VMAC®

VEHICLE MOUNTED AIR COMPRESSORS

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UNDERHOOD LITE AIR COMPRESSOR OWNERS MANUAL

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VR LITE AIR COMPRESSOR OWNERS MANUAL

VMAC – *Vehicle Mounted Air Compressors*
Toll Free: 1-888-241-2289
Fax: 1-250-740-3201

Changes and Revisions

Version	Revision Details	Revised by /date	Checked by /date	Reviewed by /date	Implemented
A	15-072	RF June 17 2015	RD June 17 2015	SC June 17 2015	June 22 2015
B					
C					
D					

The information in this manual is intended for certified VMAC installers who have been trained in installation procedures and for people with mechanical trade certification who have the tools and equipment to properly and safely perform the installation. Do not attempt this installation if you do not have the appropriate mechanical training, knowledge and experience.

Follow all safety precautions for mechanical work. Any grinding, bending or restructuring operations for correct fit in modified trucks must follow standard shop practices.

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

The VMAC warranty form is located online at:

http://vmacair.com/support/warranty/

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

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

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VMAC – ***Vehicle Mounted Air Compressors***
Toll Free: 1-888-241-2289
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General Information

Introduction

This manual provides operation instructions, specifications, adjustment, maintenance, and warranty information for the VMAC VR LITE UNDERHOOD air compressor.

Ordering Parts

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

Safety Messages

This symbol is used to call your attention to instructions concerning your 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 alert to the possibility of personal injury or death. Be alert; your safety is involved. While it is impossible to warn about every conceivable hazard, let good common sense be your guide.

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

This symbol is used to call your attention to additional instructions involving fire hazards.

This symbol is used to call your attention to additional instructions involving explosion hazards.

Important Safety Notice

The information contained within this manual is based on sound engineering principles, research, extensive field experience and technical information. Information is constantly changing with the addition of new models, assemblies and service techniques. If a discrepancy is noted in this manual, contact VMAC prior to initiating or proceeding with service. Current information may clarify the matter. Any person with knowledge of such discrepancies who performs any work on the system, 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 performance or the operational safety of the equipment.

Read this information before operating the compressor for the first time. Follow the information and procedures in this manual for operation, maintenance and repair. Observe the following items to reduce the chance of personal injury or equipment damage.

Follow all safety precautions for mechanical work. Moving fan belts and fan blades 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.

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of the equipment. Always use genuine VMAC replacement parts; do not use any substitutes.
The procedures described in this service manual are effective methods of service and repair. Some procedures may require the use of tools specially designed for a specific purpose. Anyone using a replacement part, service procedure or tool must first determine that neither their safety nor the safe operation of the equipment will be compromised by the replacement part, service procedure or tool selected.

This manual contains various warnings, cautions and notices that must be observed to reduce the risk of personal injury during service or repair and the possibility that improper service or repair may damage the equipment or render it unsafe. *Be aware that it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.*

VMAC will not be held responsible for any liability, injuries, loss or damage to individuals or to equipment as a result of the failure of any person to properly adhere to the procedures set out in this manual or standard safety practices. Safety should be your first consideration in performing service operations. If you have any questions concerning the procedures set out in this manual or require any more information on details that are not included in this manual, please contact VMAC before beginning any work.

Fire in the compressor system can cause an explosion and flame projection. Should this occur, there is potential for serious injury or death.

Vaporized oil propelled by high-pressure air is an explosive mixture.

Safety Precautions

Avoid all contact with pressurized air, if it penetrates your skin it can enter your bloodstream and cause serious bodily harm or even death. Do not breathe the compressor air. Vaporized oil is a severe respiratory hazard.

Vaporized oil propelled by high pressure air is an explosive mixture. To prevent compressor explosion or fire, make sure that the air entering the compressor is free of flammable vapors

Observe the following general safety rules:

- Pay attention to operations; do not leave the vehicle unattended.
- Follow safe work practices and wear the appropriate safety equipment when operating air-powered equipment, particularly eye and hearing protection.
- Avoid contact with drive belts and stay clear of all moving parts when the system is operating.
- Follow all safety precautions for under hood mechanical work.
- Follow safety procedures for the type of work being completed.

Observe these rules when operating the compressor:

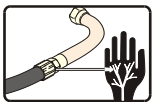
- Do not bypass or disable the oil temperature sensor.
- Do not expose the tank or compressor to extreme heat.
- Do not perform any service until the system has been completely depressurized and you have verified that all air has been discharged from the compressor system and any connected receiver tanks.
- Do not try to repair or service a pressurized system
- Maintenance and repair on system components should only be performed by qualified personnel
- The vehicle must be in park (for automatic transmissions) or neutral (for manual transmissions) with the park 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
- Do not bypass the park brake or DDC (drive disable circuit) connections
- Do not operate the compressor while driving
- Do not tamper with or remove the pressure relief valve

Personal Hazards

Follow all safe work practices. Wear the appropriate safety equipment.

Do not breathe the compressor air. Vaporized oil is a respiratory hazard.

Always use the appropriate personal protective equipment, particularly eye and hearing protection when operating air-powered equipment.



The compressor system is under sufficient pressure that a leak could force the air/oil mixture through the skin directly into your bloodstream. This could cause serious injury or death.

Never adjust or attempt to make any repairs to the system while the engine is running. Components and hoses under pressure could fail and cause serious injury or death.

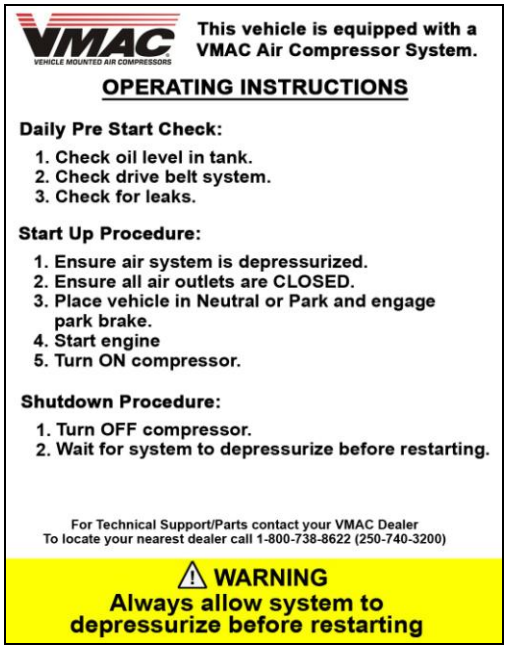
Never perform maintenance procedures on the system until the compressor has been shut down for at least 5 minutes to ensure the system is fully depressurized. After 5 minutes open the discharge valve to ensure the system is depressurized. Failure to depressurize the system could cause parts to separate explosively. Flying parts could cause serious injury or death. Air/oil mixture could be sprayed out with sufficient force to penetrate the skin, which could cause serious injury or death.

The engine, exhaust and the compressor system get very hot during operation, contact with the components or the oil can cause serious burns. Allow sufficient time for the system to cool before performing service.

Components and hoses under pressure could separate suddenly, fly out and cause serious injury or death. If equipped, the auxiliary air tank must be drained before servicing any components in the compressor system

System Identification and Warnings

Ensure that the safety and operational instruction decal is affixed in an obvious location so that it can be seen by vehicle operators. A good spot for this is usually on the inside of the door, on the panel underneath the steering wheel, or next to the compressor control panel.



To alert any technicians that may service the vehicle, affix the servicing caution/contact label in the engine compartment near the hood latch in a visible location. Thoroughly clean the selected area before affixing the label

System Specifications

Model:

- VR LITE UNDERHOOD Air Compressor

Compressor Type:

- Oil injected rotary screw

Drive System:

- Front End Auxiliary Drive (FEAD)

Control:

- Electric on/off 12V clutch control

Maximum Air Delivery:

- Up to 35 CFM and 175 PSI depending on installation and engine speed

Pressure Regulation:

- Compressor clutch engages/disengages in response to air demand

Engine Controls:

- End user adjustable single speed throttle control
- Elevated idle in response to air demand

Safety Features:

- 200 PSI (1380 kPa) relief valve in separator tank
- thermostatic switch
- rapid blow-down valve to relieve system pressure on shutdown

Lubrication:

- VMAC certified and approved synthetic oil

Filters:

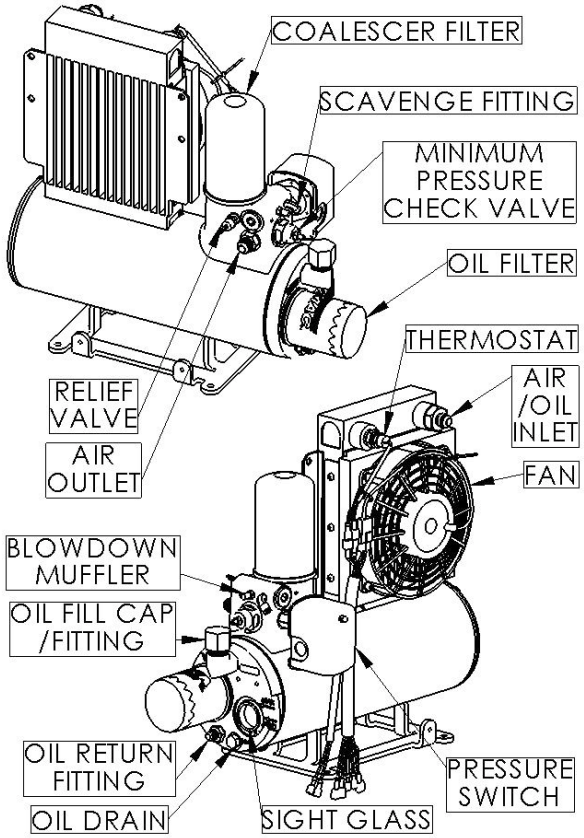
- Air filter: paper-type replaceable
- Oil filter: spin-on type high pressure
- Coalescing filter: spin-on type

System Components

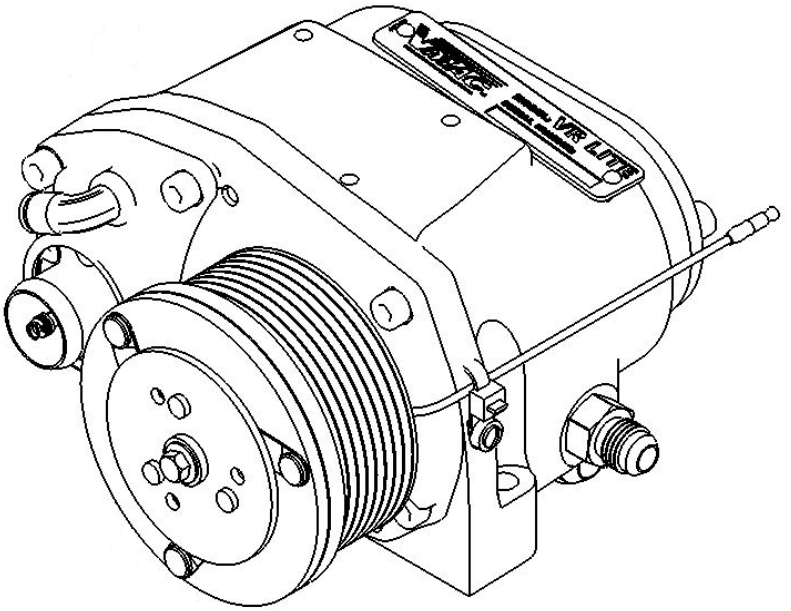
The VR Lite consists of the following components:

- WHASP tank (Waste Heat Air Separation Package)
- Compressor
- Control panel
- Throttle control
- Air/oil discharge hose
- Oil return hose
- 1/4” scavenge oil return line

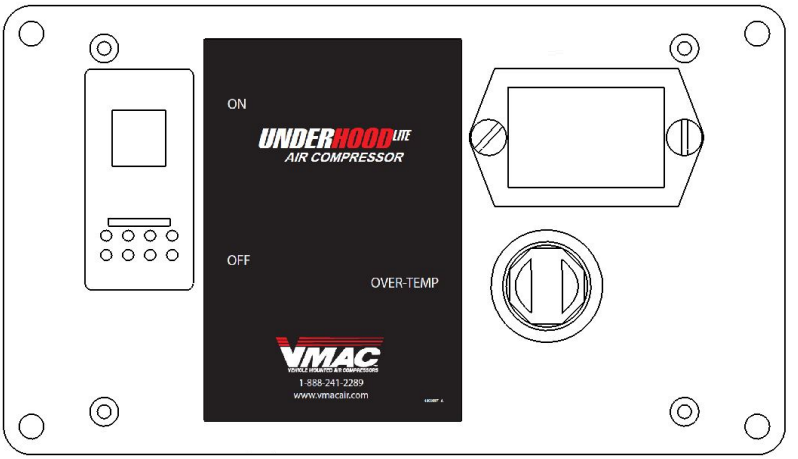
WHASP Tank



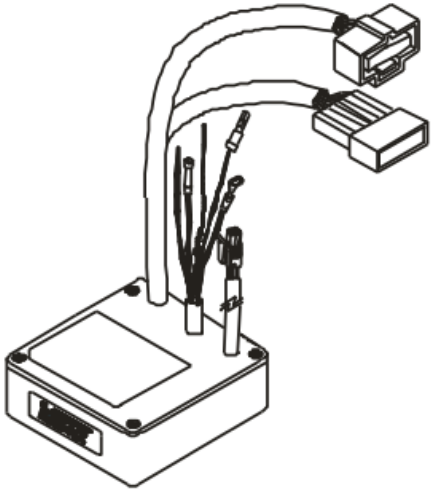
Compressor



Control Panel



Throttle control

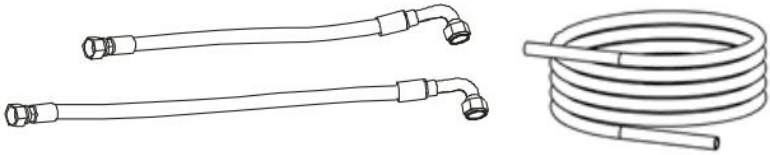


Ford applications with the SEIC may have a different style of throttle control module. See Section: Setup, Performance Testing, and Adjustments for more information.

Hoses

The VR Lite has three main hoses:

- #8 (1/2” ID) discharge hose
- #6 (3/8” ID) oil return hose
- 1/4” OD PTFE scavenge oil return line



Compressor oil will degrade rubber lined hoses, use only hoses with an AQP Elastomer type liner. Ensure any replacement hoses used are compatible with the VMAC compressor oil. Contact VMAC at 1-888-241-2289 for further information.

Operating Principles

Air Compression

The VR-Lite systems use a VMAC designed and built flooded-lobe, rotary screw compressor. The oil-filled compressor housing contains two rotors.

Compression occurs when inlet air (at normal atmospheric pressure) enters a chamber where it is trapped between meshing rotor lobes. Cooled oil is injected into the rotors during compression to lubricate the rotors and bearings, absorb the heat of compression, and seal the rotor lobes to allow for efficient compression. As the rotors rotate, the meshing lobes compress the volume of the trapped air/oil mixture before sending it down the discharge line to be cooled and separated by the WHASP tank.

Oil Separation and Cooling

The system uses a WHASP (Waste Heat Air Separation Package) tank combined 2-stage air/oil separator and oil cooler. The hot air/oil mixture from the compressor enters the cooler on the top of the tank, where the mixture is cooled and the majority of the oil separates from the air (first stage separation) and settles into the reservoir tank below the cooler. The cooled oil then passes through a high-pressure oil filter before being returned to the compressor via the oil return line. The remaining oil mist and fine droplets are removed from the air by passing it through a coalescing filter (second stage separation). Oil removed by the coalescing filter is collected and returned to the compressor via the 1/4" scavenge line.

The WHASP tank contains an integrated minimum pressure check valve (MPCV) to ensure a minimum pressure of approximately 60 PSI (410 kPa) is maintained in the tank to ensure proper oil flow while the clutch is engaged and the system is compressing air. Air will not flow out of the WHASP tank until this pressure is reached. The MPCV is factory set and requires no adjustment or servicing. Due to the integrated check valve no separate check valve is required or recommended when connecting the WHASP tank output to a receiver tank.

Filtration

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

The system is equipped with a replaceable paper element air inlet filter, spin-on high pressure oil filter and a spin-on coalescing filter.

These system filters enhance performance and extend component life by reducing damage from dust and other debris. Proper maintenance is the key to long compressor system life.

Belt Alignment and Tensioning

Depending on the application, the VR LITE system may be driven by either the OEM FEAD serpentine belt, or its own dedicated serpentine belt. Depending on the particular system the compressor may be driven by a belt with 8 ribs or less. For proper alignment always ensure the belt is centered on the clutch grooves, i.e. if the system uses a 4-rib serpentine belt it should be centered on the middle 4 grooves with 2 unused grooves showing on either side of the belt.

For systems driven by the OEM FEAD serpentine belt, the compressor mounts and is driven in the same manner as a typical optional second alternator. The OEM belt may be replaced with a longer belt if required and the OEM belt tensioning system is retained. Belt maintenance and service should be performed per the OEM's maintenance schedule.

Systems with a dedicated serpentine auxiliary FEAD belt are equipped with an automatic tensioner and do not require manual adjustment. Check pulley alignment to ensure proper belt operation.

Additional Belt Information

Where necessary, VMAC provides a replacement for the OEM FEAD belt in the compressor kit. The OEM belt and any brackets removed during compressor installation should be kept with the vehicle. In the event of a compressor failure, the VMAC supplied belt and brackets can be replaced with the OEM belt and brackets to ensure the vehicle remains operable. See the installation manual for specific belt replacement instructions.

Pressure Regulation and Engine Speed Control

The system uses a minimalistic control circuit. A pressure switch and thermostatic switch provide signals to the compressor clutch and throttle control. When discharge pressure drops below the pressure switch cut-in pressure, the system engages the clutch and commands the engine to increase to its high idle speed. When the pressure increases to the cut-out pressure, the clutch disengages and the engine drops to base idle.

These control devices provide the following benefits:

- quick response to air flow demands
- reduction of standby noise
- reduction of cooling system load
- fuel conservation when not using air

The engine speed set-point and the pressure switch cut-out set-point are adjustable. Higher engine speed will yield higher compressor output, but with the penalty of increased fuel consumption.

For information on adjustment, please refer to the section titled “Adjusting the System”

An external regulator is required for operation at tool pressures lower than 100 PSI (690 kPa).

Safety Devices

A 200 PSI (1380 kPa) pressure relief valve is installed in the WHASP tank to prevent system over pressure (refer to tank diagram on page 9). The system is also equipped with an automatic rapid blow-down system to discharge system pressure on shutdown.

The system makes use of the OEM safety circuits when available, or adds safety circuits where required. These circuits prevent the operation of the high idle system if certain conditions are not met. This both protects the vehicle, and ensures that the engine will not automatically go to high idle, should the compressor system be inadvertently activated at an inappropriate time.

The compressor system is equipped with a thermostatic switch which disengages the compressor clutch and drops the engine to base idle, should the air/oil temperature increase above a safe level. An indicator light on the control box will illuminate to show that an over-temperature event has occurred.

A 20A fuse protects the system. If the fuse blows continuously, there is an electrical problem that will not be solved by a higher fuse rating. Exceeding the rating can cause component damage.

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

Hose Protection

To prevent damage to the lines, observe the following:

- Always ensure that the hoses are secure, do not allow the hoses to dangle under the vehicle
- Always ensure that the hoses do not get pinched in steering or suspension components
- Make sure to keep the hoses away from hot surfaces, such as turbocharger housings or exhaust system components
- Hoses should not be bent tightly around sharp metal edges
- Ensure that hoses are kept away from fan blades or belts
- If the hoses are secured in a bundle, protect them from abrasion by insulating them from each other using rubber padding or plastic loom
- If any hoses appear damaged, replace hoses prior to failure.

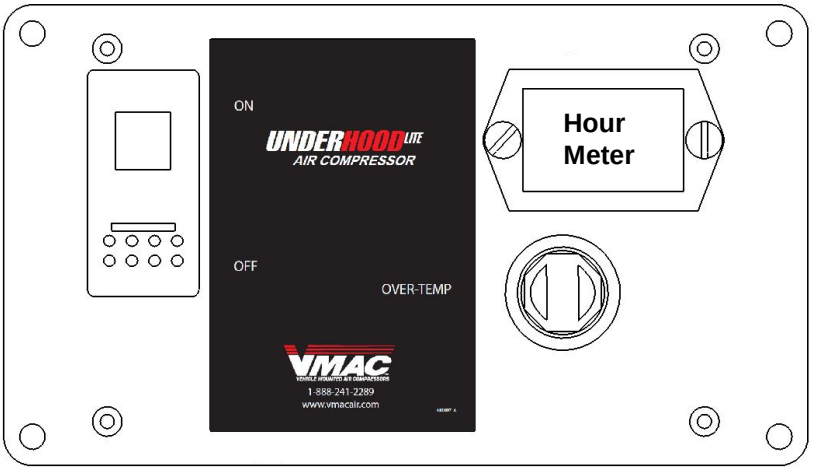
System Operation

Control Box Features

The control panel is not weather-proof. It should be installed either inside the cab or inside a cabinet on the service body (if equipped).

The control box has the following features:

- On/off toggle switch with green indicator light
- Compressor hour meter display
- Over-temperature warning light



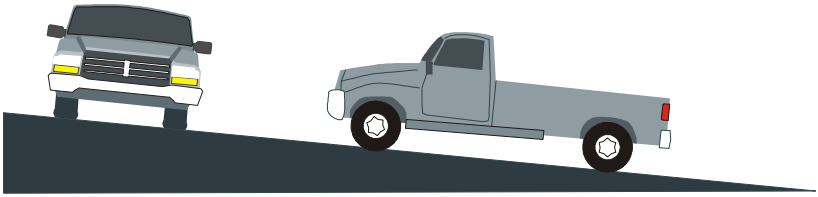
Automatic Over-Temperature Shutdown

If the compressor oil temperature exceeds 140 ^{o}C (290 ^{o}F), the thermostatic switch will disengage the compressor clutch, preventing operation of the system. The cooling fan will remain running.

The warning light on the control box will illuminate to inform you of the over-temperature situation. The control system will prevent the compressor from automatically re-starting. The system must be switched off and back on again to clear the over-temperature code.
If the oil has cooled to a safe temperature, the system will be ready to restart.

Operating Instructions

The vehicle must not be parked on grades exceeding 20 º in slope as this may affect lubrication and air/oil separation.



1. Place the manual transmission in neutral or the automatic transmission in park and fully apply the park brake.
2. Start and run the vehicle long enough for the engine to stabilize at base idle and reach normal operating temperature.
3. Close the hood (if open).
4. Close all compressor air system outlets.
5. Activate the compressor using the toggle switch on the control panel.

Engine RPM will increase to the set speed. A brief hissing of air from the blow down muffler on the cooler/separator tank, terminated by an audible “clunk” noise is normal. The hissing may occur for 1 to 20 seconds, depending on component and ambient temperature and receiver tank pressure. The system will build pressure until it reaches 150 PSI (less if the pressure set-point has been reduced). The clutch will disengage, and the cooler/separator tank will blow-down. The engine will drop to base idle.

Re-starting the compressor immediately after shutdown may cause belt slippage and compressor clutch damage.

Cold Environment Operation

The VR Lite compressor system is not designed or recommended for use in cold climates.

If operating the system below 0°C (32°F) ambient temperature, ensure the following conditions are met before starting the compressor:

- Vehicle engine must be at normal operating temperature.
- Compressor system components must all be at or above 0°C (32°F). Starting the system while any of the components are below 0°C (32°F) may damage the compressor.
- In situations where the ambient temperature is very low, the hissing sound that comes from the blow-down muffler on the WHASP tank during startup may occur for slightly longer than usual.

Diesel Particulate Filter Warning (DPF)

When engine driven or PTO driven equipment is run on vehicles with DPF for extended periods of time, particulate may build up in the filter. All vehicles with a DPF have a warning light (or message) on the instrument panel or message center. Run time until filter build up depends on many variables and is the responsibility of the operator to monitor. It is suggested that if equipment is run for extended periods of time (over 1 hour) without driving, the vehicle DPF warning system must be checked after 1 hour and every 15 min thereafter. If the DPF warning light or message appears, see the vehicle owner's manual for methods of cleaning or regenerating.

Stationary Elevated Idle Control (Ford Applications Only)

If any of the vehicle's parameters are outside of their normal operating range, the SEIC system will disable itself to prevent engine damage.

SEIC Restart Delay

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

If the pressure switch requests air during this time, the clutch will engage as per normal, but the SEIC system will not recognize the high idle request. Should this occur, turn off the compressor system with the control switch and allow the tank to complete its blow-down cycle. Turn the compressor system on, and it should operate normally.

For more information on the Ford SEIC system find the appropriate bulletin for your vehicle at:

https://www.fleet.ford.com/truckbbas/topics/qvmp.html

Problem Diagnostics and Troubleshooting

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

- accurately identify the problem by operating the system yourself
- determine possible causes for the problem by understanding how the system operates
- isolate the potential causes by accurate testing using the correct, recognized procedures
- perform proper repairs using the correct procedures and the recommended replacement parts
- perform proper post-repair testing to ensure that the repairs were effective
- do not use test practices that are potentially harmful to people or the equipment
- electrical testing should be performed according to the processes described in the troubleshooting chart. For accurate diagnosis, refer to the electrical circuit diagram in the installation manual.

Always ensure that manual transmissions are in neutral or automatic transmissions are in park with the park brake applied before starting the engine or operating the system

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 is too low.	Park on level ground, check level at sight glass, add as necessary.
	Drive belt is broken.	Install new drive belt. Check alignment of pulleys. Replace automatic tensioner.
	No power to the clutch.	Check for 12 V at the clutch, check fuse, check for broken wires or failed switch.
	Bad ground.	Check the system ground.
	Open clutch stator windings.	With compressor switch off and clutch wire disconnected, check resistance between the bullet connector and the compressor body. Resistance (less lead resistance) should be 4 to 5 ohms. If outside this range replace the stator.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Frequent over-temperature shutdowns.	Low oil level.	Check oil on level ground, add as required.
	Restriction in the compressor oil hoses.	Check for kinked or pinched oil hoses.
	Compressor oil filter plugged.	Replace oil filter.
	Heat exchanger not functioning or is fouled with deposits.	Remove and clean or replace heat exchanger.
	Engine cooling system failure (high engine temperature).	Correct engine cooling problems.
	Engine fan clutch slipping.	Replace fan clutch.
	High ambient temperatures.	Reduce duty cycle.
	Thermostatic switch malfunctioning.	Replace if defective.
	Cooling fan failure.	Check and replace if defective
	Air flow through cooler obstructed	Ensure adequate ventilation to cooler core
		Ensure cooler core is not plugged with debris
	System needs service	Perform recommended service
Excessive air pressure	Pressure regulator valve (if equipped) set too high.	Reduce system pressure by installing and adjusting regulator.
Engine stalls when compressor is activated.	System is under pressure.	Allow sufficient time for blow-down.
	Blow-down valve not working.	Replace blow-down valve.
Belt squeals when compressor switch is activated.	System is under pressure.	Allow 10 seconds for blow-down.
	Blow-down valve not working or muffler is plugged.	Replace blow-down valve or clean muffler.
	Improper belt tension.	Check belt tensioner.
	Belt is glazed.	Replace belt.
Frequent relief valve operation.	Pressure switch setting is too high.	Adjust pressure switch setting below 150.
	Pressure switch defective.	Replace pressure switch.
	Relief valve defective.	Replace relief valve.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Power fuse blows.	Short to ground in the control circuit.	Locate and correct short or replace control system.
	Incorrect fuse.	Install correct OEM fuse.
	Incorrect wiring.	Repair wiring according to wiring diagram.
Low air pressure.	Air flow is too high.	Reduce consumption.
	Throttle control set too low.	Increase engine speed setting.
	Pressure switch setting too low.	Increase pressure switch setting.
Objectionable noise level.	Elevated idle RPM setting higher than necessary to meet air demand requirements.	Reduce elevated idle RPM setting.
	Operating with the hood open	Close the hood.
Engine RPM stays at base idle when compressor runs.	Throttle at minimum setting.	Adjust throttle set point to desired level.
	SEIC restart glitch (Ford only).	Turn off compressor, allow to blow-down, restart compressor.
	Throttle control not functioning.	Replace throttle control.
	Throttle controls not connected properly.	Check and correct connections.
Engine RPM does not return to base idle.	Faulty pressure switch.	Replace pressure switch.
	Wiring fault	Check and correct wiring according to wiring diagram.
Excessive oil in the air.	Failed coalescing separator element.	Replace element.
	High oil level.	Correct oil level.
	Vehicle is not within requirements of 20 degrees of level.	Level vehicle and check for oil in the air.
	Compressor was turned off while running at high speed.	Allow engine RPM to drop to base idle before turning the compressor off.
Oil blows out of compressor air filter on compressor shutdown.	Shutting the engine off while running at high speed.	Allow engine to idle-down before shutting down the compressor. Turn off any air tools before shutting down compressor.
	Intake valve failure.	Check and replace as necessary
Oil drips from clutch after shutdown.	Seal leaking.	Contact the nearest dealer to replace input shaft seal.

Maintenance

Routine Maintenance

The compressor system does not contain reed-valves or other easily fouled, fatigue-prone components. With proper maintenance, the need for premature repair 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 through the air inlet, they can contaminate roller bearings and the rotors in the compressor. Contamination will cause severe, rapid damage to components.

Impact damage and premature bearing failure may occur in the compressor bearings if the system is not operated on a regular basis due to vibration caused by vehicle operation. Operate the system at least every 30 days for 15 minutes at no load to ensure bearing lubrication and rotation.

During the warranty period, you must follow the maintenance schedule and use only original genuine VMAC replacement parts to maintain your system and your warranty.

Maintenance Schedule

The following maintenance schedule should be observed to assure good performance and long service life. The hours indicated are those displayed on the Compressor Control Box. Service should be performed at the lesser of the two intervals, whichever occurs first. For replacement part numbers, please check the appropriate Illustrated Parts List for your application or call a dealer near you.

50 hours or 1 week:

- Check the drive belt
- Check pressure relief valve function

200 hours or 6 months:

- Replace the air filter, oil filter and change oil

400 hours or 1 year:

- Replace the air filter, oil filter, coalescing element, pressure relief valve, muffler and change oil.

Oil Level Maintenance

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

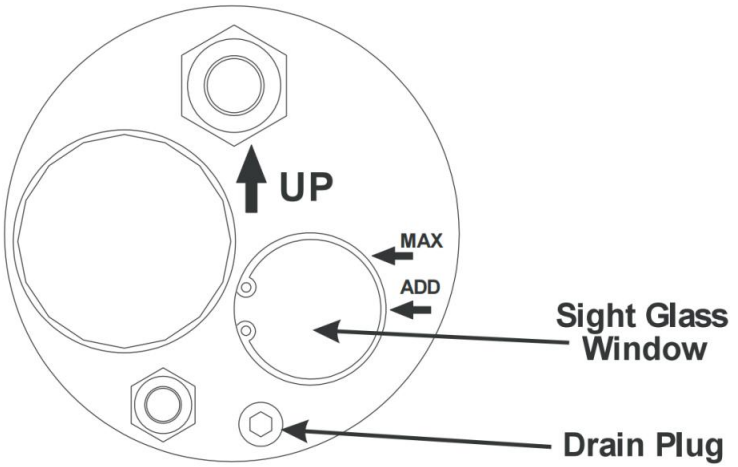
1. Ensure the vehicle is parked on level ground and that the compressor system is de-pressurized and cool to the touch.

2. Check the oil level in the sight glass, and ensure that it is between the “MAX” arrow and the “ADD” arrow.

3. If the level is below the “ADD” arrow, add oil to the system.

a. Remove the fill cap on the tank (above the sight glass).
b. Using a funnel, pour oil into the fill fitting until the oil level in the sight glass reaches the “MAX” arrow.
c. Replace the fill cap and tighten securely.

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



Inspecting the Drive Belt

Check the drive belt carefully for evidence of glazing, missing portions of the ribs or damage to the belt edges and surface. If the belt is damaged, install a new drive belt.

Inspect all pulleys and idlers for damage. If any component shows cracks, chipping, impact damage or any other indications of physical damage, replace the pulley or idler.

If the damage indicates possible misalignment, check pulley alignment. If the pulleys are not properly aligned, check all fasteners to ensure that they are properly torqued and that there are no loose components.

Inspecting the Muffler

Visually inspect the muffler for evidence of corrosion or loss of functionality. Ensure the muffler allows the blow-down cap to function. This can be tested by turning the system on and have it reach operating pressure. Turn the system off and listen for the pressurized air to blow-down through the muffler. If the muffler is showing signs of blockage, contact your local authorized VMAC dealer for a replacement part.

Inspecting the Pressure Relief Valve

Inspect the pressure relief valve for signs of corrosion or loss of functionality. To test the pressure relief valve functionality, turn the system on and bring it up to operating pressure. Pull the ring on the pressure relief valve to depressurize the system. Turn the system off, and ensure the system comes back to operating pressure when the system is restarted. If the pressure relief valve is showing loss of functionality, contact your local authorized VMAC dealer for a replacement part.

Relief valve failure can result in air/oil tank over pressurization leading to system failure or rupture.

Replacing the Air Filter

Never run the compressor, drive the vehicle or even allow the vehicle to sit parked without the recommended air filter and filter cover installed.

If the system has been just operated, shut off the engine and wait at least 30 seconds for the air pressure to vent before working on the system.

1. Clean loose debris from the area around the compressor and the filter cover to prevent contamination entering the compressor.

2. Remove the filter cover retaining nut, the filter cover and the filter element. On some installations, it may be necessary to remove the filter assembly from the filter bracket to access the filter cover nut and remove the cover.

3. Immediately cover the air inlet opening by masking with tape or with a clean cloth to prevent contamination. Do not use compressed air or perform any other tasks around the compressor until the filter and cover are replaced.

4. Clean the inside of the filter cover with a clean, dry cloth. Do not use flammable solvents to clean the inside of the cover. If you do use solvent, rinse the inside of the cover thoroughly with fresh water and dry it before installing the cover.

5. Remove the cloth or masking and install a new air filter. Make sure that the filter fits over the step on the filter plate.

6. Replace the cover and secure it with the cover bolt. Do not over-tighten the bolt. Reinstall the filter on the filter bracket (if removed)

Never attempt to clean the filter element with compressed air. Replace the filter element.

Replacing the Oil Filter

Always use a VMAC oil filter. VMAC oil filters are designed to work properly at system pressure. Standard automotive oil filters are NOT capable of withstanding system pressure.

If the system has been just operated, shut off the engine and wait at least 30 seconds for the air pressure to vent before working on the system.

Do not attempt to change the oil filter until the oil has cooled. Hot oil can cause severe burns.

1. Clean the area around the tank and the filter to prevent contamination.

2. Remove the drain plug and drain the oil into a container large enough to hold at least 1 USG (4 liters)

3. Install and tighten the plug.

4. Remove the filter by turning it counterclockwise. Before discarding the filter, check to make sure that the threaded nipple did not unscrew with the filter. If the nipple is in the filter, remove it carefully to avoid thread damage and replace it in the tank

.

5. Check the gasket-sealing surface on the front of the tank for contamination, old gasket material, or damage.

6. Apply a thin coating of compressor oil to the filter-sealing gasket and fill the filter with VMAC compressor oil.

7. 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 sealing gasket.

Never over-tighten the filter, as this may damage the seal or the filter.

8. Remove the filler cap from the fill fitting and pour VMAC compressor oil into the oil filler fitting on the tank using a funnel.

You must use VMAC certified and approved synthetic compressor oil. Failure to use this oil will result in damage to the compressor and may void your warranty.

9. Check the level at the sight glass at the filter end of the tank. Continue adding oil until the level is correct.

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

10. Install the fill cap on the fill fitting and tighten it securely.

11. Place the manual transmission in neutral or the automatic transmission in park and fully apply the park brake.

12. Start the engine and allow it to reach operating temperature.

13. Turn the compressor system on, allow the system to pressurize, and return to base idle speed.

14. Turn off the compressor system.

15. Allow the system to settle for 5 minutes, and then check the oil level through the sight glass. The level must be between the minimum and maximum level indicators.

16. Check for oil leaks.

Changing Compressor Oil

If the system has just been operated, shut off the engine and wait at least 30 seconds for the air pressure to vent before working on the system. Also allow sufficient time for the oil to cool.

1. Clean the area around the tank and filter to prevent contamination.

2. Remove the drain plug and drain the oil into a container large enough to hold at least 4 litres (1 U.S. gal.)

3. Install and tighten the plug.

4. If you are replacing the oil filter, follow filter replacement procedures.

5. Remove the filler cap from the fill fitting and pour VMAC compressor oil into the oil fill fitting on the tank.

You must use VMAC certified and approved synthetic compressor oil. Failure to use this oil will result in damage to the compressor and may void your warranty.

6. Check the level at the sight glass at the filter end of the tank. Continue adding oil until the level is correct.

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

7. Place the manual transmission in neutral or the automatic transmission in park and fully apply the park brake.

8. Start the engine and allow it to reach operating temperature.

9. Turn on the compressor system, allow the system to pressurize, and return to base idle speed.

10. Turn off the compressor system.

11. Allow the system to settle for 5 minutes, and then check the oil level through the sight glass. The level must be between the minimum and maximum level indicators.

12. Check for oil leaks.

Changing the Coalescing Filter

If the system has just been operated, shut off the engine and wait at least thirty seconds for the air pressure to vent before working on the system. Also allow sufficient time for the oil to cool.

1. Clean the tank in the area of the coalescing filter to prevent contamination.

2. Note that the oil does not need to be drained to change the coalescing filter.

3. Remove the spin-on type coalescing filter by turning it counterclockwise.

4. Ensure the filter nipple has not loosened off from the tank

5. Check the gasket-sealing surface on the front of the tank for contamination, old gasket material, or damage.

6. Apply a thin coating of compressor oil to the filter-sealing gasket.

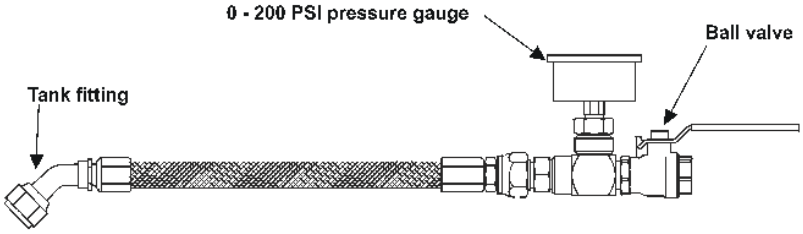
7. Spin the filter onto the threaded nipple until the gasket contacts the sealing surface on the tank, then tighten the filter an additional 3/4 to 1 turn to seat the sealing gasket.

8. Operate the system and check for leaks.

Setup, Performance Testing, and Adjustments

This system requires minimal adjustment. The maximum system pressure is adjusted via the pressure switch on the tank, and the output is adjusted with the throttle control. Refer to the owner's manual for specific instructions on how to adjust the system.

You can test the system operation using the tools that will be operated by the system or you can test operations using a .125" (1/8") orifice in the outlet to simulate tool use.



System Testing and Adjustment Tool - A700052

1. Install the test tool at the system outlet. If you are using the VMAC test tool, the appropriate orifice size is .125."
2. Make sure that the ball valve is closed.
3. Place the transmission in park and fully apply the park brake.
4. Allow the engine to run until it is at operating temperature.
5. Operate the air compressor system until the oil is warm.
6. Observe the pressure gauge. Pressure should be approximately 150 psi.
7. Open the ball valve on the test tool and observe the engine tachometer. Engine speed should increase to high idle of 3000 RPM.
8. Close the air valve slowly to allow the system pressure to rise. When the pressure reaches the pressure switch set-point of 150 PSI, the system will disengage the compressor clutch and drop the engine to base idle.
9. Once the system pressure is at maximum, slowly open the ball valve on the test tool until the pressure on the gauge begins to drop. Engine speed should ramp up to high idle when the pressure drops approximately 40 PSI below the pressure switch set-point.

Adjusting the System

Airflow and system pressure are related. If airflow demands on the system are low, operating pressure will remain high. If airflow demands are high, operating pressure will reduce. By making adjustments to the engine speed while operating a specific tool, you will achieve optimum performance.

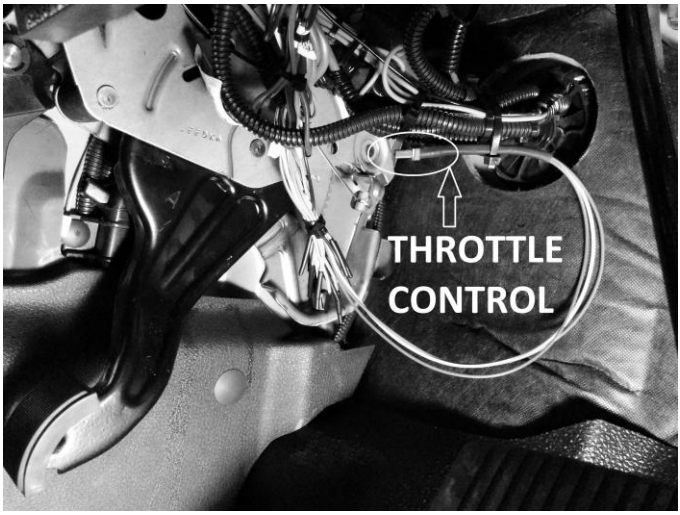
If insufficient airflow is developed under high demand conditions, check engine RPM.

Compressor CFM output is directly related to engine speed. As engine speed increases, so does compressor output. Matching system output to the tools used has the benefit of maximizing performance and optimizing fuel consumption.

The Throttle Control is adjusted at the factory to operate the engine in the middle of the RPM range. The engine speed can be increased or decreased to obtain the desired output.

For Ford vehicles equipped with SEIC:

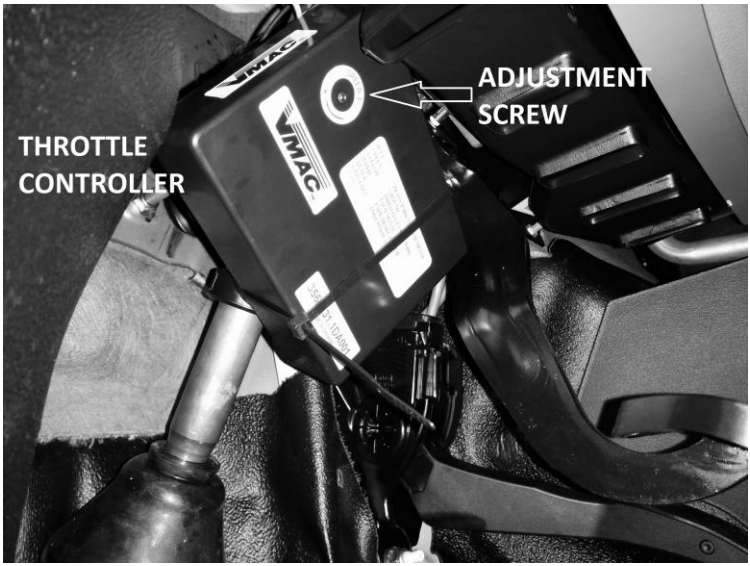
Locate the VMAC throttle controller. It will be installed under the dash, near the park brake pedal.



Adjustment is made by turning the thumb screw. Turn the screw clockwise to increase engine speed, or counter-clockwise to decrease engine speed.

For all other vehicles:

Locate the VMAC throttle controller. It is typically installed under the dash, near the throttle pedal. ***Example installation only, actual installation may not be exactly as shown.***



Adjustment is made by turning the set screw with a small flathead screwdriver. Turn the screw clockwise to increase engine speed, or counter-clockwise to decrease engine speed

Engine RPM adjustments may be made so that the amount of air delivered by the system matches the requirements of the tools or equipment that you will be using.

- If the system is cycling on and off rapidly when using a particular tool, the engine speed is likely higher than necessary for that tool. Try turning the engine speed down and observe the performance.
- If the system is unable to “keep up” with a specific tool the engine speed is too low. Try increasing the engine speed gradually, until the desired performance is obtained.

The VMAC control system is designed such that the user cannot increase the engine speed beyond a safe level. Adjusting the engine speed is a low risk activity.

Adjusting the Pressure Switch

The pressure switch is adjusted to limit maximum pressure to a safe level, and to turn off the compressor when there is no air demand.

If you are making an adjustment to the pressure switch set point, ensure that all components of the air system have a rated service pressure above the new set point.

DO NOT ADJUST THE PRESSURE ABOVE THE RATED PRESSURE OF ANY COMPONENT IN THE SYSTEM

The pressure switch is adjustable for “cut-out” pressure (maximum tank pressure; the point at which the compressor clutch disengages).

1. Make sure that the oil level is correct and the system is at operating temperature.

2. Operate the system until it reaches full pressure. Observe the pressure on the gauge.

3. Remove the plastic pressure switch cover

4. Locate the long bolt with the spring and nylock adjustment nut. Tighten or loosen the adjustment nut on the pressure switch. Tightening the nut increases the “cut-out” pressure, and loosening the nut decreases the “cut-out” pressure.

5. Use air until the compressor turns back on, while observing the pressure gauge. Observe the new “cut-out” pressure when the clutch disengages.

6. Repeat steps 4 and 5 until the desired “cut-out” pressure is obtained.

7. Re-install the plastic cover.

8. Pressure can be adjusted within the range of 100-175 PSI, depending on your requirements.

Recommended Accessories

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

Auxiliary Receiver Tank

- The separator/cooler tank (WHASP tank) automatically depressurizes on compressor shut-down to protect the compressor and clutch from damage that may occur if the compressor starts while pressurized. The use of a receiver tank provides a buffer so that tools may be used immediately upon system startup. The addition of a receiver tank will also reduce the frequency of clutch and system cycling.
- A six gallon tank is of optimal size for use with this compressor system.
- For information on installing a receiver tank see the Auxiliary Air Receiver section of this manual.
- Receiver tanks are available for purchase through VMAC and include:
  - Tank
  - Safety valve
  - Manual water drain
  - See the Accessory product page of this manual for more information.

Pressure Gauge

- Install a 200 PSI pressure gauge downstream of the VMAC tank outlet.
- While not critical to system performance, a pressure gauge is important for fine tuning the system and simplifies any potential troubleshooting.

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

Auxiliary Air Receiver

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

The VMAC WHASP tank has a built-in check valve at the outlet port, so an additional check valve is not required for use with an auxiliary air receiver. Use of an additional check valve may cause erratic performance.

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

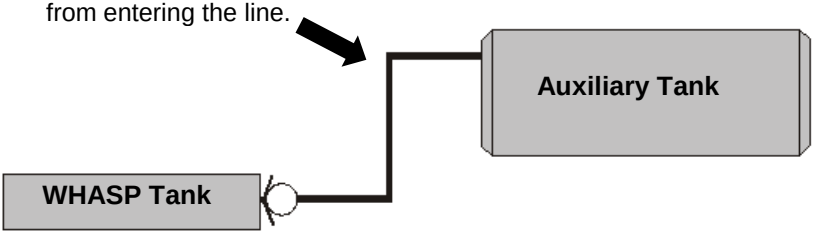


Figure 10

Pressure in the auxiliary tank will not be relieved when the compressor system blows down. This is normal operation. Prior to performing any service work on the system, relieve the pressure in the auxiliary tank.

Accessory Products from VMAC

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

	**Eliminator Aftercooler** Removes up to 80% of moisture from compressed air. Quick installation, automatic drain and compact design
	**Filter Regulator Lubricator** Removes lubricants, water and dirt from the air stream. Adds atomized tool oil to lubricate tools. Reduces pressure for longer tool life.
	**Hose Reel** Secure, compact, retractable hose storage in a sturdy reel.
	**Air Receiver Tank** Thirty-five gallon capacity in a compact tank, complete with fittings and a gauge.
	**Air Receiver Tank** Ten or Six gallon capacity in a compact tank, complete with fittings and a gauge.
	**Service Kits** Using OEM service products will extend the life of your system. Includes oil, filters, seals and O-rings. 200 hour and 400 hour service interval kits are available

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

VMAC – ***Vehicle Mounted Air Compressors***
Toll Free: 1-888-241-2289
Fax: 1-250-740-3201

VMAC Warranty

1. General Provisions and Limitations:

1.1 VMAC Global Technology Inc, (hereafter ”VMAC”) warrants to each original retail purchaser (hereafter “Buyer”) of its new Underhood Air Compressor Systems (hereafter “Product(s)”) from VMAC or its authorized Dealers that such Product(s) are, at the time of delivery to the Buyer, free of manufacturer defects in material and workmanship.

1.2 Product Warranty – Underhood Air Compressors applies to Products(s) manufactured on or after January 1, 2005. (System ID numbers ending with *TA001* or greater).

2. No warranty is made with respect to:

2.1 Any Product(s) which have, in VMAC’s judgment, been subject to negligence, accident or improper storage, installation, application, operation or maintenance, or have been repaired or altered in such a way that affects the Product(s) adversely.

2.2 Components or accessories manufactured, warranted and serviced by others.

2.3 Damages caused from normal maintenance service and repairs and corrections with minimum action, such as adjustments and inspections, or replacement of items, such as service filters, belts, seals and service kits.

2.4 Consequential damages caused by Product(s) failure.

2.5 Any Product(s) if other than VMAC’s genuine components are used in the Product(s).

2.6 Normal wear and tear of Product(s).

3. Warranty Period:

3.1 The warranty period will commence upon installation of the Product(s). The returned warranty registration form marks the date of installation. If the warranty registration form has not been received by VMAC within 6 months from the date of installation of the Product(s), then the warranty period will be deemed to commence 30 days from date of shipment from VMAC. For the full warranty period to apply, installation of Product(s) must be completed within 36 months from the date of shipment of the Product(s) from VMAC.

3.2 The following components of Product(s) are warranted against manufacturer defects in materials and workmanship for a period of 24 months or 2,000 hours of operation, whichever expires first: Compressor, Brackets, Air/Oil Separator Tank and Oil Cooler.

3.3 All other components of Product(s), not listed in 3.2, are warranted against manufacturer defects in materials and workmanship for a period of 12 months or 1,000 hours of operation, whichever expires first.

3.4 Replacement components of Product(s) listed in 3.2, excluding VMAC factory rebuilt components, shall be warranted for the remainder of the original warranty period. If the original warranty period has expired, replacement components of Product(s) listed in 3.2 and purchased by Buyer, excluding VMAC factory rebuilt components, shall be warranted for a period of 12 months or 1,000 hours of operation, whichever expires first.

3.5 VMAC factory rebuilt components shall be warranted for a period of 6 months from date of shipment from VMAC.

3.6 Replacement components of Product(s) listed in 3.3, shall be warranted for the remainder of the original warranty period. If the original warranty period has expired, replacement components of Product(s) listed in 3.3 and purchased by Buyer, shall be warranted for a period of 12 months or 1,000 hours of operation, whichever expires first.

4. VMAC Obligations:

4.1 VMAC's obligation is limited to repairing or, at VMAC's option, replacing, during normal business hours at an authorized service facility of VMAC, any component, which in VMAC's judgment is proven to be defective as warranted.

4.2 VMAC's obligation is limited to Product(s) proven to be warranted. No liability is accepted for any consequential damages, injuries or expenses directly or indirectly related to Product(s) failure.

5. Buyer Obligations:

5.1 Buyer shall notify VMAC of the alleged defect within 10 days of initial discovery and return the allegedly defective component(s) within 30 days of initial discovery.

5.2 The Buyer must prepay all costs associated with the warranty claim and submit receipts and/or invoices to VMAC for evaluation.

5.3 If required by VMAC, the Buyer must return components claimed under this warranty to a facility designated by VMAC for evaluation, to establish a claim under this warranty.

5.4 Buyer shall maintain and service VMAC Product(s) in accordance with the VMAC Product(s) Owner's Manual.

6. Warranty Registration Validation:

6.1 A warranty registration form is provided to the Buyer with the Product(s). The form must be fully completed by the Buyer and returned to VMAC upon completion of the installation of the Product(s) to validate the warranty. Warranty registration can also be completed online on the VMAC website at http://www.vmac.ca/index.php?warrantyregistration. Warranty claims will not be processed unless VMAC has received a fully completed warranty registration form.

7. Disclaimer and Warranty Service:

7.1 Any labor costs claimed in excess of VMAC's set rate and/or times are not provided by this warranty. If applicable, any labor costs in excess of VMAC rate schedules caused by, but not limited to, location or inaccessibility of the equipment, travel time or labor provided by unauthorized service personnel are not provided by this warranty.

7.2 This warranty is in lieu of all other warranties or obligations express or implied. VMAC expressly disclaims all implied warranties of merchantability or fitness for a particular purpose.

7.3 Warranty claims must be pre-authorized by VMAC, and the components returned via prepaid freight using the designated "Returned Merchandise Authorization" number and form.

VMAC Product Warranty Registration

This form must be **fully** completed and returned to VMAC at the time of installation. Warranty will be void if this form is not received by VMAC within **30 days** of installation.

VMAC Dealer Information

Company Name: _____

City: _____ State/Prov:_____

Installer Information

Company Name: _____

City: _____ State/Prov:_____

Installation Date: _____/_____/_____
Day Month Year

Owner Information

Company Name: _____

Address: _____

City: _____ State/Prov:_____

Zip/Postal: _____ Phone #: (____)____-_____

Vehicle Information

Year: _____ Make: _____

Vehicle Identification Number: _____

Unit #: _____

Product Information

System Identification Number: **V** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

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

Throttle Control Serial Number: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

VMAC – Vehicle Mounted Air Compressors
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www.vmacair.com