

Installation Manual for VMAC OEM Air to Oil Cooler Package - A270101

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Table of Contents

Table of Contents	1
General Information	3
Safety	4
Safety Precautions	5
Cooler Installation	7
Illustrated Parts List.....	14

Changes and Revisions

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			Mech.	Elec.			
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Important Information

The information in this manual is intended for approved VMAC installers who have been trained in installation and service procedures and/or for anyone with mechanical trade certification who have the tools and equipment to properly and safely perform the service. Do not attempt this service without the appropriate mechanical training, knowledge, and experience.

Follow all safety precautions for mechanical work. Any fabrication for correct fit in equipment must follow industry standard “best practices”.

Notice

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General Information

Introduction

This manual provides installation instructions for the generic Air to Oil Cooler Package. Read this manual prior to servicing or operating the compressor system.

Follow all safety precautions when servicing or operating the VMAC system.

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

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

Ordering Parts

To order parts, contact the VMAC Inside Sales department. To assist in selecting the appropriate parts, please provide the VMAC compressor serial number, part number, description, and quantity. Contact VMAC Inside Sales by calling 1 (887) 912-6605 or by email to sales@vmacair.com.

Safety

Important Safety Notice




The information contained in this manual is based on sound engineering principles, research, extensive field experience and technical information. Information is constantly changing with the addition of new models, assemblies, service techniques and running OEM changes. If a discrepancy is found in this manual, contact the VMAC OEM department prior to initiating or proceeding with installation, service or repair. Current information may clarify the issue. Anyone with knowledge of such discrepancies, who proceeds to perform service and repair, assumes all risks.

Only proven service procedures are recommended. Anyone who departs from the specific instructions provided in this manual must first 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 anyone to properly adhere to the procedures set out in this manual or standard safety practices. Safety should be the first consideration when performing any service operations. If there are any questions concerning the procedures in this manual, or more information is required, please contact VMAC OEM department prior to beginning repairs.

Safety Messages

This manual contains various warnings, cautions and notices that must be observed to reduce the risk of personal injury during installation, service or repair and the possibility that improper installation, service or repair may damage the equipment or render it unsafe.

	<p><i>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.</i></p>
	<p><i>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.</i></p>
	<p><i>This symbol is used to call attention to additional instructions or special emphasis on a specific procedure.</i></p>

Safety Precautions



As it is impossible to warn of every possible hazard that may result from operating this system, common sense and industry standard safety practices must be observed.

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.

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.

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.



Moving Parts Hazard

- Before performing service, disconnect the power source to prevent unexpected equipment start.
- Do not operate the system without guards in place. If the guards are damaged or missing, replace them before operating the equipment.




Electrical Hazard


- Ensure the ground point connection is connected to the equipment body/chassis to prevent the chance of injury.
- Ensure the equipment is grounded appropriately.






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 prior to performing service.
- Never allow any part of your body to contact the compressor components until the system has cooled sufficiently.

	<p>Compressor Air and Oil Hazard</p> <ul style="list-style-type: none"> • 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. • 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 move or service the system while it is pressurized or operating. • Components and hoses under pressure could separate suddenly and cause serious injury or death. If equipped, the air receiver tank must be drained prior to servicing the system. • 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.
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	<p>Burst Hazard</p> <ul style="list-style-type: none"> • 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.
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  	<p>Personal Safety</p> <ul style="list-style-type: none"> • Vaporized oil is a respiratory hazard, do not breathe the compressor air. • Always use the appropriate personal protective equipment, particularly eye and hearing protection when operating air powered equipment.
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Cooler Installation

Mounting

Locate the VMAC air to oil cooler in a suitable location that provides good cool air flow and easy accessibility (Figure 1). The unit should have at least 8in of clearance on all sides. Ensure there is sufficient space to connect the air lines, connect the wiring, and maintain good air flow. For best performance, the location should be set up such that the hot air exiting the cooler is not able to circle around and re-enter the cooler; ensure that there is a constant flow of cool air.

	<ul style="list-style-type: none">• Mounting the cooler requires constant flow of cold air. Mounting the cooler in an enclosed space or providing the cooler with warm air can result in inefficient heat removal from the system and may cause additional wear and possible failure of the system.
	<ul style="list-style-type: none">• Mounting the cooler in an enclosed space or providing the cooler with warm air can result in higher working environment temperatures which may cause heat exhaustion or other complications for workers in the surrounding area.

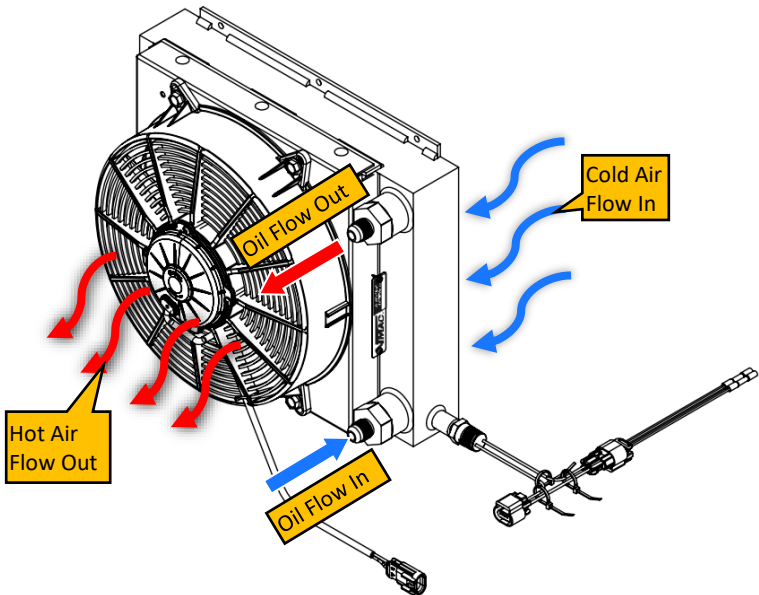


Figure 1 - Oil Cooler Overview

- Place the cooler in position and back drill the mounting holes into the mounting location (Figure 2). Holes are 1/4" clearance holes.
- Secure using appropriately sized bolts. Installing rubber foot mounts is recommended to reduce vibrational transfer between components.

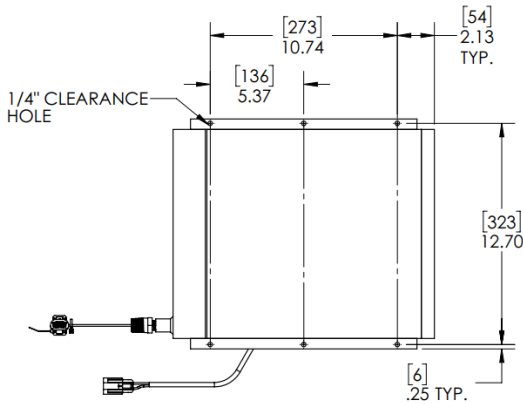


Figure 2 - Cooler Mounting Dimensions

Hydraulic Lock Condition



- ***The Hydraulic Lock condition should be reduced or eliminated as the condition can cause premature clutch and/or compressor failure.***

Hydraulic lock occurs when there is too much oil inside the compressor at start-up. Flooding of the compressor with oil can be prevented by installing a check valve between the oil cooler and the compressor.

When hydraulic lock happens, the compressor and/or clutch experience increased load when the system is started and can lead to premature clutch and/or compressor failure.

Hydraulic lock can occur when any of the supplementary oil system components (separator system, oil cooler, or thermostatic valve) are installed at a higher height than the compressor. When this happens, the weight of the oil in the line will cause the oil to drain into the compressor and flood it. When this occurs, the compressor rotors experience much higher than normal friction as they try to compress the oil and result in a much higher torque to clear the oil in the system and start to bring in air to compress.

To check for hydraulic lock, wait for the system to cool down (~10 mins) and turn the face of the clutch by hand. The compressor should have slight resistance for half a rotation and then turn smoothly. Should the compressor be completely flooded with oil, the resistance will occur for 2.5 rotations. If the latter occurs, a check valve as detailed below should be installed to prevent the compressor from flooding with oil on shutdown.

Check Valve (As Required)



- *It is best practice to mount the cooler below the level of the compressor to prevent hydraulic lock.*
- *If mounting the cooler above the compressor is required, a check valve must be installed.*
- *Check valve package number: A270102.*

- See the manual that comes with A270102, Check Valve Package, for detailed instructions and configurations.
- The Check Valve should be installed down stream of the cold oil out port.
- Ensure that the check valve has been mounted in the direction as indicated by the arrow on the product. Improperly installing the check valve in the opposite direction will result in no oil going to the compressor and system failure.

Thermostatic Valve (As Required)



- *It is best practice to use the thermostatic valve in cold climate and/or low duty operations.*
- *If starting in temperatures below -15°C (5°F), installing a thermostatic valve is highly recommended.*
- *Thermostatic valve package number: A270103.*

- See the manual that comes with A270103, Thermo Valve Package, for detailed instructions and configurations.
- Install the thermostatic valve such that Port C on the thermostatic valve is connected to the “Oil Flow In” fitting on the cooler and Port B is connected to the tee. Improper orientation can result in either hot oil or little to no oil going back into the compressor and result in system failure.
- Use the hose provided to connect the “Oil Flow Out” fitting on the cooler to the tee.
- If also using a check valve, the check valve must be installed after the tee as shown in the manual provided with the check valve.

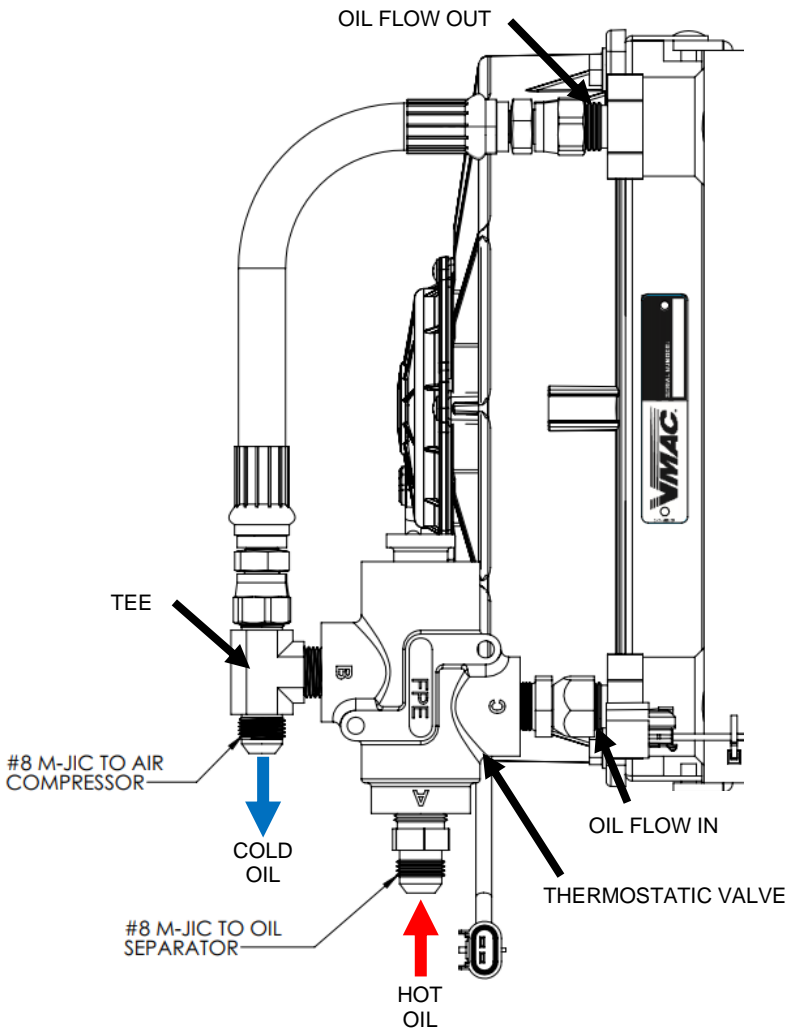




Figure 3: Optional Thermostatic Valve

JIC Fittings

	<p><i>Do not overtighten JIC Hydraulic fittings. Overtightening may cause reduced life or permanent deformation of the sealing area of the fitting.</i></p>
	<p><i>JIC type hydraulic fittings do not require sealing compound or teflon sealing tape. JIC fittings when properly tightened form a metal to metal seal. Adding sealing compound or teflon sealing tape may introduce gaps and prevent the formation of a seal.</i></p>

- Spin-on the swivel nut by hand until it bottoms out; do not overtighten by hand.
- Using two appropriately sized wrenches, tighten the swivel using the Flats From Wrench Resistance (FFWR) method.
- FFWR method:
 - At the bottom out position, mark a line across the two fittings
 - Note the fitting/hose size and tighten the fitting by the value indicated in the table below.
 - Turn the fitting by the number of flats indicated (1 flat = 1/6 revolution or 60° rotation) or until firm resistance is met.

Fitting (hose) size	Flats	Degrees rotation
#04 (1/4")	2	120°
#05 (5/16")	2	120°
#06 (3/8")	1-1/2	90°
#08 (1/2")	1-1/2	90°
#12 (3/4")	1-1/4	75°
#16 (1")	1	60°

Table 1: FFWR Method Tightening Values

Connecting the Hoses



When routing hoses, ensure cap plugs are installed so that contaminants do not get in the line. Take care when routing hoses, as a hose failure may damage the compressor and/or cause injury.



All hoses, tubes and wires that are installed, rerouted or shifted during the installation must be secured so that they do not contact any hot, sharp or moving parts. Use rubber coated P-clips wherever possible. Follow the routing suggestions in this manual and cover all hoses with plastic loom.

- Connect the oil line from the separator tank (hot oil) located at the bottom of the oil separator tank to the “Oil Flow In” fitting located at the bottom of the air to oil cooler (Figure 1). Use a second wrench to support the fitting on the component and prevent it from spinning when tightening. The recommended hose size is #8 (1/2”) hose.
- Connect the oil return line (cooled oil) located on the bottom left of the compressor to the top “Oil Flow Out” fitting at the top of the air to oil cooler (Figure 1). Use a second wrench to support the fitting on the component and prevent it from spinning when tightening. The recommended hose size is #8 (1/2”) hose.
- If using the optional thermostatic valve package, the “Oil Flow Out” fitting is located after the tee. The “Oil Flow In” fitting is located on the thermostatic valve. Refer to Figure 3 and thermostatic valve installation for further reference.

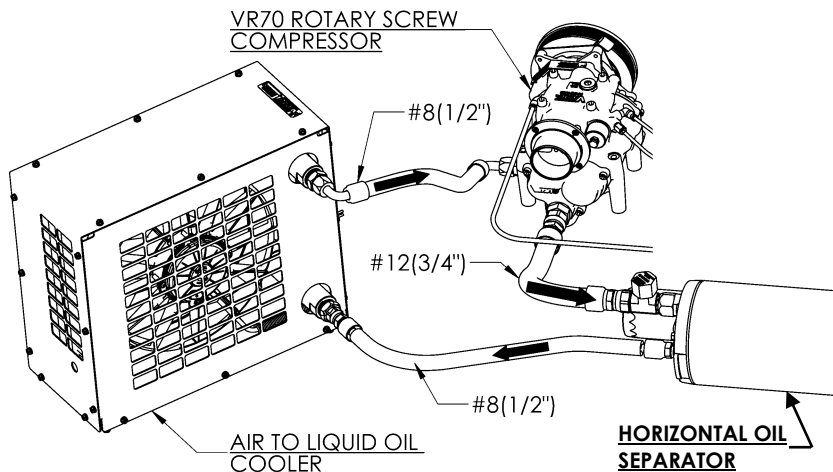


Figure 4 - Hose Routing

Connecting the Wires

- Connect the red wire from the air to oil cooler to a key switched 12 V source through a 35 A fuse using the recommended wire size (Table 2).
- Connect the green/yellow wire to a good body ground using the recommended wire size (Table 2).
- Operation: The temperature switch is normally open, when an oil temperature of 80°C (176°F) is reached, the switch closes to complete the circuit and engages the fan motor.

Wire Length	Recommended Wire Gauge
0 ft to 8 ft	10 AWG
> 8 ft	8 AWG

Table 2 – Recommended Wire Size

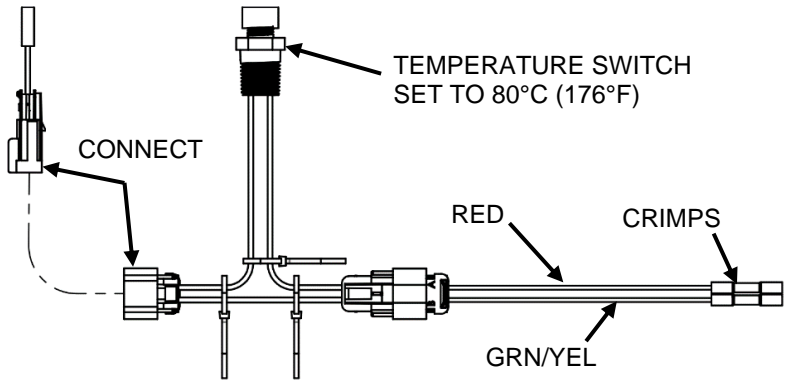


Figure 5 - Wire Connections

Illustrated Parts List

Air to Oil Cooler Package – A270101 (2020103 plus install manual)

Item #	Part #	Qty	Description
1	3600124	1	COOLER, #16 ORB PORTS
2	6000565	1	SHROUD, FAN
3	1500595	6	RIVET, ALU, STANDARD, BLIND 1/4"
4	3551041	1	FAN, PULLER, 11", GT280-12V
5	1520570	4	BOLT, HHCS FL LK PL, M8 X 1.25 X 16
6	3550887	1	ASSY, TEMP SWITCH, GT280
7	3530798	1	PIGTAIL, FAN, GT280, MOD
8	4900145	2	FTG, STR, #16MORB-#8MJIC, VITON
9	4400594	1	LABEL, NAME PLATE, GENERIC

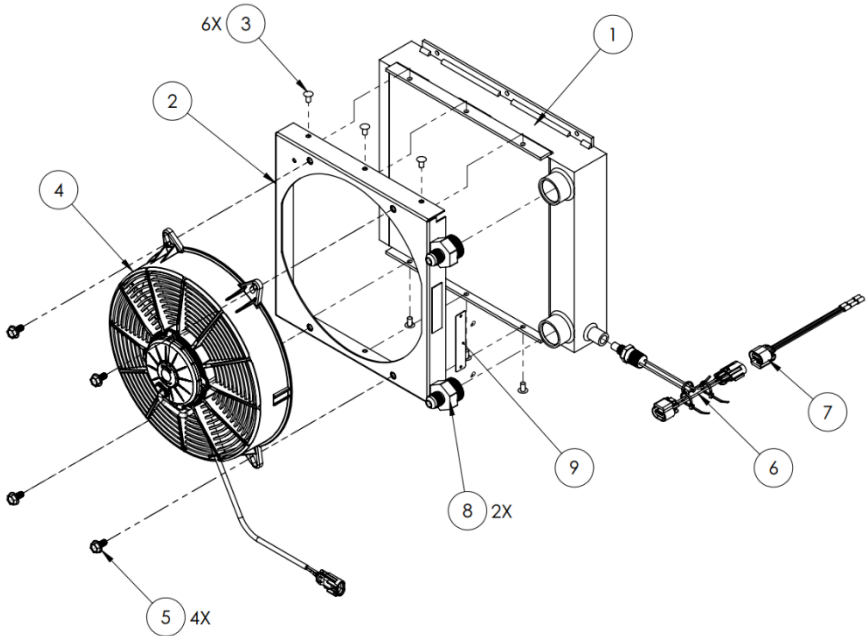


Figure 6 - Air to Oil Cooler Package

Optional Check Valve Package – A270102

Item #	Part #	Qty	Description
1	4500132	1	VALVE, CHECK, 1/2, CRACK 5PSI
2	4900016	1	FTG, STR, 1/2" MNPT-#8MJIC
3	4900167	1	FTG, STR, #8FJIC-1/2" MNPT

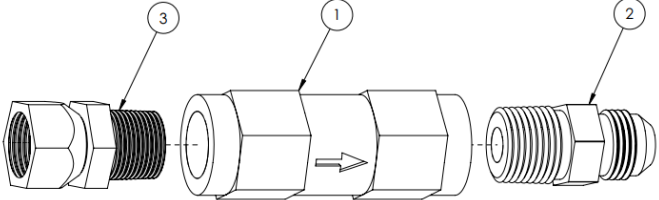


Figure 7 - Optional Check Valve Package

Optional Thermostatic Valve Package – A270103

Item #	Part #	Qty	Description
1	4500131	1	VALVE,THERMO,1/2NPT,160F
2	4900167	1	FTG, STR, #8FJIC-1/2" MNPT
3	4900016	1	FTG, STR, 1/2" MNPT-#8MJIC
4	4900084	1	TEE, #8MJIC-1/2" MNPT-#8MJIC
5	1710786	1	HOSE, ASSEMBLY, 12.5"

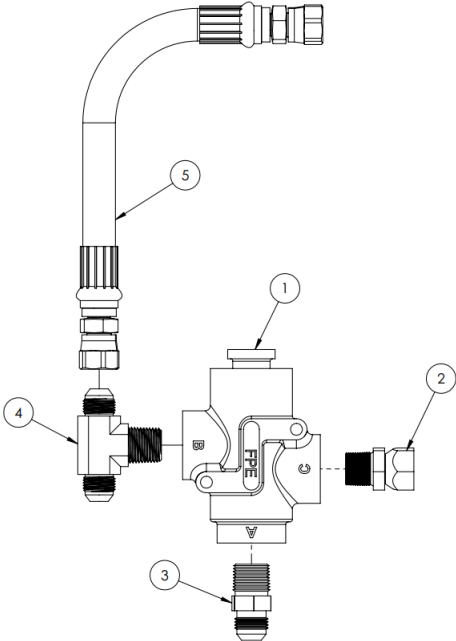


Figure 8 - Optional Thermostatic Valve Package

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