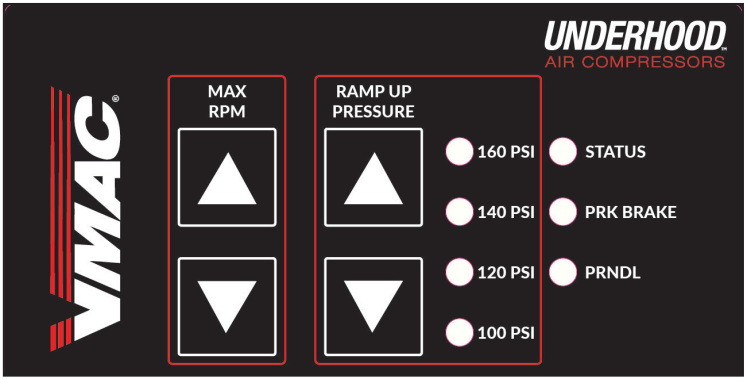


Figure 36 — Throttle control

Adjusting the rpm

The cfm produced by the system is directly related to engine speed; by default, the DTC is programmed to provide up to 70 cfm.

The DTC is located under the dashboard panel near the steering wheel.

If maximum cfm is not required, the operator may wish to reduce the "MAX RPM" to save fuel, as well as reduce the engine noise.

- See the system specific installation manual for the rpm value required to achieve maximum cfm.
- If the system is unable to "keep up" with a specific tool, the engine speed may be too low. Try increasing the engine speed gradually, until the desired performance is obtained.

Maximum rpm

To adjust the maximum VMAC rpm, set the PTO selector switch to "VARIABLE RPM" and press the "MAX RPM" "▲" or "▼" buttons as needed (in 50 rpm increments). On some early models, after pressing one of the buttons, the throttle will temporarily jump up to the new maximum rpm. After 4 seconds of inactivity, the throttle will store the new "Max RPM" value and resume normal operation.

Minimum rpm

If the VMAC base idle ("FIXED" rpm) is not optimal, it can be adjusted between 1,000 rpm and 1,500 RPM (default rpm is 1,250).

☐ With the vehicle running, the PTO selector switch set to "FIXED RPM", and the system at full system pressure, press and hold the "▲" and "▼" buttons in the "RAMP UP PRESSURE" column for several seconds until all of the LEDs turn on. Then release the buttons.

The DTC is now in "Idle adjust mode". While in "Idle adjust mode" the engine speed will remain at VMAC base idle until the system is turned off. Once the system is turned on again, it will operate as normal.

☐ Use the "▲" or "▼" buttons in the "MAX RPM" column to adjust the VMAC base idle (in increments of 50 rpm).

☐ Once the desired base idle has been set, turn the system off.

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.

DTC Auto Calibration

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

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

VMAC systems are installed on a wide range of vehicles from many different manufacturers. Some systems require the DTC to be manually calibrated the first time the system is installed, or when the DTC is reset, or replaced.

In the event that the DTC has been factory reset, or replaced, refer to the "Digital Throttle Control Operation and Adjustments" chapter in the system installation manual for any specific DTC calibration instructions.

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.

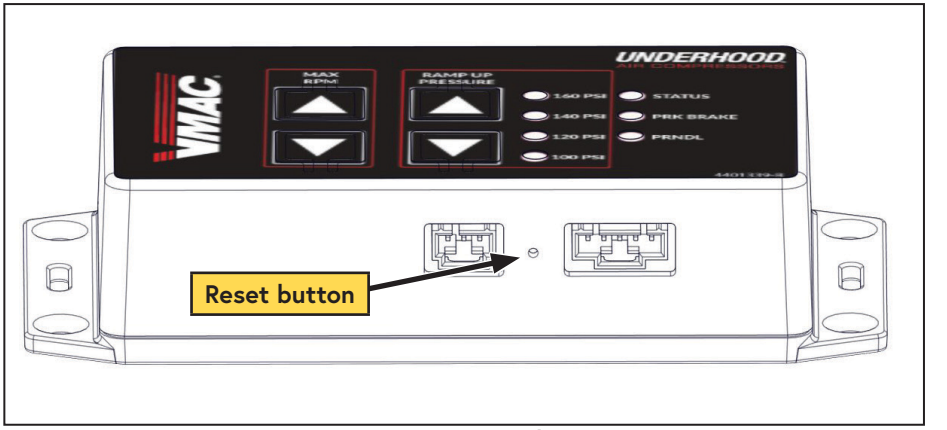


Figure 37 — Reset button

In the event that the DTC has been factory reset, or replaced, refer to the "Digital Throttle Control Operation and Adjustments" chapter in the system installation manual for any specific DTC calibration instructions.

Adjusting the Throttle Control (2 Speed Systems)

Operating the hydraulic system beyond its design parameters could result in component failure causing equipment damage, injury or death. VMAC will not be held liable for any injury or damage to any hydraulic components due to excessive hydraulic flow or pressure.

This system has been adjusted at the factory for general operation, not maximum cfm. Any adjustment to the vehicle engine speed must account for the maximum gpm rating of the various hydraulic components. See Table 2 on page 62 for cfm/gpm ratings at various engine speeds.

If maximum compressor cfm is required, some form of flow diversion must be incorporated into the hydraulic circuit.

Maximum RPM

To configure the system for maximum cfm output, install the 70 cfm (0.190 in) orifice in the VMAC Test Tool and adjust the engine rpm so that 100 psi (690 kPa) is maintained on the test tool gauge with the ball valve completely open.

Dependant upon individual installation specifications, the second speed may not be enabled.

Dual Speed (Optional)

On systems configured for 2 speed operation, the Throttle Control can be configured to operate at one speed (e.g. to provide specific hydraulic flow to a crane) and a second, higher speed (High Idle) (e.g. configured for maximum cfm or faster crane movement).

Adjusting the Throttle Control

Turn the screws counterclockwise to decrease engine speed or clockwise to increase engine speed (Figure 38).

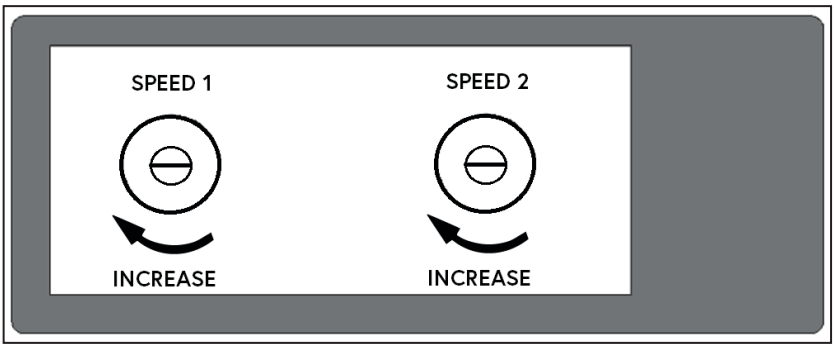


Figure 38 — 2 speed throttle adjustments

VMAC recommends installing the Throttle Control behind the kick panel in the passenger side footwell or under the passenger dashboard.

Engine Speed (RPM)			1,200	1,300	1,400	1,500	1,700	1,800	2,000	2,100	2,200	2,600	2,700
Compressor Output (CFM @ 100 psi)			30	34	37	41	46	49	53	55	58	66	69
VMAC Part #s													
4500150	Hydraulic Output	(GPM @ 3,265 psi)	8.1	8.8	9.5	10.2	11.5	12.2	13.5	14.2	14.9	2,258 Max RPM	
4500149		(GPM @ 3,410 psi)	7.4	8.0	8.7	9.3	10.5	11.1	12.4	13.0	13.6		
4500148		(GPM @ 3,625 psi)	4.9	5.3	5.8	6.2	7.0	7.4	8.2	8.6	9.0	10.7	2,661 Max RPM
4500147			3.5	3.8	4.1	4.4	5.0	5.3	5.9	6.2	6.5	7.7	8.0

Table 2 — Compressor and hydraulic pump performance chart

"SPEED 1" must be set prior to setting "SPEED 2".

Setting "SPEED 1"

- ☐ Place the transmission in "PARK" and fully apply the park brake.
- ☐ Install the VMAC test tool (P/N: A700052) with the appropriate orifice.

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 fittings.

- ☐ Allow the vehicle to run until the engine is at operating temperature.
- ☐ Operate the air compressor system until the oil is warm.
- ☐ Open the ball valve on the test tool and observe the engine tachometer.

When making adjustments to the Throttle Control, count the turns to the adjustment pot(s) in case the procedure needs to be reversed.

- ☐ Turn the "SPEED 1" adjustment screw clockwise to increase engine speed and counterclockwise to decrease engine speed (Figure 38 on page 61).
- ☐ Verify the hydraulic pressure and flow is within the hydraulic equipment manufacturer's specifications.
- ☐ Slowly close the ball valve and allow the system to build to full system pressure.

Setting "SPEED 2" (if connected)

Operating the hydraulic system beyond its design parameters could result in component failure causing equipment damage, injury or death. VMAC will not be held liable for any injury or damage to any hydraulic components due to excessive hydraulic flow or pressure.

- ☐ Verify that the hydraulic circuit has been isolated to prevent possible injury or damage from excessive flow or pressurization.
- ☐ Activate the High Idle setting.
- ☐ ADJUST the "SPEED 2" adjustment screw clockwise to increase engine speed and counterclockwise to decrease engine speed (Figure 38 on page 61).
- ☐ Slowly close the ball valve and allow the system to build to full system pressure.
- ☐ Once engine speed has reduced to base idle, turn off the system.

Adjusting the Pressure Regulator

Never adjust the pressure cutout to exceed 175 psi (1205 kPa). The pressure relief valve will activate at 200 psi (1379 kPa) and rapid air loss will occur which may cause component damage, injury or death.

In applications that require pressures below 150 psi, VMAC recommends leaving the maximum pressure set at 150 psi and installing a regulator downstream to regulate pressure to the desired amount. This will provide optimum performance and response time when air is demanded.

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.
- ☐ Pressure can be adjusted within a range of 145 psi (999.7 kPa) – 175 psi (1205 kPa), dependent upon requirements.

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

- ☐ 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 (engine speed should increase on variable speed systems). Close the valve and observe the pressure to ensure that the adjustment is correct.

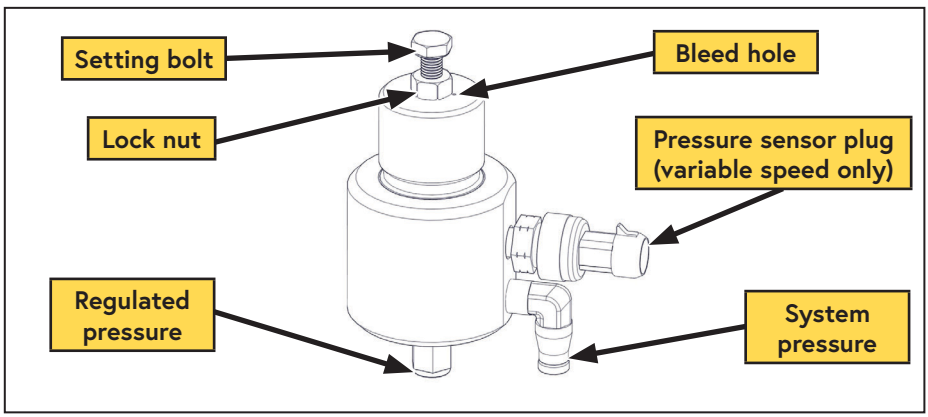


Figure 39 — Air regulator

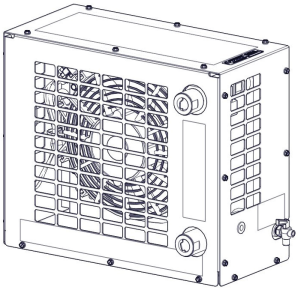
Accessory Products from VMAC

Compressor Service Kits

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

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

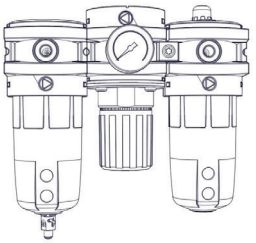
Air Aftercooler — 70 cfm



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

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

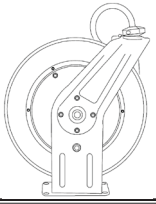
Filter Regulator Lubricator (FRL) — 70 cfm



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

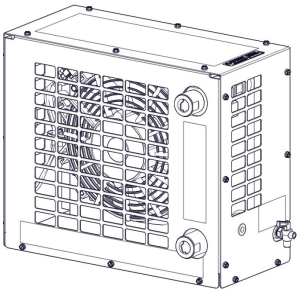
- Max air flow: up to 70 cfm / 150 psi
- Port size: 3/4 in NPT inlet and outlet

1/2 in × 50 ft Hose Reel



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

Hydraulic Fluid Cooler



Part number: A850001

Recommended for high duty cycle industrial and work truck hydraulic systems working in extreme hot climates, 100 °F (37 °C) and above; capable of removing up to 33,750 BTU / Hr.

- Hydraulic flow: 5 - 20 GPM (19 - 76 l/min)
- Pressure rating: Up to 500 psi (34.5 bar)
- Electrical: 12 V @ 10 Amps
- Dimensions: 17.0 in (43.2 cm) L × 8.0 in (20.3 cm) W x 13.0 in (33 cm) H
- Weight: 30 lbs (13.5 kg)

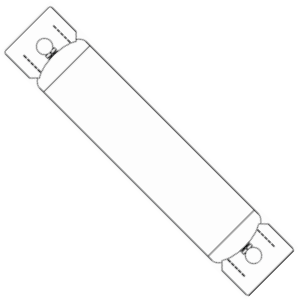
10 Gallon Air Receiver Tank w/ Mounting Feet

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

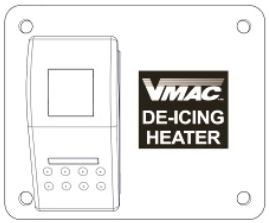


Part number: A300010

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).

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.

Notes

Warranty Registration

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

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

Product Information

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

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

Owner Information

Company Name: _____

City: _____ State / Province: _____

Phone: (____) ____–_____

Email Address: _____

Installer Information

Company Name: _____

City: _____ State / Province: _____

Submitted by

Name: _____ Phone: (____) ____–_____

Email Address: _____

Optional Additional Information

Year: _____ Make: _____

Model: _____ Unit: _____

Vehicle Identification Number: _____

Manufactured by

888-241-2289
877-740-3202
www.vmacair.com
tech@vmacair.com
warranty@vmacair.com
kb.vmacair.com
1333 Kipp Road, Nanaimo, B.C., V9X 1R3 Canada