

# VMAC Specialty Products

## Owner's Manual

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VMAC Specialty Products Owners Manual

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# Introduction

This manual provides operation instructions, specifications, maintenance schedules and warranty information for the VMAC range of specialty compressor systems.

## Ordering Parts

To order parts, contact the nearest VMAC dealer. To locate the nearest dealer, call 1-888-241-2289.

## VMAC Warranty

### 1 GENERAL PROVISIONS AND LIMITATIONS

1.1 VMAC, Division of Mangonel Investments Corporation, (hereafter "VMAC") warrants to each original retail purchaser (hereafter "Buyer") of its new Specialty 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.

### 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 date of installation of the Product(s), then the warranty period will be deemed to commence 30 days from date of shipment from VMAC.
- 3.2 Product(s) are warranted against manufacturer defects in materials and workmanship for a period of 12 months or 1,000 hours of operation, whichever expires first.
- 3.3 Replacement components of Product(s), 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) 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.

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

#### 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.

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

# Safety Precautions

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
- avoid all contact with pressurized air, because if it penetrates your skin it can enter your bloodstream and kill you
- to prevent compressor explosion or fire, make sure that the air entering the compressor is free of flammable vapors
- vaporized oil propelled by high-pressure air is an explosive mixture
- do not breathe the compressor air, vaporized oil is a respiratory hazard  
stay clear of all moving parts when the system is operating
- follow all safety precautions for underhood mechanical work
- follow safety procedures for tire service

Observe these rules when operating the compressor:

- do not bypass or disable the oil temperature switch
- do not expose the tank or compressor to extreme heat
- do not perform any service until the system has been completely blown-down (for a minimum of 1 minute) and you have verified that all air has been discharged
- do not repair or service a pressurized system
- maintenance and repair on system components should only be performed by qualified personnel
- 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 2 to 3 minutes before turning the system off to allow system cooling and lubrication
- do not tamper with the pressure relief valve
- do not attempt to repair or modify any component

## Installation Instructions

Detailed information on installation of specialty products is provided in separate publications for each application. There are many different applications and components that can be used together to make up a compressor system. This document provides guidelines to end users for maintenance schedules and the correct procedures for basic maintenance. If major service or repairs are required, the equipment should be taken to a VMAC authorized dealer, who is a professional technician, trained and equipped with the appropriate special tools and equipment to do the job properly and safely.

## System Specifications and Operation

VMAC has several different specialty compressors that are designed to mount directly onto any engine or transmission with the necessary SAE port. The compressors can also be mounted with a clutch in the drive train to allow normal operation of the engine by disengaging the compressor when it is not required. As there are many different applications, refer to the owner's manual provided by the OEM equipment manufacturer for specific operating instructions.

## Operational Warnings



***These operational warnings should be observed. Failure to observe these warnings could damage equipment or cause injury or death.***

- If the compressor system is mounted directly to the engine, the compressor will operate every time the engine is started.
- Do not start the engine while servicing the compressor on direct mounted systems.
- Do not attempt to service any system that is hot or is under pressure. Always allow the system to cool and make sure that all pressure is released, including pressure from areas behind one-way check valves and from auxiliary tanks.
- Make sure that the air system is depressurized prior to initial and ongoing startups. If the system is not depressurized, parts can separate explosively. In addition to causing premature failure and voiding warranty, this can result in a hazardous situation created by flying parts and oil sprays that can penetrate through clothing and skin.

# Operating Principles

These systems use an oil injected, rotary screw compressor. The compressor housing contains two rotors, turning at a conservative speed.

Compression occurs when inlet air (at normal atmospheric pressure) enters a chamber where it is trapped between the rotating rotor lobes.

A lubricated pitch line provides sealing. As the lobes mesh, they reduce the volume of the air, compressing it to the desired pressure. There are no valves to carbon, stick, fatigue or fail. The motion is smooth, low on stress and constant speed for low vibration and exceptional bearing life. The rotors are extremely rigid and can generally withstand startup without lubrication, or at extremely low temperatures, which is not the case for vane compressors.

## Oil Separation

The system has a two-stage air/oil separator. The first separation stage consists of baffles, which perform mechanical separation. The second stage uses a special separation element.

Primary separation occurs in the air/oil separator tank. As air is discharged from the tank, it passes through a coalescing element which removes any remaining oil in the air. All separation stages have a scavenge feature to return the oil to the system.

There are two locations for VMAC oil separators:

- aluminum tank with integral coalescing and oil filtration
- steel tank with remote coalescing and oil filtration

## Oil Cooling

Hot oil from the compressor system is collected in the primary separator sump and passed through a cooler to remove heat from the oil. This maintains the oil temperature at an optimal performance range which increases system durability and reduces the temperature of the compressed air. Coolers are either liquid-to-air or liquid-to-liquid. A liquid-to-air cooler passes the oil through radiator tubes that are exposed to moving air, usually provided by a fan system. A liquid-to-liquid cooler passes the oil through a heat exchanger which transfers heat from the oil to the engine coolant.

## Filtration

The rotary screw compressor is designed and machined to exacting tolerances. Foreign particles entering the system will drastically damage or shorten the life expectancy of the compressor and will result in damage to bearings, gears, rotors and the inside of the housing.

The system is equipped with a replaceable paper element air inlet filter and a spin-on cartridge oil filter. There is also a built-in coalescent filter for the second oil separation stage. On aluminum tanks, a scavenge screen filter is fitted to the rear of the tank.

Oil filters may be located on the tank or remotely mounted and connected with oil hoses.

Air filters can be located on the top of the compressor or remotely mounted and connected with an inlet tube.



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

## Safety Devices

All VMAC systems have a pressure relief valve in the tank and a self-regulating inlet control valve to ensure that the system always operates within the designed minimum and maximum pressure range.

The system must contain an oil over-temperature sensor in the compressor which stops system operation or reduces pressure and illuminates a warning light if the temperature becomes excessive. This may be part of the system supplied by VMAC or be installed by the system installer. If an over-temperature problem persists, refer to the troubleshooting section in this manual.

1. Turn the compressor system off.
2. Allow a few minutes for the oil to drain back to the tank, then check the oil level through the sight-glass on the tank.
3. Oil level must be checked with the system horizontally level, not on a slope.
4. If the oil level is low, follow the steps for adding oil to the system.



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

## Line Protection

To prevent damage to the lines, observe the following:

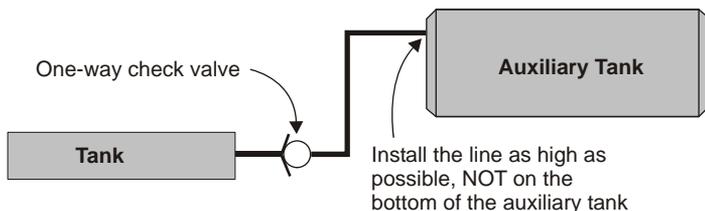
- always secure the hoses, do not allow the hoses to dangle under the vehicle
- make sure that the hoses do not get pinched in steering or suspension components
- keep the hoses away from hot surfaces, such as turbocharger housings or exhaust system components
- do not bend the hoses tightly around sharp metal edges
- keep the hoses 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

## Special Installation Notes

If you intend to use an auxiliary air tank with this system you must observe the following installation procedure. Failure to observe this procedure will result in damage to the system.

The line from the VMAC tank to the auxiliary air tank must have a check valve installed to prevent blow-back from the auxiliary tank and to prevent moisture from entering the VMAC tank.

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 sludge from the bottom of the tank from interfering with proper check valve functions.



# Operational Limitations

The system must not be operated in excess of 15 ° from horizontal, as this will affect lubrication and air/oil separation.

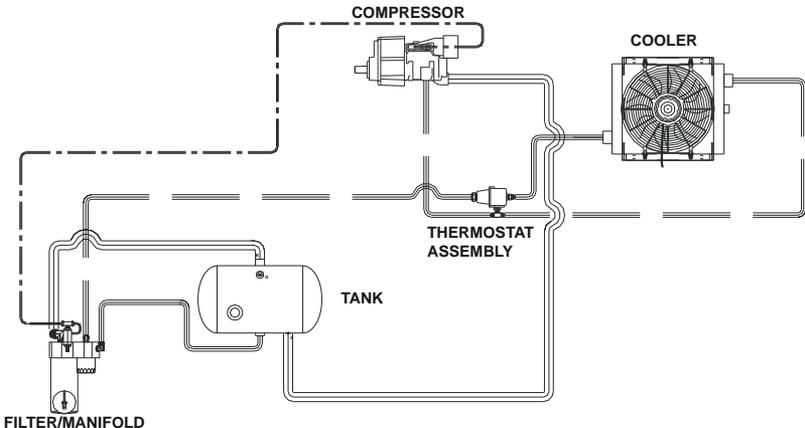
# Additional System Information

## 140 CFM with Steel Tank and Remote Manifold

The schematic diagram shows a 140 CFM PTO-driven system with a steel horizontal tank, remote filters and automatic system pressure blow-down.

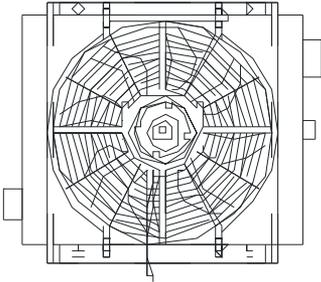
This system has the following specific functions:

- the thermostat prevents oil cooling until the oil reaches optimum working temperature
- there is a check valve in the manifold assembly to prevent backflow of air through the scavenge line when the system is not operating, eliminating the possibility of hydraulic lock caused by flooding the rotors with oil
- when the system is turned off, the blow-down valve on the manifold vents system pressure
- the oil fill hose is usually connected to a tee fitting on the bottom of the tank and routed up to an accessible location

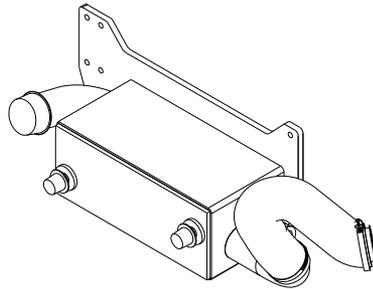


# Component Identification

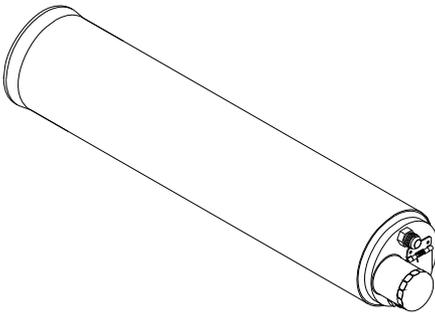
The following diagrams will assist you in identifying components of the system and should be referred to if required when performing service. Always refer to part numbers stamped on components when ordering replacements.



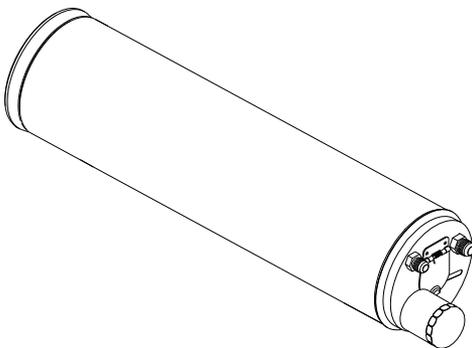
Liquid-to-Air Oil Cooler



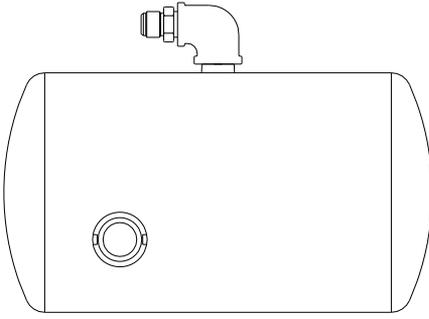
Liquid-to-Liquid Oil Cooler



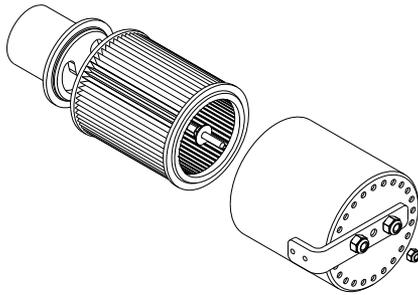
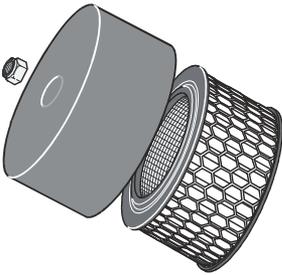
Air/Oil Separator Tank – 70 CFM Aluminum



Air/Oil Separator Tank – 140 CFM Aluminum

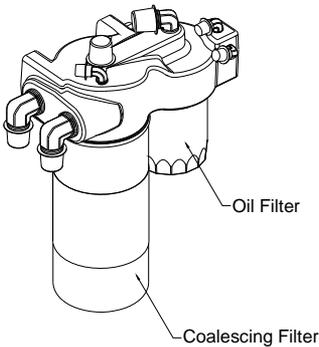


Air/Oil Separator Tank – 140 CFM Steel

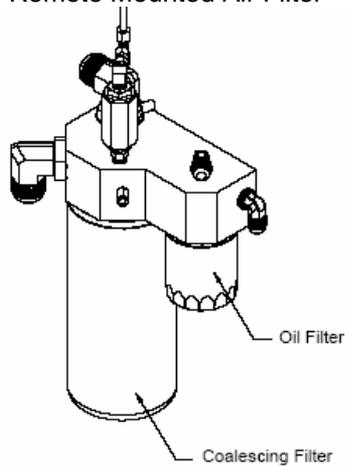


Compressor Mounted Air Filter

Remote Mounted Air Filter



Remote Oil Filter – 70 CFM



Remote Oil Filter – 140 CFM

# Routine Maintenance

The compressor system contains no reed-valves or other easily fouled, fatigue-prone components. With proper maintenance, the need for premature repair or component replacement can be drastically reduced.



***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.***

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, gears and the rotors in the compressor. Contamination will cause severe, rapid damage to components.



***Never run the compressor without the recommended air filter and filter cover installed.***



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

## Maintenance Schedule

The following maintenance schedule should be observed to assure good performance and long service life. The hours indicated are:

- engine hours where the compressor is directly mounted to the engine
- actual compressor operating hours where the compressor is equipped with a clutch to disengage operation from the engine

Service should be performed at the lesser of the two intervals, hours or calendar months, whichever occurs first.

For replacement part numbers, check the appropriate Illustrated Parts List for your application or call a dealer near you.

## Daily or every 8 hours:

Check the oil level and add oil if necessary.

## 200 hours or 6 months:

Replace the air filter, oil filter and change oil

Use service kit #A700019 (70 CFM) #A700059 (140 CFM)

## 400 hours or 1 year:

Replace the air filter, oil filter, coalescing element and change oil

70 CFM Aluminum tanks use service kit #A700020 140 CFM

Aluminum tanks use service kit #A700060

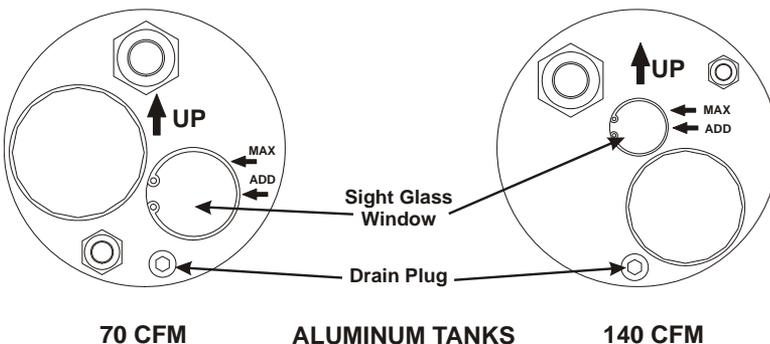
70 CFM Steel tanks use service kit #A700019 & 3600079 140 CFM

Steel tanks use service kit #A700059 & 3600087

## Adding Oil to the System

If the system has been just operated, shut it off, wait for the system to cool and vent all air pressure before working on the system.

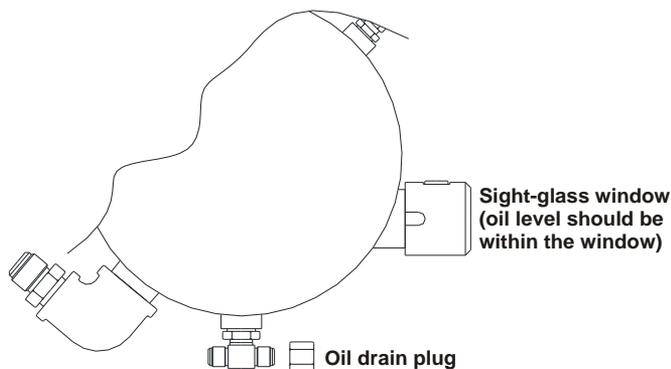
1. Locate the oil fill point for the compressor. The port may have been relocated due to OEM manufacturer requirements. If necessary, refer to OEM manuals for the location.
2. Clean around the oil fill port and remove the fill plug.
3. Pour oil into the oil fill port using a funnel.
4. Allow time for the oil to drain into the tank, then check the sight-glass on the tank to ensure that the correct oil level is attained. It is important not to overfill the system.



70 CFM

ALUMINUM TANKS

140 CFM



## STEEL TANKS



***Overfilling the system with oil can flood the sight glass window and make the system appear empty.***

5. Install the fill plug and tighten it securely.
6. Operate the system and check for oil leaks.
7. Stop the system, allow it to cool, depressurize and check the oil level.

## Replacing the Air Filter

If the system has been just operated, shut it off and vent all air pressure before working on the system.

1. Clean the area around the filter cover to prevent contamination entering the compressor.
2. Remove the filter cover retaining nut, the filter cover and the filter element.
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 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 tape and install a new air filter. Make sure that the filter fits over the machined step on the housing.
6. Replace the cover and secure it with the cover bolt. Do not over-tighten the bolt.



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

## Replacing the Oil Filter

If the system has been just operated, shut off the engine, allow the system to cool and vent all pressure before working on the system.

1. Clean the area around the filter to prevent contamination.
2. 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 filter housing.
3. Check the gasket-sealing surface on the front of the tank or on the manifold block for contamination, old gasket material or damage.
4. Apply a thin coating of compressor oil to the filter-sealing gasket.
5. Spin the filter onto the threaded nipple until the gasket contacts the sealing surface.
6. Tighten the filter an additional 3/4 to 1 turn to seat the sealing gasket.
7. Check the oil level in the sight glass on the air/oil tank.
8. Operate the system and check for oil leaks.
9. Stop the system, allow it to cool, depressurize and check the oil level to ensure that it is at the correct level.



***To prevent damage, always use a proper filter wrench. Never over-tighten the filter, as this may damage the seal or the filter.***

## Changing Compressor Oil

If the system has been just operated, shut it off, wait for the system to cool and vent all air pressure before working on the system.

1. Clean the area around the oil drain plug on the air/oil tank to prevent contamination.
2. Remove the drain plug and drain the oil into a container large enough to hold at least 12 litres (3 U.S. gal.).
3. Install and tighten the plug.
4. If you are replacing the oil filter, follow filter replacement procedures.
5. Fill the system with VMAC certified and approved compressor oil to the correct level.
6. Install the fill plug and tighten it securely.
7. Operate the system and check for oil leaks.
8. Stop the system, allow it to cool, depressurize and check the oil level to ensure that it is at the correct level.

## Changing the Coalescing Filter

If the system has been just operated, shut it off, wait for the system to cool and vent all air pressure before working on the system.

### **70 CFM and 140 CFM Aluminum Tanks**

Refer to the instructions provided with the service kit.

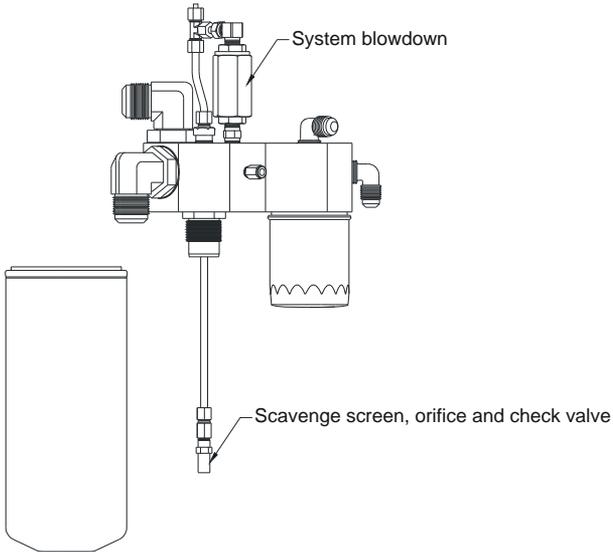
## Remote Mounted Filters

1. Clean the area around the filter to prevent contamination.
2. 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 filter housing.
3. Check the gasket-sealing surface on the manifold block for contamination, old gasket material or damage.
4. Apply a thin coating of compressor oil to the filter sealing gasket and to the nipple in the manifold block.

5. Spin the filter onto the threaded nipple until the gasket contacts the sealing surface.
6. Tighten the filter an additional 3/4 to 1 turn to seat the sealing gasket.



***To prevent damage, always use a proper filter wrench. Never over-tighten the filter, as this may damage the seal or the filter.***



# Problem Diagnosis

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.

<b>SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>CORRECTIVE ACTION</b>
Frequent over-temp 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.
	Oil temperature probe failure.	Replace if defective.
Excessive air pressure	Pressure regulator valve too high.	Reduce system pressure by adjusting pressure reg. valve.
Engine stalls when compressor is activated.	System is under pressure.	Allow 10 seconds for blow-down.
	Blow-down valve not working.	Replace blow-down valve.
Frequent relief valve operation.	Pressure regulator setting too high.	Adjust pressure regulator setting below 160 PSI.
	Pressure control line plugged or frozen.	Remove pressure control line, clear obstructions. (Blow out.)
	Relief valve defective.	Replace relief valve.
	System still at high pressure.	Allow 10 seconds for blow-down.
Low air pressure.	Air flow is too high.	Reduce consumption.
	Pressure regulator valve set too low.	Increase pressure by adjusting pressure regulator valve.
Excessive oil in the air.	Failed coalescing separator element.	Replace element.
	Clogged scavenge line screen.	Clean or replace parts as required.
	High oil level.	Correct oil level.
	Poor fit between coalescing filter and tank – lack of seal at O-rings.	Replace parts as required.
	Wing tank – volume shutting down under load.	Clean or replace parts as required.
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.
Oil leak at input shaft	Seal leaking.	Contact the nearest dealer to replace gearbox input shaft seal.
Objectionable noise level.	Excessive gear wear.	Contact the nearest dealer to replace compressor/gearbox assembly.