

WARNING

Read this Manual before
installing, operating or
working on this equipment.
Failure to do so could
result in bodily injury and/
or damage.

MANUAL FOR
COMPRESSOR MODEL
60/70/80 VIPER

Vanair Manufacturing Inc
19015 U S 12
New Buffalo MI 49117

Tel. 269-469-4461
800-526-8817
Fax 269-469-0497

POO220-1
12/23/02

WARRANTY – Viper

The rotary screw compressor unit is warranted by the manufacturer for three years against defects in materials and workmanship. The unit will be replaced or repaired at manufacturer's option as a result of such defects. This warranty does not cover damage caused by accident, misuse or negligence. If compressor unit is disassembled the warranty is void. All other parts including the compressor unit shaft seal are warranted for twelve months subject to the same conditions mentioned previously. Any and all such claims for warranty consideration must be coordinated through the Warranty-Service Department at the address below. Do Not return parts without prior authorization.

Warranty is limited to the supply of replacement parts failing within the warranty period. Credit for labor required to refit replacement parts is NOT included. On units supplied with engines, the Engine Manufacturer's Warranty will apply. Please refer to Engine Owner's Manual supplied.

Warranty will commence upon receipt of the Warranty Registration Card. If the Warranty Registration Card is not received within six months, then warranty commencement date shall be thirty days from the date of shipment from VANAIR.

This statement of warranty is expressly in lieu of and disclaims all other express warranties, implied warranties of merchantability and all other implied warranties which extend beyond the description on the face hereof. This warranty does not include incidental or consequential damages.

This warranty shall be void and VANAIR shall have no responsibility to repair, replace or repay the purchase price of defective or damaged parts resulting from the use of or repair of replacement parts not of VANAIR'S manufacture, or approved by VANAIR, or from buyer's failure to store, install, maintain and operate the compressor according to the recommendations contained in the MANUAL.

All claims under the Warranty shall be made by contacting VANAIR Warranty-Service Department.

VANAIR MANUFACTURING INC.

19015, U.S. 12,
NEW BUFFALO,
MICHIGAN 49117
TEL: 269-469-4461
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WARRANTY

The rotary screw compressor unit is warranted by the manufacturer for two years against defects in materials and workmanship. The unit will be replaced or repaired at manufacturer's option as a result of such defects. This warranty does not cover damage caused by accident, misuse or negligence. If compressor unit is disassembled the warranty is void. All other parts including the compressor unit shaft seal are warranted for twelve months subject to the same conditions mentioned previously. Any and all such claims for warranty consideration must be coordinated through the Warranty-Service Department at the address below. Do not return parts without prior authorization.

Warranty is limited to supply of replacement parts falling within the warranty period. Credit for labor required to refit replacement parts is NOT included, except for replacement of the compressor unit, when specific, allowable labor credits will apply. Details on such labor credit allowances should be obtained through the Warranty-Service Department. Factory installed units will also include warranty on the installation for one year.

Warranty will commence upon receipt of the Warranty Registration Card. If the Warranty Registration Card is not received within six months, then warranty commence date shall be 30 days from date of shipment from VANAIR.

THIS STATEMENT OF WARRANTY IS EXPRESSLY IN LIEU OF AND DISCLAIMS ALL OTHER EXPRESS WARRANTIES, IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL OTHER IMPLIED WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY DOES NOT INCLUDE INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This warranty shall be void and VANAIR shall have no responsibility to repair, replace or repay the purchase price of defective or damaged parts or components resulting from the use or repair of replacement parts not of VANAIR'S manufacture, or approved by VANAIR, or from buyer's failure to store, install, maintain and operate the compressor according to the recommendations contained in the Operator & Parts Manual.

All claims under the Warranty shall be made by contacting VANAIR Warranty-Service Department.



VANAIR MANUFACTURING, INC.
19015 U.S. HWY 12
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Tel: 616-469-4461
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(PLEASE PRINT)

Model No. 70 GAS VIPER

Serial No. 30-6Y810

Company Name _____

Address _____

Company Service _____

Product Application _____

Person to Contact _____

Telephone No. _____

Equipment Purchased _____

From _____

Address _____

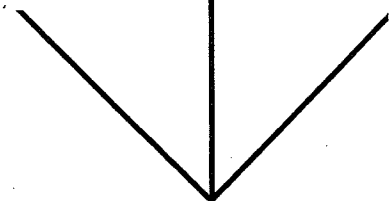
Start-Up _____ Month _____ Day _____ Year _____

This Card Registers You As A VANAIR Compressor Owner.

Printed in U.S.A.

WC 2-10-98

Please Mail Card Now



Please
Place
Stamp
Here

**VANAIR MANUFACTURING, INC.
19015 U.S. HWY. 12
NEW BUFFALO, MI 49117**

California Proposition 65 Warning

Engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

TABLE OF CONTENTS – Viper

Warranty	i	Cooler Core Cleaning	4.11
Table of Contents	ii	Adding/Changing Oil	4.12
Specifications	iii	Pressure Regulating Valve	4.13
		Inlet Valve	4.14
Section 1 - Safety:		Torque Specifications	4.15
Danger, Warnings, Caution	1	Fuel Tank and Fittings	4.16
Decals	4	Engine Speed Adjustments	4.17
		Section 5 - Troubleshooting:	
Section 2 - Description:		Failure to Start.	5.1
Introduction	2.1	Compressor Shuts Down	5.2
Description of Components	2.2	Will Not Build Up Pressure	5.3
Compressor and Inlet Valve	2.3	Compressor Over pressures	5.4
Engine and Fuel Tank	2.4	Insufficient Air Pressure	5.5
Cooling and Lubrication	2.5	Oil Carryover	5.6
Discharge System	2.6	Compressor Overheating	5.7
Capacity Control System	2.7	Retains Pressure after Shutdown	5.8
Instruments and Electrical	2.8	Improper Control Operation	5.9
Main Frame and Enclosure	2.9	Engine Overheating	5.10
		Section 6 - Diagrams:	
Section 3 - Operation:		General Assembly Drawing	6.1
General	3.1	Schematic Piping Drawing	6.2
Purpose of Controls	3.2	Electrical Wiring Drawing	6.3
Initial Start-up Procedure	3.3		
Subsequent Start-up Procedure	3.4	Section 7 - Illustrations and Parts List:	
Shutdown Procedure	3.5	Procedure for Ordering Parts	7.1
Operating Conditions	3.6	Recommended Replacement Parts	7.2
		Compressor/Inlet Valve/Drive	7.3
Section 4 - Maintenance:		Exhaust/Battery Systems	7.4
General	4.1	Oil Cooling System	7.5
Daily Operation	4.2	Discharge System (Part 1 of 2)	7.6
After Initial 50 Hours	4.3	Control System and Instrumentation	7.7
		Fuel System	7.8
Every 500 Hours (6 months)	4.4	Sheet Metal and Frame Assembly	7.9
Every 1000 Hours (1 year)	4.5	Decal Location	7.10
Lubrication Guide	4.6		
Oil Filter Replacement	4.7	Section 8 - Options	
Coalescer (Separator) Element	4.8		
Air Filter Replacement	4.9		
Belt Tightening and Replacement	4.10		

SPECIFICATIONS – Viper

		<u>60 Viper</u>	<u>70 Viper</u>
Compressor:			
Make/type		Single Stage, Oil Injection	Rotary Screw
Capacity	cfm	60	70
Operating Pressure	psig	150	100
Speed (Full Load)	rpm	4800	5540
Speed (Idle)	rpm	3485	4370
Oil Sump Capacity	gal	2.5	2.5
Service Valves		(1) 3/4"	(1) 3/4"
Inlet Control		0 - 100% Step less	
Cooling System		Air to Oil - Thermostat Controlled	
Air Filtration		Dry Type - Single Stage	
Oil Filtration		25 Micron with By-Pass Relief.	
Ambient Operating Range Deg. F		-20 Deg. F to +110 Deg. F	
ENGINE:			
Make/Model		Kohler/CH25	
Type		4 Cycle, V-Twin, Overhead Valve	
Size		25 H.P. @ 3600 rpm	
Speed (Full Load)	rpm	3580	3300
Speed (Idle)	rpm	2600	2600
Fuel Type		Gas	Gas
Fuel Tank Capacity	gal	5	5
Electrical System	volts D.C.	12	12
Cooling		Air with Integral Oil Cooler	
PACKAGE:			
Dimensions Overall	inches	46 L x 33 W x 26 Ht	
Weight	lbs	535	535

Specifications subject to change without notice

Vanair Manufacturing Inc. Designs and manufactures all of their products so they can be operated safely. However, the responsibility for safe operation rests with those who use and maintain this equipment. The following safety precautions are offered as a guide, which if conscientiously followed will minimize the possibility of accidents. Many of the following items may seem like common sense, which they are. We would ask that you also use your common sense in operating and maintaining this equipment since each situation may have it's own peculiarities and circumstances.

IMPORTANT - The following safety guidelines are for your safety, well-being and also to help protect from injury to others and prevent equipment damage.

WARNING - **Read this manual** before installing, operating or working on or with this equipment. Failure to do so could result in bodily injury or damage.

CAUTION - Never start this equipment unless it is safe to do so. **Do not operate** the air compressor/systems **with a known unsafe condition**. Tag and render the system inoperative by disconnecting the power source so others who may not know of the unsafe condition cannot operate it.

CAUTION - Install, use and **operate** this equipment **only in full compliance** with all pertinent and applicable O.S.H.A., Federal, State and Local codes, standard and regulations.

WARNING - **Do not modify** this compressor and/or controls or systems in any way except with written factory approval.

DANGER - **Do not attempt to remove any compressor part or work** on the compressor or it's systems **without first relieving the entire system pressure**, open a service valve to atmosphere to assure all pressure is vented.

DANGER - **Do not attempt to service** any part of the machine **while it is operating**.

DANGER - **Do not operate the compressor in excess of pressures and speeds** indicate on the nameplate, or it's ratings as indicated in the "Specifications" section.

CAUTION - **Periodically check** all safety devices for proper operation.

DANGER - **Do not play** with compressed air. It can cause serious injury.

WARNING - **Do not use flammable solvents** for cleaning parts or compressor installation.

CAUTION - Be sure no tools, rags or loose parts are left on compressor drive systems or near intake.

CAUTION - Exercise care and cleanliness during maintenance and when making repairs. Cover openings and keep dirt and tools away from parts and openings.

WARNING - Do not operate compressor in areas where there is a possibility of ingesting flammable, toxic, noxious or corrosive fumes or substances.

WARNING - Never disconnect, by-pass or render inoperative any safety system and operate the machine.

CAUTION - Do not operate the compressor without proper flow of cooling air, or without correct lubricant levels or types.

DANGER - Keep hands, arms, hair and other parts of the body and loose clothing away from fans, drive shafts and other moving parts.

WARNING - Do not operate the machine with guards removed or safety devices in-operative.

DANGER - Do not use air from this compressor for breathing purposes, Vanair Manufacturing, Inc. disclaims any and all liabilities for damage or loss due to personal injuries, including death and/or property damages arising out of using Vanair compressors for breathing purposes.

CAUTION - Operate the compressor only in open or well ventilated areas.

WARNING - Do not install shut-off valves between compressor and compressor receiver tank (sump).

CAUTION - Do not install safety devices and/or replacement parts other than authorized Vanair replacement parts.

CAUTION - Ensure all plugs, hoses, covers and parts which may have been removed for service are replaced before operating.

WARNING - Ensure that hoses connected to the service valves are fitted with correctly sized and rated flow limiting devices. This is to prevent broken or is connected hoses from "whipping". These devices must comply with respective codes.

- WARNING** - Do not use tools, hoses or equipment that are rated below the maximum rating of this compressor.
- CAUTION** - Keep personnel out of line with, and away from, the discharge opening of valves, hoses and tools.
- WARNING** - Hot Surfaces, compressors generate heat. Take precautions when working on or around this equipment-some surfaces and components are hot!
- CAUTION** - Clean up any lubricant or fuel spills immediately.
- CAUTION** - Render equipment inoperative when carrying out maintenance or repairs.
- CAUTION** - Keep electrical wiring including terminals in good condition. Hoses and fittings with no leaks. Replace any wiring or hoses which have cracked or worn.
- CAUTION** - Keep tools or other conductive objects away from live electrical parts.
- WARNING** - Wear respective protective equipment when operating or working on this equipment. Protective equipment should be in full compliance with respective codes.
- WARNING** - Over speed is hazardous! Never tamper with the governor components or settings to increase the maximum speed. Severe personal injury and equipment damage can result if operated at speeds above maximum.
- CAUTION** - Never touch electrical wires or components while the machine is operating. They can be sources of electrical shock which could cause severe injury or burns.

Safety decals are supplied as part of the decal package. They should be affixed to the completed vehicle prior to going into service. They should be located so that they are clearly visible to both user and service personnel.

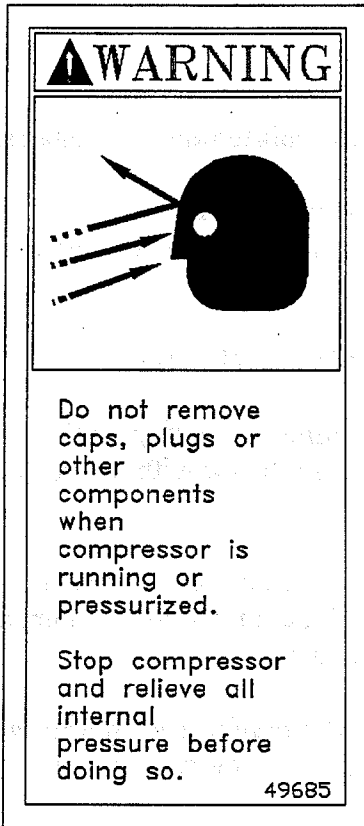


Fig. 3.1

Locate adjacent to oil filler on body or receiver.

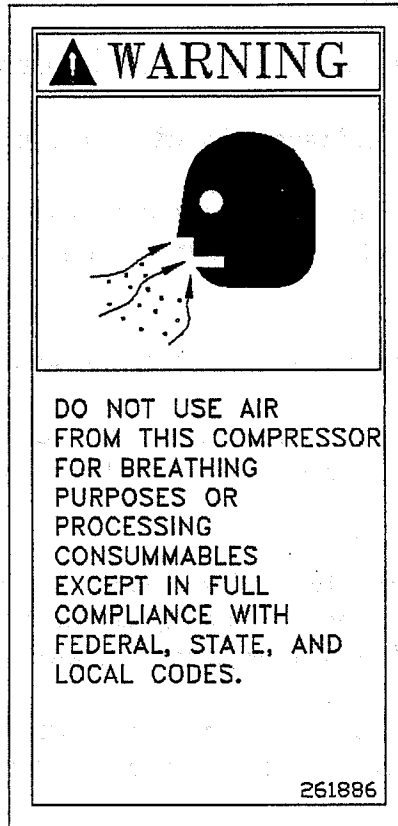


Fig. 3.2

Locate next to each service outlet valve.

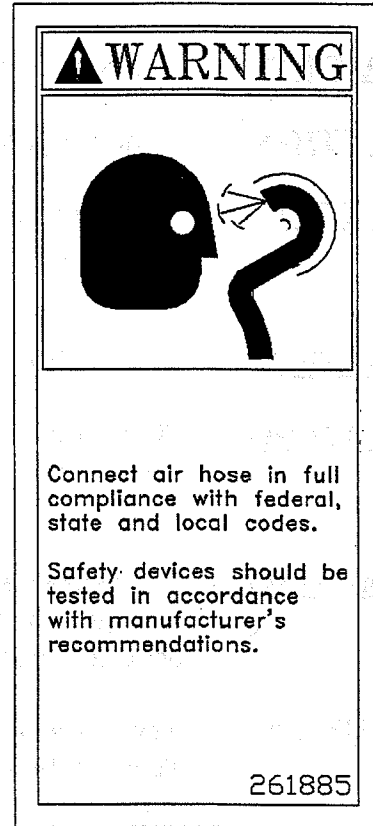
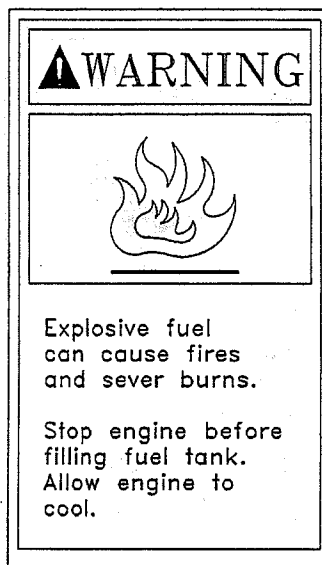
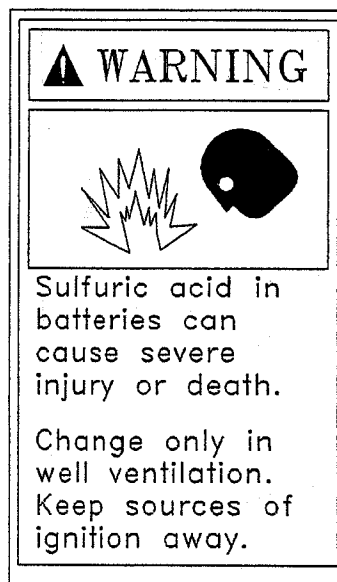


Fig. 3.3

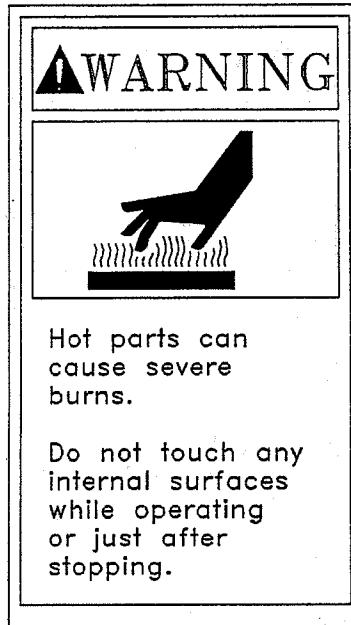
Locate next to each service outlet valve.



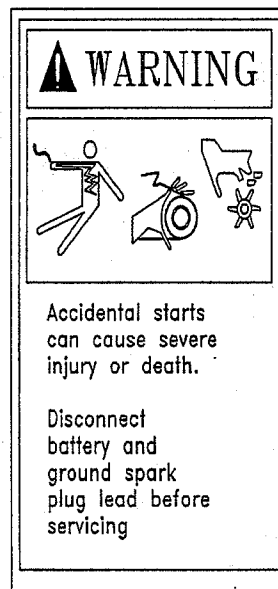
Explosive Fuel! Gasoline is extremely flammable and it's vapors can explode if ignited. Store gasoline only in approved containers, in well-ventilated, unoccupied buildings, away from sparks or flames. **Do not** fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. **Do not** start the engine near spilled fuel. Never use gasoline as a cleaning agent.



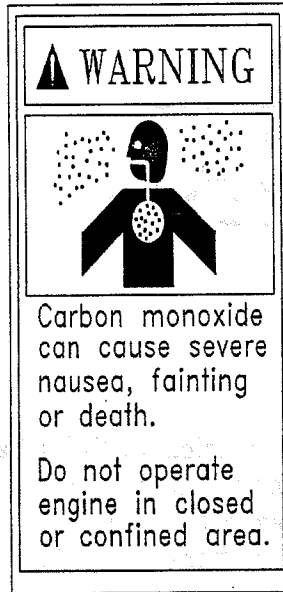
Dangerous Acid, Explosive Gases! Batteries contain sulphuric acid. To prevent acid burns, avoid contact with skin, eyes and clothing. Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.



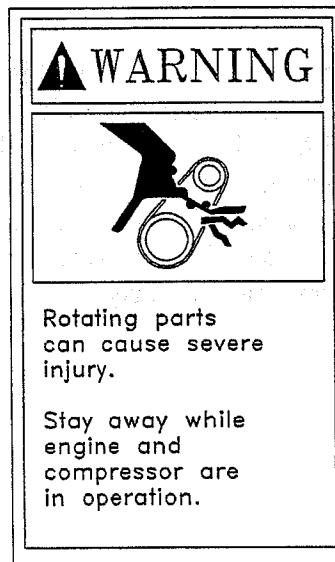
Hot Parts! Engine components can get extremely hot from operation. To prevent severe burns, **do not** touch these areas while the engine is running-or immediately after it is turned off. Never operate the engine with heat shields or guards removed.



Accidental Starts! Before servicing the engine or equipment, always disconnect the spark plug lead to prevent the engine from starting accidentally. Ground the lead to prevent sparks that could cause fires. Disconnect the battery to prevent any shorting of wires or electrical hazard or danger.



Lethal Exhaust Gases! Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless and can cause death if inhaled. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.



Rotating Parts! Keep hands, feet, hair and clothing away from all moving parts to prevent injury. Never operate the machine with covers, shrouds or guards removed.



- DANGER** - Machine should be lifted using the lifting bail provided. Inspect lifting bail and all points of attachment for cracked welds and cracked, bent, corroded or otherwise degraded members, and for loose bolts or nuts. Keep all personnel out from under and away from the machine when it is suspended. Lift no higher than necessary. Set down and operate compressor on a level surface. **Do not** lift the compressor while it is operating.
- DANGER** - Forklift unit at the wide span, between the feet of the unit, facing the long side and where decals indicate "INSERT LIFT FORKS HERE". **Do not** forklift machine when it is running.
- DANGER** - **Do not** attempt to jumpstart if battery fluid is frozen or slushy. Bring battery up to 60° F (16° C) before attempting to jumpstart. Jumpstart only from vehicles with a NEGATIVE ground system. **Do not** jumpstart using generator sets, welders, or other sources of D.C. power. Avoid accidental contact between jumper cable terminals/clamps and any metallic portion of the machine or starting vehicle. The safest way to recharge the batter is to remove it from the machine and trickle charge from a suitable battery charger.

2.1 Introduction:

The 60/70 cfm Viper Series air compressor systems will offer superior performance and reliability along with a minimal amount of maintenance requirements.

This Manual should be read in conjunction with other appropriate Manuals or literature, such as Engine Owner's Manual, etc.

The compressor module is equipped with a SULLAIR® Rotary Screw Compressor Unit which is renown for it's durability and reliability.

2.2 Description of Components:

The package includes a heavy duty rotary screw Air Compressor with integral Inlet Valve assembly, Gasoline Engine (use unleaded fuel only) and Fuel Tank, Compressor Cooling and Lubrication System, Compressor Discharge System, Capacity Control System, Instruments and Electrical System. The complete operating system is mounted in a neat compact durable Enclosure providing easy access for maintenance.

2.3 Compressor Air End and Inlet Valve:

The SULLAIR® compressor unit is a single stage, positive displacement, oil flood lubricated type compressor. This unit provides continuous pulse free compression to meet your needs.

Lubricant is injected into the compressor unit and mixes directly with the air as the rotors turn compressing the air. The lubricant has three primary functions:

- As coolant, it controls the rise of air temperature normally associated with the heat of compression.
- Seals the leakage paths between the rotors and the stator, and also between the rotor themselves.
- Acts as a lubricating film between the rotors allowing one rotor to directly drive the other, which is an idler. It also lubricates the bearings and seal.

After the air/lubricant mixture is discharged from the compressor unit, the lubricant is separated from the air. The air then flows to the service line and the fluid is cooled in preparation for re-injection. The integral Inlet Valve results in a low profile compressor module. It's function will be covered under Capacity Control.

2.4 Gasoline Engine & Fuel Tank:

The engine selected has been generously sized to have power in hand at the operating speeds to provide rapid acceleration between unload/load conditions and is applied at speeds below it's maximum rating. Fuel for the gasoline engine should be UNLEADED with a minimum Octane Rating of 87. Please refer to the Engine Owner's Manual for service and maintenance requirements.

The Kohler CH25 gasoline engine is a V-Twin, O.H.V. design, air cooled engine. It has numerous features such as: Electronic Ignition, Nickel-Silicon plated cylinders, Hydraulic Valve Lifters, Integral Engine Oil Cooler, etc. Features which add up to a durable prime mover.

The drive system from the engine to the compressor is a V-belt system with provision for belt tensioning. The belt selection is a heavy duty industrial drive.

A 5 gallon fuel tank is provided which incorporates a large fill cap. Access for re-fueling is by raising the hinged top cover. Fuel level can be viewed either through the fill cap or from outside of the enclosure through the slots provided for that purpose. A fuel filter is provided on the engine.

An air cylinder is fitted to the throttle assembly which will automatically speed up/slow down the engine upon air demand. There are two adjustment screws on the engine governor system. The one adjacent to the small cylinder is for the Idle speed control, the one towards the outside of the unit is for high speed, these adjustment screws are retained with locknuts. Refer to the Specification Sheet for correct engine speed settings, these should not normally have to be adjusted after factory setting.

2.5 Compressor Cooling & Lubrication.

A Schematic Diagram of the lubrication system can be found on Drg. No. 262899 (Control System).

Lubricant is stored in the Receiver Tank. Oil flow is created by pressure differential, (there is no separate oil lubrication pump). As the compressor is engaged the resultant air pressure forces the lubricant through the oil filter and oil cooler prior to injection into the compressor. Within the compressor air end the oil mixes with the air and is discharged as a heavy air/oil mix into the receiver tank where the majority of the oil is separated. Carryover of finer particles of oil are separated out in the air/oil separator (coalescer) and is returned to the compressor through the Scavenge line to a low pressure (vacuum) port. The scavenge line is fitted with a check valve to prevent reverse flow during the shutdown process.

The oil filter incorporates a By-Pass Relief Valve to help protect from oil starvation on cold temperature starts and will help protect the compressor in case of a plugged oil filter (this condition should be corrected immediately-refer to Maintenance Section).

The cooler fan is activated by means of a thermal switch which reacts to changes in oil temperature during operation, these changes are influenced by load/unload cycles and ambient conditions (or low oil level).

2.6 Compressor Discharge System:

The compressor unit discharges compressed air/lubricant mixture into the receiver tank. The receiver serves two main purposes:

- It acts as a primary lubricant separator,
- Serves as the compressor oil sump.

The compressed air/lubricant mixture enters the sump and is directed against the side wall. By change of direction and reduction of velocity, larger droplets of fluid fall to the bottom of the sump. The finer particles remaining are carried to the final air/oil separator (coalescer), where they collect on the element media fibers. As more fluid collects it percolates down to the bottom of the element where it is then returned to the compressor (lower pressure zone) through the return scavenge line, which contains both an orifice to reduce the amount of air loss back to the compressor and a check valve to prevent reverse flow during shutdown operations.

Final discharge air from the separator unit has a connection which feeds the Control System. The main service line air passes through a minimum pressure orifice which ensures that a minimum pressure is maintained in the receiver tank for lubricant circulation, it then passes to the Service Valve.

The Service Valve incorporates an automatic bleed-off device for the downstream piping such that when the valve is turned off it will vent downstream air, making for safer hose disconnects.

The receiver tank is A.S.M.E. rated and certified, for 175 psig. Working pressure. A Pressure Relief Valve is connected to the receiver and is set to open if the pressure exceeds 175 psig. The Oil Fill Cap has a built in vent to relieve any remaining internal pressure, should there be an attempt to remove this cap without completely venting down first. **IMPORTANT** - Relieve all pressure before removing any components.

An oil level Sight Glass is provided. Oil level should be checked with unit shut down and oil allowed to settle. Oil level should be checked daily.

2.7 Capacity Control System:

The purpose of the control system is to regulate the amount of air intake in accordance with the amount of compressed air being used.

The control system consists of an Inlet Valve (mounted integrally in the compressor unit), Pressure Regulating Valve, Speed Control Cylinder, Blowdown Valve and respective air lines.

The following functional description of the control system is described in distinct phases of operation. This description will apply to all control systems with the exception of stated pressures which will vary depending upon machine model. The pressures stated will be in accordance with a compressor having an operating pressure range of 100 to 115 psig.

START 0 to 100 psig.:

When the compressor is started, the receiver pressure quickly rises from 0 to 100 psig. During this period the Pressure Regulator Valve is inoperative. The Inlet Valve is fully open due to inlet air pressure, and the compressor operates at full capacity. As the compressor operates at full capacity the engine runs at full speed.

Regulation 100 to 115 psig.:

Should less than the rated capacity of air be used, the receiver and service line pressure will rise above 100 psig. The Pressure Regulating Valve will start to open and pass air to both the Inlet Valve and the Air Cylinder mounted on the engine. This causes the Inlet Valve to start closing and the engine to start to slow down. As pressure in the receiver increases the Inlet Valve will become fully closed and the Engine will reach idle speed.

Air Demand:

As air is demanded from the service line, the receiver pressure will drop and the Pressure Regulating Valve will close. This allows the Inlet Valve to re-open, the Air Cylinder on the engine will retract, and the engine will once again run at the pre-set full speed.

This cycle will repeat dependent upon air demand from the compressor.

Shutdown:

The unit is fitted with an automatic Blowdown Valve. When the unit is switched off, the compressor air end becomes pressurized and a signal is passed to the Blowdown Valve pilot actuator, this activates the valve and vents the system pressure down to atmosphere.

2.8 Instruments and Electrical System:

The Engine Controls consist of an Ignition Key Switch and pull Choke control. Adjacent to these are the Air Pressure Gauge, Hour meter and engine start oil pressure Override Push-button.

- Ignition Key Switch is used only for starting/stopping the engine. It has three positions OFF/RUN/START.
- Override Push-button is used when starting the engine and will by-pass the low engine oil pressure protective shutdown switch. This button is depressed during cranking and for a few seconds after it has fired, once the engine oil pressure is above the switch setting it can be released.
- Pull Choke is used for cold starts. It allows for a richer mixture, it should be gradually pushed back in as the engine warms up and sustains smooth running. **DO NOT LEAVE IT PULLED OUT.**
- Air Pressure Gauge continually monitors the service line air pressure.
- Hour meter indicates total accumulated hours of compressor operation. This is useful for planning and logging service operations.

Electrical System is comprised not only of the necessary equipment required to operate the compressor unit, but also systems to shut down the compressor in the event of malfunctions. The Electrical System is a 12 volt D.C. negative ground system.

- Engine Components consist of Starter Motor, Alternator (15 amp), Electronic Ignition System, Fuel Solenoid and Low Engine Oil Pressure Switch (This switch will shut down the engine if the oil pressure becomes insufficient).
- Compressor Over temperature Shut down Switch, will shutdown the compressor if the discharge temperature exceeds 240°F.
- Fan Temperature Switch, automatically cycles the compressor oil cooling fan ON/OFF to maintain the compressor oil temperature between 180 to 240° F.
- Electrical Harness, is provided to interconnect all the electrical devices.
- Battery, is a heavy duty 12 volt D.C. with a capacity of 400 C.A. @32° F.

2.9 Main Frame and Enclosure:

The steel mainframe is stiffened to provide rigidity and permit fork lift movement (Locate forks at "Lift Here" arrows). The foot on each corner of the base has a small pad with a hole for bolt-down provision if required. Forks should only be inserted in the correct location, or damage may occur to parts under the frame.

The enclosure which is attached to the main frame is made from steel and is powder coated to provide a durable finish.

The complete top cover is hinged for easy access to fuel fill and most maintenance items. It incorporates a prop support.

A detachable front grill provides access to engine oil filter and battery.

Instrumentation and engine controls are conveniently located at one end of the machine along with the service air outlet.

Fuel and compressor oil levels can be checked at a glance from the front of the machine where the top cover release catches are located.

Cooling air outlet for both the compressor and the engine are directed up and out through the roof panel together with the engine exhaust.

A lift bail is provided to allow for overhead lifting (**WARNING-Do not** go underneath the machine at any time while the machine is being lifted). This item is an option.

Safety and information decals are provided in appropriate locations on the machine, please read and understand all the information contained thereon.

3.1 General:

While VANAIR has built into this compressor a comprehensive array of controls and safety systems, you will want to recognize and interpret the readings or malfunctions which will call for service or indicate the beginning of a problem.

Before starting your VANAIR compressor read this section thoroughly and familiarize yourself with the controls and operation.

3.2 Purpose of Controls:

Control or Indicator:

Purpose:

Engine Ignition Switch.
(Key Switch).

This switch has three positions: OFF/ON/START
In the OFF position the electrical ignition system is switched OFF and the key can be removed. RUN position is detented and is the normal operating mode. START is for cranking the engine, allow the key to return to RUN once the engine has started.

Choke.
(Pull Knob)

Used for cold starts, pull out for maximum choke, gradually push in as engine warms up. Normal run position is fully pushed in. **DO NOT** leave pulled out or engine will run with rich mixture.

Start Override.
(Push-button)

Used to by-pass the engine low oil pressure switch when starting the engine. Must be pressed simultaneously when cranking the engine, hold depressed for about 5 to 10 seconds after the engine has started.

Discharge Air Pressure.
(Pressure Gauge)

Continuously monitors service line discharge air pressure.

Operation Hours.
(Hour meter Gauge).

Indicates the accumulated hours of operation. Useful for planning and logging service schedules.

Fluid Level.
(Sight Glass).

Indicates the compressor fluid level in the sump. Check the level when the unit is shutdown. Should show in sight glass at half way mark.

Compressor Discharge Temperature Switch.

Opens the electrical circuit to shutdown the compressor when the discharge temperature reaches 240° F.

<u>Control or Indicator:</u>	<u>Purpose:</u>
Minimum Pressure Orifice	Maintains a minimum pressure in the compressor sump of 40 psig. If the service valve is fully opened.
Pressure Relief Valve	Opens sump pressure to atmosphere should the pressure in the sump exceed 175 psig.
Blowdown Valve	Vents compressor sump pressure to atmosphere upon shutdown.
Pressure Regulating Valve	Allows a pressure signal to reach the engine speed control cylinder and the inlet valve, to control air delivery according to demand.
Air Inlet Valve	Regulates the amount of air allowed to enter the compressor. Also acts as a check valve upon shutdown to prevent air/oil blowback into the air filter.
Fan Temperature Switch.	Thermostatically switches the compressor oil cooling fan ON/OFF to maintain a minimum oil temperature of 160° F. (typical operation 170 to 200° F.).

3.3 Initial Start-Up procedure:

The following procedure should be used to make the initial start-up of your compressor.

1. Position the compressor on a level surface so that proper amounts of liquid can be added if required.
2. Check engine and compressor oil levels, add correct oil if necessary.
3. Fill fuel tank.
4. Crack open the service valve.
5. Pull engine choke out.
6. Turn engine ignition switch to ON position
7. Depress START OVERRIDE button and turn ignition switch to START. As engine engages, release START switch, but hold the OVERRIDE button for approximately 5 to 10 seconds and then release.
8. As engine warms up, push in CHOKE and close service valve.
9. Allow for sufficient warm-up of machine before operating.
10. After the initial run, shut the machine down and top off compressor oil sump as required. Tighten any loose fittings, check drive belt tension and inspect for any leaks.

3.4 Subsequent Start-Up Procedure:

On subsequent starts, follow the procedure explained below:

1. Check engine and compressor oils, add correct oil if necessary. Fill the fuel tank.
2. Crack open the service valve.
3. Pull engine choke out.
4. Turn ignition switch to **ON** position.
5. Depress **START OVERRIDE** button and turn ignition switch to **START**. As engine engages, release **START** switch, but hold the **OVERRIDE** button for approximately 5 to 10 seconds and then release.
6. As engine warms up push in **CHOKE**.
7. Allow for sufficient warm up of machine before operating.

3.5 Shutdown Procedure:

1. Close the service valve and run the compressor for about 5 minutes.
2. Turn the ignition switch to the **OFF** position.

In case of **EMERGENCY** where immediate shutdown is required this procedure is **NOT** necessary. **TURN** ignition switch **OFF** immediately.

3.6 Operating Conditions:

1. Operate only in well ventilated areas. Exhaust fumes can be lethal.
2. Ensure no obstructions on cooling air intakes at both ends of the machine.
3. Do not leave anything resting on top of the machine. Hot engine exhaust and cooling air will generate high heat and must not be restricted.
4. Be sure to leave sufficient room around the machine for cooling air. Minimum 6 inches each end and at least one side unrestricted.
5. Fuel only when cold.
6. Operate machine with top cover closed. To avoid engine exhaust fumes/heat being deflected.
7. Refer to specifications for operating parameters, speeds, etc.

4.1 General:

A good maintenance program is the key to long compressor life. Below is a program that when adhered to, should keep the compressor in top operating condition. However, it should be understood that these intervals are for normal operation in a good clean environment. More frequent inspections, oil changes and general maintenance should be carried out in dusty environments, high ambient temperatures or extended light load conditions. For maintenance requirements on the Engine refer to Engine Operators Manual for a detailed description of Service Instructions.

WARNING - DO NOT remove caps, plugs or any components when the compressor is running or pressurized. Stop the compressor and relieve all internal pressure before doing so.

WARNING - DO NOT work on any electrical components unless the battery is disconnected.

4.2 Daily Operation:

Before Starting:

1. Check fluid levels-engine/compressor/fuel (with machine level).
2. Check for any leaks or loose bolts.
3. Check drive belt is tight.

After Starting:

4. Check pressure gauge for correct operating pressure.
5. Ensure choke is pushed in after warm up.
6. Check for leaks.

4.3 After Initial 50 Hours:

1. Change Oil Filter (Since initial oil filter will have collected any foreign materials which may have collected in manufacture).
2. Check Belt Tension and Alignment (Majority of belt stretch will occur during early operation hours, also be sure to check alignment).
3. Check Engine Operator Manual for required service.
4. Check Compressor oil for water or emulsion.

4.4 Every 500 Hours (or 6 months):

1. Change Compressor Oil and Filter.
2. Change Air Filter (Shorter intervals may be required if dirty environment).
3. Check Belt Tension and Alignment.
4. Blow out Compressor Cooler Core.
5. Lubricate Control Linkage.
6. Check all Fittings and Fastenings.

4.5 Every 1000 Hours (or 1 year):

1. Check Safety Circuit Switches.
2. Check Sump Safety Valve.
3. Replace Spin-On Coalescer (sooner if required).

4.6 Lubrication Guide:

WARNING - It is Important that the Compressor Oil be of a recommended type and that it is inspected and replaced together with the oil and air filters, in accordance with this Manual.

The result of poorly maintained lubricant and/or filters may produce hazardous conditions resulting in ignition, which could cause a fire in the sump. Damage to equipment and serious bodily harm may result.

1. General:

It is not possible to establish limits on all physical and chemical properties of lubricants which can affect their performance over a broad range of operating and environmental influences. The responsibility for recommending a suitable lubricant must rest with the user's lubricant supplier and their knowledge of the suitability of their lubricants in screw compressors, operating in the particular environment involved.

2. Prime Lubricant Characteristics:

1. Viscosity: 160-210 SUS at 100° F.
47 SUS or greater at 210° F.
2. Flashpoint: 400° F. Minimum.
3. Pour point: Must be at least 20° F. Lower than the lowest expected ambient operating temperature.
4. Contain: Rust and Oxidation Inhibitors.
5. Contain: Foam Suppressors.

3. Types of Lubricant to be Considered:**1. Automatic Transmission Fluids (i.e. Dexron® III).**

Are suitable for the majority of applications. They are commonly applied in heavy duty, high temperature conditions and also where temperatures are consistently below freezing (32° F.) down to approximately 0° F.

In light load and/or high humidity operating conditions A.T.F. can absorb moisture and may result in emulsification of the lubricant. If this occurs change lubricant immediately since the lubricating properties are breaking down. If this condition persists consider changing to a different type of lubricant (consult supplier).

2. Industrial Type Oils:

Should be of premium quality non-detergent mineral oil, viscosity grade SAE10 (ISO 32). Industrial oils may be better for high humidity and/or low load factor, where condensed moisture and emulsification may occur. Water will separate and must be drained from the oil sump (daily if necessary). In addition to the primary oil These lubricants should generally only be applied where conditions above 32° F. prevail.

3. Synthetic Lubricants:

In so far as known, all the elastomeric components and metals used in the compressor are fully compatible with Synthetic Hydrocarbon (SHC) and Diester Lubricants.

However, the synthetic lubricant should not employ Viscosity Index Additives since they could precipitate out and cause plugging. Viscosity ranges selected should be based on those outlined in Prime Characteristics and in close liaison with the lubricant supplier.

CAUTION - Various factors can affect "Extended Life" lubricants, such as reactive gases or vapors which could be ingested into the compressor and may adversely affect these lubricants. It is recommended with these lubricants to maintain oil filter changes as recommended intervals and participate in an oil Sampling Program with the lubricant supplier.

4. CAUTION - DO NOT MIX OILS OF DIFFERENT TYPES.**5. Factory Fill - A.T.F. -Dexron® III or equivalent.****4.7 Oil Filter Replacement:**

The compressor oil filter is a spin on, throw away type. Before attempting to remove the oil filter, ensure all air is relieved from the system. **CAUTION-** Use only Vanair filters, other filters may not have correct pressure rating.

Remove:

1. Remove old filter (use strap wrench if required) by turning Anti-Clockwise and discard as appropriate.
2. Clean filter head with lint free wiper or cloth.

Replacement:

3. Apply a light film of oil to the seal surface on the new element.
4. Screw new element on Clockwise by hand until seal contacts filter head, then turn an additional 3/4 turn (By Hand).
5. Run compressor and test for leaks.

4.8 Coalescer (Air/Oil Separator) Replacement:

This is a spin-on, throw away type unit. Before attempting to change ensure all pressure is relieved from the system. Change in accordance with Maintenance Guidelines. If oil carryover into the service line occurs and the return line scavenge orifice is clear, than change the element. Verify receiver is not overfull.

Remove:

1. Remove old element (use strap wrench if required) by turning Anti-Clockwise and discard as appropriate.
2. Disconnect bottom oil scavenge line from element.

Replacement:

3. Replace the seal in the head with the new one provided and lubricate with a film of clean oil.
4. Refit oil scavenge line to bottom of element.
5. Screw element on Clockwise until it seats on the head seal, rotate ONE more complete turn (use strap wrench if necessary). Take care not to damage element.
6. Start up and check for leaks.

4.9 Air Filter Replacement:

The air filter is a self contained throw away assembly. **DO NOT** replace with compressor in operation.

Remove:

1. Unscrew the wing nut on top of the air filter and remove filter assembly including the intake Hose.
2. Remove the Intake Hose and discard filter as appropriate.

Replacement:

3. Refit existing Intake Hose onto the new Air Filter.
4. Fit the new filter onto the compressor air end inlet and ensure the Intake Hose pushes into the receptacle on the end panel.
5. Replace and tighten the wing nut to retain the Air Filter assembly.

4.10 Belts - Tightening and Replacement:

Correct tensioning and alignment is important for belt life, bearing life and power transmission.

Correct tensioning and alignment was provided at time of shipment from the factory.

However, since maximum belt elongation will occur within the first 50 hours of operation (of new belts), their tension and alignment should be checked several times during this period and corrected as required. The belts should thereafter be checked periodically in order to obtain maximum life and performance.

NOTICE - To avoid possible belt damage, never force belts over the sheaves. Oil spilled or splashed onto the belts in any quantity will cause slippage and severely reduce belt life - Take care when filling compressor oil.

Replacing/Tightening V-Belts:

1. Slacken bolts holding compressor air end to base, accessible under base. Only slacken sufficient for air end to move in slots.
2. Back off the adjusting screw on the engine side to allow old belt/s to be removed and new one/s positioned. Ensure new belt is seated in grooves.
3. Tighten adjusting screw adjacent to engine, to take up main slack. Then loosen adjusting screw on opposite side of air end and screw in to touch air end. Sequentially, tighten engine side adjusting screw and back out opposite side screw. Periodically check tension and alignment, these two adjusting screws will permit you to obtain correct tension and alignment.

Tension Data:

Deflection at center of belt span 0.25 ins.

With a Force of 4 lb.

Ensure pulleys are aligned by using a long straight edge which will span both pulleys. Position the straight edge on the sides of the pulleys, if they are in-line there should be no gaps between the straight edge and the pulleys (for the full contact distance across each pulley side), adjust as necessary to get correct alignment and tension.

It may be necessary to repeat and check several times before both tension and alignment are satisfied.

4.11 Cooler Core Cleaning (exterior):

Remove leaves, papers etc. from outside face. Use compressed air and carefully blow through the core from the inside of the canopy (through fan assembly or remove fan assembly).

DO NOT use high pressure air or pressure washer.

Note- Oil cooler core is aluminum, if this does at some point require internal cleaning, this is best done by a suitably equipped radiator shop. Internal cleaning is **NOT** a normal maintenance item if the oil is maintained in good condition.

4.12 Adding/Changing Compressor Oil:

Ensure all pressure is relieved from the system. Check oil level with unit level, otherwise a false oil level indication will occur.

1. Remove oil fill plug located on top of the receiver.
2. Carefully add lubricant and monitor sight glass, allow time for oil to level out. A complete refill is approximately 2.5 gal. Fill/top-up to half way mark on sight glass. If sump is overfilled, oil carryover may occur.
3. Replace oil fill cap.
4. Run unit and recheck oil level after shutdown, allowing time for oil to settle.

Oil drain is located underneath base. This can be routed to a more convenient location if required, dependent upon installation. Use only Schedule 80 pipe or suitably rated hose.

NOTE - Fill cap has a vent release hole as a safety feature and to act as a "tell-tale". If air escapes while unscrewing the fill cap, then the system still has pressure. Re-tighten the cap and fully release the system pressure through service valve before unscrewing fill cap.

4.13 Pressure Regulating Valve:

Before adjusting the control system it is necessary to determine the rated full load pressure and the high and low speed (rpm) settings. These can be found in the Specification Section.

For this example we will assume a working pressure of 100 psig Full Load

Procedure for Setting:

1. Start the compressor and allow engine to warm up, with service valve closed.
2. Adjust the Pressure Regulating valve (located behind the pressure gauge) by unscrewing the locknut and then adjust the screw as follows:
Screw IN (clockwise) to INCREASE pressure.
Screw OUT (anti-clockwise) to Decrease pressure.

3. Set the pressure to approximately **115** psig. On the gauge and tighten the locknut.
Note - Air will leak from the small hole adjacent to the locknut.
4. The engine should be in the **IDLE** condition. Check speed and adjust if necessary.
5. Gradually open the service valve and hold the pressure at **100** psig. Note - Air should have stopped leaking from the small hole in regulating valve.
6. The engine should now be in the **HIGH** speed mode. Check speed and adjust high speed stop screw on engine if necessary.

NOTE - If HIGH speed needed any significant adjustment, it may be necessary to then go back and re-adjust the Pressure Regulating Valve again as described above.

7. Cycle the machine using the service valve, check pressure gauge settings are okay and the engine speeds up/down as air demand increases/decreases.

4.14 Inlet Valve:

The most common items which may need attention at some point are the Piston Seal and the Poppet Valve Head. A failure of either of these items would result in the machine over pressuring, and in the case of the Poppet Valve Head (if it was not seating correctly) oil would blow back into the air filter during shutdown. Attention should first be given to the Pressure Regulating Valve to ensure that it is functioning correctly.

Remove:

1. Remove Air Filter.
2. Unscrew the four socket head cap screws holding the large flange on top of the compressor air end. This flange has been sealed with gasket eliminator so it may be necessary to tap with a brass mallet to break this seal.
3. Remove flange, then carefully remove Poppet Head and spring (examine Poppet Head for signs of uneven seating). Take care not to drop anything into the inlet throat of the compressor.
4. Inlet Piston assembly (large brass hexagon) can now be unscrewed (anti-clockwise) with a large socket.
5. Inlet Piston Assembly can be dismantled by removing the retainer ring on the top, remove top cover and spring, the piston can then be carefully pulled out.

Replace:

6. Remove old seal. Generously lubricate new seal with clean oil and fit onto piston. The lip should face down towards bottom of piston (away from rod).
7. Reassemble Piston Assembly and reinstall screwing clockwise, tighten with socket.

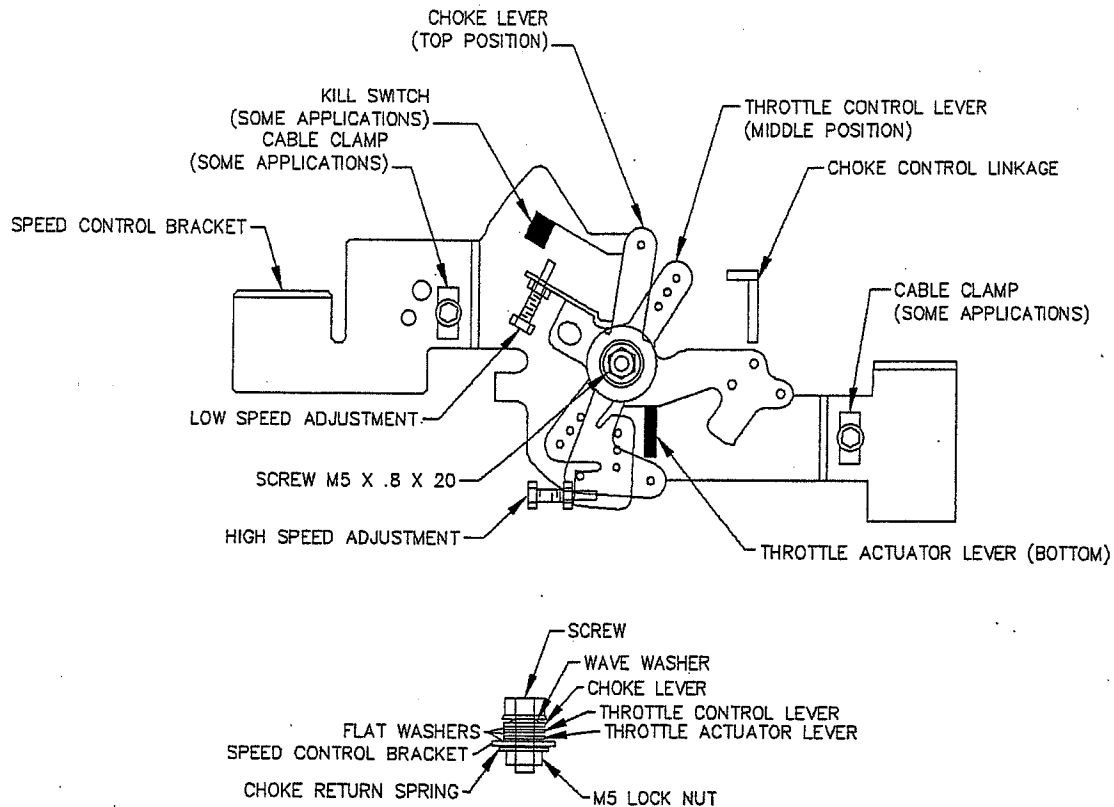
8. Remove old traces of gasket eliminator and wipe clean. Apply a thin coat of gasket eliminator (Loctite® 515 or equivalent) to compressor inlet surface and refit the cleaned flange. Tighten socket cap screws in a Cross pattern to even clamping load.
9. Replace Air Filter, run test and then shutdown. Check for correct functioning and no leaks.

4.15 Recommended Torque Specifications:

<u>Capscrew</u>	<u>GRADE</u>	<u>Tightening Torque</u>	
		<u>DRY</u>	<u>LUBRICATED</u>
<u>SIZE</u>			
1/4 - 20 UNC	5	8 ft lbs	6 ft lbs
5/16-18 UNC	5	17 ft lbs	13 ft lbs
3/8 - 16 UNC	5	30 ft lbs	23 ft lbs
1/2-13 UNC	5	75 ft lbs	55 ft lbs
3/4 - 10 UNC	5	260 ft lbs	200 ft lbs

4.16 Fuel Tank - Fittings:

If for any reason the lower fitting in the nylon fuel tank has to be removed **DO NOT** refit using TEFLON® tape or pipe dope on the fitting threads. Use PERMATEX® #2 For a Gasket or equivalent compound which is compatible with gasoline/nylon.



4.17 Engine Speed Adjustments:

****Note**** To increase engine RPM, turn adjusting screw clockwise.
 To reduce RPM, turn adjusting screw counter clockwise.

Speeds for respective units for V-25 form or customer inquiries:

1.0 60 CFM and 150 PSIG

Engine: Idle 2600 RPM, full load 3580 RPM
 Compressor: Idle 3485 RPM, full load 4800 RPM
 (i.e. drive ratio 1.46)

2.0 70 CFM and 100 PSIG

Engine: Idle 2600 RPM, full load 3300 RPM
 Compressor: Idle 4370 RPM, full load 5540 RPM
 (i.e. drive ratio 1.68)

NOTES

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The information contained in the Troubleshooting Chart has been compiled from information gathered. It contains symptoms and usual causes for the most common types of problem. All available data concerning the trouble should be systematically analyzed before undertaking any repairs or component replacement.

A visual inspection is worth performing for almost all problems and may avoid unnecessary additional damage to the machine. The procedures which can be performed in the least amount of time and with the least amount of removal or disassembly of parts should be performed first.

WARNING - Before working on any machine, ensure it is shut down, keys removed, air pressure relieved, battery disconnected and unit has cooled down.

SYMPTOM:**PROBABLE CAUSE:**

- | | | |
|----------------------------------------------------|---------------------------------------|-------------------------------------------------------------|
| 1. Failure to Start | 1.1 No fuel----- | Fill if necessary. |
| | 1.2 Pinched fuel line----- | Replace or reroute. |
| | 1.3 Plugged fuel filter----- | Replace. |
| | 1.4 Low battery voltage----- | Recharge or replace. |
| | ----- | Loose connections-tighten. |
| | ----- | Dirty connections-clean. |
| | 1.5 Plugged air filter----- | Replace. |
| | 1.6 Defective oil pressure switch---- | Check continuity-replace. |
| | 1.7 Defective air temp. switch----- | Check continuity-replace. |
| | 1.8 Blown fuse----- | Check continuity-replace. |
| 2. Compressor
Shuts Down
with Air
Demand. | 1.9 Poor ground connection----- | Check and clean/renew. |
| | 1.10 Engine problems----- | Refer to Engine Operator
Manual. |
| | 2.1 No fuel ----- | Fill if necessary. |
| | 2.2 Compressor temperature----- | Low oil level-top up. |
| | switch opening----- | Restricted cooling air intake-
clean-reposition machine. |
| | ----- | Fan not operating-check
ground-check fan switch. |
| | 2.3 Plugged oil filter----- | Replace |
| | 2.4 Dirty cooler core----- | Clean. |
| | 2.5 Contaminated cooler core----- | Remove and clean. |
| 2.6 Defective engine oil press switch | Replace. | |
| 2.7 Engine speed too low----- | Adjust and reset. | |

Symptom:

Probable Cause:

3. Compressor
will Not Build
Up Pressure.

- 3.1 Air demand too great-----
- 3.2 Air filter plugged-----
- 3.3 Defective pressure regulator-----
- 3.4 Press. Reg. out of adjustment---
- 3.5 Engine does not speed up-----
- 3.6 Control cylinder stuck-----
- 3.7 Belts slipping-----

- Check for leaks/correct.
Too much air demand.
- Check and replace.
- Replace.
- Reset.
- Pressure regulator.
- Speed control adjustment
- Engine governor `stuck.
- Replace.
- Readjust.

4. Compressor
Over pressures.

- 4.1 Press. Regul. Out of adjustment---
- 4.2 Defective Press. Regul-----
- 4.3 Leak in air control line-----
- 4.4 Inlet valve stuck-----
- 4.5 Restriction in control line-----
- 4.6 Check valve stuck-----
- 4.7 Faulty gauge-----
- 4.8 Defective Safety Valve-----
- 4.9 Plugged Coalescer-----

- Reset.
- Replace.
- Check and correct.
- Free or replace.
- Dirt or ice, clean/free up.
- Replace.
- Check with shop
air/replace.
- Replace.
- Replace.

5. Insufficient
Air Delivery,

- 5.1 Plugged Air Filter-----
- 5.2 Plugged Coalescer-----
- 5.4 Engine speed too low-----
- 5.5 Inlet valve stuck-----
- 5.6 Belts slipping-----

- Replace.
- Replace.
- Adjust and reset
- Free or replace.
- Readjust.

6. Oil Carryover.

- 6.1 Oil level overfull-----
- 6.2 Plugged oil scavenge orifice----
- 6.3 Scavenge return line kinked----
- 6.4 Check valve stuck-----
- 6.5 Discharge Pressure too low----
- 6.6 Defective coalescer-----

- Drain to correct level.
- Remove and clean.
- Replace/re-route.
- Replace.
- Review air usage.
- Check press. regul. setting.
- Replace.

Symptom:

Probable Cause:

7. Compressor
Overheating.

- 7.1 Insufficient oil----- Check level and top up.
- 7.2 Restricted cooling air flow----- Reposition machine.
- 7.3 Fan not operating----- Check ground connection.
 - Check fan switch.
 - Check air pressure switch.
 - Check circuit breaker.
 - Check for shorted wires.
 - Check fan motor.
- 7.4 Plugged oil filter----- Replace.
- 7.5 Cooler core plugged----- Clean.
- 7.6 Pressure set too high----- Readjust.
- 7.7 Restricted cooling air flow----- Reposition machine.
- 7.8 Contaminated cooler core----- Remove and clean.

8. System Retains
Pressure After
Shutdown

- 8.1 No signal to blowdown valve--- Check pilot line for leak/fold
- 8.2 Blowdown silencer plugged----- Clean or replace.
- 8.3 Blowdown valve plugged----- Replace.
- 8.4 Plugged coalescer element----- Replace.

9. Improper Control
Operation

- 9.1 Engine does not speed up----- Cylinder stuck, replace.
 - Governor stuck, free/lube.
 - Operating pressure too high.
 - Fuel filter partly plugged.
- 9.2 Engine does not slow down----- Leak in control line.
 - Press.regul.out of adjustment.
 - Press. regul. faulty.
 - Air cylinder stuck, replace.
 - Governor stuck, free/lube.

10. Engine
Overheating

- 10.1 Low oil level----- Top up.
- 10.2 Oil filter plugged----- Replace.
- 10.3 Restricted cooling air in/out--- Clean engine intake grill.
 - Too close to obstruction.
 - Engine oil cooler plugged.
- 10.4 Compressor pressure----- Readjust.
 - to high
- 10.5 Check engine manual.

NOTES

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes the process of gathering information from different sources and how this data is then processed to identify trends and anomalies. This section also discusses the role of technology in modern data analysis.

3. The third part of the document focuses on the legal and ethical aspects of data collection and analysis. It addresses the need to comply with relevant laws and regulations, as well as the importance of protecting individual privacy and ensuring that data is used only for its intended purpose.

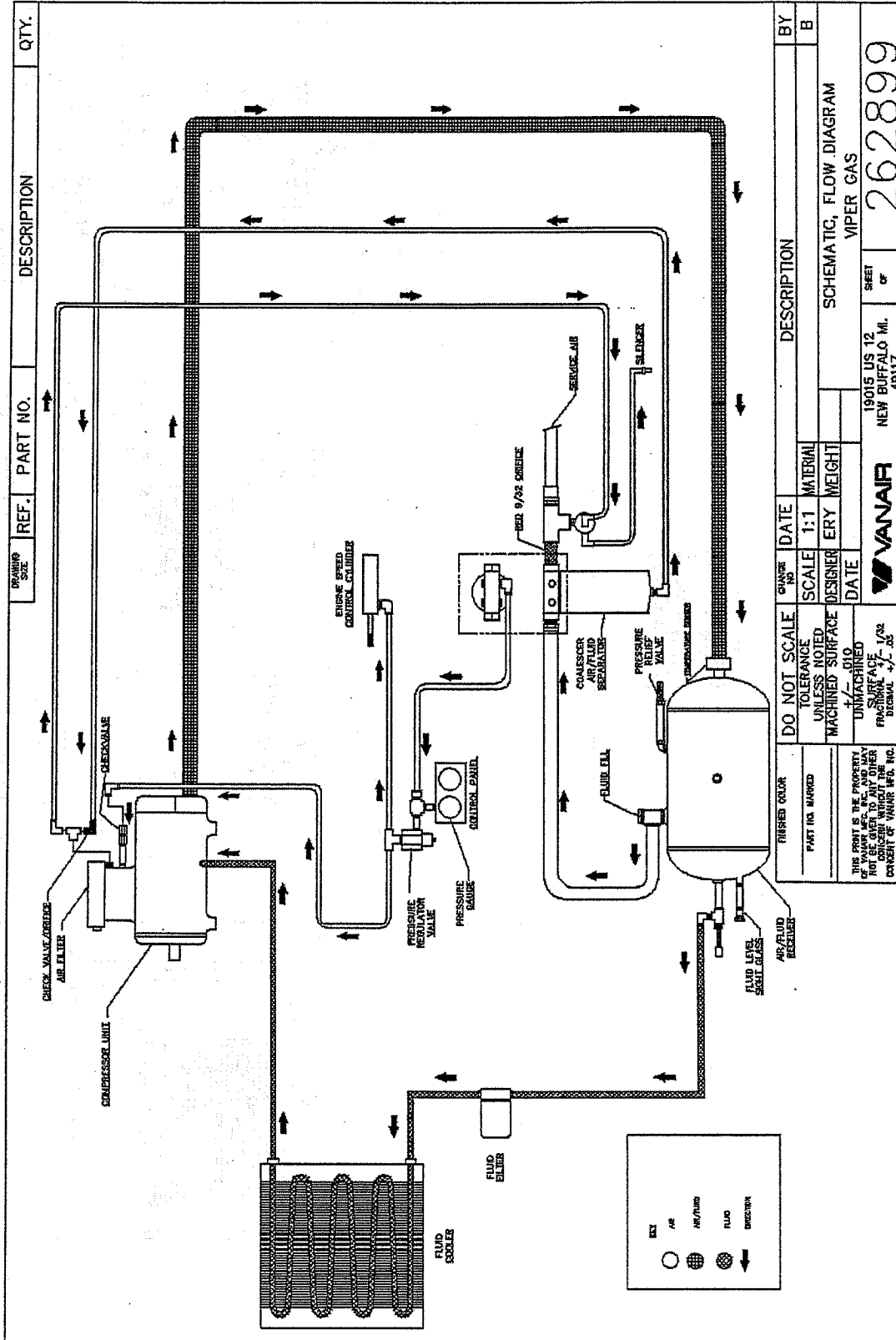
4. The final part of the document provides a summary of the key points discussed and offers recommendations for improving the overall effectiveness of the data collection and analysis process. It stresses the importance of ongoing monitoring and evaluation to ensure that the system remains up-to-date and effective.

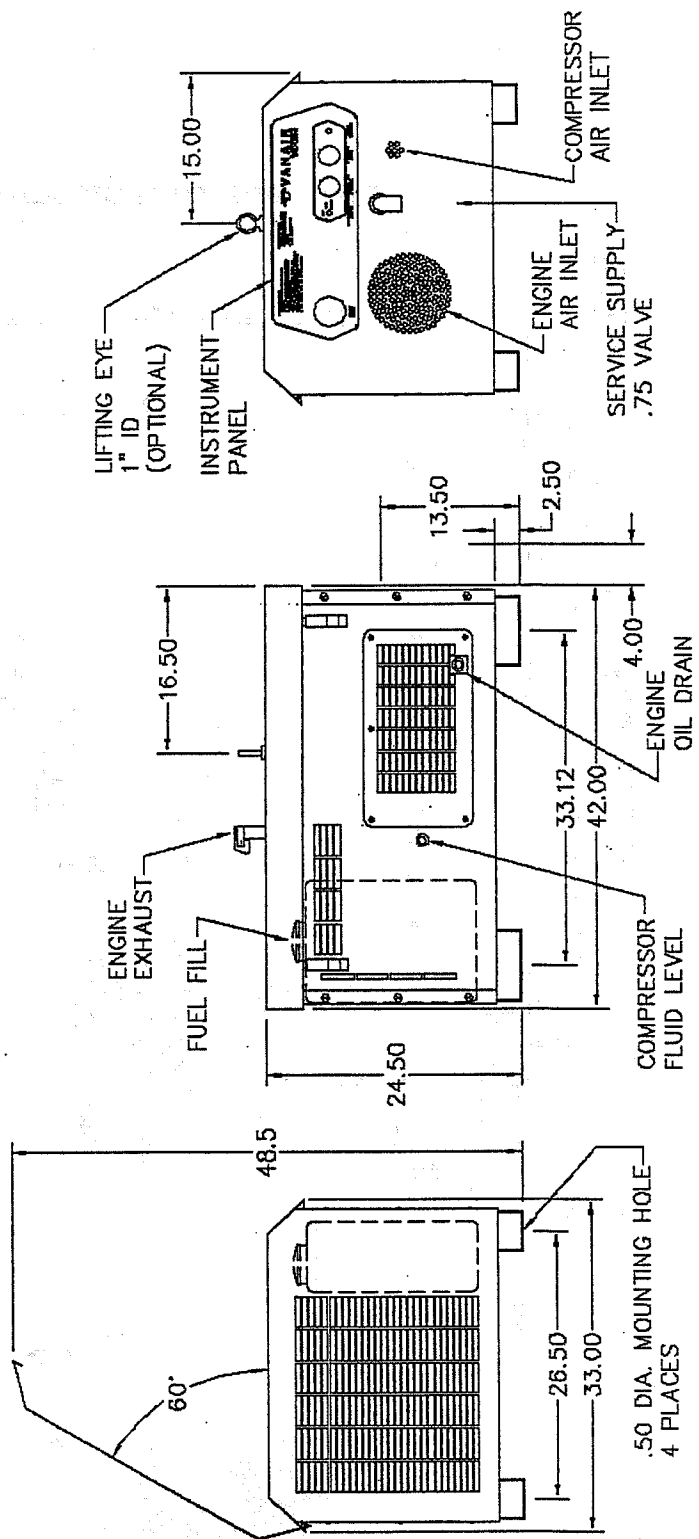
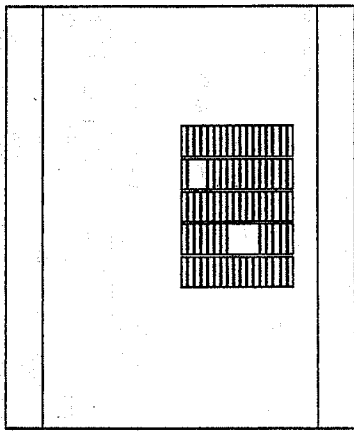
Page 1 of 1

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Author: / /

Version: / /





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7.1 Procedure for Ordering Parts:

Parts should be ordered from the nearest Sullair®/Vanair Distributor, from whom the unit was purchased. If for any reason parts cannot be obtained in this manner, contact the factory direct at the address below.

When ordering parts it is IMPORTANT to indicate the SERIAL NUMBER of the machine. This is located on the top of the cooler housing.

Some standard fasteners (capscrews, nuts, washers, etc.) And fittings plus other standard hardware may not have been included in the Parts List. Unless otherwise stated, standard pipe and fittings are Schedule 40 Malleable Iron to conform to A.N.S.I. B16.3 Class 150. Fastenings unless otherwise listed are Grade 5. These are items which may be obtained quicker and more economically from local sources.

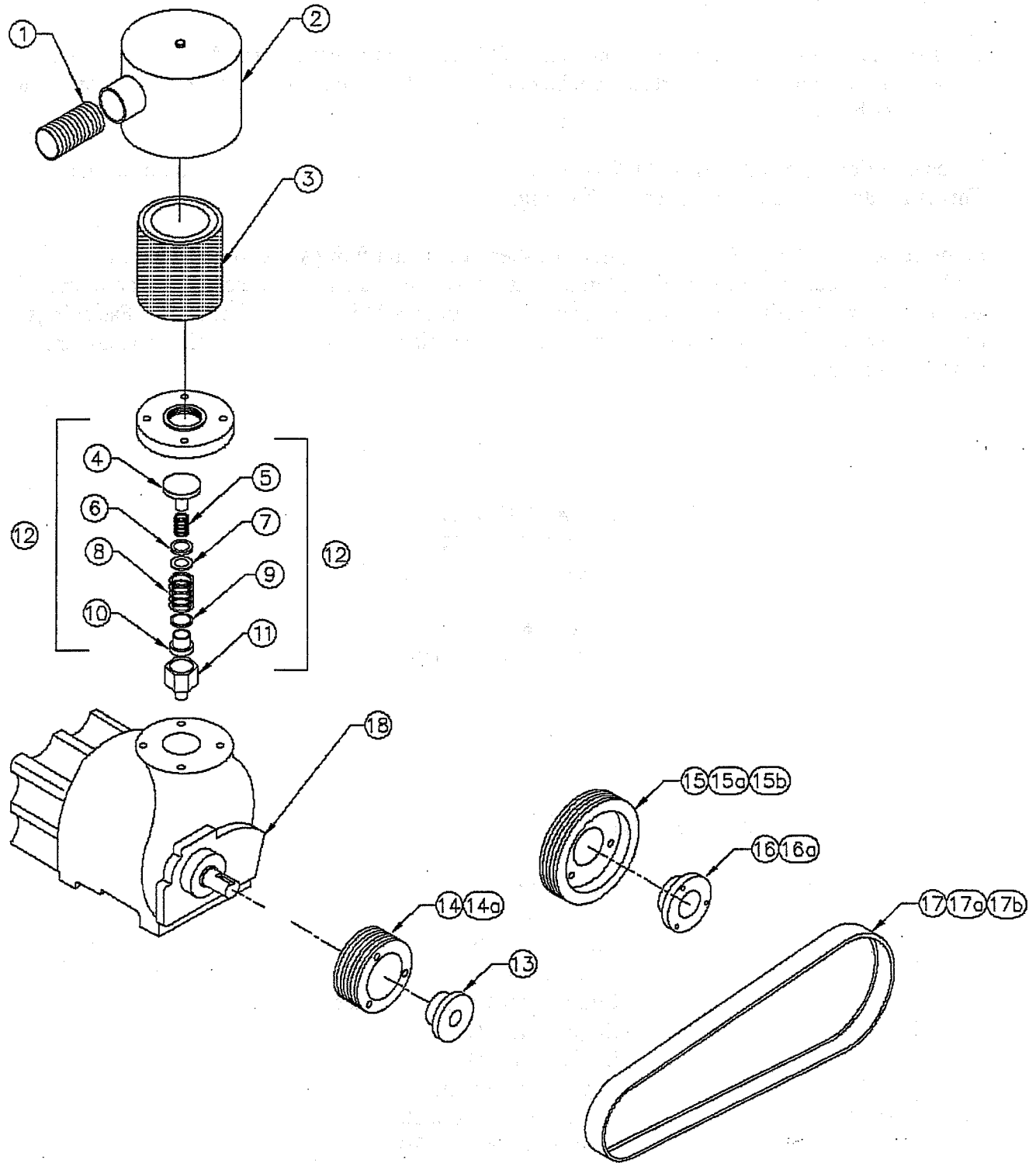
**VANAIR MANUFACTURING INC.
19015, US 12,
NEW BUFFALO, MI 49117.**

**TEL. 269-469-4461.
FAX. 269-469-0497.**

7.2 Recommended Replacement Parts:

Part Number:	Description:
264166	Element, Air Filter.
261991	Compressor Oil Filter.
262715	Compressor Coalescer Filter.
262722	Engine Air Filter.
262723	Engine Oil Filter.
262724	Engine Fuel Filter.
262813	Drive Belt - Model 60.
262617	Drive Belt - Model 70.
263661	Drive Belt - Model 80

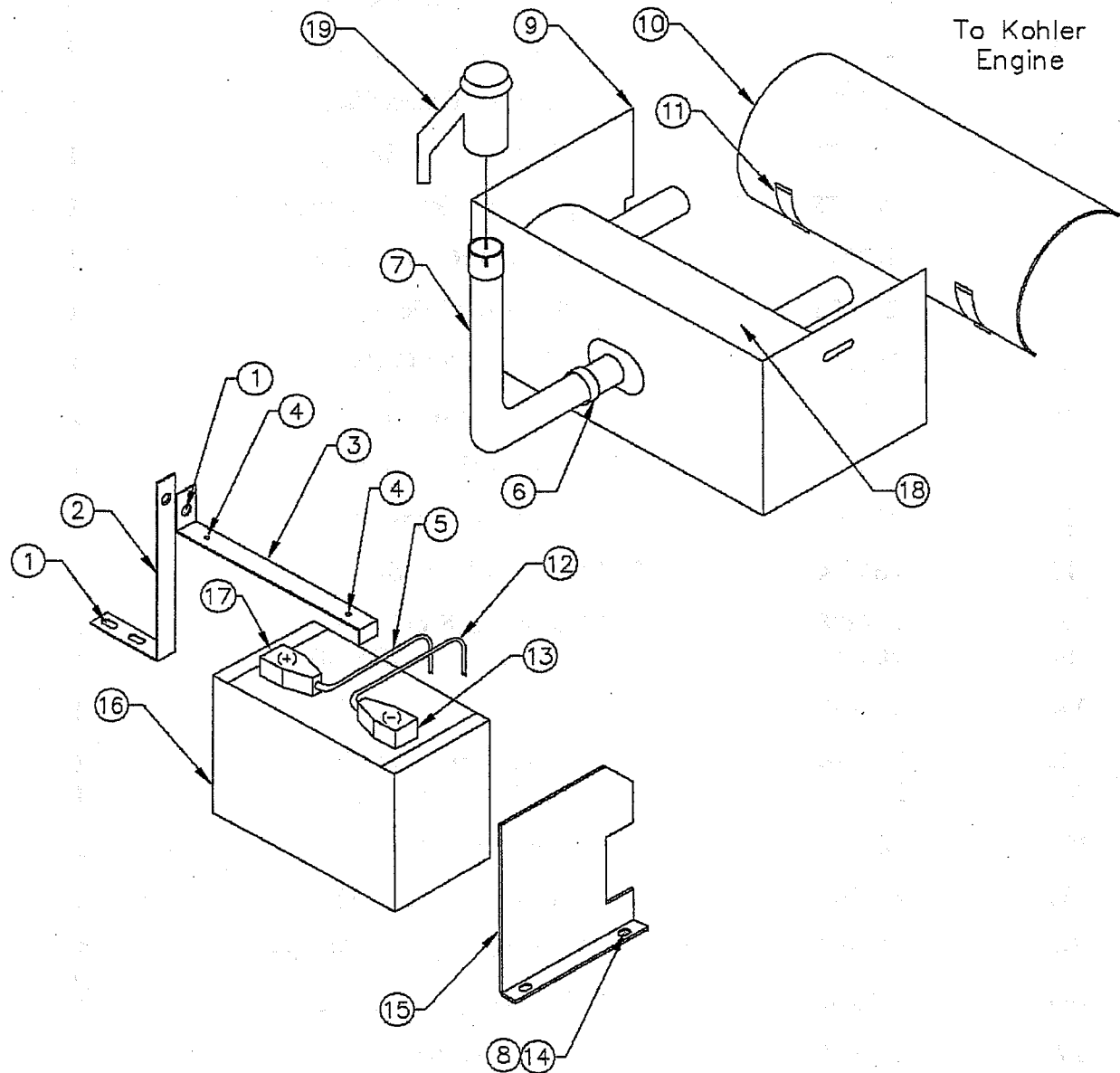
COMPRESSOR / INLET VALVE / DRIVE ASSEMBLY



7.2 COMPRESSOR / INLET VALVE / DRIVE ASSEMBLY

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	262705	Exhaust Hose	1
2	264417	Inlet Air Filter Cover	1
3	264418	Air Filter Element	1
4	262978	Air Inlet Check Valve	1
5	262977	Check Valve Spring	1
6	262975	Spring Air Inlet Retainer	1
7	262974	Air Inlet Retainer Ring	1
8	262973	Piston Air Inlet Spring	1
9	262972	Inlet Valve O-Ring	1
10	262971	Inlet Valve Piston	1
11	262970	Inlet Valve Cylinder	1
12	262969	Inlet Valve Assembly	1
13	262614	60 / 70 / 80 Bushing (Small Sheave)	1
13a	264488	60 Bushing (Small Sheave)	1
14	262613	60 / 70 Sheave (Small)	1
14a	263659	80 Sheave (Small)	1
14b	264716	60 Sheave (Small)	1
15	262812	60 Sheave (Large)	1
15a	262616	70 Sheave (Large)	1
15b	263660	80 Sheave (Large)	1
16	262615	60 / 70 Bushing (Large Sheave)	1
16a	263614	80 Bushing (Large Sheave)	1
17	262813	60 Belt	1
17a	262617	70 Belt (before s/n: 30-64303)	1
17b	262813	70 Belt (after s/n: 30-64304)	1
17c	263661	80 Belt	1
18	262708	Compressor	1

EXHAUST / BATTERY SYSTEMS

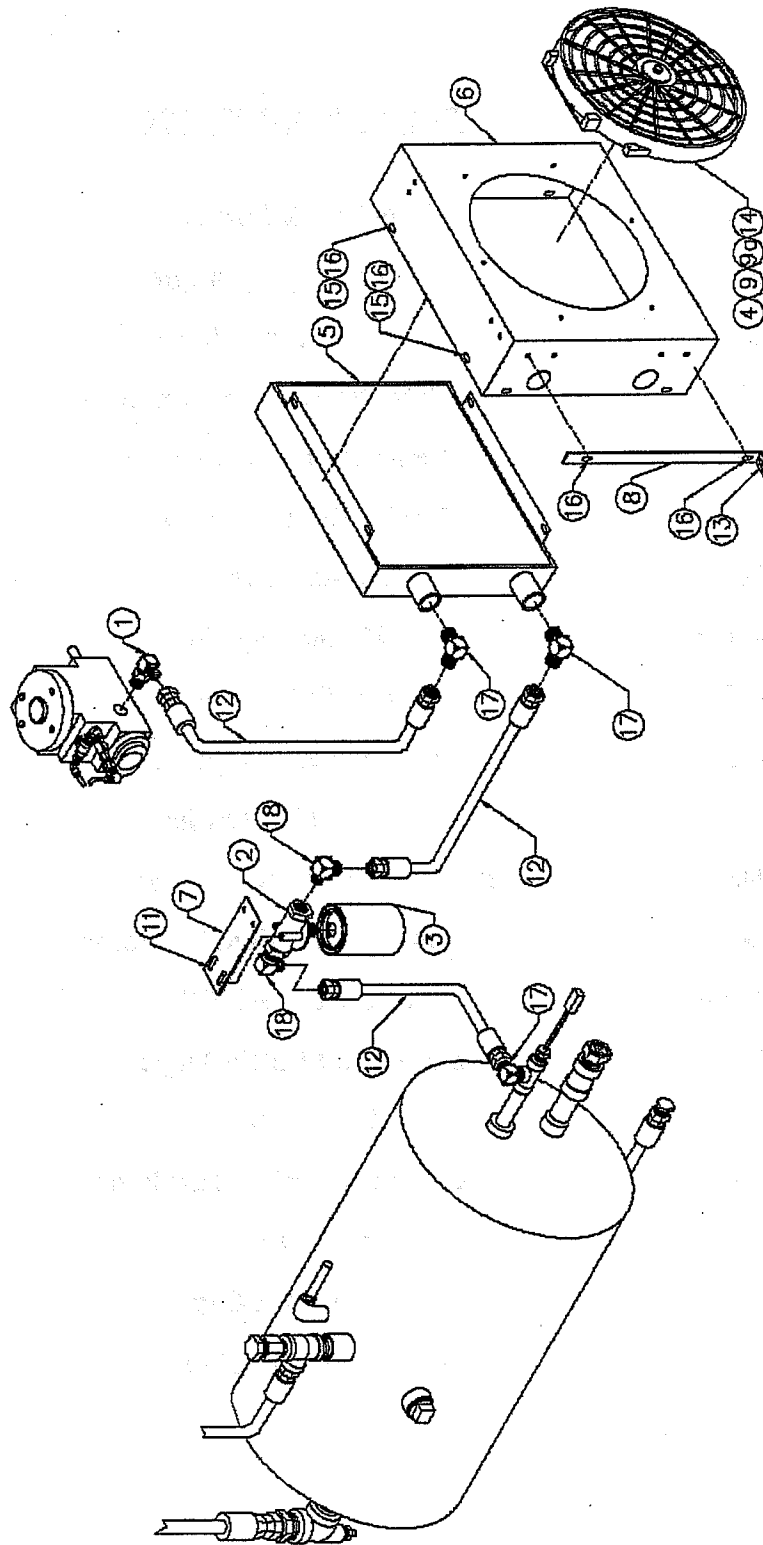


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7.4 EXHAUST/ BATTERY SYSTEMS

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	829705-075	5/16-18 x 3/4 Screw	2
2	263377	Battery Support Angle	1
3	263376	Battery Hold Down Bracket	1
4	262955	9/16 Diameter Rubber Bumpers	2
5	263942	32" Positive Battery Cable	1
6	262906	1 1/4 Exhaust Clamp	1
7	262707	Exhaust Tube	1
8	825504-145	1/4-20 Locking Nut	2
9	263449	Exhaust Shield Panel	1
10	264411	Anti Icing Kit - Option	1
11	264411	Anti Icing Kit - Option	1
12	263943	20" Negative Battery Cable	1
13	261192	Black Battery Terminal Insulator	1
14	829104-150	1/4-20 x 1 1/2 HHCS	2
15	262701	Engine Cool Baffle Angle	1
16	262596	12Volt Battery	1
17	261191	Red Battery Terminal Insulator	1
18	262646	Exhaust Muffler	1
19	262706	Exhaust Rain Cap	1
N/S	262645	Kohler Gas Engine	1

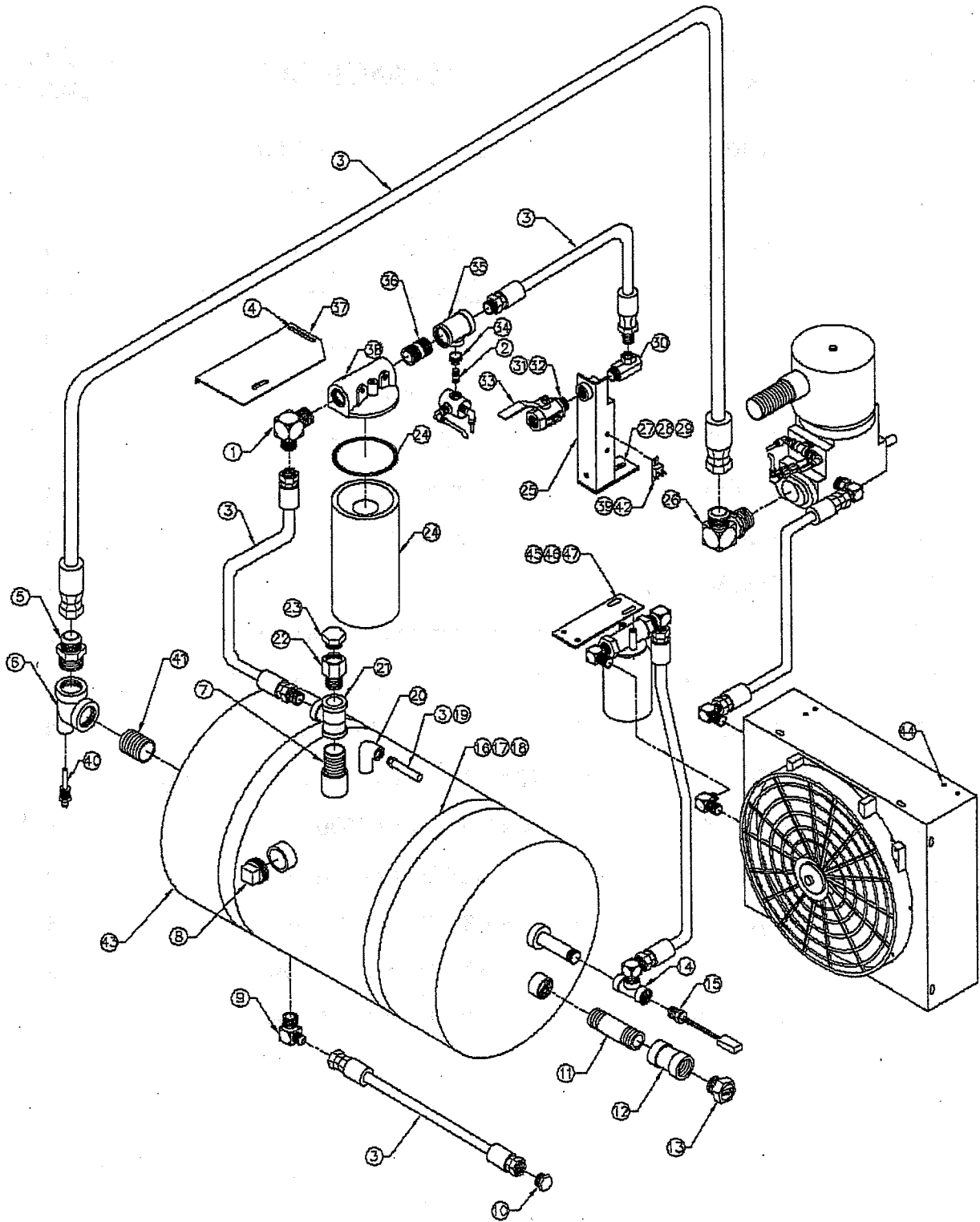
OIL COOLING



7.6 OIL COOLING SYSTEM

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	260403-112	1/2 JIC x 5/8 SAE Elbow	1
2	261990	Oil Filter Head	1
3	261991	Oil Filter Element	1
4	262105	Fan and Motor Mounting Clips	6
5	262274	Oil Cooler	1
6	262311	Cooler Shroud	1
7	262597	Oil Filter Plate	1
8	262634	Cooler Support Angle	1
9	263744	Fan And Motor Assembly	1
9a	263758	Fan Motor	1
10	825504-145	1/4-20 Hex Plated Locking Nut	2
11	829705-075	5/16-18 x 3/4 Serrated Washer Screw	2
12	263872	Viper Hose Kit	3
13	829705-100	5/16-18 x 1 Hex Serrated Washer Screw	7
14	834204-075	1/4 x 3/4 Hex Self Thread Screw	6
15	825305-283	5/16 Hex Flange Nut	4
16	829705-075	5/16-18 x 3/4 Serrated Washer Screw	6
17	860208-050	1/2 JIC x 1/2 Elbow	2
18	860208-075	1/2 JIC X 3/4 Elbow	2

DISCHARGE SYSTEM

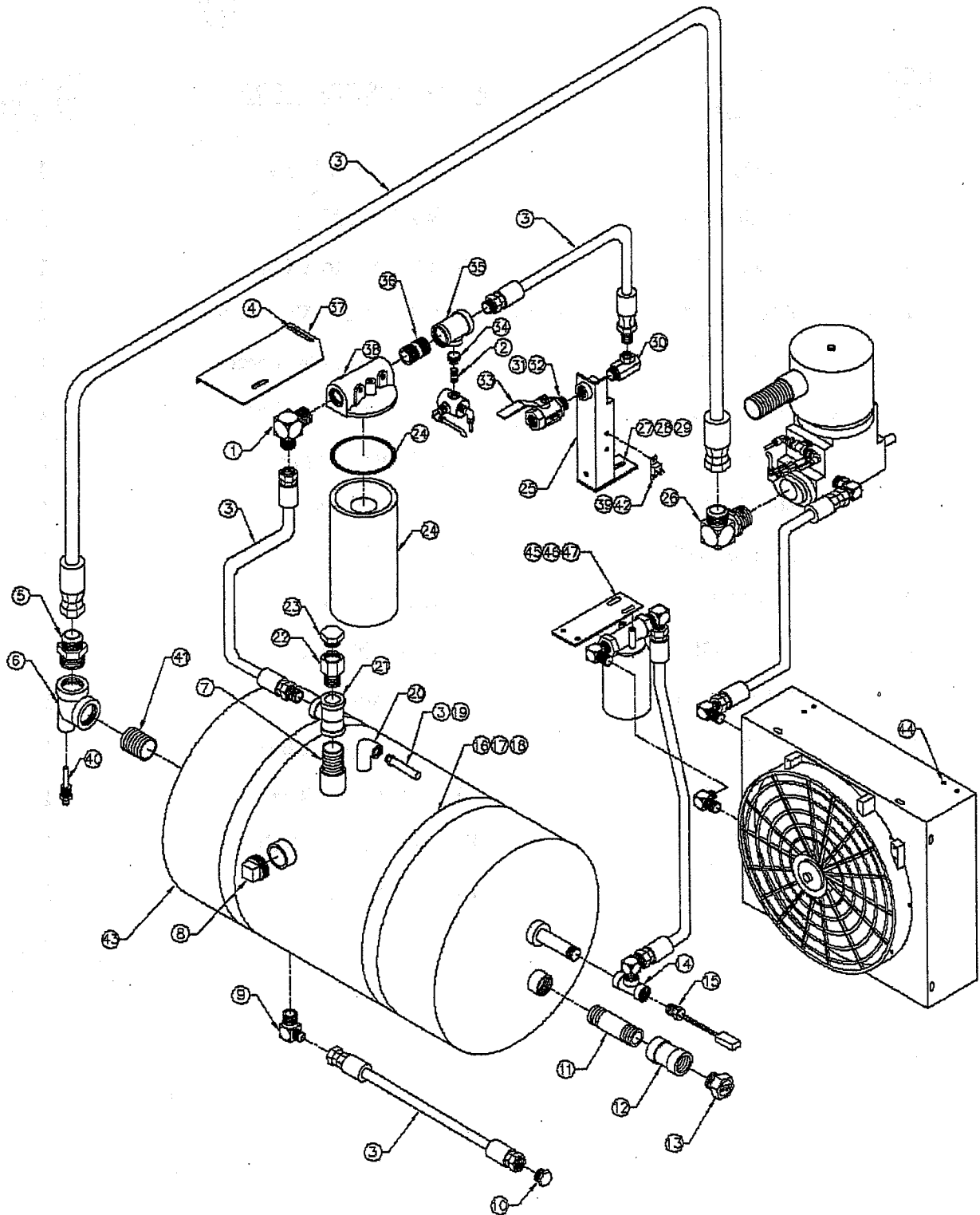


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7.8 Discharge System

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	860216-075	1 JIC x 3/4 Elbow	1
2	802904-033	1/4 x 1 1/2 Nipple	1
3	263872	Gas Viper Hose Kit	1
4	829705-075	5/16-18 x 3/4 Serrated Washer Screw	2
5	860124-125	1 1/4 JIC X 1 1/2 Connector	1
6	802906-026	1 1/2 x 1/2 x 1 1/2 Tee	1
7	822216-000	1" Close Nipple	1
8	807800-060	1 1/2 Plug	1
9	860208-075	1/2 JIC x 3/4 Elbow	1
10	263293	1/2 NPT Plug	1
11	823116-000	1" x 6 Nipple	1
12	801215-040	1" Coupling	1
13	041327	Oil Level Sight Glass	1
14	802903-022	3/4 x 1/2 x 1/2 Tee	1
15	260230	Temperature Switch	1
16	262600	10" Mounting Band	2

DISCHARGE SYSTEM

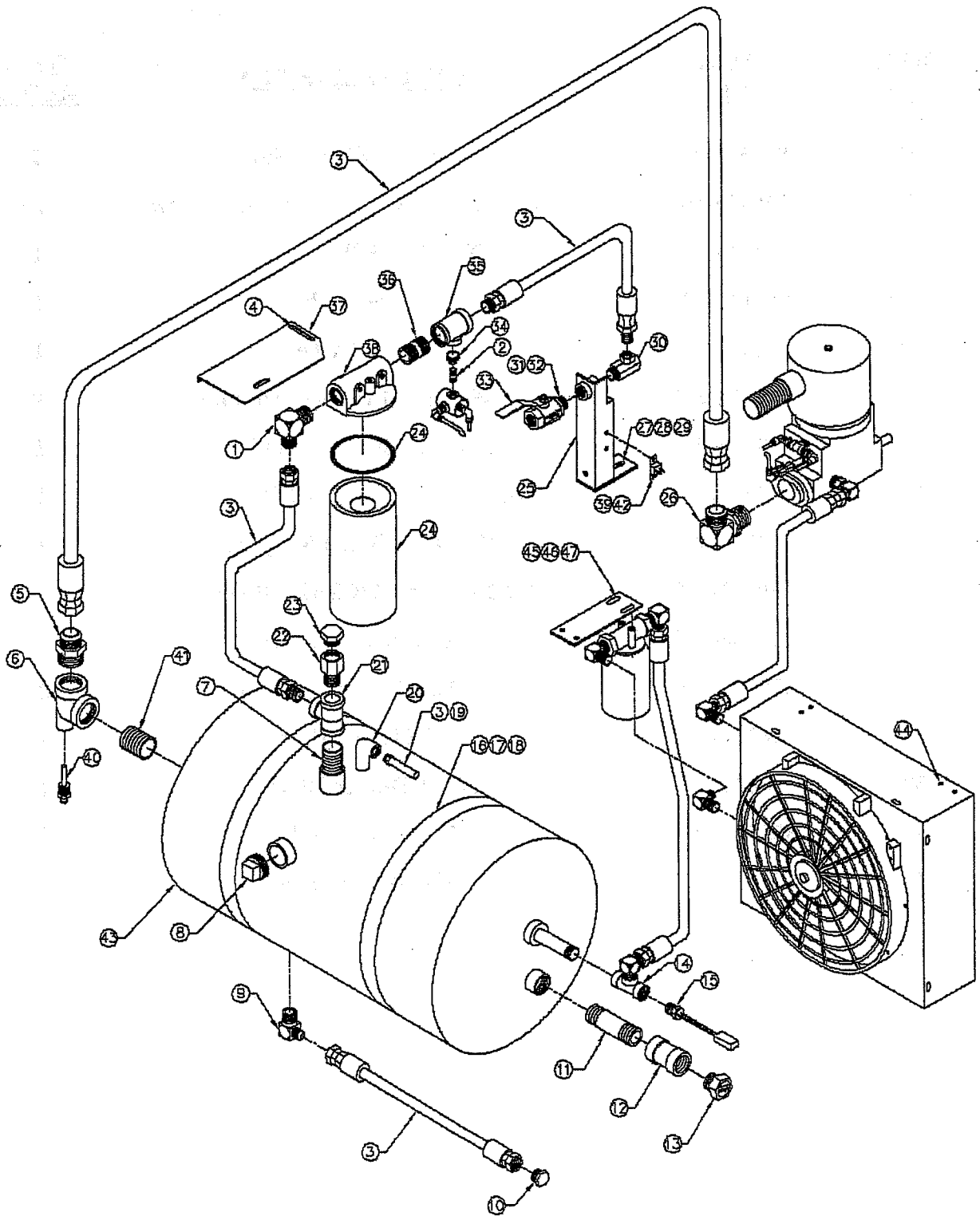


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7.10 Discharge System Continued

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
17	825305-283	5/16 Hex Flange Nut	2
18	829705-150	5/16-18 x 1 1/2 Serrated Washer Screw	2
19	262008	1/2 NPT 175 PSI Relief Valve	1
20	801115-020	1/2 Street Elbow	1
21	802904-043	1 x 1 x 3/4 Tee	1
22	250028-663	1" MPT x 1 5/16 SAE Adapter	1
23	048063	1 5/16 Oil Fill Cap With Vent	1
24	262715	Spin - On Separator Element	1
25	262637	Discharge Outlet Support	1
26	260403-110	1 1/4 Jic x 1 1/4 SAE Elbow	1
27	825506-198	3/8-16 Hex Locking Nut	4
28	829506-100	3/8-16 x 1 Carriage Bolt	2
29	838206-071	3/8 Flat Washer	4
30	048429	3/4 90 Degree Elbow	1
31	822212-000	3/4 Close Nipple	1
32	801115-030	3/4 Street Elbow	1

DISCHARGE SYSTEM

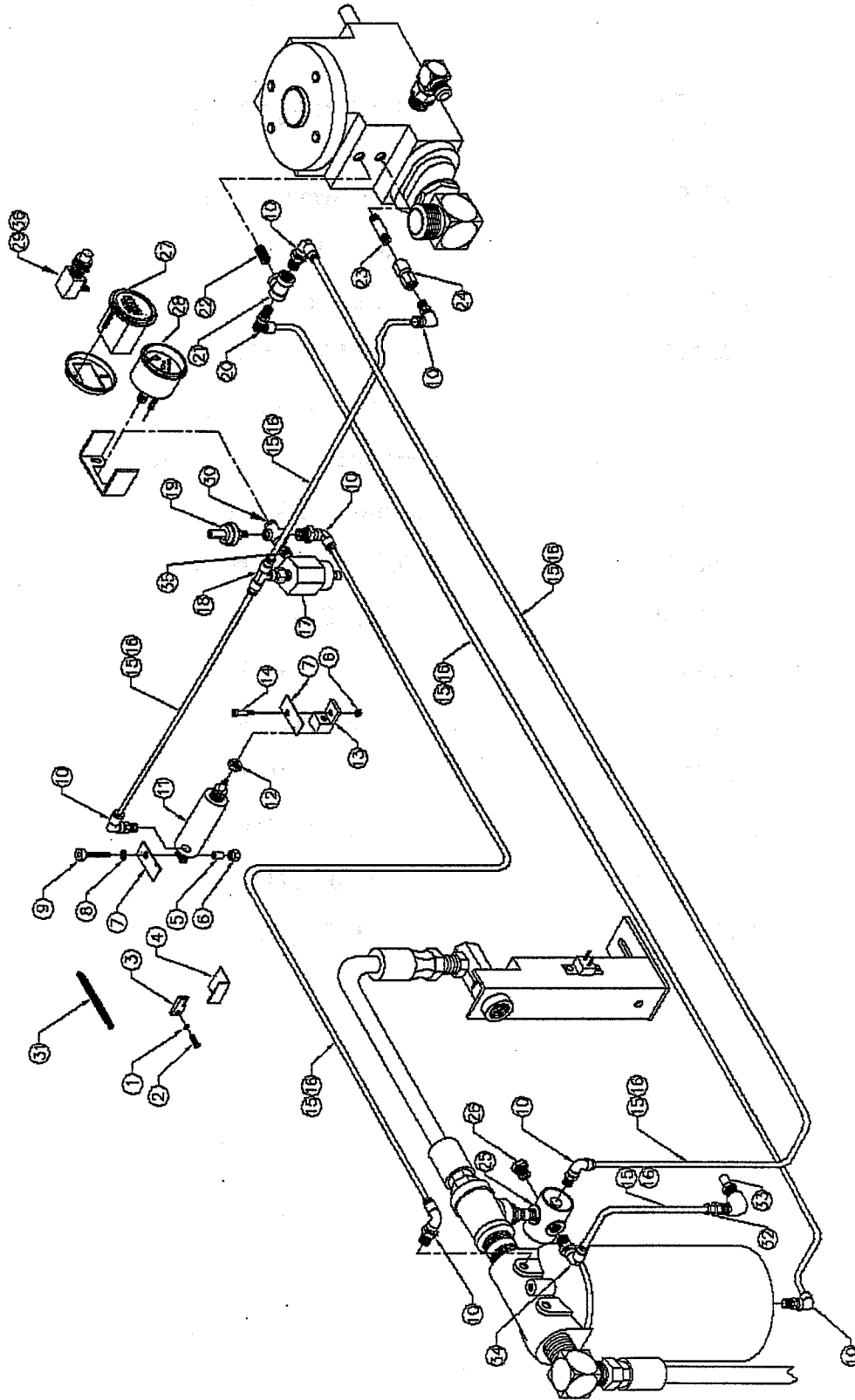


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7.12 Discharge System Continued

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
33	261982	3/4 Service Valve	1
34	804103-020	3/4 x 1/2 Bushing	1
35	802904-033	1 x 3/4 x 3/4 Tee	1
36	262912	60/70/80 CFM Orifice	1
37	262598	Separator Mounting Angle	1
38	262714	Separator Element Head	1
39	260034	Circuit Breaker 20 Amp	1
40	046048	N.O. Temperature Switch	1
41	822224-000	1 1/2 Close Nipple	1
42	263273	#8-32 x 1/2 Truss Head Screw	2
43	262288	Receiver Tank	1
44	829705-075	5/16-18 x 3/4 Screw	2
45	838504-062	1/4 Lock Washer	2
46	829104-075	1/4-20 x 3/4 Screw	2
47	838204-071	1/4 Flat Washer	2

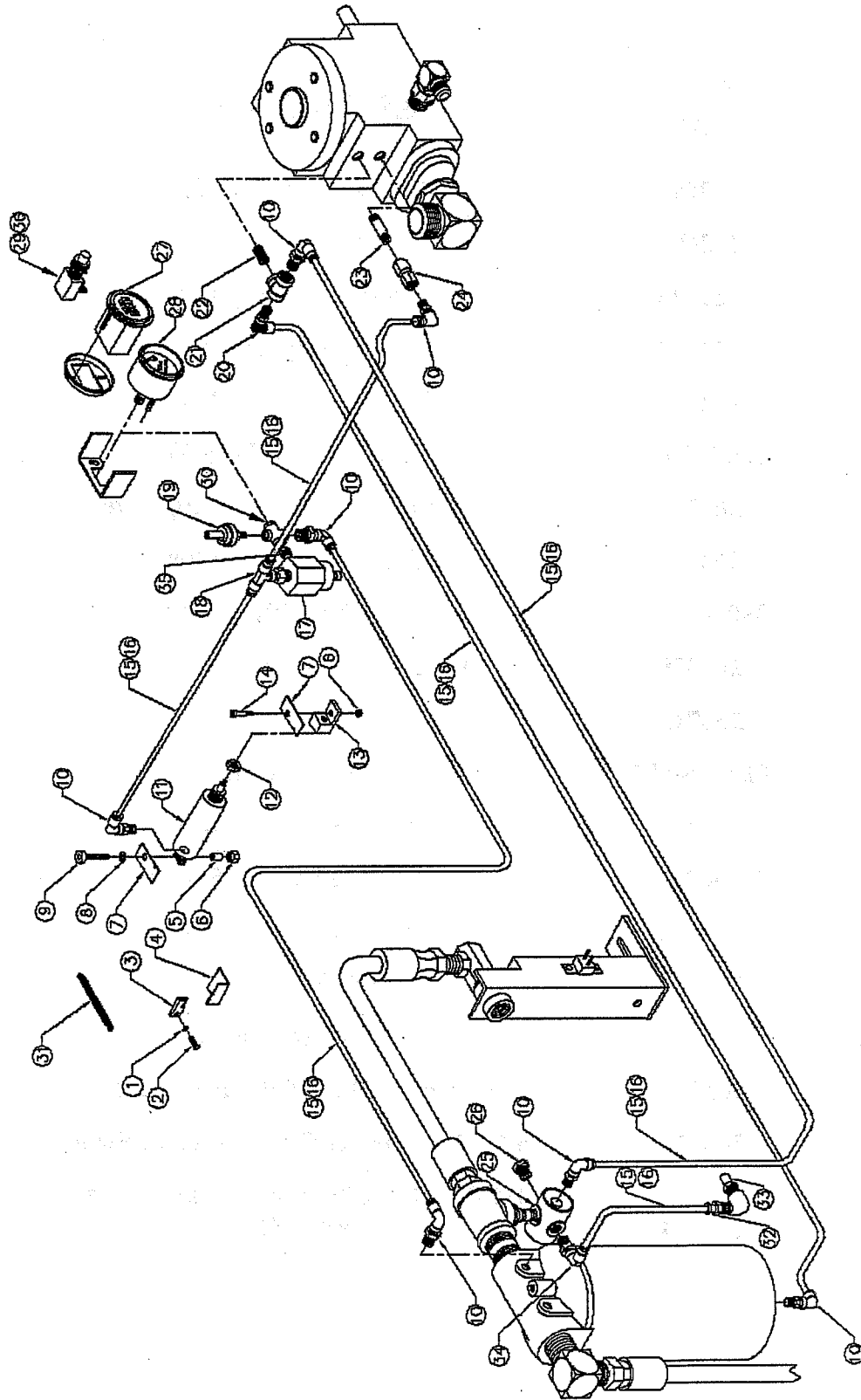
CONTROL SYSTEMS AND INSTRUMENTS



7.14 CONTROL SYSTEM AND INSTRUMENTS

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	263696	M4 - .7 x 30mm Hex Screw	1
2	263697	M4 - .7 Nut	1
3	262838	Engine Idle Support	1
4	262837	Idle Stop Angle	1
5	262760	5/16 O.D. Spacer Tube	2
6	825502-083	#10-24 Hex Locking Nut	2
7	262717	Cylinder Spring Mounting Plate	1
8	262704	1/4 Flat Nylon Washer	2
9	830504-100	1/4 x 1 Shoulder Screw	1
10	261309	1/4 T x 1/8 P Push-On Elbow	6
11	262712	Engine Air Cylinder	1
12	824605-195	5/16 Jam Nut	1
13	262711	Engine Control Clevis	1
14	830504-075	1/4 x 3/4 Shoulder Screw	1
15	261322	1/4 Push - On Tubing	1
16	261410	3/8 Flex Loom	1
17	262047	Regulator Valve	1
18	261313	M Branch 1/4 x 1/4 P Push - On Tee	1
19	262450	25 P.S.I. Normally Open Pressure Switch	1
20	264104	1/4 T x 1/8 P Elbow With Check Valve and Orifice	1

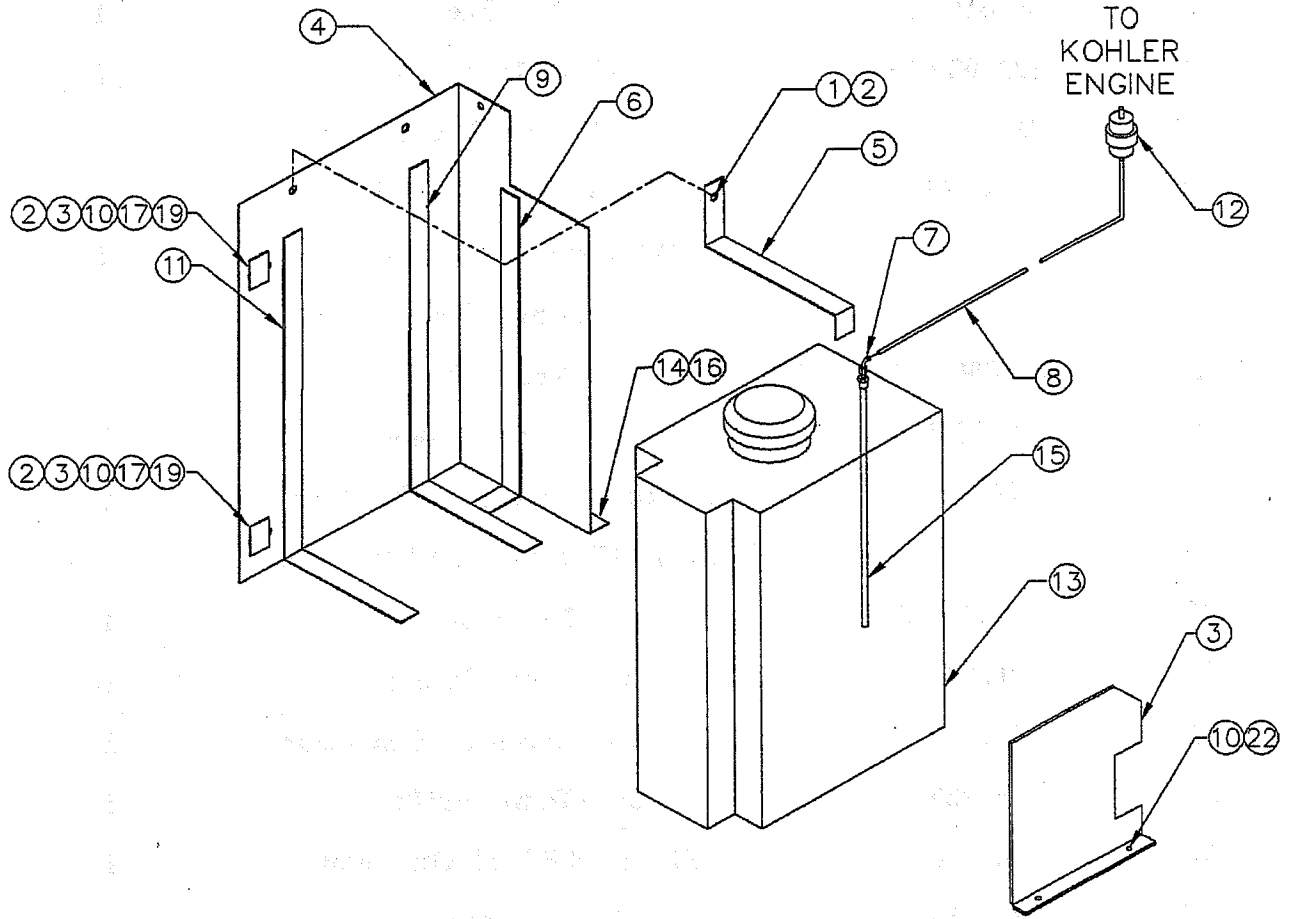
CONTROL SYSTEMS AND INSTRUMENTS



7.16 CONTROL SYSTEM AND INSTRUMENTATION

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
21	804415-005	1/8" Tee	1
22	823102-015	1/8 x 1 1/2 Nipple	1
23	822202-000	1/8" Close Nipple	1
24	264103	1/8 Female Pipe Check Valve	1
25	262254	1/4" Normally Open 3-Way Pneumatic Valve	1
26	807800-010	1/4 Pipe Plug	1
27	040035	Hour Meter Gauge	1
28	261974	Air Pressure Gauge with Switch	1
29	262653	Normally Closed Pushbutton Switch	1
30	801315-005	1/8 Cross	1
31	262713	3" Control Spring	1
32	261317	1/4 T x 1/4 P Push- On Connector	1
33	261223	Blow Down Muffler	1
34	261310	1/4 T x 1/4 P Push-On Elbow	1
N/S	262810	Wiring Harness	1
N/S	261546	Hose Support Clamps (With Lifting Bail)	2
N/S	261546	Hose Support Clamps (Without Lifting Bail)	4
35	861604-012	1/4 x 1/8 Hex Nipple	1
36	263965	5/8-32 Brass Nut	1

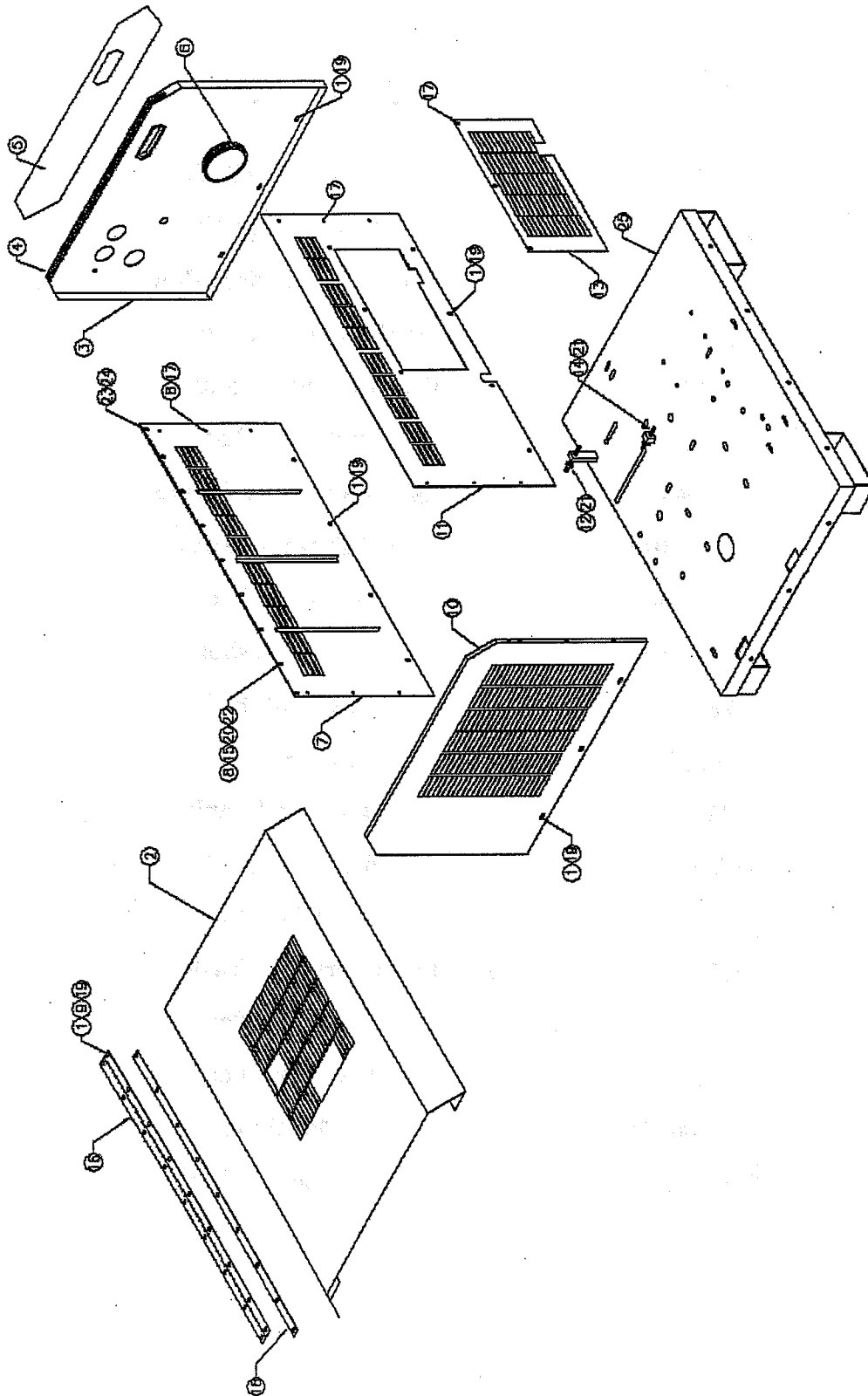
FUEL SYSTEM



7.18 FUEL SYSTEM

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	829705-075	5/16-18 x 3/4 HHCS	1
2	825305-283	5/16-18 Flange Nut	1
3	829505-075	5/16 x 3/4 Carriage Bolt	2
4	262694	Fuel Tank Baffle Panel	1
5	262782	Fuel Tank Strap Support	1
6	262709	Fuel Tank Pad	1
7	260864	3/16 - 5/16 Hose Clamp	2
8	842315-025	1/4" Fuel Line Hose	1
9	262709	Fuel Tank Pad	1
10	838204-071	1/4 Flat Washer	4
11	262709	Fuel Tank Pad	1
12	262724	Fuel Filter	1
13	262609	Plastic Fuel Tank	1
14	825505-166	5/16-18 Locking Nut	2
15	263291	Fuel Line Tube	1
16	829705-100	5/16-18 x 1 Serrated Washer Screw	2
17	262709	Fuel Tank Pad	1
18	262709	Fuel Tank Pad	1
19	838204-071	1/4 Flat Washer	2
20	838205-071	5/16 Flat Washer	2

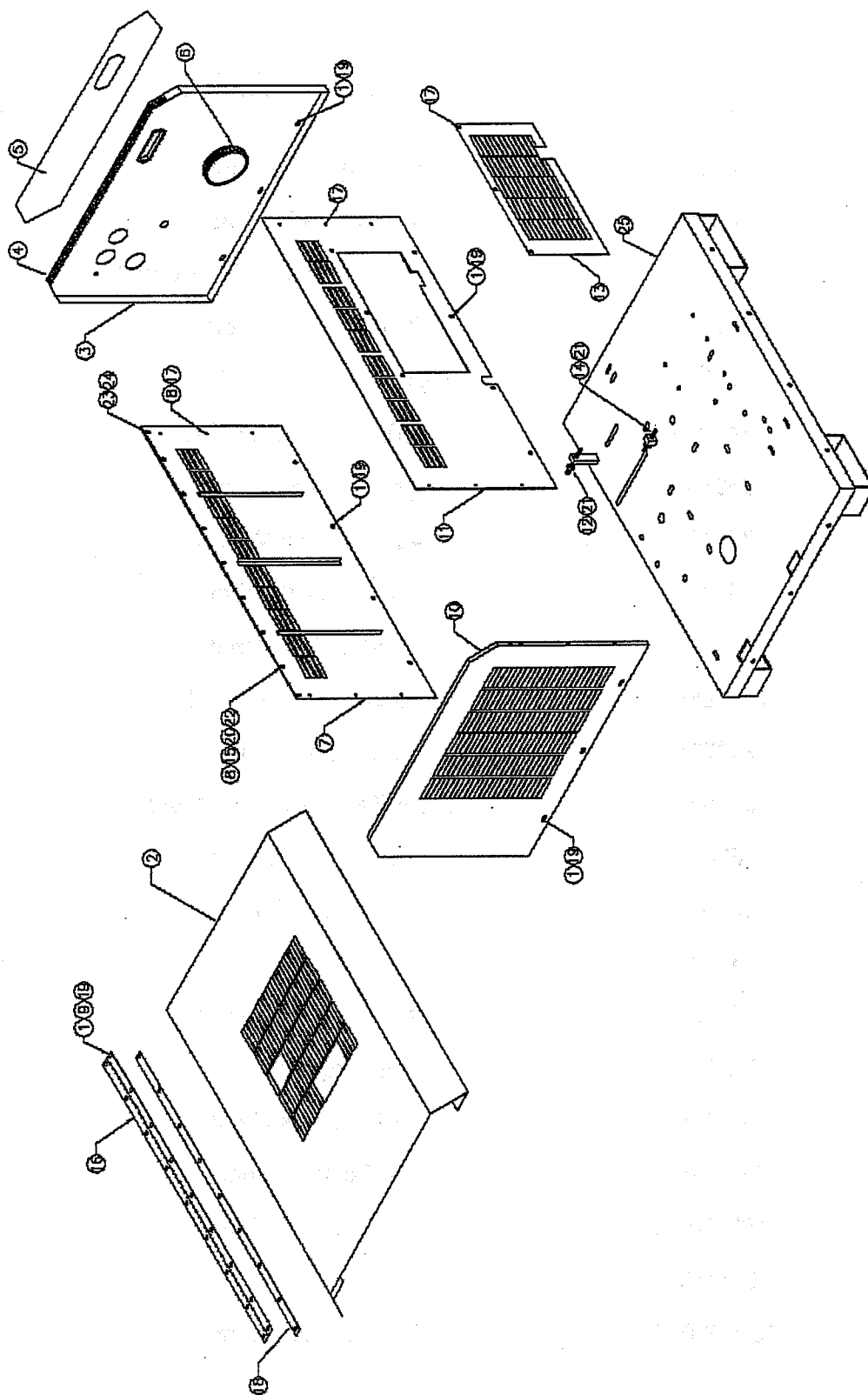
SHEET METAL



7.20 SHEET METAL AND FRAME ASSEMBLY

REF. NO.	PART NO.	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	262943	5/16 Nylon Washer	21
2	262681	Roof Assembly Panel	1
3	262678	Instrument/Discharge End Panel	1
4	261228	Trim Lock Edging	1
5	262716	Instrument Panel Decal	1
6	262785	Rubber Air Inlet Seal	1
7	262648	Right Hand Side Panel	1
8	262704	1/4 Flat Nylon Washer	7
9	262950	5/16 Lock Washer	7
10	262679	Cooler End Panel	1
11	262680	Left Hand Side Panel	1
12	263274	1/2-13 x 2 Bolt	1
13	262689	Engine/Battery Cover Panel	1
14	262814	1/2-13 x 3-1/2 Bolt	1
15	262952	1/4-20 Nut	7
16	262688	Hinge	1
17	262703	#14 Truss Head Screw	15
18	262795	Hinge Support Plate	1
19	262945	5/16-18 x 3/4 Truss Head Screw	14
20	262951	1/4 Lock Washer	7
21	825208-448	1/2-13 Locking Nut	2
22	262953	1/4-20 Nut	7
23	829705-050	5/16-18 x 1/2 Screw	2

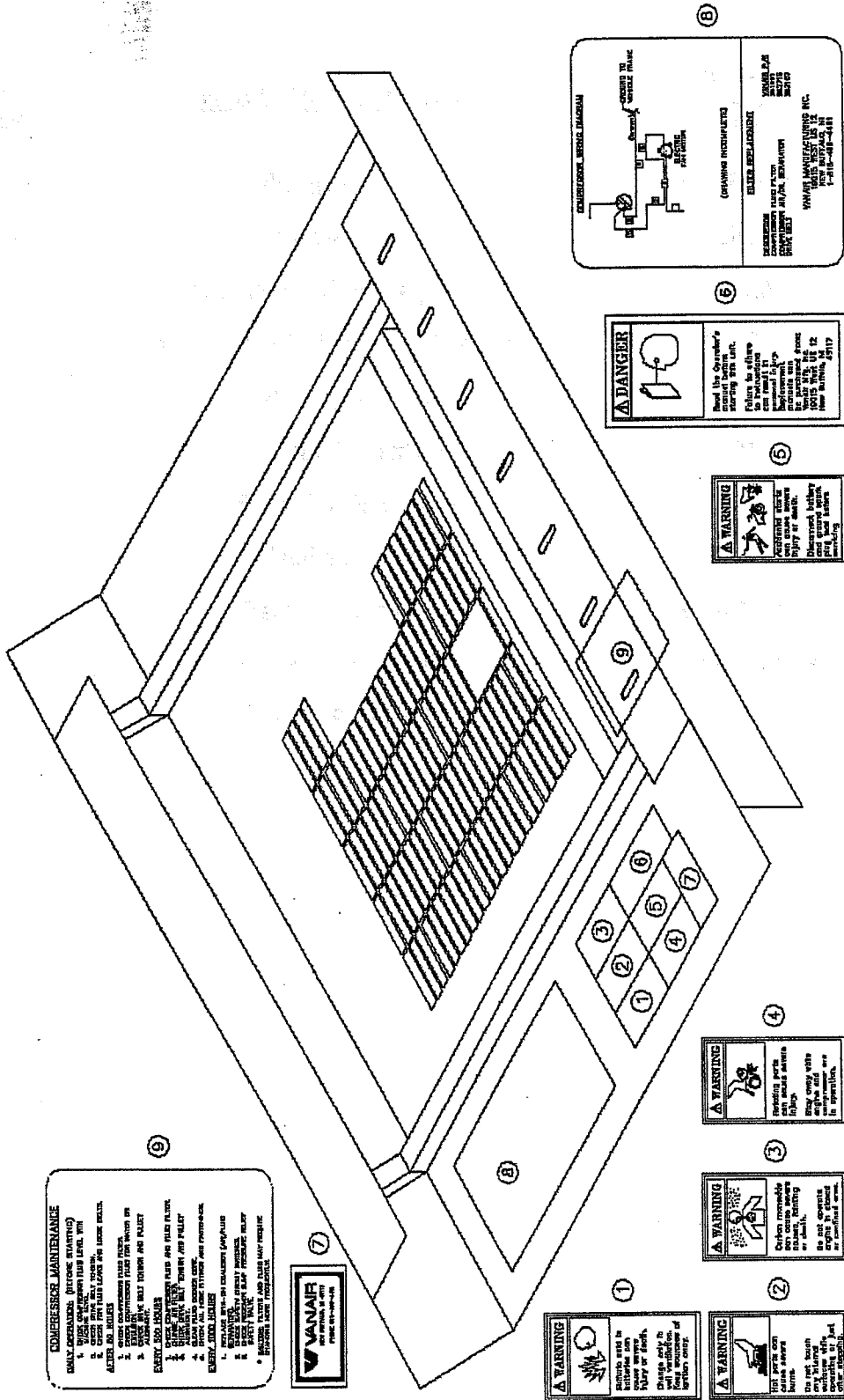
SHEET METAL



7.22 SHEET METAL AND FRAME ASSEMBLY

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
24	825305-283	5/16 Flange Nut	2
25	262633	Viper Frame	1
N/S	262997	Canopy Cable Assembly	1
N/S	263270	Right Hand Angle Keep Latch	1
N/S	262783	Roof Support Rod	1
N/S	263610	3/16 Push-On Retainer	1
N/S	263611	3/16 x 1 1/2 Clevis Pin	1
N/S	264138	Rubber Seal	1
N/S	829107-075	7/16-14 x 3/4 HHCS	1
N/S	838507-140	7/16 Lock Washer	1
N/S	263270	Latch, Rubber	2

DECAL LOCATION



COMPRESSOR MAINTENANCE
 ALWAYS USE THE FOLLOWING SAFETY PRECAUTIONS:
 1. ALWAYS DISCONNECT THE UNIT FROM THE MAIN POWER SUPPLY.
 2. ALWAYS LOCK THE MAIN POWER SUPPLY.
 3. ALWAYS LOCK THE MAIN POWER SUPPLY AND THE UNIT.
 4. ALWAYS LOCK THE MAIN POWER SUPPLY AND THE UNIT.
EVERY 3000 HOURS
 1. CHECK THE OIL LEVEL.
 2. CHECK THE OIL PRESSURE.
 3. CHECK THE OIL TEMPERATURE.
 4. CHECK THE OIL CLEANLINESS.
EVERY 6000 HOURS
 1. CHECK THE OIL LEVEL.
 2. CHECK THE OIL PRESSURE.
 3. CHECK THE OIL TEMPERATURE.
 4. CHECK THE OIL CLEANLINESS.
 * ALWAYS USE THE FOLLOWING SAFETY PRECAUTIONS:
 * ALWAYS LOCK THE MAIN POWER SUPPLY.



WARNING
 High pressure
 inside the unit
 can cause
 injury or death.
 Check with
 the manufacturer
 for the correct
 pressure rating.

WARNING
 Do not touch
 the fan blades
 while the unit
 is running.
 Injury or death
 may result.

WARNING
 Carbon monoxide
 is a colorless,
 odorless gas
 that can cause
 injury or death.
 Do not operate
 the unit in
 enclosed spaces
 or near
 flammable
 materials.

WARNING
 Sharp edges
 can cause
 injury or death.
 Handle with
 care.

WARNING
 Moving parts
 can cause
 injury or death.
 Do not touch
 the fan blades
 while the unit
 is running.

WARNING
 Electrical safety
 Do not touch
 the electrical
 components
 while the unit
 is running.
 Injury or death
 may result.

DANGER
 Read the Operator's
 manual before
 starting the unit.
 Failure to follow
 the instructions
 can result in
 injury or death.
 Do not touch
 the fan blades
 while the unit
 is running.
 Injury or death
 may result.

WARNING
 Do not touch
 the fan blades
 while the unit
 is running.
 Injury or death
 may result.

COMPRESSOR MAINTENANCE
 ALWAYS USE THE FOLLOWING SAFETY PRECAUTIONS:
 1. ALWAYS DISCONNECT THE UNIT FROM THE MAIN POWER SUPPLY.
 2. ALWAYS LOCK THE MAIN POWER SUPPLY.
 3. ALWAYS LOCK THE MAIN POWER SUPPLY AND THE UNIT.
 4. ALWAYS LOCK THE MAIN POWER SUPPLY AND THE UNIT.
EVERY 3000 HOURS
 1. CHECK THE OIL LEVEL.
 2. CHECK THE OIL PRESSURE.
 3. CHECK THE OIL TEMPERATURE.
 4. CHECK THE OIL CLEANLINESS.
EVERY 6000 HOURS
 1. CHECK THE OIL LEVEL.
 2. CHECK THE OIL PRESSURE.
 3. CHECK THE OIL TEMPERATURE.
 4. CHECK THE OIL CLEANLINESS.
 * ALWAYS USE THE FOLLOWING SAFETY PRECAUTIONS:
 * ALWAYS LOCK THE MAIN POWER SUPPLY.

VANAIF MANUFACTURING INC.
 1000 W. 10th St.
 Waukegan, IL 60087
 Phone: 815-491-4411

7.24 DECAL LOCATION

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	264375	Decal, Sulfuric Acid	1
2	264372	Decal, Hot Parts	1
3	264376	Decal, Carbon Monoxide	1
4	264374	Decal, Rotating Parts	1
5	264373	Decal, Accidental Starts	1
6	264382	Decal, Read Operator's Manual	1
7	NPN	Decal, Vanair	1
8	NPN	Decal, Compressor Wiring	1
9	NPN	Decal, Compressor Maintenance	1

NPN No Part Number

7.26 DECAL LOCATION CONTINUED

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	264377	Decal, Explosive Fuel	1
2	NPN	Decal, Gasoline Only	1
3	NPN	Decal, Insert Forks Here	4
4	NPN	Decal, VANAIR Viper Logo	1
5	NPN	Decal, VANAIR Viper Logo	1
6	NPN	Decal, Compressor Fluid Drain	1
7	NPN	Decal, Engine Oil Drain	1

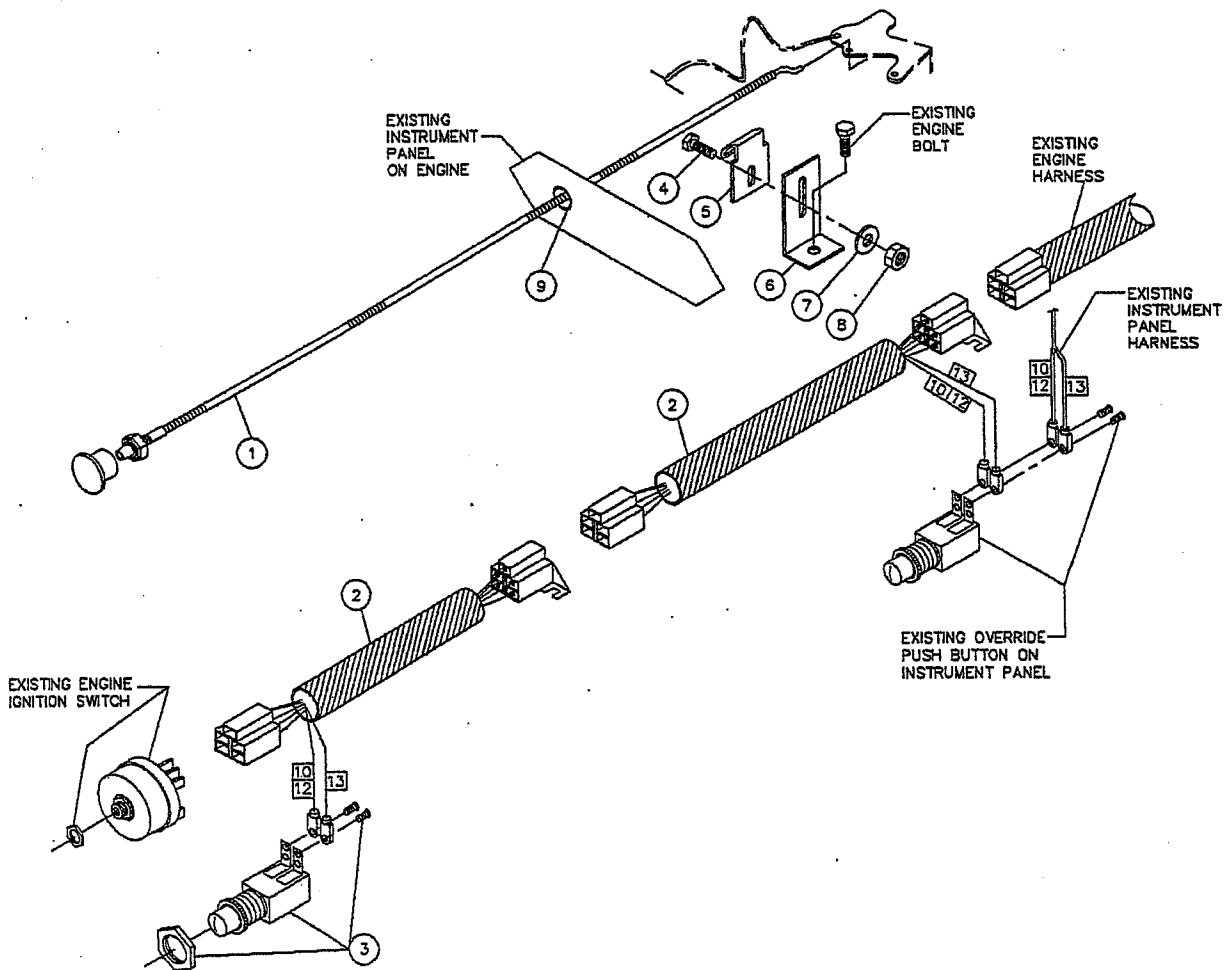
NPN No Part Number

7.28 DECAL LOCATION CONTINUED

<u>REF. NO.</u>	<u>PART NO.</u>	<u>PART DESCRIPTION</u>	<u>QTY. REQ'D</u>
1	264378	Decal, Do Not Remove Caps	1
2	NPN	Decal, Compressor Oil	1
3	264379	Decal, Do Not Use Air	1
4	264381	Decal, Connect Air Hoses	1

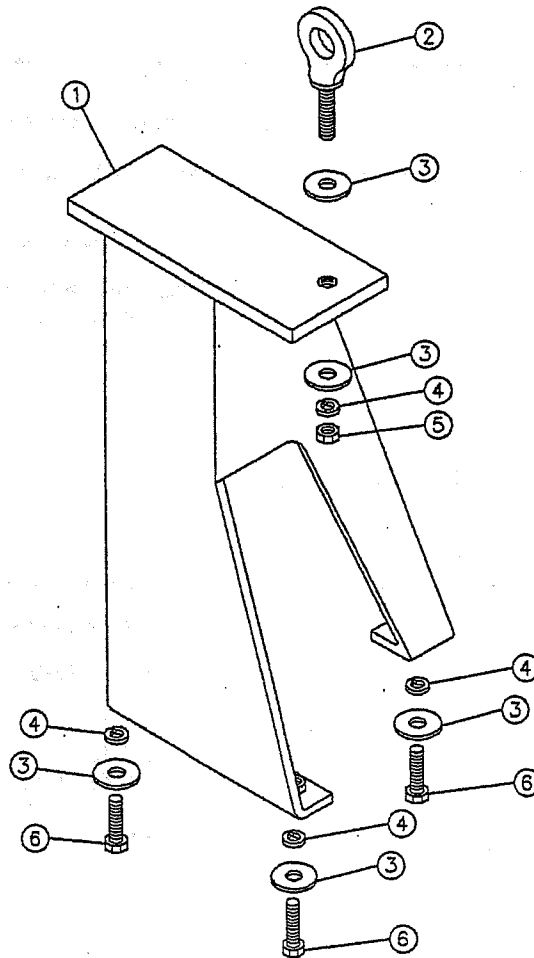
Remote Starting Option: (Ref. ID 263059)

<u>Ref. No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Qty.</u>
1	Cable, Engine Choke.	263054	1
2	Harness, Engine	263058	2
3	Switch, Push-Button	262653	1
4	Screw, Pan Hd. #8-32 x 1/2	831601-050	15
5	Clamp, Conduit	263101	1
6	Angle, Choke Cable	263100	1
7	Washer, Flat	263102	1
8	Nut, Hex Hd. #8-32	825201-130	1
9	Grommet, Rubber	263103	1



8.3 Lifting Bail Option (Ref. Id 264809).

<u>Ref.</u>	<u>Description</u>	<u>Part No.</u>	<u>Qty</u>
1	Bail, Lifting Assy	264683	1
2	Bolt, Eye Lifting	262700	1
3	Washer, Flat ½	838208-112	5
4	Washer, Lock ½	835808-125	4
5	Nut, Hex Locking ½ - 13	825508-262	1
6	Capscrew, Hex Hd GR8 ½ - 13 x 2	829408-200	3





CITGO TRANSGARD® ATF, Dexron III®/Mercon®

Material Safety Data Sheet

CITGO Petroleum Corporation
P.O. Box 3758
Tulsa, OK 74102-3758

MSDS No. 633123001

Revision Date 05/22/2001

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Emergency Overview

Physical State Liquid.
Color Red. Odor Mild petroleum odor

WARNING:

Oil injected into the skin from high-pressure leaks in hydraulic systems can cause severe injury.
Most damage occurs during the first few hours.
Seek Medical Attention Immediately.
Surgical removal of oil may be necessary.
Can cause mild skin irritation and inflammation with prolonged or repeated contact.
Spills may create a slipping hazard.

Hazard Rankings

	HMIS	NFPA
Health Hazard	0	0
Fire Hazard	1	1
Reactivity	0	0

* = Chronic Health Hazard

Protective Equipment

Minimum Requirements
See Section 8 for Details



SECTION 1: IDENTIFICATION

Trade Name	CITGO TRANSGARD® ATF, Dexron III®/Mercon®	Technical Contact	(918) 495-5933
Product Number	633123001	Medical Emergency	(918) 495-4700
CAS Number	Mixture.	CHEMTREC Emergency (United States Only)	(800) 424-9300
Product Family	Automatic Transmission Fluid		
Synonyms	Automatic Transmission Fluid; Former ILS Code: 33123; CITGO SAP Product Code No.: 633123001		

SECTION 2: COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
1) Highly-Refined Petroleum Lubricant Oils	64741-76-0; 64741-88-4; 64741-89-5; 64742-54-7; 64742-55-8; 64742-65-0	90 - 100
2) Proprietary Ingredients	Proprietary Mixture	0 - 10

SECTION 3: HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact.

Signs and Symptoms of Acute Exposure

- Inhalation** No significant adverse health effects are expected to occur upon short-term exposure to this product. Aspiration of liquid into the lungs can cause severe lung damage or death.
- Eye Contact** This product can cause transient mild eye irritation with short-term contact with liquid sprays or mists.
- Skin Contact** This material can cause mild skin irritation from prolonged or repeated skin contact. Injection under the skin, in muscle, or into the blood stream can cause irritation, inflammation, swelling, fever, and systemic effects and mild central nervous system depression. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage. Initial symptoms may be minor. Injection of petroleum hydrocarbons requires immediate medical attention.
- Ingestion** If swallowed, no significant adverse health effects are anticipated. Ingestion can cause a laxative effect. If aspirated into the lungs, liquid can cause severe lung damage or death.
- Chronic Health Effects Summary** Contains a petroleum-based mineral oil. Prolonged or repeated skin contact can cause mild irritation and inflammation characterized by drying, cracking, (dermatitis) or oil acne. Repeated or prolonged inhalation of petroleum-based mineral oil mists at concentrations above applicable workplace exposure levels can cause respiratory irritation or other pulmonary effects.
- Conditions Aggravated by Exposure** Personnel with pre-existing skin disorders should avoid repeated or prolonged contact with this product.
- Target Organs** May cause damage to the following organs: skin.
- Carcinogenic Potential** This product does not contain any components at concentrations above 0.1% which are considered carcinogenic by OSHA, IARC or NTP.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	<input type="checkbox"/>	Toxic	<input type="checkbox"/>	Combustible	<input type="checkbox"/>	Explosive	<input type="checkbox"/>	Pyrophoric	<input type="checkbox"/>
Sensitizer	<input type="checkbox"/>	Highly Toxic	<input type="checkbox"/>	Flammable	<input type="checkbox"/>	Oxidizer	<input type="checkbox"/>	Water-reactive	<input type="checkbox"/>
Corrosive	<input type="checkbox"/>	Carcinogenic	<input type="checkbox"/>	Compressed Gas	<input type="checkbox"/>	Organic Peroxide	<input type="checkbox"/>	Unstable	<input type="checkbox"/>

SECTION 4: FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

- Inhalation** Vaporization is not expected at ambient temperatures. This material is not expected to cause inhalation-related disorders under anticipated conditions of use. In case of overexposure, move the person to fresh air.
- Eye Contact** Check for and remove contact lenses. Flush eyes with cool, clean, low-pressure water while occasionally lifting and lowering eyelids. Seek medical attention if excessive tearing, redness, or pain persists.
- Skin Contact** Remove contaminated shoes and clothing. Wipe off excess material. Wash exposed skin with soap and water. Seek medical attention if tissue appears damaged or if irritation persists. Thoroughly clean contaminated clothing before reuse. Discard contaminated leather goods. If material is injected under the skin, into muscle, or into the bloodstream, seek medical attention immediately.

Ingestion Do not induce vomiting unless directed to by a physician. Do not give anything to drink unless directed to by a physician. Never give anything by mouth to a person who is not fully conscious. Seek medical attention immediately.

Notes to Physician The viscosity of the product represented by this MSDS is 100 to 400 SUS at 100° F. Accordingly, upon ingestion there is a low to moderate risk of aspiration. Careful gastric lavage may be considered to evacuate large quantities of material. In the event of injection in underlying tissue, immediate treatment should include extensive incision, debridement and saline irrigation. Inadequate treatment can result in ischemia and gangrene. Early symptoms may be minimal.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Flammability Classification NFPA Class-III B combustible material. Slightly combustible

Flash Point Method CLOSED CUP: 171°C (340°F). (Pensky-Martens (ASTM D-93).) OPEN CUP: 199°C (390°F) (Cleveland.)

Lower Flammable Limit No data. **Upper Flammable Limit** No data.

Autoignition Temperature Not available.

Hazardous Combustion Products Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and trace oxides of sulfur and/or nitrogen.

Special Properties This material can burn but will not readily ignite. This material will release vapors when heated above the flash point temperature that can ignite when exposed to a source of ignition. In enclosed spaces, heated vapor can ignite with explosive force. Mists or sprays may burn at temperatures below the flash point.

Extinguishing Media Use dry chemical, foam, Carbon Dioxide or water fog.

Fire Fighting Protective Clothing Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Do not touch damaged containers or spilled material unless wearing appropriate protective equipment. Slipping hazard; do not walk through spilled material. Stop leak if you can do so without risk. For small spills, absorb or cover with dry earth, sand, or other inert non-combustible absorbent material and place into waste containers for later disposal. Contain large spills to maximize product recovery or disposal. Prevent entry into waterways or sewers. In urban area, cleanup spill as soon as possible. In natural environments, seek cleanup advice from specialists to minimize physical habitat damage. This material will float on water. Absorbent pads and similar materials can be used. Comply with all laws and regulations.

SECTION 7: HANDLING AND STORAGE

Handling Avoid water contamination and extreme temperatures to minimize product degradation. Empty containers may contain product residues that can ignite with explosive force. Do not pressurize, cut, weld, braze solder, drill, grind or expose containers to flames, sparks, heat or other potential ignition sources. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers and/or waste residues of this product.

Storage Keep container closed. Do not store with strong oxidizing agents. Do not store at temperatures above 120° F or in direct sunlight for extended periods of time. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

- Engineering Controls** Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of mists and/or vapors below the recommended exposure limits (see below). An eye wash station and safety shower should be located near the work-station.
- Personal Protective Equipment** Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.



- Eye Protection** Safety glasses equipped with side shields should be adequate protection under most conditions of use. Wear goggles and/or face shield if splashing or spraying is anticipated. Wear goggles and face shield if material is heated above 125°F (51°C). Have suitable eye wash water available.
- Hand Protection** No special skin protection other than good personal hygiene practice is recommended under anticipated conditions of use. However, when prolonged or extensive contact is possible, use of disposable PCV or nitrile gloves is recommended. Wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities, or leaving work.
- Body Protection** Use clean and impervious protective clothing (e.g., neoprene or Tyvek®) if splashing or spraying conditions are present. Protective clothing may include long-sleeve outer garment, apron, or lab coat. If significant contact occurs, remove oil-contaminated clothing as soon as possible and promptly shower. Launder contaminated before reuse or discard. Wear heat protective boots and protective clothing when handling material at elevated temperatures.
- Respiratory Protection** Vaporization or misting is not expected at ambient temperatures. Therefore, the need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefilter should be used. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).
- General Comments** Use good personal hygiene practices. Wash hands and other exposed skin areas with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities, or leaving work. DO NOT use gasoline, kerosene, solvents or harsh abrasives as skin cleaners. Since specific exposure standards/control limits have not been established for this product, the "Oil Mist, Mineral" exposure limits shown below are suggested as minimum control guidelines.

Occupational Exposure Guidelines

Substance	Applicable Workplace Exposure Levels
1) Oil Mist, Mineral	TWA: 5 STEL: 10 (mg/M ³) from ACGIH (TLV) TWA: 5 (mg/M ³) from OSHA (PEL) TWA: 5 STEL: 10 (mg/M ³) from NIOSH

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid.	Color	Red.	Odor	Mild petroleum odor
Specific Gravity	0.87 (Water = 1)	pH	Not Applicable.	Vapor Density	>1 (Air = 1)
Boiling Point/Range	Not available.			Melting/Freezing Point	Not available.
Vapor Pressure	<0.1 mm of Hg (@ 20°C)			Viscosity (cSt @ 40°C)	36
Solubility in Water	Insoluble in cold water.			Volatile Characteristics	Negligible volatility

Additional Properties API Gravity (ASTM D287) = 31.5 @ 60° F
 Density = 7.23 Lbs/gal.
 Viscosity (ASTM D2161) = AP 180 SUS @ 100° F

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability	Stable.	Hazardous Polymerization Not expected to occur.
Conditions to Avoid	Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.	
Materials Incompatibility	Strong oxidizers.	
Hazardous Decomposition Products	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.	

SECTION 11: TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data	Highly-Refined Petroleum Lubricant Oils: ORAL (LD50): Acute: >5000 mg/kg [Rat]. DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].
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Highly-Refined Petroleum Lubricant Oils:
 Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects. In long term studies (up to two years) no carcinogenic effects have been reported in any animal species tested.

SECTION 12: ECOLOGICAL INFORMATION

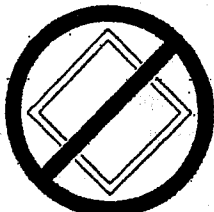
Ecotoxicity	Analysis for ecological effects has not been conducted on this product. However, if spilled, this product and any contaminated soil or water may be harmful to human, animal, and aquatic life. Also, the coating action associated with petroleum and petroleum products can be harmful or fatal to aquatic life and waterfowl.
Environmental Fate	An environmental fate analysis has not been conducted on this specific product. However, plants and animals may experience harmful or fatal effects when coated with petroleum-based products. Petroleum-based (mineral) lube oils will normally float on water. In stagnant or slow-flowing waterways, an oil layer can cover a large surface area. As a result, this oil layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway might be enough to cause a fish kill or create an anaerobic environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Conditions of use may cause this material to become a hazardous waste, as defined by Federal or State regulations. It is the responsibility of the user to determine if the material is a hazardous waste at the time of disposal. Transportation, treatment, storage and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14: TRANSPORT INFORMATION

DOT Status	Not a U.S. Department of Transportation regulated material.		
Proper Shipping Name	Not regulated.		
Hazard Class	Not regulated.	Packing Group(s)	Not regulated.
		UN/NA ID	Not applicable.
Reportable Quantity	A Reportable Quantity (RQ) has not been established for any components of this material.		
Placards		Emergency Response Guide No.	Not applicable.
		HAZMAT STCC No.	Not assigned.
		MARPOL III Status	Not a DOT "Marine Pollutant" per 49 CFR 171.8.

SECTION 15: REGULATORY INFORMATION

FSCA Inventory	This product and/or its components are listed on the Toxic Substance Control Act (TSCA) inventory.
SARA 302/304	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.
SARA 311/312	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: No SARA 311/312 hazard categories identified.
SARA 313	This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA: No components were identified.
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are: None identified
CWA	This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.
California Proposition 65	This product is not known to contain the any components for which the State of California has found to cause cancer, birth defects or other reproductive harm.
New Jersey Right-to-Know Label	Petroleum Oil (Automatic Transmission Fluid)
Additional Regulatory Remarks	No additional regulatory remarks.

SECTION 16: OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number 3.0
Revision Date 05/22/2001
Print Date Printed on 05/22/2001.

ABBREVIATIONS

AP = Approximately Established EQ = Equal > = Greater Than < = Less Than NA = Not Applicable ND = No Data NE = Not

ACGIH = American Conference of Governmental Industrial Hygienists AIHA = American Industrial Hygiene Association
IARC = International Agency for Research on Cancer NTP = National Toxicology Program
NIOSH = National Institute of Occupational Safety and Health OSHA = Occupational Safety and Health Administration
NPCA = National Paint and Coating Manufacturers Association HMIS = Hazardous Materials Information System
NFPA = National Fire Protection Association EPA = Environmental Protection Agency

DISCLAIMER OF LIABILITY

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***** END OF MSDS *****

Vanair Manufacturing, Incorporated
19015 U.S. Hwy 12
New Buffalo, MI 49117
Tel. 269 469 4461
Fax. 269 469 0497

Form Number: VT-25
POO220
Serial Number: 30- 64810

Viper Data & Test Report

Model: 70 C.F.M @ 100

Compressor Serial No. 00603009696

Receiver Serial No. 376463

Engine: Model: CH730-S Fuel Type GAS
Spec No.: CH730-0011 Cooling EIE
Serial Number: 3316305421

Drive Type: No. of Belts one No. of Grooves 3

TEST DATA:

Capacity: CFM 70 Pressure 100

Speeds:

Engine: Idle 2620 Full Load 3314

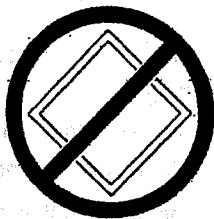
Compressor Idle 4406 Full Load 5514

CHECKS: Compressor Cooling ✓
Belt Tension & Alignment ✓
Gauges ✓
Oil Levels ✓
Starting ✓
Load/Unload ✓
Fit & Finish ✓

NOTES/SPECIAL FEATURES: LEFT BAP1

Assembled by: PENNY Date: 3-1-04
Tested by: M.R.C Date: 3-1-04

SECTION 14: TRANSPORT INFORMATION

DOT Status	Not a U.S. Department of Transportation regulated material.		
Proper Shipping Name	Not regulated.		
Hazard Class	Not regulated.	Packing Group(s)	Not regulated.
		UN/NA ID	Not applicable.
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Additional Regulatory Remarks	No additional regulatory remarks.

SECTION 16: OTHER INFORMATION

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***** END OF MSDS *****

Vanair Manufacturing, Incorporated
19015 U.S. Hwy 12
New Buffalo, MI 49117
Tel. 269 469 4461
Fax. 269 469 0497

Form Number: VT-25
POO220
Serial Number: 30- 64810

Viper Data & Test Report

Model: 70 C.F.M @ 100

Compressor Serial No. 00603009696

Receiver Serial No. 376463

Engine: Model: CH730-S Fuel Type GAS
Spec No.: CH730-0011 Cooling EIE
Serial Number: 3316305421
Drive Type: No. of Belts one No. of Grooves 3

TEST DATA:

Capacity: CFM 70 Pressure 100
Speeds:
Engine: Idle 2620 Full Load 3314
Compressor Idle 4406 Full Load 5514

CHECKS: Compressor Cooling ✓
Belt Tension & Alignment ✓
Gauges ✓
Oil Levels ✓
Starting ✓
Load/Unload ✓
Fit & Finish ✓

NOTES/SPECIAL FEATURES: LEFT BAP1

Assembled by: Perry Date: 3-1-04
Tested by: M.R.C Date: 3-1-04

Vanair Manufacturing, Inc.
 19015 US 12
 New Buffalo, MI 49117
 Tel. 269-469-4461
 Fax. 269-469-0497

FORM V-25

VIPER by VANAIR

<i>Order No.:</i>	30-64810	<i>Part No.:</i>	050136
<i>Distributor:</i>	DICKINSON EQUIPMENT	<i>Date:</i>	FEBRUARY 27, 2004
	3220 17TH AVENUE WEST	<i>Contact:</i>	JRV
	SEATTLE, WA 98119	<i>Tel:</i>	206-285-1090
<i>End User:</i>	SPOKANE METAL PRODUCTS	<i>Fax:</i>	206-285-0750

COMPRESSOR DATA

<i>Capacity:</i>	70	<i>P.S.I.</i>	100 MAX.
<i>Type:</i>	<i>Single Stage Screw</i>	<i>Cooling:</i>	ELECTRIC

DRIVER

<i>Engine:</i>	KOHLER	<i>Hydraulic Motor:</i>	
<i>Size:</i>	25 HP	<i>Input Req[umnts:</i>	<i>g.p.m.</i>
<i>Fuel Type:</i>	GAS	<i>@</i>	<i>p.s.i.g.</i>

SPEEDS

	<i>Idle:</i>		<i>Full Load:</i>	
<i>Driver:</i>	2600	<i>r.p.m.</i>	3300	<i>r.p.m.</i>
<i>Compressor:</i>	4370	<i>r.p.m.</i>	5540	<i>r.p.m.</i>

<i>Compressor:</i>	
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