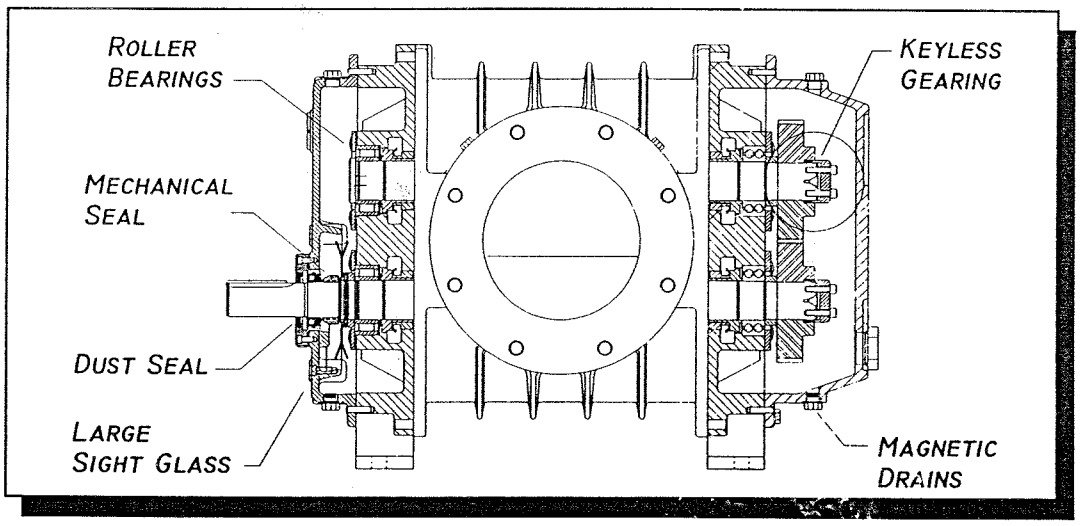
STOKES® VACUUM Inc.
EST. 1895

# M-SEAL BLOWER INSTRUCTIONS

## 6 INCH M-SEAL MODEL BLOWERS

## SERIAL NO.

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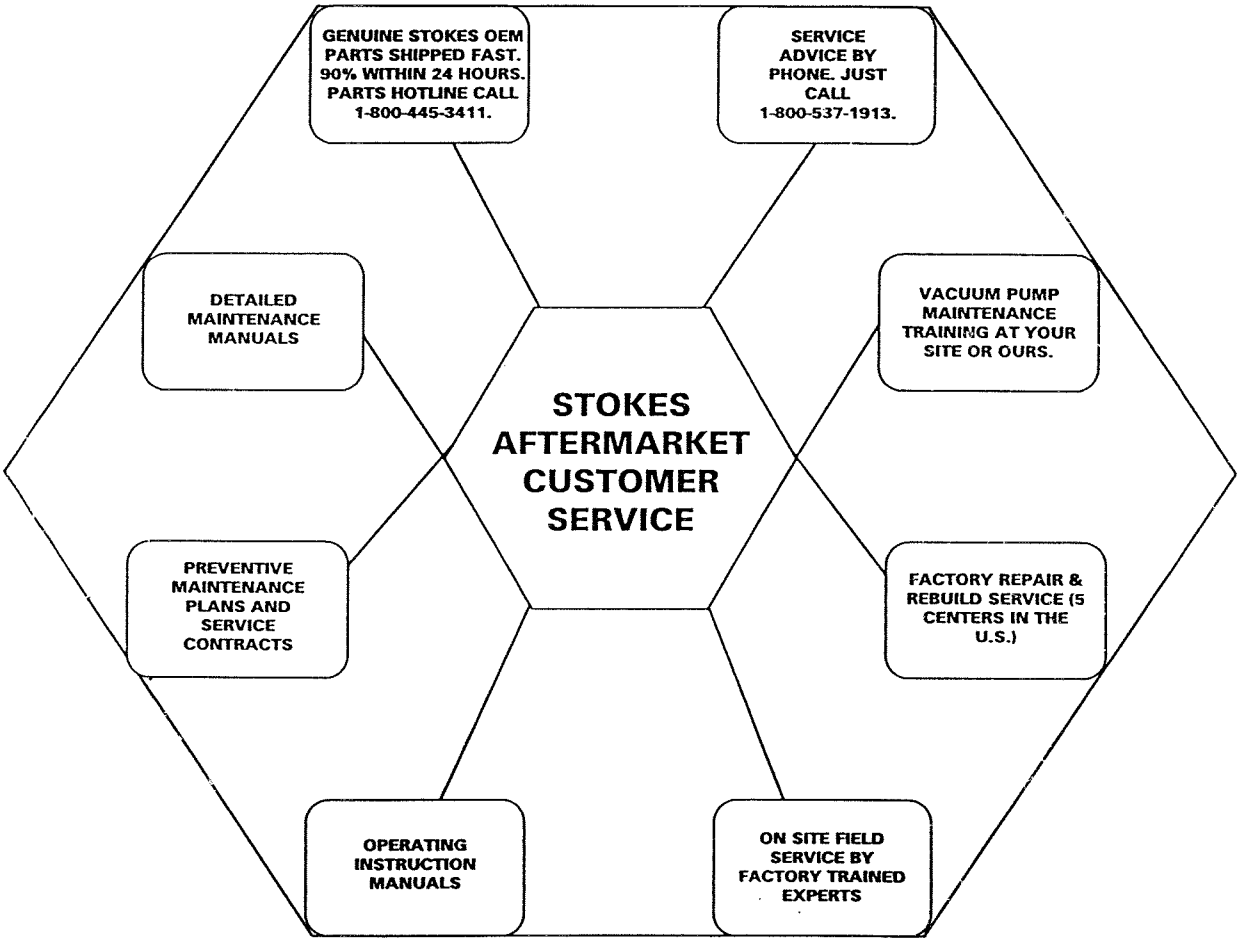


*USE YOUR INSTRUCTION MANUAL.* YOU WILL FIND A PREVENTIVE MAINTENANCE CHECKLIST, THE TYPE OF LUBRICANTS TO BE USED, A RECOMMENDED SPARE PARTS LIST, ACCESSORIES FOR OUR VACUUM PUMPS AND BLOWER AND OTHER HELPFUL INFORMATION.

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# SAFETY PRECAUTIONS

***For equipment covered specifically or indirectly in this instruction manual, it is important that all personnel observe safety precautions to minimize the chances of injury. Among the many considerations, the following should particularly be noted***

- ✓ ***Pump casing and associated piping or accessories may become hot enough to cause major skin burns on contact.***
- ✓ ***Internal and external rotating parts of the booster and driving equipment can produce serious physical injuries. Do not reach into any opening in the booster while it is operating, or while subject to accidental starting. Cover external moving parts with adequate guards.***
- ✓ ***Disconnect all power sources before doing any work, and DO NOT bypass or render inoperative any safety or protective devices.***
- ✓ ***If booster is operated with piping disconnected, place a strong coarse screen over the inlet and discharge.***
- ✓ ***Stay clear of open inlet piping (suction area) and open discharge blast.***
- ✓ ***Stay clear of the blast from the pressure relief valves and the suction area of vacuum relief valves.***
- ✓ ***Use proper care and good procedure in handling, lifting, installing, operating and maintaining the equipment. Do not use the motor for lifting.***
- ✓ ***Impeller casing and gear housing pressure must not exceed 25 psi (172 kpa) gauge. Do not pressurize vented cavities from an external source, nor restrict the vents.***
- ✓ ***When adding to or drawing oil from or otherwise servicing equipment which has been pumping toxic, flammable, explosive or other hazardous substances, observe appropriate precautions to avoid serious personal injury.***
- ✓ ***DO NOT exceed 80 psig maximum in the motor cooling jacket. Allow water to flow for 15 minutes minimum after shutdown of blower to cool down the motor windings. DO NOT do any work or maintenance with water on.***
- ✓ ***Cool down booster before doing any work or maintenance.***
- ✓ ***Break vacuum inside booster before doing any work or maintenance.***

## Safety Precautions

**DON'T Run the machine unless all GUARDS are in position**


The OSHA requires manufacturers to fit guards on all exposed rotating shafts, glands, couplings and belt drives, etc... It is incumbent upon the operatorto ensure that these are in position before the machine is operated.

**DO Wear suitable HEARING PROTECTION when working in the vicinity of noisy machinery.**


The noise levels emitted by rotary machinery may vary depending on rotational speed, application, and environment, and on certain installations these noise levels can be sufficiently high to cause hearing damage if exposure is prolonged. On such installations, correct hearing protection must always be worn if working in the immediate vicinity.

**DO NOT Attempt maintenance work or adjustments unless wearing suitable PROTECTIVE CLOTHING.**


Rotary equipment may cause severe injuries if incorrect clothing is worn when maintenance work is attempted if machines are in operation.

**Temperature**


Casing and associated piping and accessories may become hot enough to cause major skin burns on contact.

## GENERAL

It is important that plant operators are made aware of the responsibilities incumbent upon them to take all necessary precautions to ensure their health and safety, and also that plant authorities implement the procedures necessary towards this end, i.e. by providing relevant protective clothing and devices, and by bringing to the attention of the operators the official safety recommendations.

**DON'T Attempt any maintenance work until all electrical gear has been isolated.**

Isolate all electrical supplies before removing any guards, covers or accessories from any rotating machinery installation. Before re-connecting the electrical supply ensure that all guards, covers and accessories are correctly replaced.

**DO Ensure that maintenance work on machine handling TOXIC materials is carried out in a well-ventilated atmosphere when toxic fumes have been purged. Also observe all necessary FIRE precautions.**

On installations involving toxic materials or vapors, operators should ensure that they are familiar with the regulations relating to contact with these materials and vapors, and also the correct procedures in case of fire.

**DO Ensure that all RELIEF VALVES and other SAFETY DEVICES are kept operative and are tested regularly.**

Rotating machinery installations in the Rotary Compressor, Liquid Ring Pump and Rotary Lobe category should be equipped with standard safety devices to prevent the units being operated outside their design range. These safety devices take the form of spring or weight loaded relief valves for pressure, spring loaded valve only for vacuum relief, high pressure, high vacuum and high temperature switches, low water flow and low oil level switches etc... and normal installations can include individual or multiple combinations of any or all of them. These would normally be supplied pre-set from multiple combinations of any or all of them. They would normally be supplied pre-set from the factory, or they would be finally set, on site, during commissioning. Unauthorized adjustment of any of these safety devices can lead to a potentially dangerous operating condition.

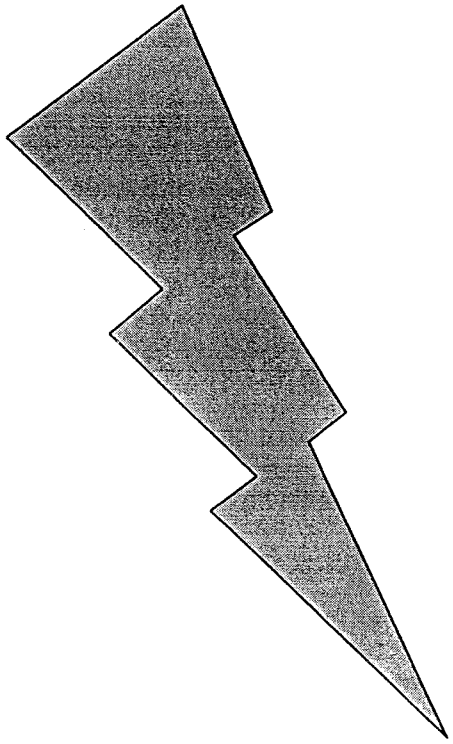
**DO NOT LEAVE ELECTRICAL GEAR LIVE AND UNATTENDED WITHOUT A SUITABLE WARNING NOTICE.**

Distinctive warning notices must be provided for posting in a conspicuous position to any piece of electrical equipment or machinery on which maintenance is being carried out, and which, for any reason whatsoever, is liable to be left unattended while in a live condition.

## OTHERS

Stay clear of open inlet piping of pressure blowers and the open discharge blast from a vacuum blower. Place a strong coarse screen over on an open inlet piping. Do not use an air blower on explosive or hazardous gases, unless the system is designed for the application.

# WARNING



## HAZARDOUS VOLTAGE
## CAN SHOCK, BURN OR CAUSE DEATH

- ✓ **DISCONNECT POWER BEFORE WORKING ON PUMP OR MOTOR.**
- ✓ **GROUND MOTOR BEFORE CONNECTING TO ELECTRICAL POWER.**
- ✓ **FAILURE TO GROUND MOTOR CAN CAUSE SEVERE OR FATAL ELECTRICAL SHOCK HARARD.**
- ✓ **SUPPLY VOLTAGE MUST BE WITHIN ±10% OF NAMEPLATE VOLTAGE. INCORRECT VOLTAGE CAN CAUSE FIRE OR SERIOUS DAMAGE TO MOTOR AND VOIDS WARRANTY. IF IN DOUBT CONSULT STOKES VACUUM INC.**

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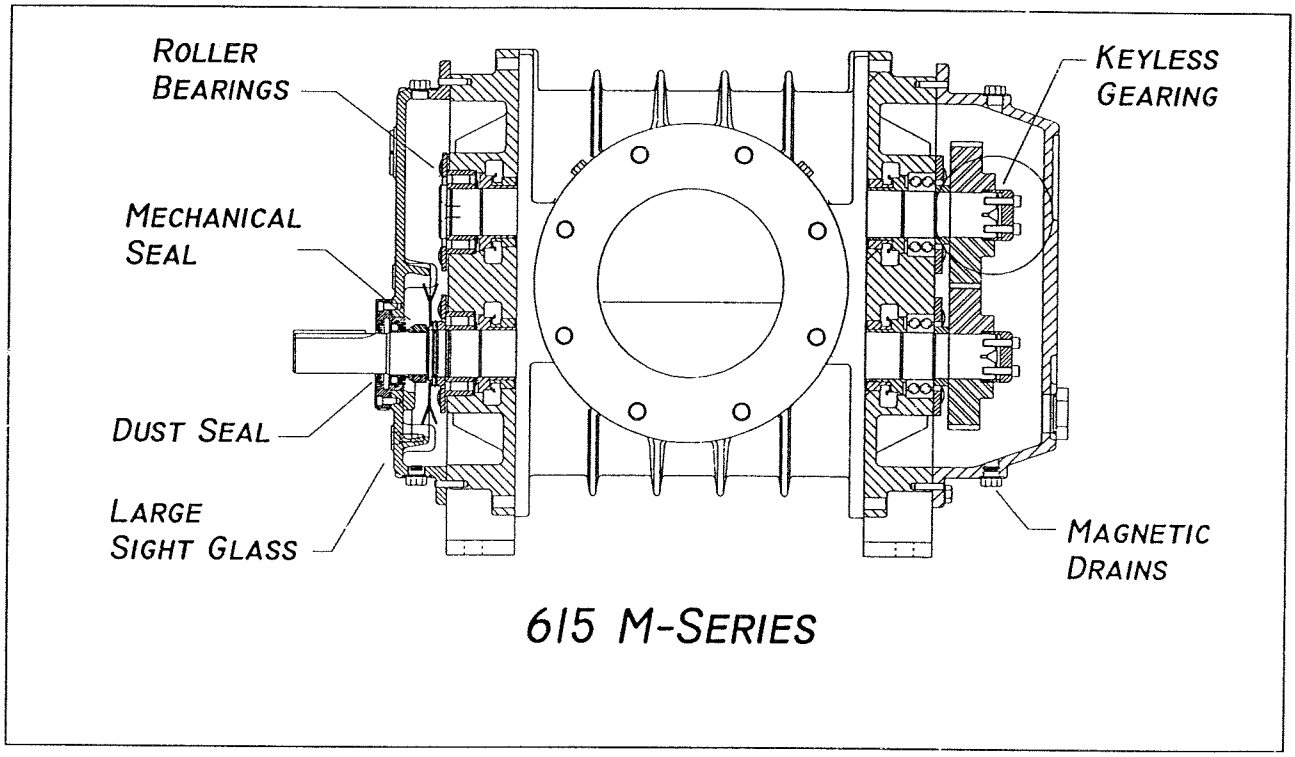
## 1.0 General

The Stokes Vacuum M Seal 6 inch blowers are standard with keyless timing, roller bearings, mechanical vacuum seal and large oil level sight glasses. The Stokes Vacuum hermetically sealed or canned motor blowers also incorporate these features without a dynamic mechanical seal. These features facilitate maintenance and improve reliability. Every blower is tested at the factory to stringent performance requirements.




The blowers are single stage, positive displacement precision engineered machines. The vacuum blowers must be backed with a suitable backing pump or roughing pump. The vacuum blowers are not intended for stand-alone operation. The impellers counter-rotate in synchronous mesh in the body housing. Precision helical gears are used for quiet operation and maintain proper impeller timing. The blowers are not intended for duty as positive pressure blowers.

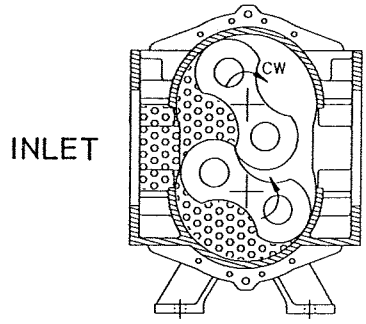
Stokes Vacuum recommends installation, operation and maintenance guidelines described further in this manual. Years of trouble free operation will result from proper care and operation. The blower nameplate contains model, lot and serial number information required when inquiring for advice, parts or service from the factory.

Blowers are not shipped with lubrication in the oil reservoirs but is provided in a separate container. Special service blowers (oxygen service) are specially prepared free of hydrocarbons from the factory and typically not supplied with the initial charge of lubricant. Canned motor blowers require heat transfer fluid for cooling the motor windings and the heat transfer fluid is provided in a separate container.

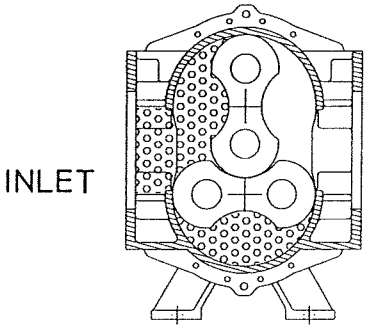
**Read the appropriate manual instructions BEFORE operating the equipment.** Follow all safety precautions explicit and implied by this manual. Any unauthorized modification or failure to follow the installation, operation requirements or procedures are the sole responsibility of the client and shall cancel any guarantees and warranties. Stokes Vacuums' liability shall not exceed the original price of the vacuum blower.

## 1.1 Principle of Operation

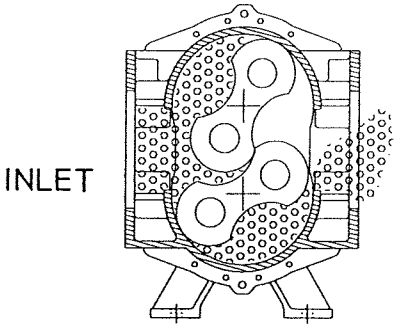
The basic operation of the two lobe vacuum blower is illustrated below. The bypass valve operation shown is only present on applicable bypass models.



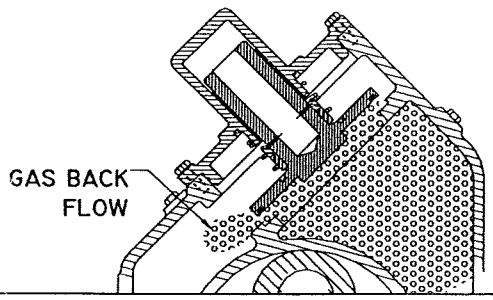

**Position 1** - Gas enters from the left side into the blower body. The top impeller rotates clock wise and the lower impeller rotates counter clockwise.




**Position 2** - Gas is trapped between the lower impeller and the blower body wall. The upper impeller rotates with precise timing to maintain proper clearance limiting gas back flow.




**Position 3** – The lower impeller discharges the trapped gas to the discharge port as it continues to rotate. The blower discharges four volumes per one rotation of the drive shaft.




**Bypass Operation** –The optional integral bypass valve limits the compression across the blower. If the compression creates an excessive pressure differential, the bypass valve opens allowing compressed gas to flow back to the inlet side of the blower.

## 1.2 Safety Precautions

For equipment covered specifically or indirectly in this instruction manual, it is required that all personnel observe appropriate safety precautions to prevent the chance of injury. The following precautions should particularly be followed:

1. Disconnect and lockout all power sources before doing any work or maintenance.

2. Pump casing and associated piping and accessories may become hot enough to cause major skin burns on contact. Allow sufficient time for the equipment to cool before doing any work or maintenance.

3. Internal and external rotating parts of the blower and driving equipment can produce serious physical injuries. Do not reach into any opening in the blower while it is operating or subject to accidental starting. Cover external moving parts with adequate guards.

4. NEVER bypass or render inoperative any safety or protective devices. The blower should be isolated from vacuum system using appropriate lockout and tag out procedures.

5. Personnel must stay clear of open inlet (suction area) and discharge piping.

6. Stay clear of blast from pressure relief and suction area of vacuum break valves.

7. Use proper care and handling procedures when lifting, installing, operating and maintaining the equipment. DO NOT use the motor for lifting on direct drive or can motor blowers.

8. Blower body must not exceed 25 psi (172 kPa) gauge. Do not pressurize vented cavities or restrict any vent.

9. Break system vacuum before doing any work or maintenance on the blower.

11. Ensure proper safety and handling procedures are followed when performing maintenance on equipment with toxic or hazardous process materials.

12. Regularly check safety devices and relief valves to verify proper performance.

# 2.0 Blower Information

The Stokes Vacuum M Seal blower 6 inch series is available in horizontal and vertical configurations. The basic M Seal models are based on Stokes Vacuum 607, 615 and 622 blowers. The M Seal blowers are typically belt driven. They are also available in direct drive and canned motor versions.

The M Seal blower gear center distance is 6 inches. The blowers have three basic body lengths of 7, 15 and 22 inches. The blowers have normal operation limits from 1200 to 3600 RPM. The volumetric pumping rates increases with body length and rotational speed.

The following application data is used to determine operational limits for the blower. The limits are based on compression and pumping speeds for the specific application. The following indicate performance limits not to be exceeded. The following limits, backing pump speed and gas loads determine cut in pressure and continuous operation pressure limits.

| Blower Body Size | Max Pressure Differential (TORR) | Maximum Temperature Rise (°F) | Maximum Discharge Temperature (°F) |
|---|---|---|---|
| 607 | 380 | 275 | 375 |
| 615 | 380 | 275 | 375 |
| 615 By Pass | N/A | 275 | 375 |
| 622 | 250 | 250 | 350 |

Stokes Vacuum can recommend cut in and operation limits when supplied with chamber size, backing pump and gas load information. The first limit reached during operation is the limiting factor. Control devices such as timers, pressure, temperature, and flow switches may be required to properly control operation of the blower.

## 2.1 Blower Models

Several variations of the base design blowers are available. The product code and model information determines the exact configuration of each blower. Blowers are available in horizontal and vertical connections.

The 615 blowers are available with an optional integral bypass valve allowing operation from atmosphere to shorten pump down time. Process isolation blowers have 4 mechanical seals that isolate the pumping chamber from the mechanical components. Blowers can be prepared free of hydrocarbons for oxygen service. The Stokes Vacuum canned motor blowers feature a hermetically sealed motor to eliminate dynamic shaft seals. Consult your Stokes Vacuum representative for application information.

## 2.2 Belt Drive Blowers

The M Seal blowers have been design to withstand loading from standard V-belts. The blower is design for standard operation from 1200 to 3600 RPM. The loads induced into the drive shaft increase with horsepower. Stokes specifies a minimum pulley diameter for the blower shaft based on motor power. Never specify a pulley with a smaller diameter than specified. See installation 3.3 for specific details on pulley diameters. Stokes Vacuum can provide blowers and motors sized for most applications.

## 2.3 Direct Drive Blowers

The 615 M Seal blowers are available with direct drive motors. Direct drive eliminates tension loads associated with belt drives. Stokes M Seal blowers are designed for easy conversion from belt to direct drive. The direct drive M Seal blower consists of a standard blower, a coupling, a motor support, and a C-face motor. Various voltages, frequencies, speed and horsepower motors are available. Large horsepower motors can not be supported by C-face motor support alone.

## 2.4 Integral Bypass

The 615 M Seal blower has an optional bypass valve for operation from atmosphere. The bypass regulates the amount of compression across the blower body. The limiting speed for the bypass blower is 3600 RPM. The pressure differential across blower is limited to 60 Torr. Maximum discharge temperature and maximum temperature rise are the same as the standard 615 blowers. Under some operating conditions, it is not possible to operate the bypass blowers continuously due to heat generated from gas compression. These conditions are dependent on chamber size and backing pump speeds. Consult factory if pump down exceeds 45 minutes. See section 1.1 for and example section view of a bypass blower.

## 2.5 Process Isolation

Stokes Vacuum process isolation blowers have 4 mechanical seals that isolate the pumping chamber from the bearing housings. These blowers are used on applications with dirty process gasses that tend to contaminate oil and aggravate mechanical wear. The process isolation blowers have water-cooled bearing housings.

## 2.6 Canned Motors

The canned motor derives its name from the thin walled stainless steel "can" that isolates the shaft-mounted rotor from the stator and ambient atmosphere. The hermetically sealed can provides a vacuum tight drive without the use of a dynamic shaft seal. These blowers greatly reduce down time associated with dynamic shaft seals.

Review sections 3.5.2, 3.6, 3.7 and 3.8.2 thoroughly before operating any canned motor blower. Stokes requires all can motors blowers be protected with the integral winding over-temperature switch and a separate water flow switch. The safety devices must interrupt blower operation if heat transfer fluid or water-cooling is lost. These devices must be incorporated into the motor control circuitry. Water flow switches are available from Stokes as an accessory. **Never operate can motor blower without cooling water and heat transfer fluid.**
Failure to install a proper water flow switch, heat transfer fluid and motor winding over-temperature switch and incorporate the switches into the motor control circuitry shall cancel any guarantees and warranties. Incorporation of the water flow switch is the sole responsibility of the client and not the responsibility of Stokes Vacuum.

| **Canned Motors** | **10 HP - 1750 RPM (cfm)** | | **20 HP – 3450 RPM (cfm)** | |
|---|---|---|---|---|
| **Standard Model Canned Blowers**<br><br>CFM is for 60 Hz. | 900-607-CH1<br>900-607-CV1<br>900-615-CH1<br>900-615-CV1<br>900-61B-CV1<br>900-61B-CH1 | 612<br>612<br>1300<br>1300<br>1300<br>1300 | 900-615-CV2<br>900-615-CH2<br>900-61B-CV2<br>900-61B-CH2<br>900-622-CV2<br>900-622-CH2 | 2600<br>2600<br>2600<br>2600<br>3900<br>3900 |
| **Motor Current** (Amps)<br>Cont. – Continuous Duty<br>Inter. – Intermittent Duty<br>Line Frequency | 208V- 33 Cont. 48 Inter.<br>230V- 30 Cont. 44 Inter.<br>460V- 15 Cont. 22 Inter.<br>3ϕ /60 Hz. 1750 RPM | | 208V- 60 Cont. 80 Inter.<br>230V- 54 Cont. 74 Inter.<br>460V- 27 Cont. 37 Inter.<br>3ϕ /60 Hz. 3450 RPM | |
| **Motor Current** (Amps)<br>Cont. – Continuous Duty<br>Inter. – Intermittent Duty<br>Line Frequency | **8 Horse Power**<br>190V- Cont. Inter.<br>380V- 15 Cont. Inter.<br>3ϕ /50 Hz. 1450 RPM | | **16 Horse Power**<br>190V- Cont. Inter.<br>380V- 26 Cont. Inter.<br>3ϕ /50 Hz. 2850 RPM | |
| **Temperature Switch**<br>Set point 350°F | 115 VAC / 6 Amp<br>Normally Closed | | 115 VAC / 6 Amp NC<br>Normally Closed | |
| **Cooling Water (85°F)** | 2 -- 3 GPM Minimum | | 2 - 3 GPM Minimum | |
| **Heat Transfer Fluid** | 4.3 Liters GE SF 97-50 | | 4.1 Liters GE SF 97-50 | |

Some applications may require horsepower exceeding the nameplate continuous duty rating. It is possible to exceed the continuous duty rating for short periods of time. Consult Stokes Vacuum on applications exceeding continuous duty amperage limits. It may be necessary to use overloads with amperage ratings greater than specified for continuous duty to avoid motor cutouts. Under no circumstances should overloads be sized larger than those

specified for intermittent duty. Operation of the motor exceeding continuous duty limits, without consulting Stokes Vacuum, may void warranty.

Consult Stokes Vacuum before attempting to use a frequency drive or inverter on canned motor blowers.

## 2.7 Oxygen Service

Stokes Vacuum can prepare blowers for hazardous gas service. The blowers are prepared free of hydrocarbons. The blowers use inert lubrication that does not react with oxygen. Special care must be used in operating oxygen service blowers.

Stokes usually paints oxygen service equipment blue and does not usually supply an initial charge of lubrication. Blower color does not guarantee service type. Always check the blower nameplate to verify service type. Consult Stokes Vacuum for proper installation and use of oxygen service blowers.

Vacuum equipment intended for oxygen-service requires special preparation and handling. Intrusion of dirt, hydrocarbon oils and greases must be prevented. Always use inert or other safe gasses to purge and break vacuum.

Oxygen service equipment requires special lubricants. Only Fomblin Y-25/5 or Krytox 1525 are to be used.

**WARNING**-Substitutes lubricants cannot be used. Substitutes or hydrocarbon contamination can result in an explosion.

Stokes recommends that any major repairs needed for the oxygen service equipment be done at the factory. Minor repairs can be made in the field. Because of the possibility of a dangerous reaction to dirt and chemical compositions in an oxygen rich environment, absolute cleanliness of parts, tools, wipers and assemblers' hands and clothes is mandatory.

# 3.0 Installation

On receipt of unit, check for any damage that may have occurred during shipping. Report any damaged, missing or incorrect parts immediately and not later than 30 days after receiving the equipment. Follow the guidelines outlined below for proper installation. Consult your local Stokes Representative if you have any questions regarding the installation or operation instructions.

Disconnect all power sources before performing any work. During installation protective coverings should be left in place to prevent rusting and reduce the chance of foreign material entering the equipment. Review safety precautions in section 1.2 before continuing.

## *3.1 Locating & Mounting*

The vacuum blower should be mounted on a smooth, flat level surface. The degree of variation in level should not exceed 1/16" per horizontal foot (1 mm per 20 cm) in any direction. Check to see that all four feet contact the mounting base. Do not distort the blower body. The mounting dimension information is at the back of the manual. Mount blower in the final operating location before adding fluids.

Check to make sure that no foreign material is present in the vacuum piping or impeller cavities. The blower interior is protected for shipment by small bags of moisture absorbent material attached to the flange covers. Check for free rotation of the impellers.

Locate the pump close to the equipment being evacuated. Place equipment so water, electrical and piping connections can be conveniently made. Provide adequate space and lift access for convenient servicing where possible. The blowers weight 450-1200 lbs. depending on the blower size. Avoid long piping runs from the vacuum chamber to the blower.

The blowers are precision balanced devices. The blower must be mounted on a sufficiently rigid base and secured to the floor to eliminate potential system vibration. Vacuum piping attached to the blower can vibrate excessively if not properly supported or secured. Blower vibration usually results from insufficient support.

## *3.2 Vacuum & Exhaust Piping*

All vacuum lines should be as short as possible and should be no smaller than the blower inlet. When running a long line, the pipe size should be increased over the inlet diameter of the pump. The lines must be conductance checked to ensure the pumping speed of system will not be decreased. Consult your local Stokes representative for help in sizing lines for long runs.

A clean rag dampened with Loctite Safety Solvent may be used to clean the blower impellers and flanges if they have accumulated dirt during installation or storage. The fore-line of the vacuum blower should have a valve to isolate the vacuum pumps from the chamber or vacuum system. Clean surfaces are very important in making a good vacuum seal.

### 3.2.1 Vacuum Inlet Piping

Be sure all vacuum piping is tight. Install a flexible connection between the blower inlet and vacuum piping to reduce vibration and prevent blower body distortions. Properly support the piping system to eliminate the potential for vibration. The blower body must not be used to support long runs of piping.

A high vacuum full opening valve is recommended to facilitate start-up and for checking pump blank off pressure. This valve should isolate the vacuum pumps from the rest of the vacuum system. Installation of a vacuum pressure gauge is recommended to verify proper vacuum pump performance. Also a vacuum break valve should be installed in the blower inlet or fore line. A filter/silencer should be installed to keep foreign materials from entering the system.

Make sure the vacuum system and connecting lines are clean and free of weld splatter, dirt or grit. **Foreign matter (particulate) can cause serious damage and premature failure of internal pump parts.** Stokes Vacuum recommends installation of a 16-mesh wire screen in front of the pump inlet connection. The screen must be removed after 20 hours of operation. Failure to remove the screen will allow it to deteriorate and can damage the pumps mechanical components.

Depending on blower size, backing pump capacity and chamber size, other devices such a interstage temperature switches, timers, vacuum pressure switches, etc. must be incorporated to protect the blower from thermal and mechanical overload.

### 3.2.2 Types of Vacuum Piping

A. Standard wrought pipes with welded joints makes the best vacuum piping systems.

B. Steel tubing with welded joints makes a lighter weight piping system and facilitates handling and installation.

C. Copper piping with soldered fittings and joints can be made vacuum tight and has the advantage of providing a neat, clean installation.

### 3.2.3 Accessory Port Piping

Accessory connection ports are provided in the blower body. The ports may be used for vacuum breaks, and vacuum gauging. Vacuum pressure gauges should be connected as follows. The 3/8" NPT pipe plug should be replaced with vacuum ball valve and connected to an elevated gauge. Use a short run of pipe to keep the valve a few inches away from the hot blower body.

All threaded vacuum joints must be doped with a liquid thread sealant (Loctite 714). Tape thread sealant will create small vacuum leaks and should not be used.

A Stokes McLeod Gauge requires a flexible vacuum connection. Synthetic smooth bore tubing such as Tygon will provide a good flexible vacuum connection. To prevent contaminates from entering the gauge, locate the McLeod gauge approximately 2 ft. (.5M) from the gauge port.

### 3.2.4 Exhaust Piping

The exhaust lines should be the size of the blower exhaust outlet. Exhaust gasses must be handled in accordance with Local, State and Federal regulations. When mounting a horizontal blower to an oil sealed backing pump, mount the blower above the inlet to avoid potential oil collection in the blower body. Include ports to check system temperatures and pressures.

### 3.2.5 Oxygen Service Piping

Oxygen service blowers are free of hydrocarbons. Oil contamination from vacuum inlet and exhaust piping can create hazardous conditions.

Completely clean all hydrocarbons from all inlet and discharge piping, vacuum system and equipment exposed to system reactants at least three (3) times with Isotron 113. Follow all appropriate safety protocols. Use (Fluroamatics) Oxy-8 paste on all threaded pipe connections and fittings. Permatex, Loctite or Teflon paste is NOT permissible. Lightly coat tools and hands with a light film of Fomblin or Krytox. No rust preventative should be used on any oxygen service booster parts. Clean bearings with Isotron 113 and lightly coat with of Fomblin or Krytox.

Ensure pump is properly filled with lubricant and all potential hazards have been properly addressed before starting any vacuum equipment. Always use inert or other safe gasses to purge and break vacuum. Refer to Section 2.7 for further information.

## 3.3 Belt Drive Blowers

Alignment of pulleys and blower belt tension are very important. Follow the installation specifications and inspect the drive system periodically to avoid mechanical problems and avoid unnecessary repairs. The following size chart specifies the minimum permissible pulley diameters. Consult factory for motors exceeding 40 HP.

| Motor (HP) | 15 HP or Less | Above 15 to 25 HP | Above 30 to 40 HP |
|---|---|---|---|
| Minimum Pulley Diameter | 5.2" PD | 6.3" PD | 7.0" PD |

Pulley misalignment can damage the bearing, belts and seal(s). Pulley alignment does not change from operation. The motor and blower driveshafts must be parallel to avoid uneven loading of belts. Check for free rotation of the blower by hand before starting the blower. **Never operate the blower without proper safety guarding installed.**

New belts usually lose some tension during initial operation and should be rechecked during the first few days of operation. Always tension the belts according to the specifications of the belt manufacturer. Excessive tension can induce unnecessary loading on the blower bearings and bending moments on the blower drive shaft. Extreme over tensioning may cause the shaft to break from fatigue.

Belt drive blowers that have been packaged by Stokes come with the pulley and belt tension already set. Re-check the alignment and tension before initial operation using the following procedure.

1. Shaft, hub and pulley components must be free of lubricants, corrosion and protective coatings.
2. Check pulley alignment with a straight edge or tight cord. The pulley faces should contact the straight edge at all four points. Misalignment of $1/8^{th}$ inch per foot will significantly aggravate belt wear.
3. If pulley alignment or removal is required, loosen motor hub set screws several turns. Remove one set screw completely. Install the set screw in center position and tighten to break locking bushing free. Reposition pulley and reinstall set screws in the original position in the locking bushing. Tighten evenly to specified torque. The locking bushing number is stamped on the inner hub face.

| Locking Bushing # | Torque (ft-lbs) | Locking Bushing # | Torque (ft-lbs) |
|---|---|---|---|
| 1310 | 14.5 | 3020 | 67 |
| 1610 | 14.5 | 3030 | 67 |
| 1615 | 14.5 | 3535 | 83 |
| 2012 | 23 | 4040 | 141 |
| 2517 | 36 | 4545 | 204 |
| 2525 | 36 | 5050 | 260 |

4. Belt span distance, belt deflection and a deflection force determine proper belt tension. Determine the span distance between contact points on the pulleys. The deflection should be $1/64^{th}$ per 1 inch of span.
5. Determine proper per belt force based on the smallest pulley diameter and belt type. Stokes supplied belt systems are usually a 3 groove "B" design. Check each belt for even loaded.Uneven load indicates pulley misalignment or non-parallel shafts.

| **Belt Section** | **Smallest Pulley Diameter** (Inches) | **RPM Range** | **Belt Force** (lbs) **Normal** | **New Belts** (Force per Belt) |
|---|---|---|---|---|
| B, BX | 4.4-5.6 | 860-2500 | 5.3 | 7.9 |
| | | 2501-4000 | 4.5 | 6.7 |
| | 5.8-8.6 | 860-2500 | 6.3 | 9.4 |
| | | 2501-4000 | 6.0 | 8.9 |
| 3VX | 4.12-6.90 | 1000-2500 | 4.9 | 7.3 |
| | | 2501-4000 | 4.4 | 6.6 |
| 5V, 5VX | 7.1-10.9 | 500-1740 | 12.7 | 18.9 |
| | | 1741-3000 | 11.2 | 16.7 |
| | 11.8-16.0 | 500-1740 | 15.5 | 23.4 |
| | | 1741-3000 | 14.6 | 21.8 |

6. Ideal tension is the minimum tension to overcome peak loading. Never exceed 1.25 times the force specified above. Lock down tension adjustment mechanism.
7. Turn pulleys over 3 times by hand. Check for free and easy rotation.
8. Recheck tension before replacing safety guards and operating the blower.

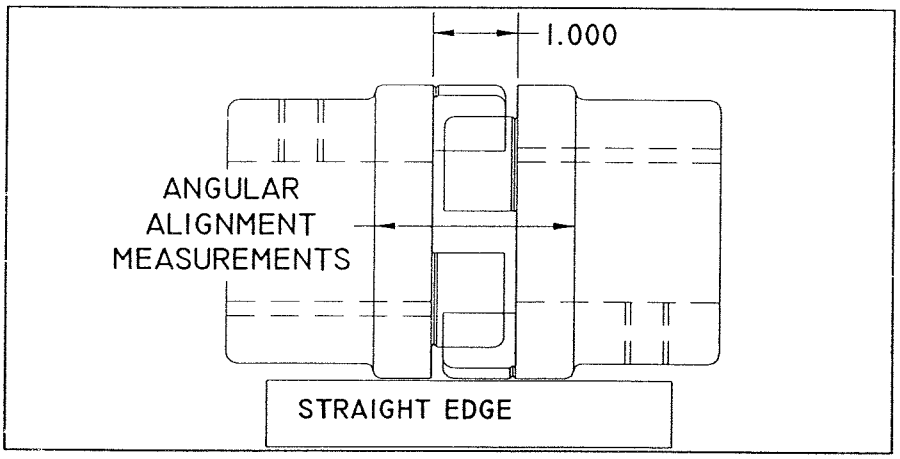
Replace all belts simultaneously when any one requires changing. Check tension frequently during the first few days of operation. Never apply belt dressing. If customer supplied belt or pulleys are used, follow the manufacturers' recommended installation procedures.

## 3.4 Direct Drive Blowers

Alignment of the drive coupling is very important. Misalignment or worn out coupling spacers (spider) will damage the blower bearings and seal(s). Follow the installation specifications and inspect the drive system periodically to avoid mechanical problems and avoid unnecessary repairs. **Never operate the blower without proper safety guarding installed.**

Direct drive blowers come with the motor coupling already set. Re-check the alignment before initial operation. The following values are for L190 couplings. Consult factory for other sizes.

1. Shaft, coupling and components must be free of lubricants, protective coatings and burrs.
2. Slide one half-coupling onto each shaft. Check keys for a snug fit.
3. Position the hubs on the shafts to achieve approximately 1.000 inch space between the hub recesses for the polymer spider. The hubs should be positioned on the shafts to achieve an equal amount of support for both coupling halves. Torque one half-coupling ½-13 set screw(s) to 45-50 ft-lbs. (61-68 N-M) when in its final position.




4. Slide the free half-coupling back and install the polymer spider. Reposition the free half-coupling to the proper spacing and torque set screw(s).
5. If hub cannot be slid back, torque second half-coupling at the proper spacing. Separate the equipment and install the polymer spider. Bring coupling hubs back together with proper spacing.
6. Check for parallel alignment with a straight edge across the two half couplings at several places around the coupling. Do not rotate the coupling. Measure the space under the straight edge. The misalignment measurement must be less than .015 inches. Reposition the shafts if the maximum misalignment is exceeded.
7. Determine angular alignment across the coupling. The measurements should be taken from the surface where the couplings neck down from the spider diameter to the diameter with the set screw(s). Find the maximum and minimum values. The difference of these two measurements must be less than .040 inches. Reposition the shafts if the maximum tolerance is exceeded. Recheck parallel alignment if repositioning was required.
8. Rotate coupling after achieving proper alignment. The shaft should rotate free and easy. Never operate a coupling above maximum permissible horsepower or RPM indicated (stamped) on coupling. Never operate an M seal blower above 3600 RPM.
9. Install proper safety guards before operating.

Check coupling spider condition monthly.

## 3.5 Water System

### 3.5.1 Process Isolation Blowers

Cooling water must be provided to the process isolation blower bearing housings during operation. Water flow control valves should not be placed in the water outlet drain line. Water pressure in the water housings must never exceed 40 psi.

A flow meter is recommended to reduce excess water consumption. The water flow should be divided equally to both bearing housings. Cooling water should enter through the lower connections to avoid trapping air pockets in the water-cooling passages.

### 3.5.2 Can Motor Blowers

Failure to install a water flow switch and incorporate the water flow switch into the motor control circuitry shall cancel any Stokes guarantee and warranties. Incorporation of the water flow switch is the sole responsibility of the client and not the responsibility of Stokes Vacuum.

Cooling water must be provided to the canned motor water-cooling jacket during operation. Stokes Vacuum requires installation of a properly sized water flow switch to assure cooling water is supplied to the canned motor blower. **The flow switch (085-052-388) must be located after the water exits the motor water jacket and wired into the motor control circuitry to prevent operation without proper water flow.** The flow switch is an accessory available from Stokes Vacuum. A flow meter is recommended to reduce excess water consumption.

Water flow control valves should not be placed in the water outlet drain line. Water pressure in the water jacket must never exceed 80 psi. Cooling water should be run through the motor water-jacket for a minimum of 15 minutes after stopping the motor to cool the stator windings. Cooling water must enter through the lower connection to avoid trapping an air pocket in the water-cooling jacket. See section 2.6 for flow requirements.

Also see Section 3.7, Heat Transfer Fluid, before operating the canned motor blower. The canned motors must have heat transfer fluid in the motor windings to prevent failure. Never operate the unit with less than the specified amount water flow or heat transfer fluid.

## 3.6 Lubrication

Do not operate the blower without verifying lubrication has been added. Verify proper levels daily. Always be sure to use the proper lubricant and never add hydrocarbon oil to an oxygen service blower.

### 3.6.1 Hydrocarbon Oils

Before operating, put the required amount of oil into the oil reservoirs. The oil levels should be at the center of the sight glass. Do not attempt to add lubricant while the blower is running. Stop the blower and break vacuum to fill or drain.

| V-LUBE H | OUNCES | | MILLILITERS | |
|---|---|---|---|---|
| FILL POINT | Horizontal | Vertical | Horizontal | Vertical |
| DRIVE END BEARING HOUSING | 26 | 46 | 750 | 1350 |
| GEAR HOUSING | 41 | 95 | 1200 | 2800 |

All quantities are approximate.

The Stokes Vacuum M Seal and Can Motor Blowers have two (2) oil reservoirs:

a) Bearing housing, drive end.
b) Gear bearing housing.

Check the interface drawing at the back of the manual for the fill and drain locations. Older blowers have an oil cup and require this third cavity to be filled. The blowers have a label on the gear cover indicating how many places require lubrication.

With blower stopped and not under vacuum, fill both fill ports with V-Lube H until each sight glass is ½ full. See applicable interface drawing for location of ports. Do not overfill or permit the oil level to fall below the bottom of the sight glass. If overfilled, oil may spill over into the blower body and can contaminate the vacuum system.

On blowers with the M Seal, overfilling the drive end of the blower can create a squealing noise from the seal. Lower the oil level slightly to eliminate the noise.

The bearings in the drive end reservoir are splash lubricated from an oil slinger that dips into the oil sump. The gears are lubricated by partial immersion in the oil sump. Splashing from the gears lubricates the bearings

When the blower is in operation, the oil level will fluctuate due to the pumping action of the gears and slinger. If viewing the oil level becomes difficult due to a dirty sight glass, remove the sight glass during an oil change and clean the viewing surface.

Each time the fill or drain plugs are removed the O-rings must be inspected for cuts or damage and replaced if necessary. The plug O-rings produce a vacuum seal.

### 3.6.2 Oxygen Service Lubrication

Do not operate the blower without verifying lubrication has been added. Quantities are the same as in section 3.6.1 for hydrocarbon oil. Add oxygen service lubricant into the reservoirs. The lubrication levels should be at the center of the sight glass. **Never attempt to add lubricant while the blower is running. Stop the blower and shutdown the equipment. Lock out power and break vacuum to fill or drain.**

Oxygen service equipment requires special lubricants. Only Fomblin Y-25/5 or Krytox 1525 are to be used. Do not substitute or mix lubricant types.

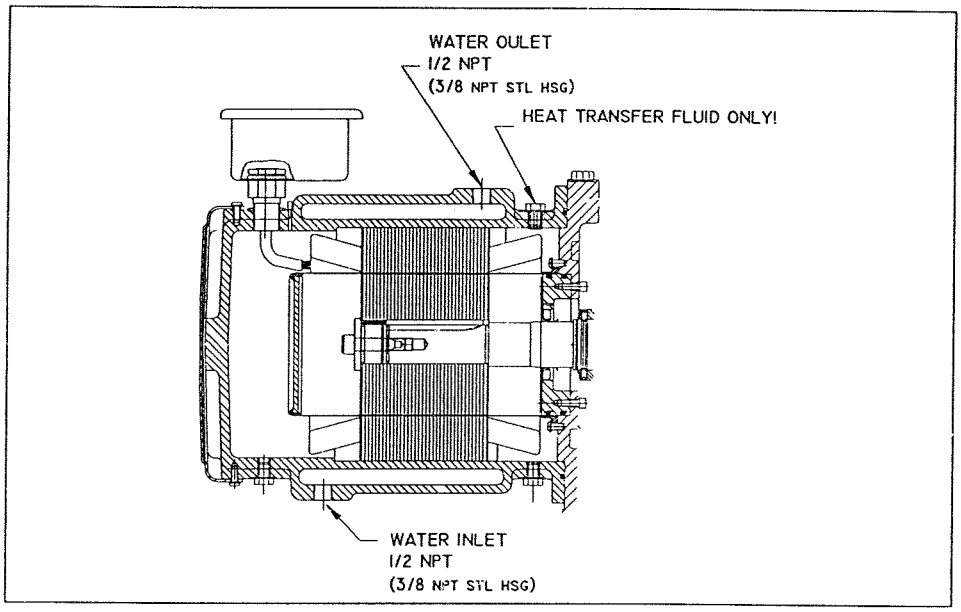
**WARNING**-Substitutes lubricants cannot be used. Substitutes or hydrocarbon contamination can result in an explosion.

Stokes recommends that any major repairs needed for the oxygen service equipment be done at the factory. Minor repairs can be made in the field. Absolute cleanliness of parts, tools, wipers, assemblers' hands and clothes is essential due to the possibility of a dangerous reaction to dirt and chemicals in an oxygen rich environment.

## 3.7 Heat Transfer Fluid (Can Motors)

Failure to install the proper amount of heat transfer fluid into the motor windings shall cancel any guarantees and warranties. Failure to maintain the proper amount of heat transfer fluid in the motor windings is the sole responsibility of the client and not the responsibility of Stokes Vacuum.

All 6 inch can motor models require heat transfer fluid. See Section 2.6 for heat transfer fluid quantities. Do not under-fill the heat transfer fluid. Do not substitute other types of heat transfer fluids. The dielectric, temperature and flammability properties are critically important. Do not fill motor windings with gear lubrication.




Stokes vacuum supplies an initial charge of heat transfer fluid with the canned motor in a separate container(s) for filling at installation. Stokes heat transfer fluid is available in 1-gallon containers (085-051-648). At room temperature the fluid should be just visible in the fill port.

Temperature changes from peak operation or from cold cooling water can significantly raise and lower the level of the fluid. Operation of the can motor at peak load will determine the proper amount of fluid. Thermal expansion may force heat transfer fluid out of the top of the motor casing if slightly overfilled. A small amount of fluid forced out of the motor windings does not necessarily indicate an operating problem.

Heat transfer fluid in the motor does not require changing, but should be periodically checked to verify proper amount. With the motor winding hot from operation, the fluid should be visible through the fill plug and cover the motor windings.

Also see Section 3.5.2, Can Motor Water System, before operating the canned motor blower. The canned motors must have cooling water to prevent failure. Never operate the unit with less than the specified amount water flow or heat transfer fluid.

## 3.8 Electrical Systems & Rotation

### 3.8.1 Standard Motor Wiring

Electrical hookup of blower motors requires that the proper overloads, motor starter, control and safety devices be installed. Control devices may include temperature switches, water flow switches, pressure switches and other control devices. Failure to include the proper control devices can lead to serious injury, damage to the equipment and voids any Stokes warranty.

A manual restart should be provided to prevent cycling in the event of an overload. Depending on blower size, backing pump capacity and chamber size, other devices such a interstage temperature switches, timers or vacuum pressure switches should be incorporated to protect the blower from thermal and mechanical overload. See section 1.1 to determine proper rotation direction.

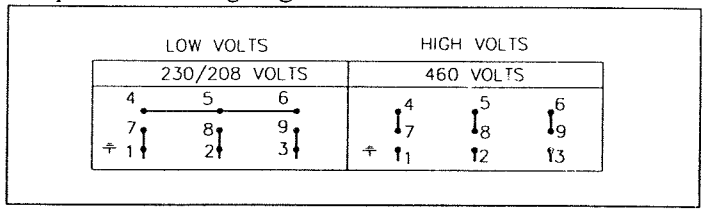
### 3.8.2 Can Motor Wiring

Electrical hookup of can motors requires that the proper overloads, motor starter and safety devices be installed. Failure to include these safety protections can lead to serious injury, damage to the equipment and voids any Stokes warranty. Also follow standard motor wiring guidelines.

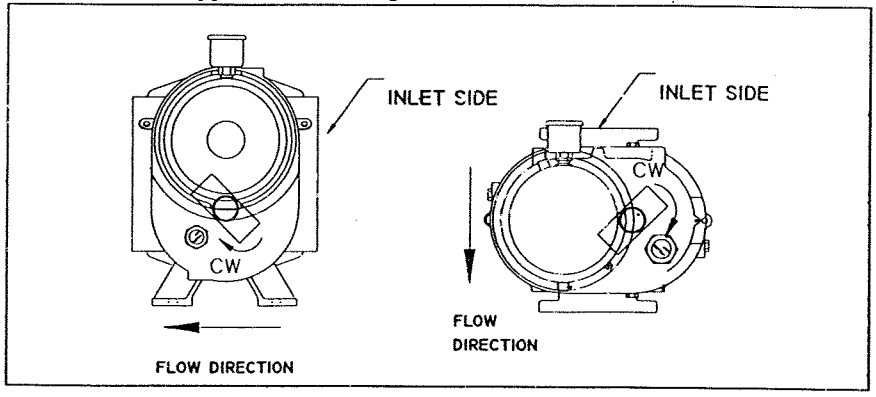
Stokes requires a control circuit that includes the motor winding temperature switch and a mandatory water flow switch on all canned motor blowers. The safety devices are required to interrupt blower operation if heat transfer fluid or water-cooling is lost. **Never operate can motor blower without cooling water and heat transfer fluid.**

The integral over-temperature switch, set at 350°F is provided on the stator for inclusion in the motor control circuitry to limit motor operation in the event of stator over-temperature. The over-temperature switch connections are the white leads in motor wiring connection box. Incorporation of a water flow switch on the motor water-jacket discharge of the blower is required to prevent operation without water flow. The flow switch is available from Stokes as an accessory. See section 2.6 for specifications.

A manual restart should be provided to prevent cycling in the event of an overload. Depending on blower size, backing pump capacity and chamber size, other devices such a interstage temperature switches, timers or vacuum pressure switches should be incorporated to protect the blower from thermal and mechanical overload or damage. Motor should be wired per the following diagram.




It is not possible to view the can motor rotation. The proper rotation can be determined by viewing the oil slinger through the large sight glass at the motor end of the blower. Momentarily jog the motor and view the slinger rotation through the sight glass as the blower coasts to a stop. **The oil slinger should rotate clockwise on can motor blowers.** The motor rotates opposite of the slinger direction.



## 3.9 Storage and Shipping

When pump is to be subjected to temperatures below freezing, drain the water jacket(s). The can motors have a motor water jacket and process isolation blowers have water-cooled bearing housings. Completely drain all water lines and jacket(s) to prevent cracking.

If the unit is to be stored for long periods, loosen the drive belts and change oil for storage. Tag the unit with a checklist for restart. Close off inlet and discharge ports. Desiccant moisture absorption packs should be added to protect the blower internal parts. Oxygen service blowers must not be coated with preservative oils.

When shipping blowers, drain oil and heat transfer fluid. Drain all water cooling lines and jackets to avoid freeze damage.

# 4.0 Operation

## 4.1 Pre-Start Check

Review all applicable manual sections relevant to the model blower to be operated **before** attempting to run.

1. Follow all safety precautions in section 1.2
2. The blower and vacuum piping should be properly mounted and secured.
3. The lubrication reservoirs should be filled to the center of the sight glasses.
4. Piping must be checked for debris in the fore-line, blower and exhaust piping.
5. Unit must be checked for free rotation.
6. Unit must be checked for proper direction of rotation.
7. Motor should be wired with proper overloads and safety cutouts.
8. Precautions to avoid possible injury or hazardous situations must be taken.
9. Always use inert or other safe gasses to purge process gasses and break vacuum.
10. Cooling water must be flowing through the can motor water jacket and the mandatory safety flow switch. (Can Motor Blowers Only)
11. The proper amount of heat transfer fluid should be in the motor housing. (Can Motor Blowers Only)
12. Cooling water must be flowing through the bearing housings (Process Isolation Blowers Only).

## 4.2 Startup

The following procedure should be followed when starting the vacuum equipment. If any problems are found, stop the blower equipment and break vacuum. Do not operate the equipment without correcting all problems.

1. Review Pre-Start Check, Section 4.1 and assure all installation requirements have been met.
2. Isolate vacuum pumps from vacuum system or chamber.
3. Start backing pump.
4. Start blower when appropriate cut-in pressure is reached.
5. Run at blankoff for 5 minutes. Check for unusual noises and excessive vibration.
6. Run at blankoff for one hour. Check for unusual noises and excessive vibration.
7. Run at normal operating conditions for about 15 minutes. Check for unusual noises and excessive vibration.
8. During the first week of operation, check the following daily. Oil levels should be in the middle of the sight glasses with the blower stopped. Check drive system. Check heat transfer fluid on canned motor blowers.

## 4.3 Shutdown

Precautions to prevent hazardous, toxic, flammable or explosive situations in the vacuum system, chamber, vacuum pumps and exhaust system must be taken. Always use inert or other safe gasses to purge process gasses and break vacuum. Byproducts of the vacuum process could collect in the pump lubricants creating potential hazards.

1. Close the vacuum system isolation valve to isolate the pumps from the rest of the system or chamber.
2. Shutdown blower.
3. Allow cooling water to flow for a minimum of 15 minutes to cool motor stator windings (Can Motor Blowers Only).
4. Stop backing pump and break vacuum to avoid reverse operation. Break vacuum with a gas that will not create a hazardous, toxic flammable or explosive situation.

# 5.0 Maintenance and Repairs

## 5.1 General

In general, major repairs are to be considered beyond the scope of maintenance work and should be performed at the factory, after arrangement through the nearest sales office. Warranty failures should not be repaired at all, unless specific written authorization has been obtained through a sales office. Unauthorized disassembly during the warranty period may void the warranty.

Stokes also has trained service personnel available for repair and maintenance service 24 hours a day in your facility. For parts call 1-800-445-3411. For service call 1-800-537-1913.

A consistent program of inspection and maintenance servicing is the most effective method of minimizing blower repairs or operating problems. A simple record of services and dates is recommended.

Lubrication is the most important requirement, other than operating the blower within its specified rating limits. In a new and properly installed unit there are no moving contacts between the two impellers or between the impellers and body or bearing housings. Wear is confined to the timing gears and the bearings that support and locate the shafts. All are lubricated and wear should be nominal if clean lubricant of the proper type is always used.

The bearings and gears supplied with Stokes blowers are generously sized and should give years of trouble-free service under normal operation.

Maintenance operations are straightforward, but personnel with good mechanical experience should do the work. No attempt is made in this manual to outline procedures for replacing bearings and gears or for timing the impellers. Best results will be obtained by having such repairs done at the factory or by Stokes Maintenance Personnel at your facility. Stokes Vacuum offers training for servicing the Blowers and Microvacs.

## 5.2 Maintenance Schedule

For normal operating conditions, during the first week, the oil levels on each end of the vacuum blower should be checked daily. Bearing and gear oil should be changed every 2000 operating hours. Add oil to maintain proper level as necessary.

Under severe operating conditions such as contamination within the vacuum system or excessively high operating temperatures within the vacuum blower more frequent oil changes are recommended. Operating conditions determine frequency of lubricant changes. Check the drive system condition monthly. Replace any worn components.

Heat transfer fluid in Canned Motor blowers does not require changing but should be checked monthly. Add if fluid is low.

## 5.3 Trouble Shooting

No pump will give good results on a poor vacuum system. If the vacuum in the system is unsatisfactory, the usual cause is leakage. A first step in poor vacuum is to tighten all fittings and verify all valves are closed. Pipe connections should be made with liquid sealant not Teflon tape.

A leak up rate test will help localize a vacuum leak. Such a test is easily made by successively isolating and evacuating each section of the system. The in-leakage rate of each isolated section can be measured. The pressure change rate is then noted. A vacuum leak detector will speed up the process of locating leaks. Stokes Vacuum offers vacuum leak detection services.

Worn pulleys and over tension shorten belt life as much s 50%. If wear allows the belts to contact the bottom of the pulley, slippage and belt burn may result. Convex wear on the side of the belts indicates pulley groove wear. Alignment problems are evident by significant wear on one side of a belt only.

| Problem | Possible Cause | Solution |
|---|---|---|
| Machine does not start | Electrical | Check electrical supply and control wiring. |
| | Rotor rub or damage | Restore clearances. |
| | Casing distortion | Relieve pipe stain or body distortion. |
| | Foreign material | Check system for material. |
| No gas flow | Speed too low | Check for belt slip and adjust. |
| | Wrong rotation | Check rotation, Switch any two leads. |
| | Obstruction in piping | Check piping, valves for open flow path. |
| | Bypass open | Free valve using a momentary gas rush. |
| Low capacity | Speed too low | Check backing pump. |
| | Excessive pressure rise | Check actual inlet and discharge pressure against predicted values. |
| | Obstruction in piping | Remove cause. |
| | Excessive slip | Remove cause. |
| | System leak | Check system, valves, fittings, plugs for leaks. |
| Excessive power | Speed too high | Check speed. Compare with rated. |
| | Pressure too high | Check actual inlet and discharge pressure against predicted values. |
| | Wrong rotation | Check rotation. Switch any two leads. |
| | Impeller rub | Check outside of cylinder, endplates, high temperature areas and impellers for contact. |
| Impeller tip drags on impeller or blower body | Insufficient clearances | Correct clearances. |
| | Blower body distortion | Relieve pipe strain or body distortion. |
| | Excessive operating pressure | Remove cause. |
| | Excessive temperature | Remove cause. |
| Excessive blower temperature | Filter clogged | Clean or replace filter. |
| | Oil overfilled | Adjust oil level. |
| | Excessive pressure differential | Check cut in pressure and backing pump . |
| | Poor vacuum | Check system for leaks & purge rates. |
| Overheating bearings or gears | Oil level incorrect | Adjust oil level. |
| | Dirty lubrication | Change oil. |
| | Coupling misalignment | Realign coupling. |
| | Excessive belt tension | Readjust alignment and tension. |
| | Insufficient water flow | Adjust water flow. |
| Knocking | Impeller timing | Check timing and readjust as required. |
| | Blower body distortion | Relieve pipe stain or body distortion. |
| | Excessive operating pressure | Remove cause. |
| | Excessive temperature | Remove cause. |
| | Worn bearings | Replace bearings. |
| | Worn gears | Replace gears. |
| Vibration | Drive misalignment | Readjust alignment and tension. |
| | Insufficient anchoring support | Add support to eliminate vibration. |
| | Impeller drag | Adjust timing and clearance. |
| | Worn bearings | Replace bearings. |
| | Worn gears | Replace gears. |
| Loss of oil | Oil cavity plug leak | Replace plug O-rings. |
| | Vacuum leak | Check seal O-rings and vacuum joints. |
| | Worn seal | Replace seal, static ring and O-rings. |
| Abnormal noise | Impeller tip drag | Check timing and readjust as required. |
| | Worn bearing | Replace bearings. |
| | Gear backlash | Replace gears. |
| | Improper belt tension | Re-tension belts. |
| (Seal squeal) | Improper oil level | Slightly lower oil level. |
| Can motor will not operate or motor cuts out | Low heat transfer fluid level | Adjust fluid level. |
| | Insufficient water flow | Increase water flow to activate flow switch. |
| | Safety devices wiring | Check wiring. |
| | Improper overloads | Check overloads. |

# M SEAL MHR HORIZONTAL FLOW MECHANICAL SEAL BLOWER
# 607-MHR LOT NO. FUTURE
# 615-MHR LOT NO. 78869 (5), 68934 (10) FUTURE
# 622-MHR LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP | 607-MHR | 615-MHR | 622-MHR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | **601-537-019** | **607 HORZ MECH SEAL BLOWER** | **D-601-537-019** | | | | X | | |
| | **601-537-015** | **615 HORZ MECH SEAL BLOWER** | **D-601-537-015** | | | | | X | |
| | **601-537-021** | **622 HORZ MECH SEAL BLOWER** | **D-601-537-021** | | | | | | X |
| | | | | | | | | | |
| 1 | 424-657-002 | BODY 607 BLOWER MACHINING | D-424-657-002 | 1 | EA | | X | | |
| 1 | 424-309-002 | BODY 615 BLOWER MACHINING | D-424-309-002-K | 1 | EA | | | X | |
| 1 | 428-575-001 | BODY 622 BLOWER MACHINING | D-428-575-001 | 1 | EA | | | | X |
| | | | | | | | | | |
| 2 | 424-661-008 | IMPELLER DRIVEN 607, KEYLESS | D-424-661-008 | 1 | EA | | X | | |
| 2 | 424-312-006 | IMPELLER DRIVEN 615, KEYLESS | D-424-312-006-A | 1 | EA | | | X | |
| 2 | 427-956-003 | IMPELLER DRIVEN 622, KEYLESS | D-427-956-003 | 1 | EA | | | | X |
| | | | | | | | | | |
| 3 | 424-662-009 | IMPELLER DRIVE 607, KEYLESS | D-424-662-009 | 1 | EA | | X | | |
| 3 | 424-311-007 | IMPELLER DRIVE 615, KEYLESS | D-424-311-007-A | 1 | EA | | | X | |
| 3 | 427-955-010 | IMPELLER DRIVE 622 KEYLESS | D-427-955-010 | 1 | EA | | | | X |
| | | | | | | | | | |
| 4 | 605-484-002 | MSEAL ENDPLATE 6" BLOWERS | D-605-484-002 | 1 | EA | | X | X | X |
| 5 | 424-310-009 | GEAR COVER MACHINING | D-424-310-009 | 1 | EA | | X | X | X |
| 6 | 424-313-003 | BEARING HOUSING 615 HORZ | D-424-313-003-G | 2 | EA | | X | X | X |
| 7 | 605-504-005 | CARRIER, MSEAL 6" BLOWERS | B-605-504-005 | 1 | EA | | X | X | X |
| 8 | 605-510-001 | FLINGER ASSY | B-605-510-001-A | 1 | EA | | X | X | X |
| 9 | 424-326-001 | SHAFT CLAMP PLATE | A-424-326-001-B | 1 | EA | | X | X | X |

**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

# M SEAL MHR HORIZONTAL FLOW MECHANICAL SEAL BLOWER
# 607-MHR LOT NO. FUTURE
# 615-MHR LOT NO. 78869 (5), 68934 (10) FUTURE
# 622-MHR LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP | 607-MHR | 615-MHR | 622-MHR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 10 | 425-033-001 | LABYRINTH SEAL FIXED | A-425-033-001-E | 4 | EA | | X | X | X |
| 11 | 425-034-002 | LABYRINTH SEAL ROTATING | A-425-034-002-H | 4 | EA | | X | X | X |
| 12 | 607-387-001 | BEARING RETAINER | B-607-387-001 | 2 | EA | | X | X | X |
| 121 | 424-327-002 | BRG RETAINER PLATE | B-424-327-002A | 2 | EA | | X | X | X |
| 13 | 424-680-002 | KEY PULLEY 607/615/622 | A-424-680-002-B | 1 | EA | | X | X | X |
| 14 | 085-051-794 | GEAR HELICAL SET 6" BLWRS MSEAL | | 1 | EA | | X | X | X |
| 15 | 085-051-795 | RING CLAMP | A-085-051-795 | 2 | EA | | X | X | X |
| 16 | 085-051-793 | LOCKING ELEMENT ASSEMBLY | | 2 | EA | | X | X | X |
| 17 | 085-051-013 | SEAL, FACE, ANTIMONY CARBON | B-085-051-013 | 1 | EA | | X | X | X |
| 18 | 085-052-012 | FELT DUST SEAL STYLE "F" | A-085-052-012 | 1 | EA | | X | X | X |
| 19 | 085-052-055 | BEARING, ROLLER | | 2 | EA | | X | X | X |
| 20 | 085-044-345 | BRG BALL 50MM X 90MM X30.2MM | * | 2 | EA | | X | X | X |
| 21 | 085-027-094 | RING RETAINER EXT SPRING STL | | 1 | EA | | X | X | X |
| 22 | 085-051-070 | SIGHT GLASS 1-5/8-12 THD STEEL | | 2 | EA | | X | X | X |
| 23 | 085-020-514 | O RING 2-5/8 ID X .139 | | 1 | EA | | X | X | X |
| 24 | 085-037-788 | WASHER SPRING 1.988 ID X 2.658 | | 4 | EA | | X | X | X |
| 25 | 008-002-019 | PIN DOWEL STL 1/4 DIA X1-1/4 | | 4 | EA | | X | X | X |
| 26 | 008-002-044 | PIN DOWEL HARD STL 1/2 X 2 | | 4 | EA | | X | X | X |
| 27 | 085-051-796 | GEAR SPACER KEYLESS | A-085-051-796 | 2 | EA | | X | X | X |
| 28 | 075-040-012 | PLUG TUBE 3/16 PORT SZ #3 | | 1 | EA | | X | X | X |
| 29 | 085-052-065 | PLUG O-RING BOSS-20 | | 1 | EA | | X | X | X |
| 30 | 085-052-011 | PLUG ORB-8 MAGNETIC | | 2 | EA | | X | X | X |
| 31 | 075-033-472 | PLUG O RING 1/2 X 3/4-16 THD | | 6 | EA | | X | X | X |
| 32 | 085-005-131 | O RING 3-1/4 ID X 3-1/2 OD | | 1 | EA | | X | X | X |
| 33 | 085-037-672 | O RING .644 ID X .087 SECT | * | 2 | EA | | X | X | X |
| 34 | 001-002-021 | SCR SOC 1/4-20 X 5/8 LG | | 4 | EA | | X | X | X |

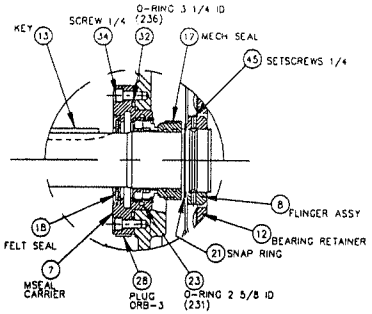
**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

# M SEAL MHR HORIZONTAL FLOW MECHANICAL SEAL BLOWER
# 607-MHR LOT NO. FUTURE
# 615-MHR LOT NO. 78869 (5), 68934 (10) FUTURE
# 622-MHR LOT NO. FUTURE
# SERIAL NO.

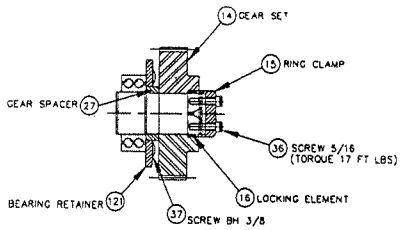
| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP | 607-MHR | 615-MHR | 622-MHR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 35 | 001-001-053 | SCR HEX 3/8-16 X 4 LG STL | | 43 | EA | | X | X | X |
| 36 | 001-002-039 | SCR SOC 5/16-18 X 1-1/4 LG ST | | 12 | EA | | X | X | X |
| 37 | 085-015-684 | SCR BUT HD SOC 3/8-16 X 3/4 | | 16 | EA | | X | X | X |
| 38 | 001-036-018 | SCR SOC 1/2-13 X 1-1/2 LG | | 1 | EA | | X | X | X |
| 39 | 085-052-013 | BEARING OD SHIM | A-085-052-013 | 2 | EA | | X | X | X |
| 40 | 424-051-001 | OIL, V-LUBE H 1 GALLON | | 1 | GL | | X | X | X |
| 41 | 085-008-032 | FLANGE PROTECTOR,8"PIPE SIZE | | 2 | EA | | X | X | X |
| 45 | 001-011-023 | SCR SET HOLLOW 1/4"-20X3/8LG | | 2 | EA | | X | X | X |
| 46 | 085-023-876 | FPS SS PLUG HXO 3/8 NPT | | 4 | EA | | X | X | X |

RSP = RECOMMENDED SPARE PART
UM = UNIT OF MEASURE

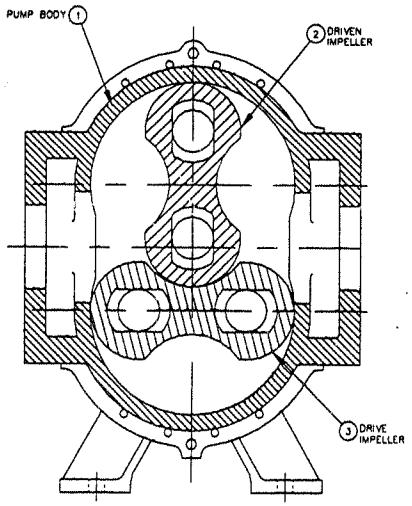
NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-005 REF.(42)
4. REFERENCE DIMENSIONAL DRAWING A-606-613-006.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.



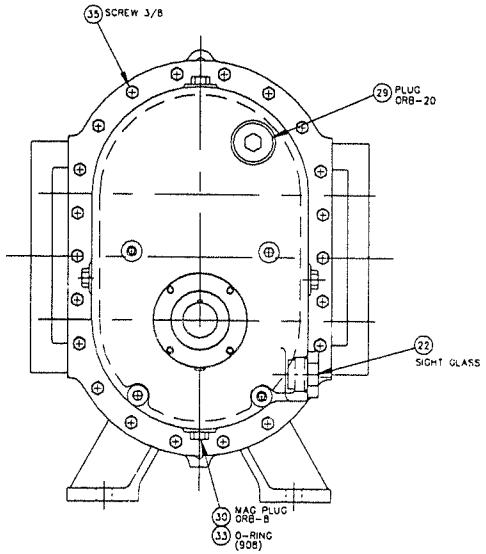

DETAIL 1

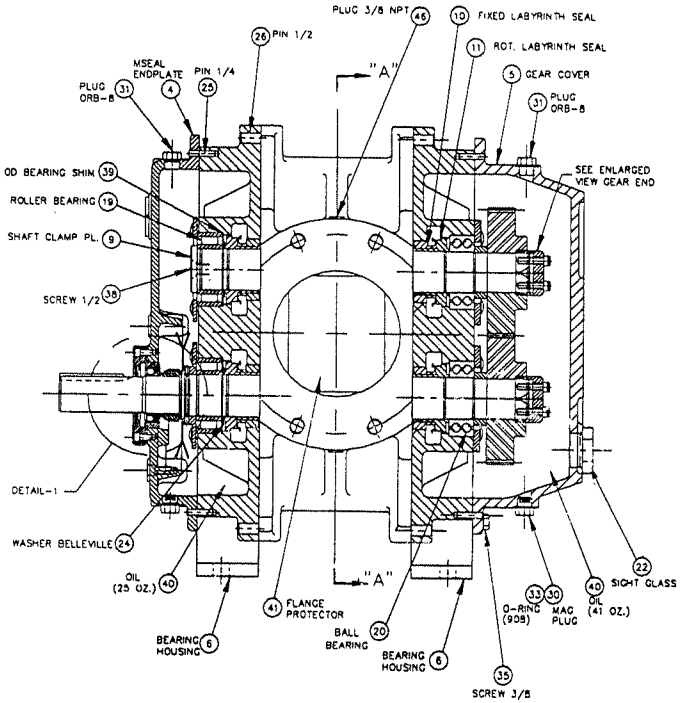



ENLARGED VIEW OF GEAR END




SECTION "A-A"




# 607 MECHANICAL FACE SEALED BLOWER WITH KEYLESS TIMING HORIZONTAL FLOW (612-1225 CFM)

ACAD FILE No. 60153719 CREATED BY R.K./CJC



| DATE | APP | REVISIONS |
|---|---|---|
| | | B |
| | | A |

DESCRIPTIVE TITLE: ASSEMBLY HORZ 607 M SEAL

DRAWN BY R.K. DATE 4/20/00 SCALE: 1=3
CHECKED BY ____ DATE ____
APPROVED BY ____ DATE ____ PLOT SCALE: 3=1
APPROVED BY ____ DATE ____
S. O. ____ PRODUCT CODE NO. 900-607-MHR

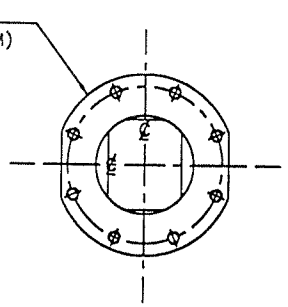
STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

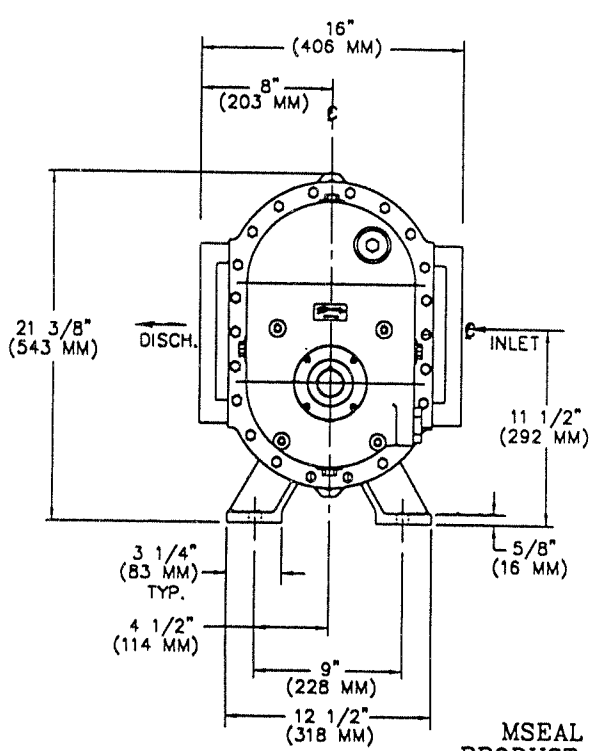
DWG. NO. D-601-537-019

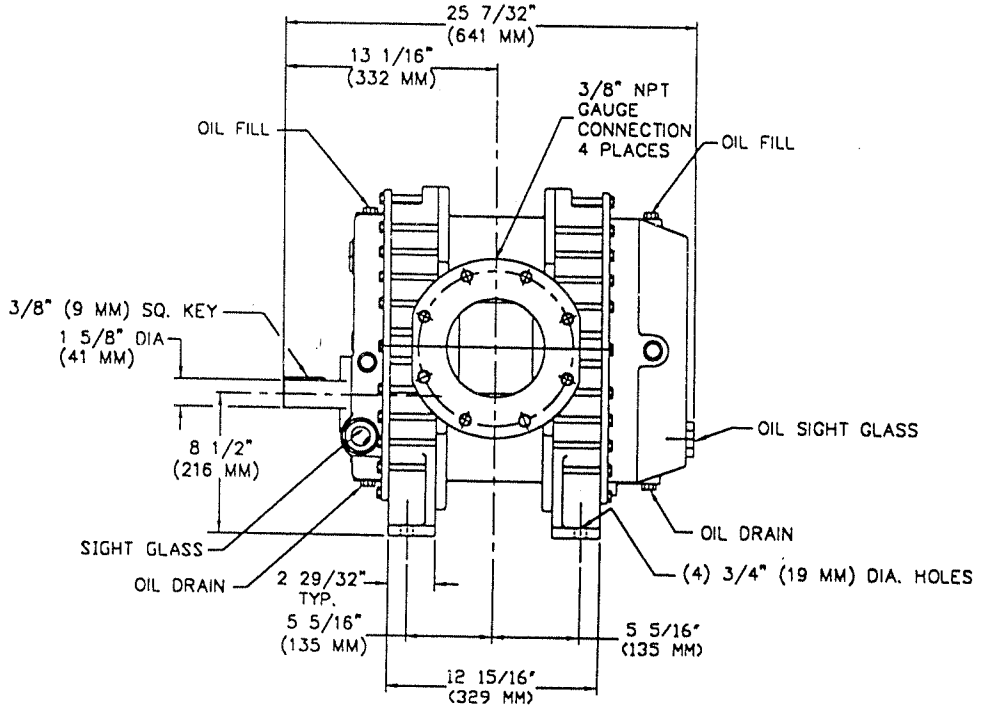
OIL CAPACITY
4 5/8 PINTS (2.18 LITERS)

APPROX. WEIGHT
485 LBS. (220 KG.)

PUMPING CAPACITIES
612 CFM. AT 1800 RPM.
935 CFM AT 2750 RPM.
1225 RPM AT 3600 RPM MAX.




MSEAL KEYLESS BLOWER
PRODUCT CODE 900-607-MHR
MODEL #607MHR
HORIZONTAL FLOW BLOWER
MECHANICAL SHAFT SEAL

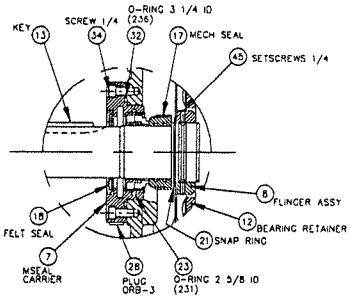
STOKES® VACUUM Inc.

ACAD No. 60681306 (1=11)

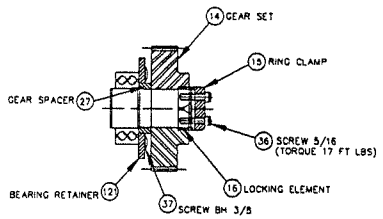
DWG. No. A-606-613-006

R.K. 4/20/00

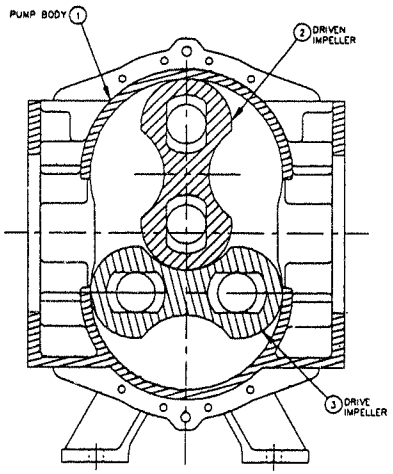
NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-005 REF. 42
4. REFERENCE DIMENSIONAL DRAWING A-606-613-005.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.



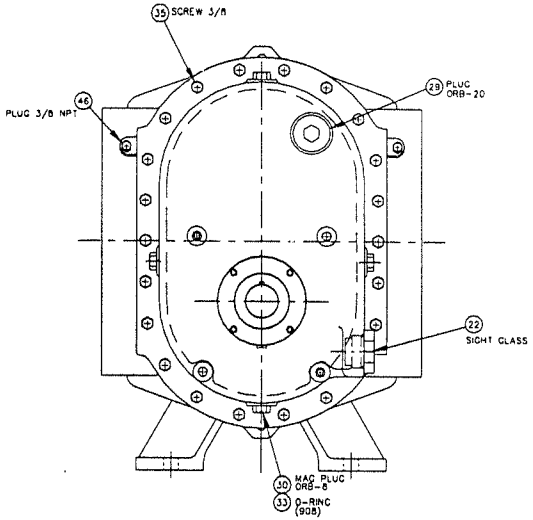

DETAIL 1

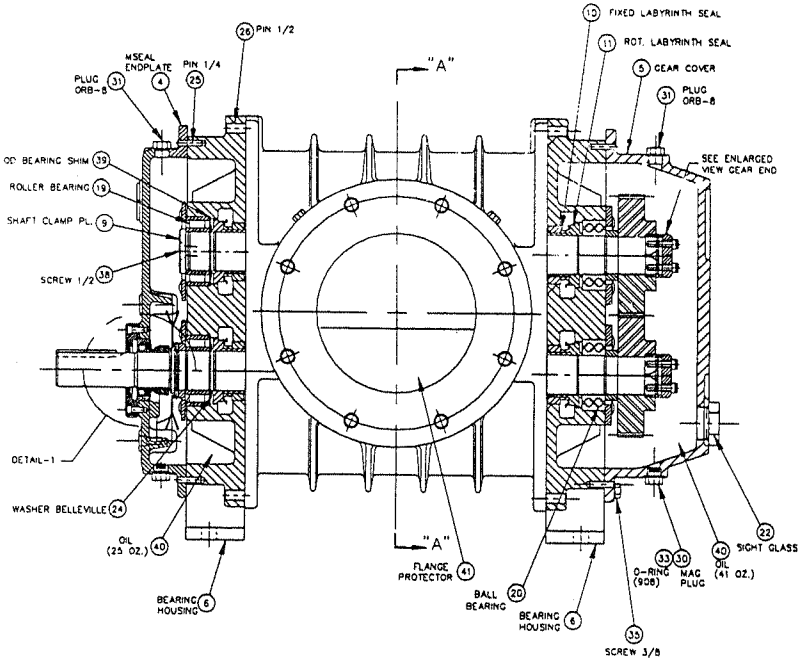



ENLARGED VIEW OF GEAR END




SECTION "A-A"




# 615 MECHANICAL FACE SEALED BLOWER WITH KEYLESS TIMING HORIZONTAL FLOW (1300-2600 CFM)

ACAD FILE No. 60153715 CREATED BY R.K.



| DATE | APP | REVISIONS |
|---|---|---|
| | | B |
| | | A |

DESCRIPTIVE TITLE: 615 HORZ MECH SEAL BLOWER

DRAWN BY R.K. DATE 12/03/99 SCALE: 1=3
CHECKED BY ____ DATE ____
APPROVED BY ____ DATE ____ PLOT SCALE: 3=1
APPROVED BY ____ DATE ____
S. O. ____ PRODUCT CODE NO. 900-615-MHR

STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

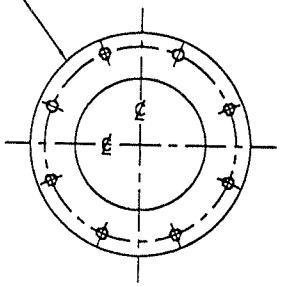
DWG. NO. D-601-537-015

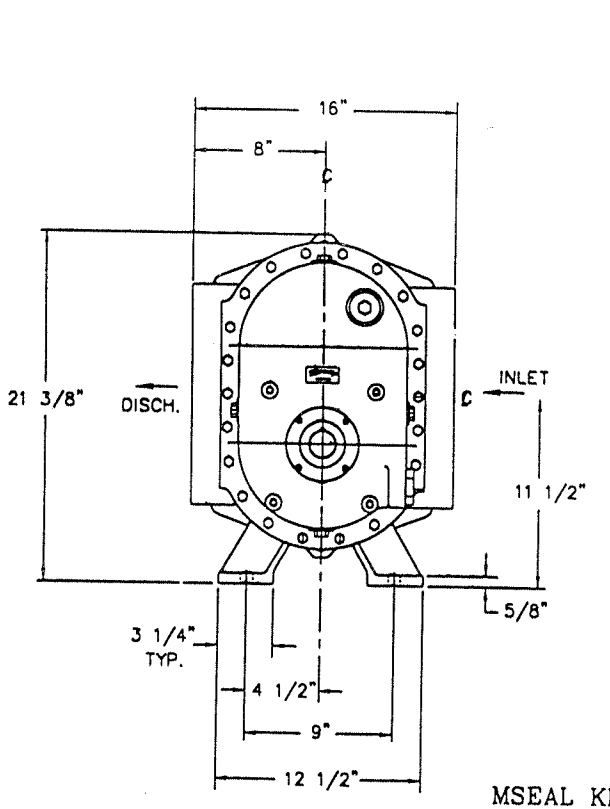
**OIL CAPACITY**
4.6 PINTS (2.18 LITERS)

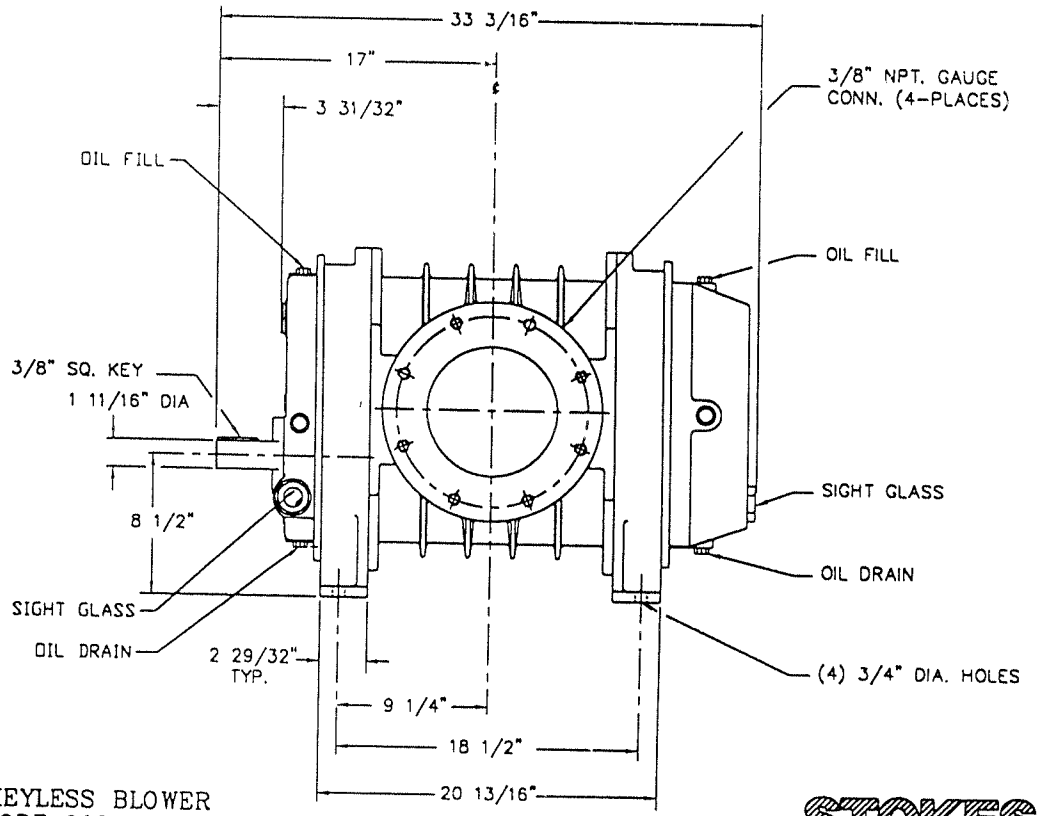
**APPROX WEIGHT**
550 LBS. (258 KG.)

**PUMPING CAPACITIES**
1300 CFM. AT 1800 RPM.
2000 CFM. AT 2750 RPM.
2600 CFM. AT 3600 RPM.

FLANGE CONN. 13 1/2" (343 MM) O.D. x
8" (203 MM) I.D. (8) 3/4"-10 NC x 1 1/8" (29 MM)
DEEP TAPPED HOLES ON 11 3/4" (298 MM) B.C.
HOLES STRADDLE ℄'S
(TYP. BOTH SIDES)






## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-615-MHR

MODEL #615MHR
HORIZONTAL FLOW BLOWER
MECHANICAL SHAFT SEAL

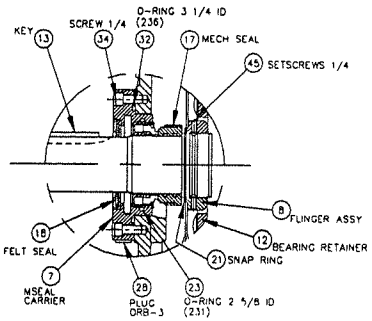
STOKES® VACUUM Inc.

ACAD No. 60661305 (1=11)

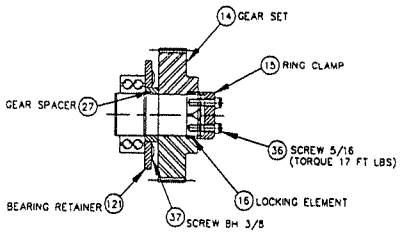
DWG. No. A-606-613-005

CJC 12/12/1999

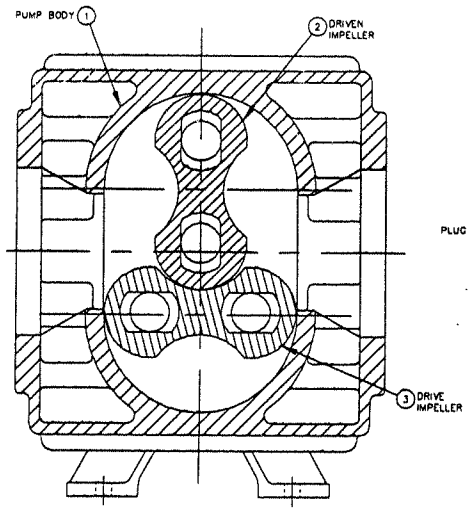
NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-005 REF. (42)
4. REFERENCE DIMENSIONAL DRAWING A-606-613-008.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.



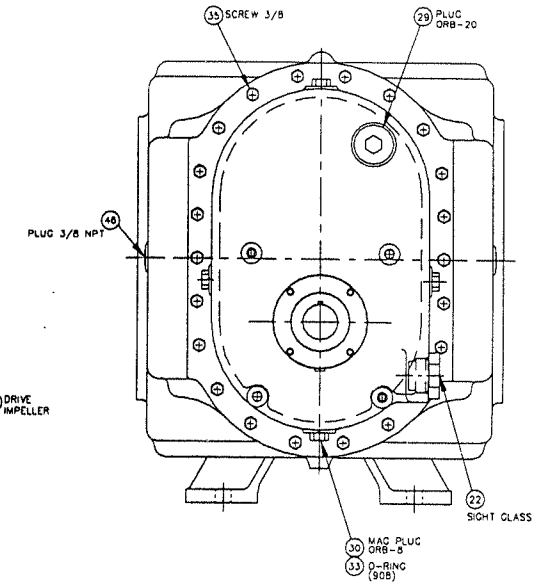
DETAIL 1

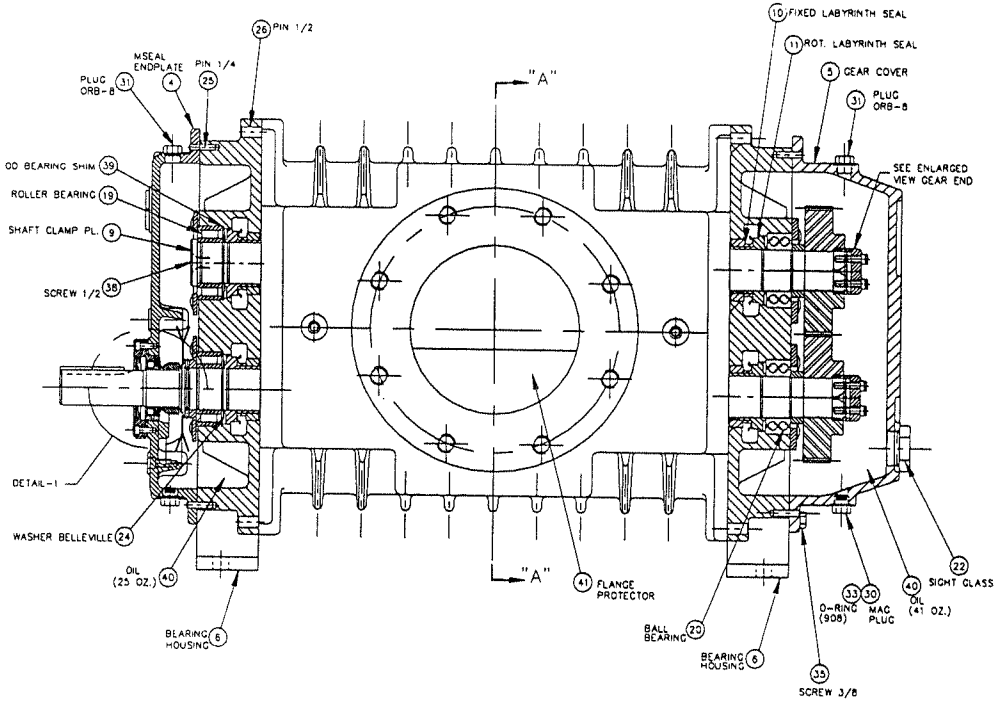


ENLARGED VIEW OF GEAR END



SECTION "A-A"




# 622 MECHANICAL FACE SEALED BLOWER WITH KEYLESS TIMING HORIZONTAL FLOW (1920-3840 CFM)

ACAD FILE No. 60153721 CREATED BY R.K./CJC



| | | | |
|---|---|---|---|
| | | | B |
| | | | A |
| DATE | APP | REVISIONS | |

DESCRIPTIVE TITLE ASSEMBLY HORIZONTAL 622 M SEAL

DRAWN BY R.K. DATE 5/9/00 SCALE: 1=3
CHECKED BY CEROVICH DATE 5/22/00
APPROVED BY CEROVICH DATE 5/22/00 PLOT SCALE: 3=1
APPROVED BY ____ DATE ____
S. O. ____ PRODUCT CODE NO. 900-622-MHR

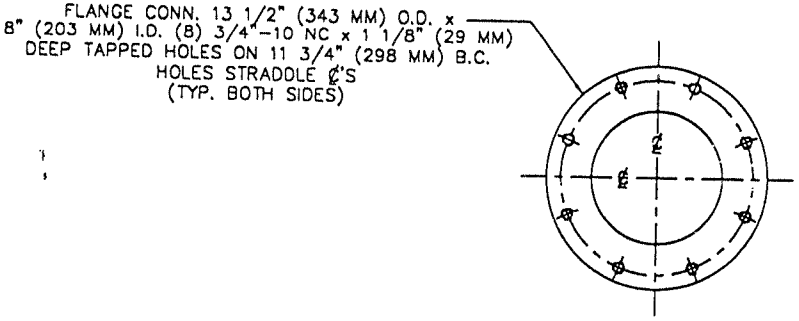
STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

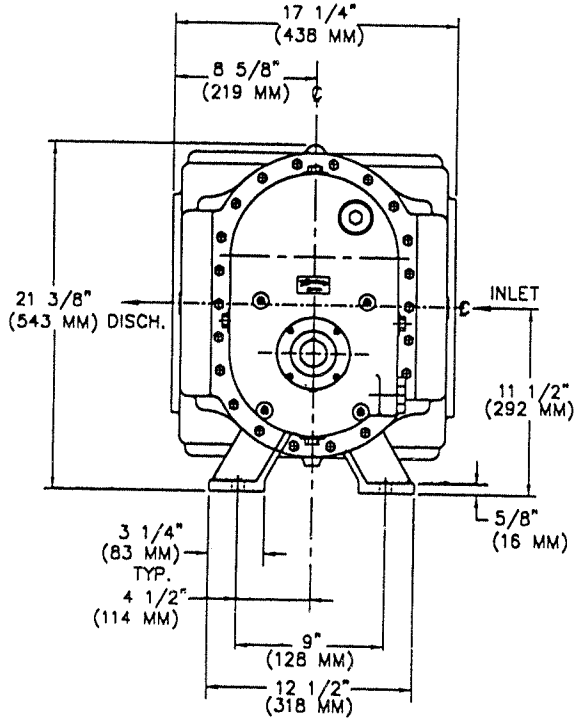
DWG. NO. D-601-537-021

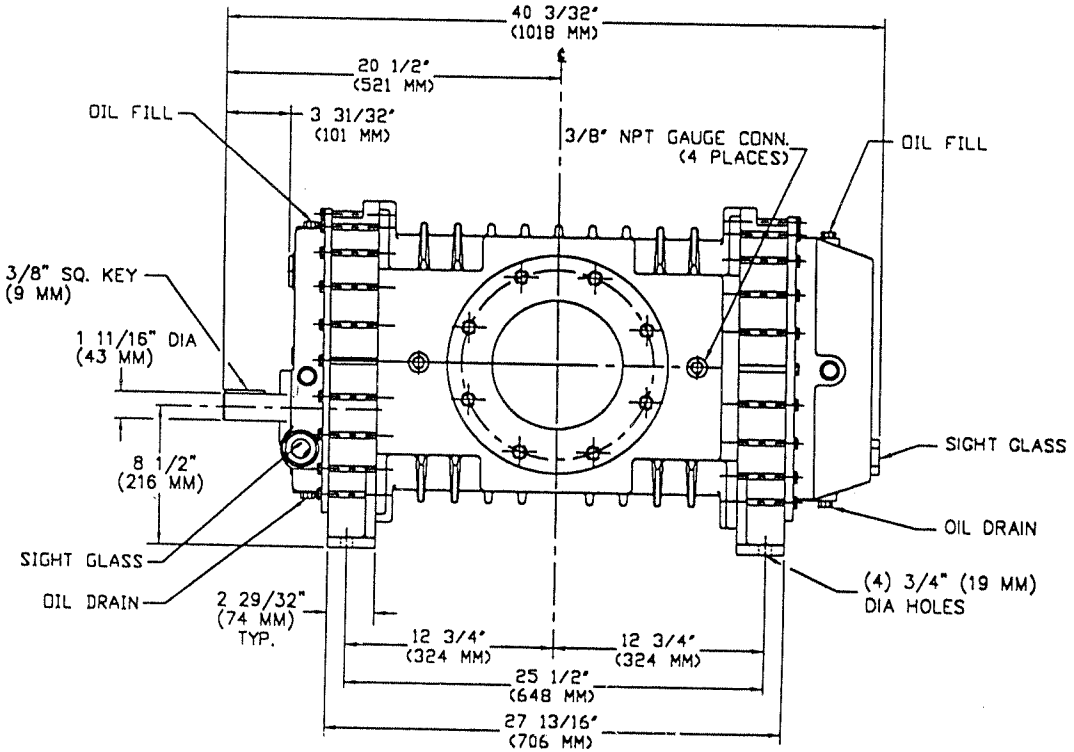
**OIL CAPACITY**
4.6 PINTS (2.18 LITERS)

**APPROX. WEIGHT**
740 LBS. (336 KG.)

**PUMPING CAPACITIES**
1920 CFM. AT 1800 RPM.
2930 CFM. AT 2750 RPM.
3840 CFM. AT 3600 RPM MAX.




## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-622-MHR

MODEL #622MHR
HORIZONTAL FLOW BLOWER
MECHANICAL SHAFT SEAL

STOKES® VACUUM Inc.

ACAD No. 60661306 (1=11)

DWG. No. A-606-613-008

RK 5/15/00

# M SEAL VERTICAL FLOW MECHANICAL SEAL BLOWER
# 607-MVR LOT NO. FUTURE
# 615-MVR LOT NO. FUTURE
# 622-MVR LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP | 607-MVR | 615-MVR | 622-MVR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | **601-537-020** | **607 VERT MECH SEAL BLOWER** | **D-601-537-020** | | | | X | | |
| | **601-537-016** | **615 VERT MECH SEAL BLOWER** | **D-601-537-016** | | | | | X | |
| | **601-537-022** | **622 VERT MECH SEAL BLOWER** | **D-601-537-022** | | | | | | X |
| | | | | | | | | | |
| 1 | 424-657-002 | BODY 607 BLOWER MACHINING | D-424-657-002 | 1 | EA | | X | | |
| 1 | 424-309-002 | BODY 615 BLOWER MACHINING | D-424-309-002-K | 1 | EA | | | X | |
| 1 | 428-575-001 | BODY 622 BLOWER MACHINING | D-428-575-001 | 1 | EA | | | | X |
| | | | | | | | | | |
| 2 | 424-310-009 | GEAR COVER MACHINING | D-424-310-009 | 1 | EA | | X | X | X |
| | | | | | | | | | |
| 3 | 424-661-008 | IMPELLER DRIVEN 607, KEYLESS | D-424-661-008 | 1 | EA | | X | | |
| 3 | 424-312-006 | IMPELLER DRIVEN 615, KEYLESS | D-424-312-006-A | 1 | EA | | | X | |
| 3 | 427-956-003 | IMPELLER DRIVEN 622, KEYLESS | D-427-956-003 | 1 | EA | | | | X |
| | | | | | | | | | |
| 4 | 424-662-009 | IMPELLER DRIVE 607, KEYLESS | D-424-662-009 | 1 | EA | | X | | |
| 4 | 424-311-007 | IMPELLER DRIVE 615, KEYLESS | D-424-311-007-A | 1 | EA | | | X | |
| 4 | 427-955-010 | IMPELLER DRIVE 622, KEYLESS | D-427-955-010 | 1 | EA | | | | X |
| | | | | | | | | | |
| 5 | 605-484-002 | MSEAL ENDPLATE 6" BLOWERS | D-605-484-002 | 1 | EA | | X | X | X |
| 6 | 424-665-012 | BEARING HOUSING VERTICAL | D-424-665-012-G | 2 | EA | | X | X | X |
| 7 | 605-504-005 | CARRIER, MSEAL 6" BLOWERS | B-605-504-005 | 1 | EA | | X | X | X |
| 8 | 605-510-001 | FLINGER ASSY | B-605-510-001-A | 1 | EA | | X | X | X |
| 9 | 424-680-002 | KEY PULLEY 607/615/622 | A-424-680-002-B | 1 | EA | | X | X | X |
| 10 | 424-326-001 | SHAFT CLAMP PLATE | A-424-326-001-B | 1 | EA | | X | X | X |
| 11 | 425-033-001 | LABYRINTH SEAL FIXED | A-425-033-001-E | 4 | EA | | X | X | X |
| 12 | 425-034-002 | LABYRINTH SEAL ROTATING | A-425-034-002-H | 4 | EA | | X | X | X |
| 13 | 607-387-001 | BEARING RETAINER | B-607-387-001 | 2 | EA | | X | X | X |

**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

# M SEAL VERTICAL FLOW MECHANICAL SEAL BLOWER
# 607-MVR LOT NO. FUTURE
# 615-MVR LOT NO. FUTURE
# 622-MVR LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP | 607-MVR | 615-MVR | 622-MVR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 131 | 424-327-002 | BRG RETAINER PLATE | B-424-327-002A | 2 | EA | | X | X | X |
| 14 | 428-231-006 | SPLASHER BACK PLATE | B-428-231-006-B | 1 | EA | | X | X | X |
| 15 | 428-134-006 | SPLASHING TROUGH | B-428-134-006-D | 1 | EA | | X | X | X |
| 16 | 085-052-012 | FELT DUST SEAL STYLE "F" | A-085-052-012 | 1 | EA | | X | X | X |
| 17 | 085-051-013 | SEAL, FACE, ANTIMONY CARBON | B-085-051-013 | 1 | EA | | X | X | X |
| 18 | 085-051-796 | GEAR SPACER KEYLESS | A-085-051-796 | 2 | EA | | X | X | X |
| 19 | 085-051-794 | GEAR HELICAL SET 6" BLWRS MSEAL | | 1 | EA | | X | X | X |
| 20 | 085-051-795 | RING CLAMP | A-085-051-795 | 2 | EA | | X | X | X |
| 21 | 085-051-793 | LOCKING ELEMENT ASSEMBLY | | 2 | EA | | X | X | X |
| 22 | 085-051-070 | SIGHT GLASS 1-5/8-12 THD STEEL | | 2 | EA | | X | X | X |
| 23 | 085-027-094 | RING RETAINER EXT SPRING STL | | 1 | EA | | X | X | X |
| 24 | 008-002-044 | PIN DOWEL HARD STL 1/2 X 2 | | 4 | EA | | X | X | X |
| 25 | 008-002-019 | PIN DOWEL STL 1/4 DIA X1-1/4 | | 4 | EA | | X | X | X |
| 26 | 085-052-055 | BEARING, ROLLER | | 2 | EA | | X | X | X |
| 27 | 085-044-345 | BRG BALL 50MM X 90MM X30.2MM | * | 2 | EA | | X | X | X |
| 28 | 085-020-514 | O RING 2-5/8 ID X .139 | | 1 | EA | | X | X | X |
| 29 | 075-033-472 | PLUG O RING 1/2 X 3/4-16 THD | | 6 | EA | | X | X | X |
| 30 | 085-052-011 | PLUG ORB-8 MAGNETIC | | 2 | EA | | X | X | X |
| 31 | 075-040-012 | PLUG TUBE 3/16 PORT SZ #3 | | 1 | EA | | X | X | X |
| 32 | 085-052-065 | PLUG O-RING BOSS-20 | | 1 | EA | | X | X | X |
| 33 | 085-037-672 | O RING .644 ID X .087 SECT | * | 2 | EA | | X | X | X |
| 34 | 085-005-131 | O RING 3-1/4 ID X 3-1/2 OD | | 1 | EA | | X | X | X |
| 35 | 085-037-788 | WASHER SPRING 1.988 ID X 2.658 | | 4 | EA | | X | X | X |
| 36 | 001-036-018 | SCR SOC 1/2-13 X 1-1/2 LG | | 1 | EA | | X | X | X |
| 37 | 001-001-053 | SCR HEX 3/8-16 X 4 LG STL | | 43 | EA | | X | X | X |
| 38 | 001-003-033 | SCR MACH RD HD 8-32 X 3/8 STL | | 5 | EA | | X | X | X |
| 39 | 001-002-021 | SCR SOC 1/4-20 X 5/8 LG | | 4 | EA | | X | X | X |

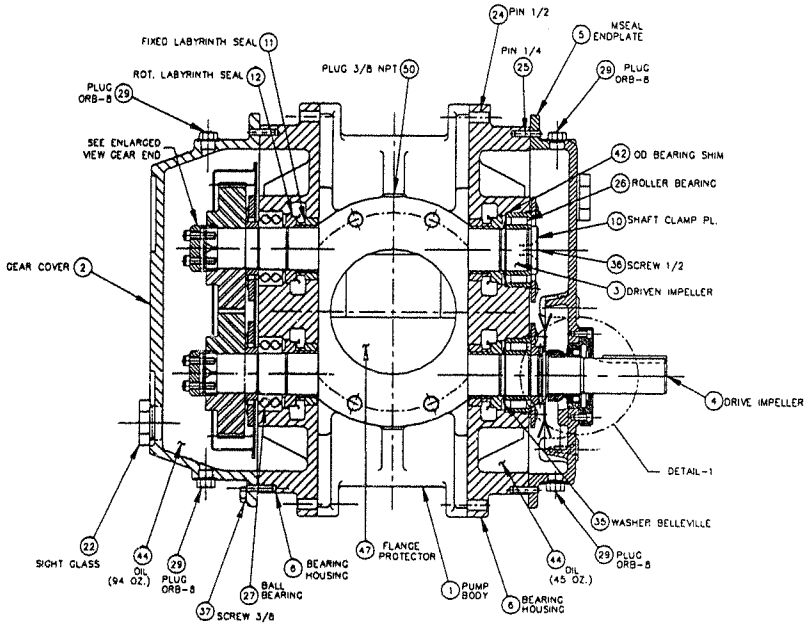
**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

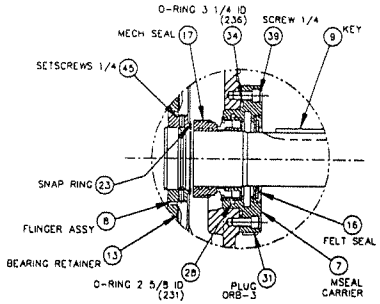
# M SEAL VERTICAL FLOW MECHANICAL SEAL BLOWER
# 607-MVR LOT NO. FUTURE
# 615-MVR LOT NO. FUTURE
# 622-MVR LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP | 607-MVR | 615-MVR | 622-MVR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 40 | 001-002-039 | SCR SOC 5/16-18 X 1-1/4 LG ST | | 12 | EA | | X | X | X |
| 41 | 085-015-684 | SCR BUT HD SOC 3/8-16 X 3/4 | | 16 | EA | | X | X | X |
| 42 | 085-052-013 | BEARING OD SHIM | A-085-052-013 | 2 | EA | | X | X | X |
| 43 | 007-005-002 | WASHER LOCK SPRING SPLIT STL | | 5 | EA | | X | X | X |
| 44 | 424-051-001 | OIL, V-LUBE H 1 GALLON | | 2 | GL | | X | X | X |
| 45 | 001-011-023 | SCR SET HOLLOW 1/4"-20X3/8LG | | 2 | EA | | X | X | X |
| 47 | 085-008-032 | FLANGE PROTECTOR,8"PIPE SIZE | | 2 | EA | | X | X | X |
| 50 | 085-023-876 | FPS SS PLUG HXO 3/8 NPT | | 4 | EA | | X | X | X |

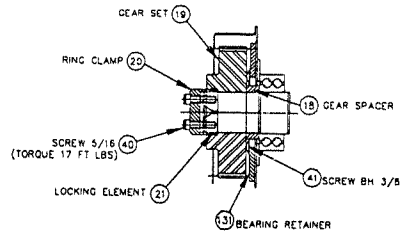
RSP = RECOMMENDED SPARE PART
UM = UNIT OF MEASURE

NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-004 REF. (49)
4. REFERENCE DIMENSIONAL DRAWING A-606-613-007.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.

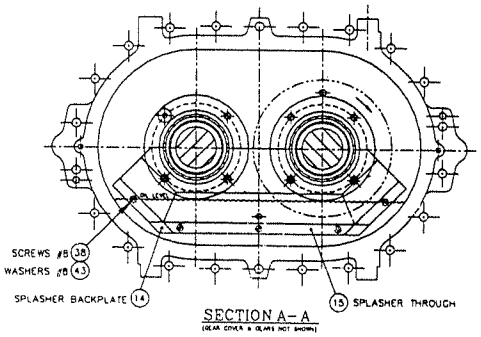


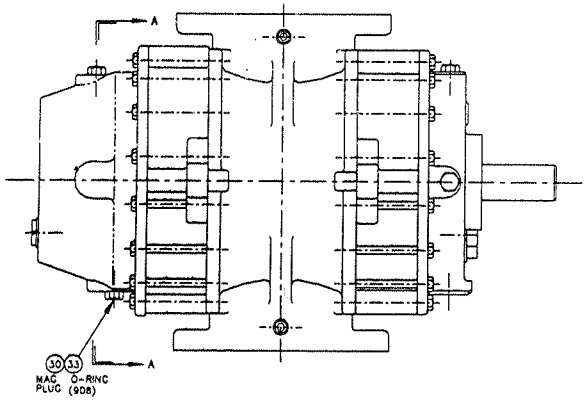

DETAIL 1

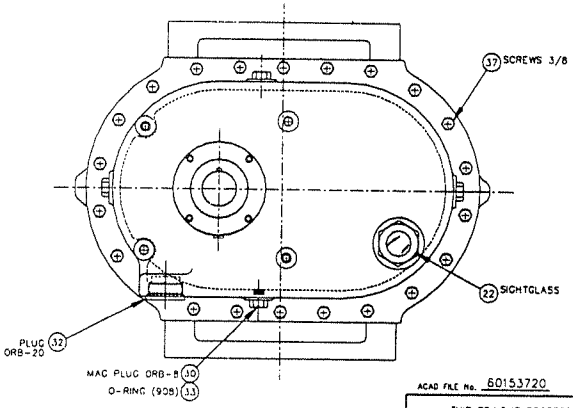



ENLARGED VIEW OF GEAR END




SECTION A-A
(GEAR COVER & GLASS NOT SHOWN)




607 MECHANICAL FACE SEAL BLOWER
WITH KEYLESS TIMING
VERTICAL FLOW (600-1225 CFM)

ACAD FILE No. 60153720 CREATED BY R.K./CJC



| DATE | APP | REVISIONS |
|---|---|---|
| | | B |
| | | A |

DESCRIPTIVE TITLE: ASSEMBLY VERTICAL 607 M SEAL

DRAWN BY R.K. DATE 4/20/00 SCALE: 1=3
CHECKED BY ____ DATE ____
APPROVED BY ____ DATE ____ PLOT SCALE: 3=1
APPROVED BY ____ DATE ____
S.O. ____ PRODUCT CODE NO. 900-607-MVR

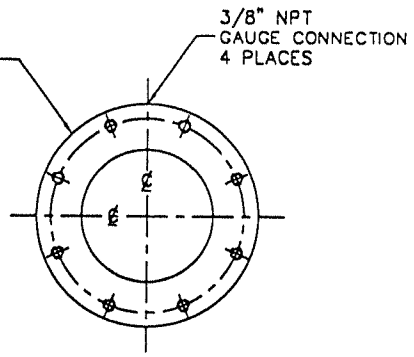
STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

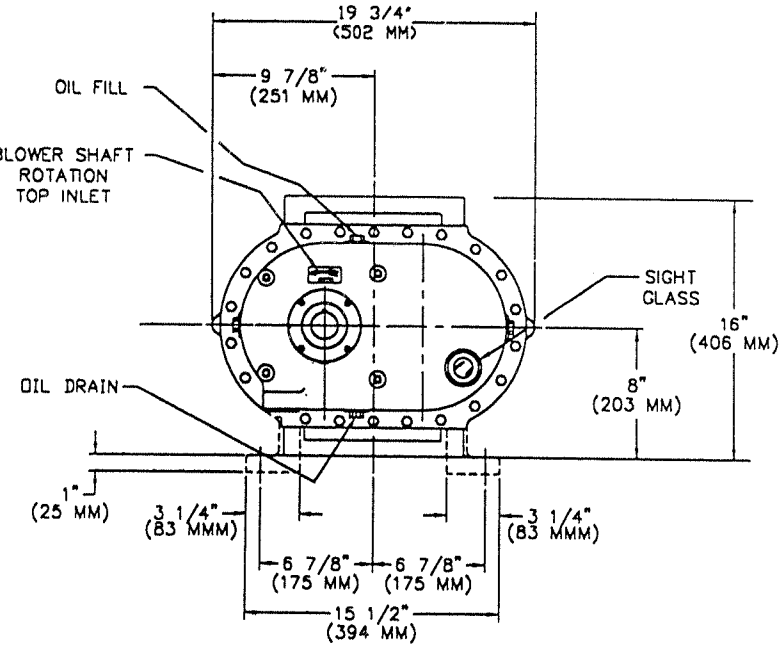
DWG. NO. D-601-537-020

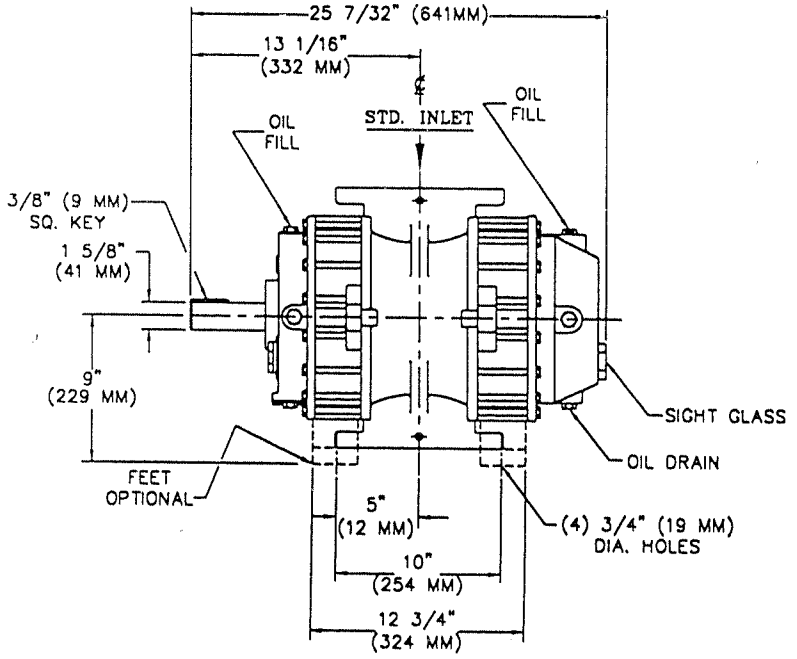
OIL CAPACITY
9 1/4 PINTS (4.38 LITERS)

APPROX. WEIGHT
475 LBS. (215 KG.)

PUMPING CAPACITIES
612 CFM. AT 1800 RPM.
935 CFM AT 2750 RPM.
1225 RPM AT 3600 RPM MAX.




## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-607-MVR

MODEL #607MVR
VERTICAL FLOW BLOWER
MECHANICAL SHAFT SEAL

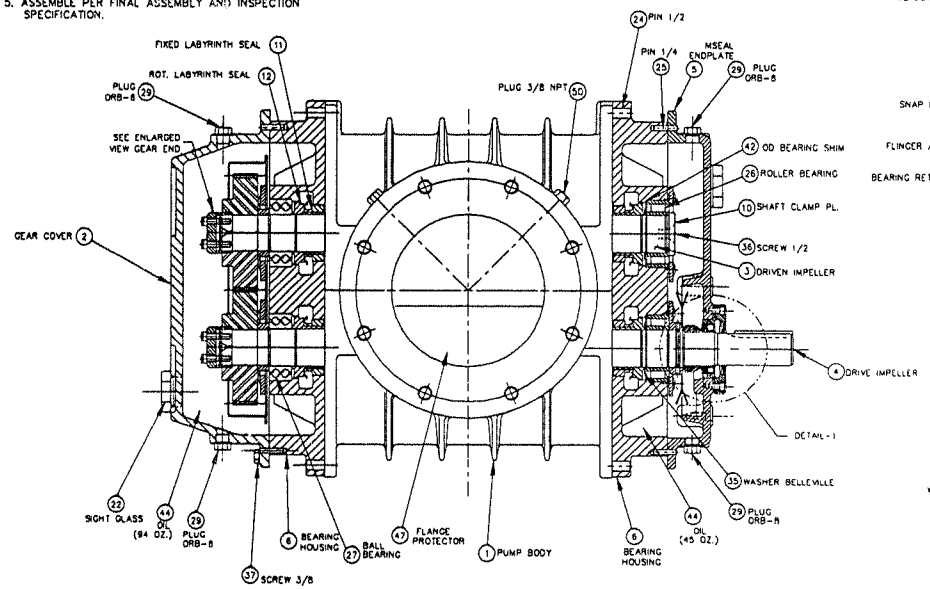
STOKES® VACUUM Inc.

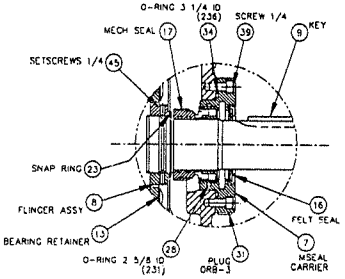
ACAO No. 60661307 (1=11)

DWG. No. A-606-613-007

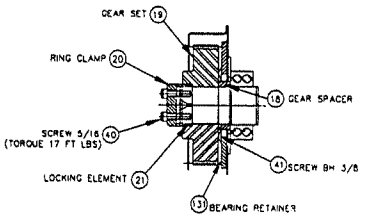
RK 4/20/2000

NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-004 REF. 46
4. REFERENCE DIMENSIONAL DRAWING A-606-613-004.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.

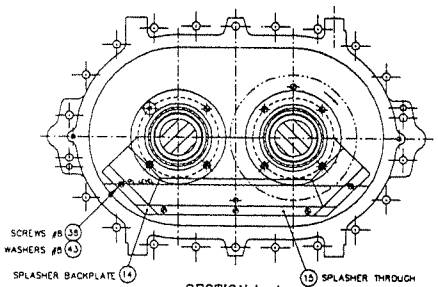


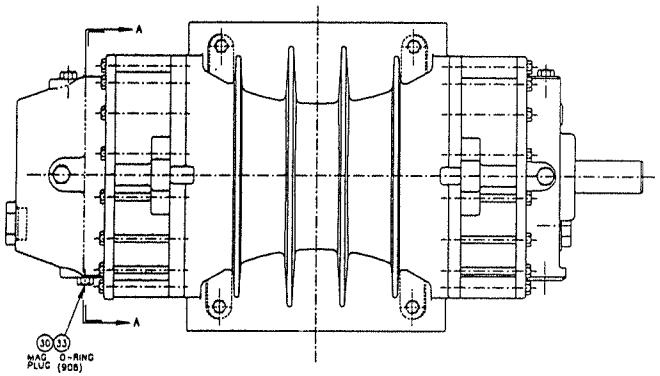

DETAIL 1

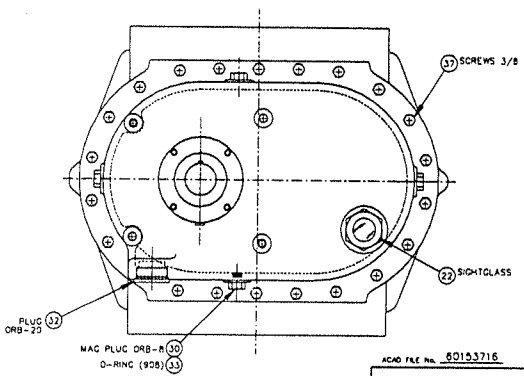



ENLARGED VIEW OF GEAR END




SECTION A-A
(GEAR COVER & BEARING NOT SHOWN)




615 MECHANICAL FACE SEAL BLOWER
WITH KEYLESS TIMING
VERTICAL FLOW (1300-2600 CFM)

ACAD FILE No. 60153716 CREATED BY R.K.



| DESCRIPTION TITLE | 615 VERT MECH SEAL BLOWER |
|---|---|
| DRAWN BY R.K. | DATE 12/6/99 SCALE: 1=3 |
| CHECKED BY | DATE |
| APPROVED BY | DATE PLOT SCALE: 3=1 |
| APPROVED BY | DATE |
| S. O. | PRODUCT CODE NO. 900-615-MVR |

| DATE | APP | REVISIONS |
|---|---|---|
| | | B |
| | | A |

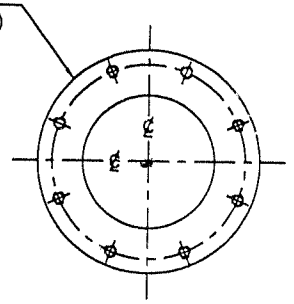
STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

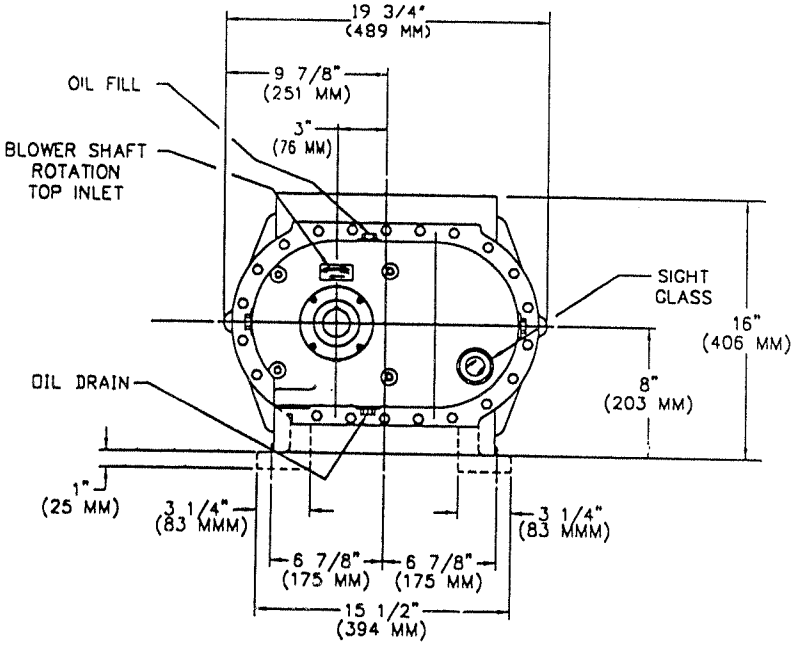
DWG. NO. D-601-537-016

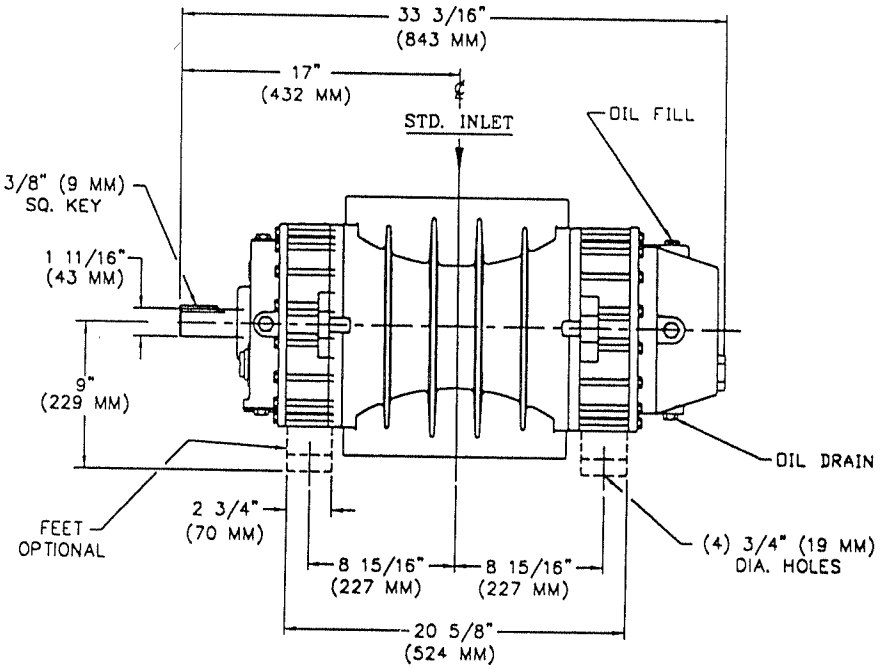
**OIL CAPACITY**
9 1/4 PINTS (4.38 LITERS)

**APPROX. WEIGHT**
550 LBS. (258 KG.)

**PUMPING CAPACITIES**
1300 CFM. AT 1800 RPM.
2000 CFM. AT 2750 RPM.
2600 CFM. AT 3600 RPM.




## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-615-MVR

MODEL #615MVR
VERTICAL FLOW BLOWER
MECHANICAL SHAFT SEAL

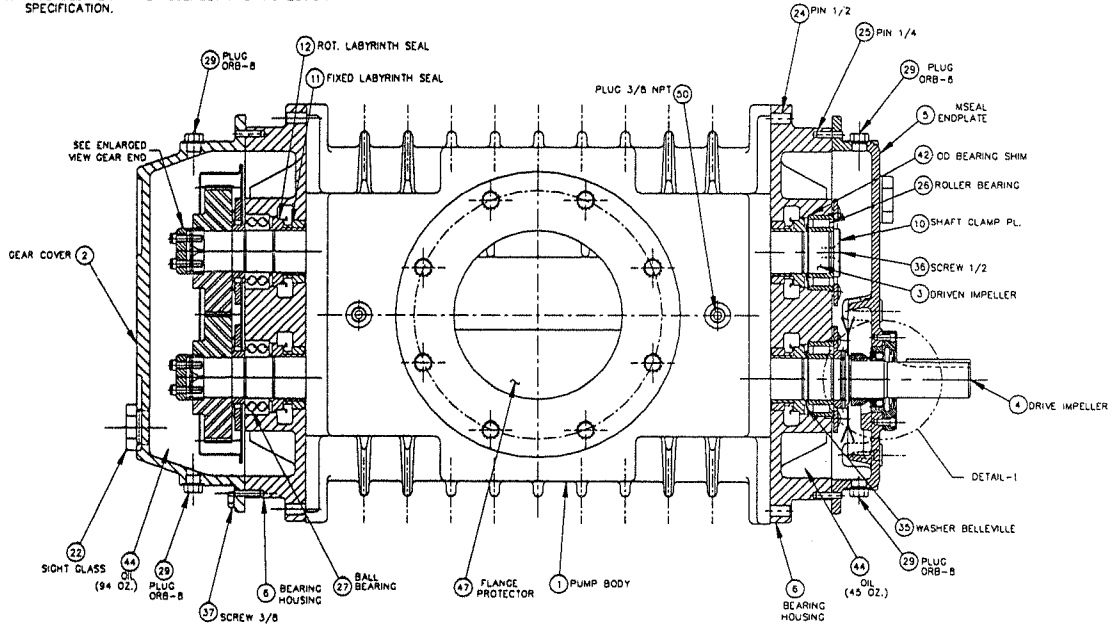
STOKES® VACUUM Inc.

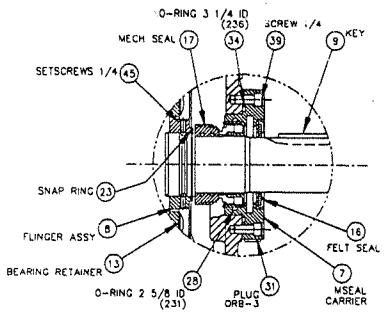
ACAD No. 60661304 (1=11)

DWG. No. A-606-613-004

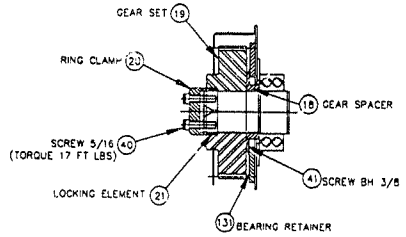
CJC 12/12/1999

NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-004 REF. (48)
4. REFERENCE DIMENSIONAL DRAWING A-613-613-009.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.

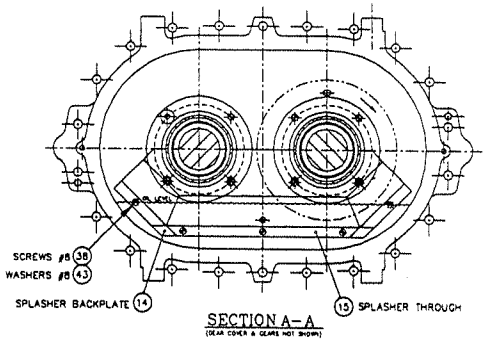


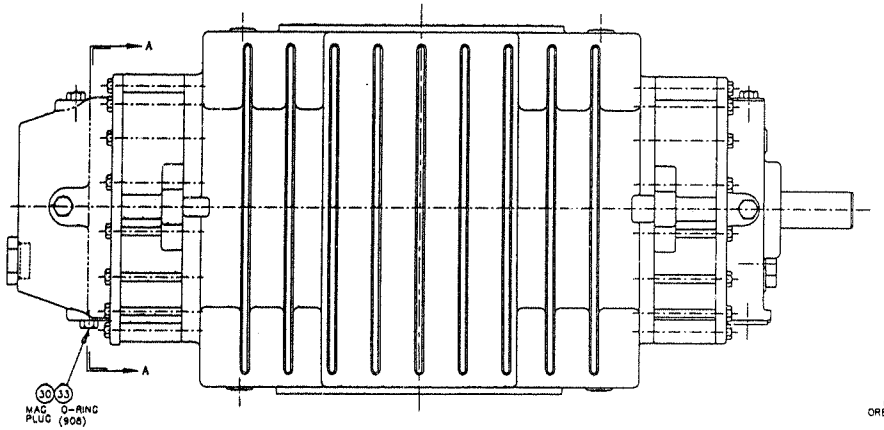

DETAIL 1

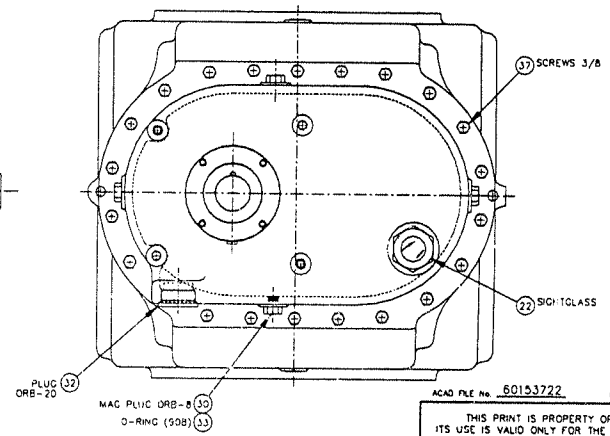



ENLARGED VIEW OF GEAR END




SECTION A-A
(GEAR COVER & GEARS NOT SHOWN)




622 MECHANICAL FACE SEAL BLOWER
WITH KEYLESS TIMING
VERTICAL FLOW (1920-3840 CFM)

ACAD FILE No. 60153722 CREATED BY R.K./CJC



| | | | |
|---|---|---|---|
| | | | B |
| | | | A |
| DATE | APP | REVISIONS | |

DESCRIPTIVE TITLE ASSEMBLY VERTICAL 622 M SEAL

DRAWN BY R.K. DATE 5/9/00 SCALE: 1=3
CHECKED BY CEROVICH DATE 5/22/00
APPROVED BY CEROVICH DATE 5/22/00 PLOT SCALE: 3=1
APPROVED BY _____ DATE _____
S. O. _____ PRODUCT CODE NO. 900-622-MVR

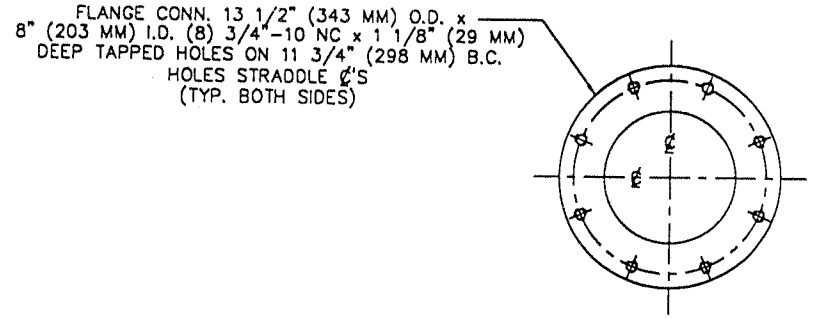
STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

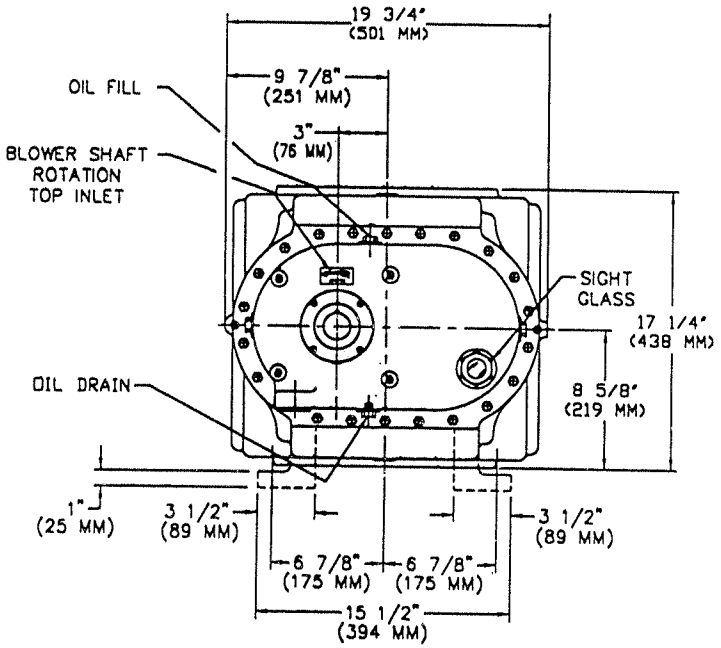
DWG. NO. D-601-537-022

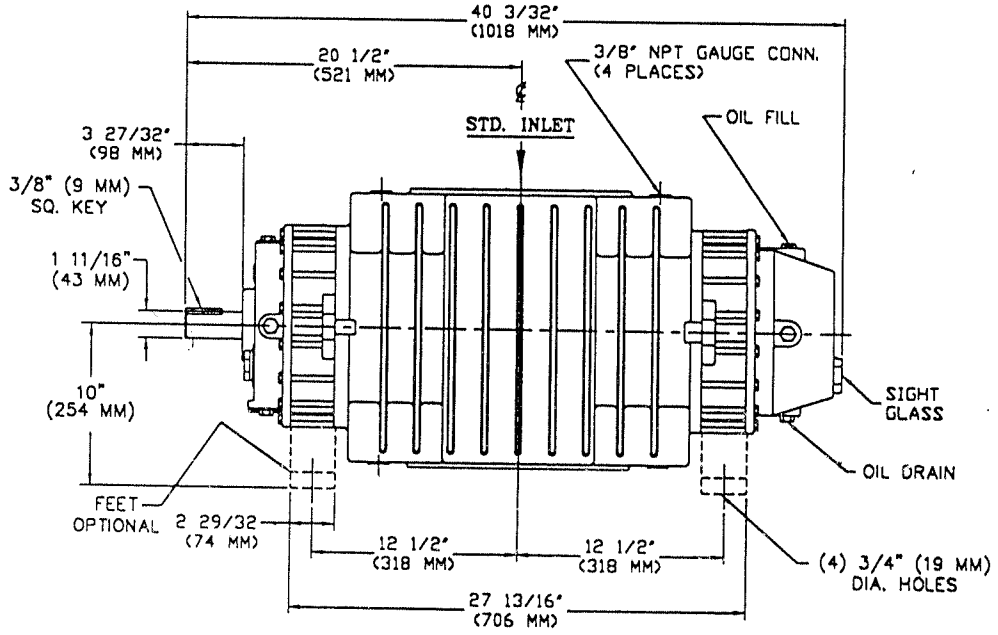
**OIL CAPACITY**
9 1/4 PINTS (4.38 LITERS)

**APPROX. WEIGHT**
740 LBS. (336 KG.)

**PUMPING CAPACITIES**
1920 CFM. AT 1800 RPM.
2930 CFM. AT 2750 RPM.
3840 CFM. AT 3600 RPM MAX.




## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-622-MVR

MODEL #622MVR
VERTICAL FLOW BLOWER
MECHANICAL SHAFT SEAL

STOKES® VACUUM Inc.

ACAD No. 60661309 (1=11)

DWG. No. A-606-613-009

RK 5/15/00

# MODEL 61B-MHR 615 BP HORIZONTAL FLOW MECHANICAL SEAL BLOWER
# LOT NO. 78870 (5), 78933 (10)
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP |
|---|---|---|---|---|---|---|
| | | | | | | |
| | **601-537-017** | **615 VERT MECH SEAL BLOWER** | **D-601-537-017** | | | |
| | | | | | | |
| 1 | 432-299-002 | BLOWER BODY 615 BP | D-432-299-002-C | 1 | EA | |
| 2 | 424-312-006 | IMPELLER DRIVEN 615, KEYLESS | D-424-312-006-A | 1 | EA | |
| 3 | 424-311-007 | IMPELLER DRIVE 615, KEYLESS | D-424-311-007-A | 1 | EA | |
| 4 | 602-181-003 | VALVE PISTON | C-602-181-003-C | 1 | EA | |
| 5 | 602-182-002 | VALVE CAP | D-602-182-002 | 1 | EA | |
| 6 | 605-484-002 | MSEAL ENDPLATE (615) | D-605-484-002 | 1 | EA | |
| 7 | 424-310-009 | GEAR COVER MACHINING | D-424-310-009 | 1 | EA | |
| 8 | 424-313-003 | BEARING HOUSING 615 HORZ | D-424-313-003-G | 2 | EA | |
| 9 | 605-504-005 | CARRIER, MSEAL | B-605-504-005 | 1 | EA | |
| 10 | 605-510-001 | FLINGER ASSY | B-605-510-001-A | 1 | EA | |
| 11 | 424-326-001 | SHAFT CLAMP PLATE | A-424-326-001-B | 1 | EA | |
| 12 | 607-387-001 | BEARING RETAINER | B-607-387-001 | 2 | EA | |
| 121 | 424-327-002 | BRG RETAINER PLATE | B-424-327-002A | 2 | EA | |
| 13 | 424-680-002 | KEY PULLEY | A-424-680-002-B | 1 | EA | |
| 14 | 425-033-001 | LABYRINTH SEAL FIXED | A-425-033-001-E | 4 | EA | |
| 15 | 425-034-002 | LABYRINTH SEAL ROTATING | A-425-034-002-H | 4 | EA | |
| 16 | 603-369-005 | STROKE LIMIT RING(USE W/-6 1EA | A-603-369-005 | 1 | EA | |
| 17 | 603-369-006 | STROKE LIMIT RING(USE W/-5 1EA | A-603-369-006 | 1 | EA | |
| 18 | 430-288-011 | COMPRESSION SPRING | A-430-288-011 | 1 | EA | |
| 19 | 085-051-070 | SIGHT GLASS 1-5/8-12 THD STEEL | | 2 | EA | |
| 20 | 085-051-795 | RING CLAMP | A-085-051-795 | 2 | EA | |
| 21 | 085-051-796 | GEAR SPACER KEYLESS | A-085-051-796 | 2 | EA | |
| 22 | 085-051-013 | SEAL, FACE, ANTIMONY CARBON | B-085-051-013 | 1 | EA | |
| 23 | 085-052-012 | FELT DUST SEAL STYLE "F" | A-085-052-012 | 1 | EA | |
| 24 | 085-052-055 | BEARING, ROLLER | | 2 | EA | |
| 25 | 085-052-013 | BEARING OD SHIM | A-085-052-013 | 2 | EA | |

**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

# MODEL 61B-MHR 615 BP HORIZONTAL FLOW MECHANICAL SEAL BLOWER
# LOT NO. 78870 (5), 78933 (10)
# SERIAL NO.

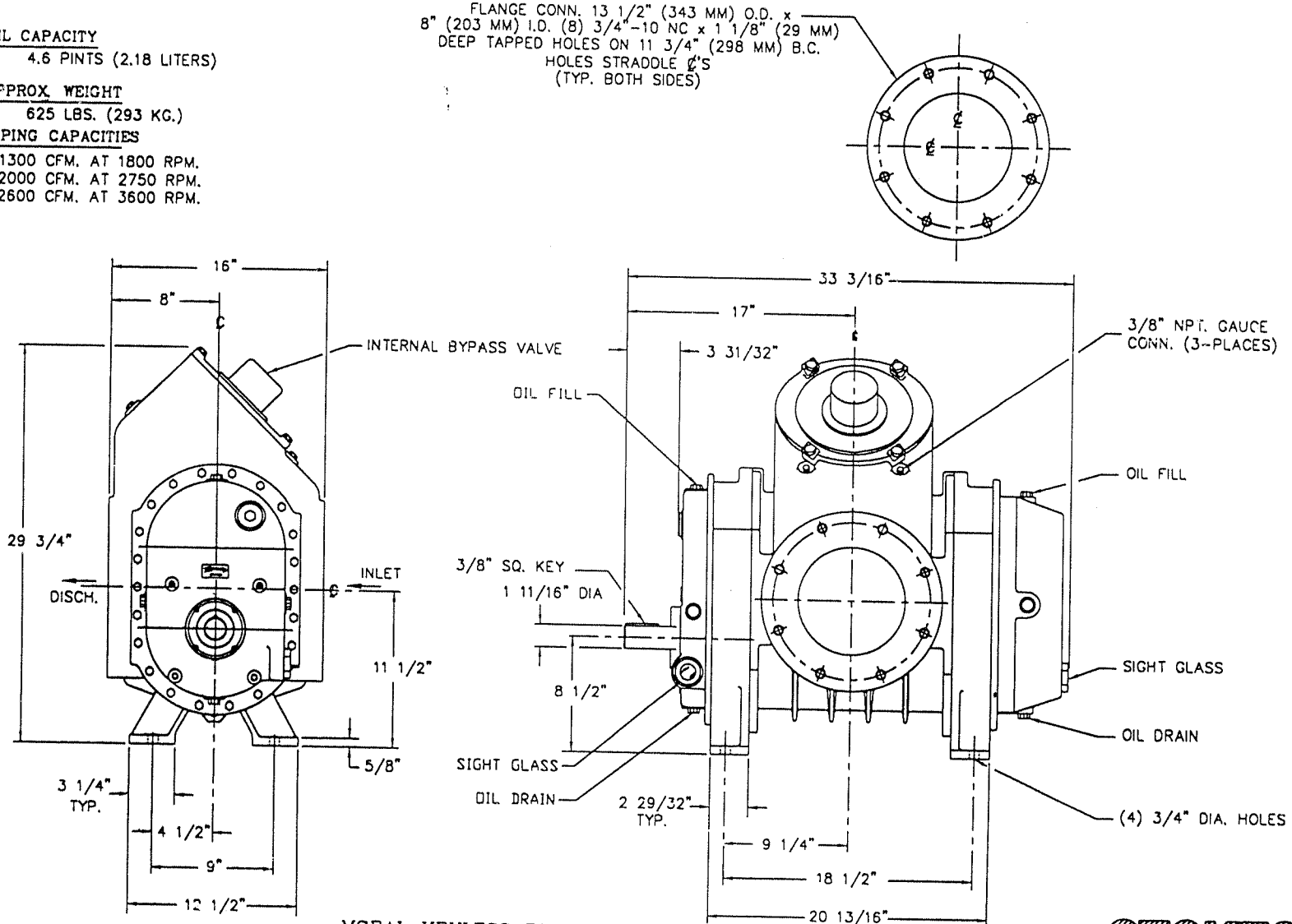
| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP |
|---|---|---|---|---|---|---|
| | | | | | | |
| 26 | 085-027-094 | RING RETAINER EXT SPRING STL | | 1 | EA | |
| 27 | 085-051-793 | LOCKING ELEMENT ASSEMBLY | | 2 | EA | |
| 28 | 085-044-345 | BRG BALL 50MM X 90MM X30.2MM | * | 2 | EA | |
| 29 | 085-020-514 | O RING 2-5/8 ID X .139 | | 1 | EA | |
| 30 | 085-051-794 | GEAR HELICAL SET | | 1 | EA | |
| 31 | 085-037-788 | WASHER SPRING 1.988 ID X 2.658 | | 4 | EA | |
| 32 | 085-052-011 | PLUG ORB-8 MAGNETIC | | 2 | EA | |
| 33 | 075-040-012 | PLUG TUBE 3/16 PORT SZ #3 | | 1 | EA | |
| 34 | 085-023-876 | FPS SS PLUG HXO 3/8 NPT | | 3 | EA | |
| 35 | 085-052-065 | PLUG O-RING BOSS-20 | | 1 | EA | |
| 36 | 085-005-131 | O RING 3-1/4 ID X 3-1/2 OD | | 1 | EA | |
| 37 | 085-042-116 | O-RING VITON 6-1/2 ID X 7 OD | | 1 | EA | |
| 38 | 085-036-358 | O-RING VITON 8 ID X.139 C/S | | 1 | EA | |
| 39 | 085-037-672 | O RING .644 ID X .087 SECT | * | 3 | EA | |
| 40 | 008-002-019 | PIN DOWEL STL 1/4 DIA X1-1/4 | | 4 | EA | |
| 41 | 008-002-044 | PIN DOWEL HARD STL 1/2 X 2 | | 4 | EA | |
| 42 | 001-002-021 | SCR SOC 1/4-20 X 5/8 LG | | 4 | EA | |
| 43 | 001-001-041 | SCR HEX 3/8-16 X 1 LG STL | | 4 | EA | |
| 44 | 007-005-006 | WASHER LOCK SPLIT SP 3/8 STD | | 4 | EA | |
| 45 | 001-036-018 | SCR SOC 1/2-13 X 1-1/2 LG | | 1 | EA | |
| 46 | 001-001-053 | SCR HEX 3/8-16 X 4 LG STL | | 43 | EA | |
| 47 | 001-002-039 | SCR SOC 5/16-18 X 1-1/4 LG ST | | 12 | EA | |
| 48 | 085-015-684 | SCR BUT HD SOC 3/8-16 X 3/4 | | 16 | EA | |
| 49 | 075-033-472 | PLUG O RING 1/2 X 3/4-16 THD | | 6 | EA | |
| 50 | 424-051-001 | OIL, V-LUBE H 1 GALLON | | 1 | GL | |
| 51 | 085-008-032 | FLANGE PROTECTOR,8"PIPE SIZE | | 2 | EA | |
| 55 | 001-011-023 | SCR SET HOLLOW 1/4"-20X3/8LG | | 2 | EA | |

**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

**OIL CAPACITY**
4.6 PINTS (2.18 LITERS)

**APPROX. WEIGHT**
625 LBS. (293 KG.)

**PUMPING CAPACITIES**
1300 CFM. AT 1800 RPM.
2000 CFM. AT 2750 RPM.
2600 CFM. AT 3600 RPM.




## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-61B-MHR

MODEL #615MHRBP
BYPASS BLOWER HORIZONTAL FLOW
MECHANICAL SHAFT SEAL

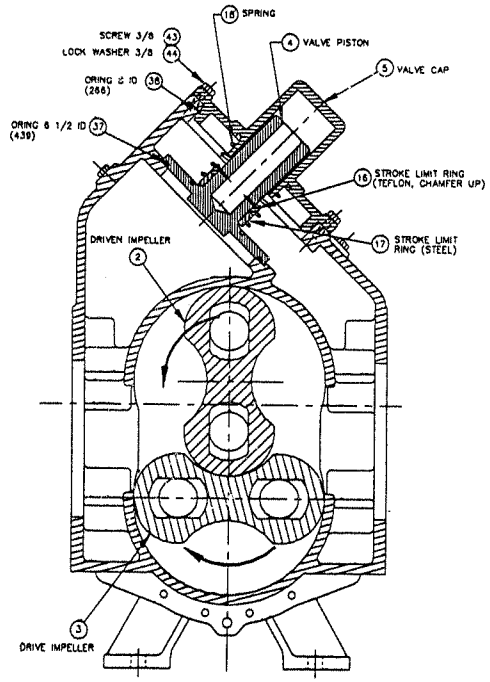
STOKES® VACUUM Inc.

ACAD No. 60681303 (1=11)

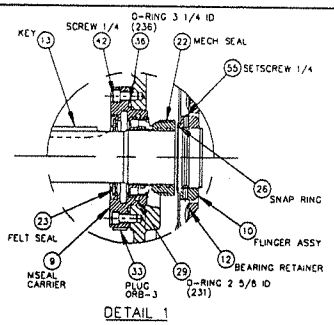
DWG. No. A--606--613-003

C/C 12/12/1999

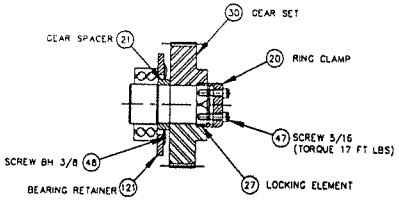
NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. INSTALL TEFLON LIMIT RING WITH CHAMFER UP.
4. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-003 (REF).
5. REFERENCE DIMENSIONAL DRAWING A-606-613-003.
6. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.



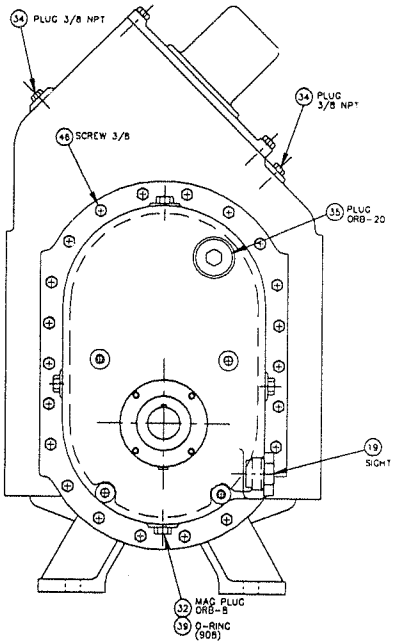

SECTION "A-A"

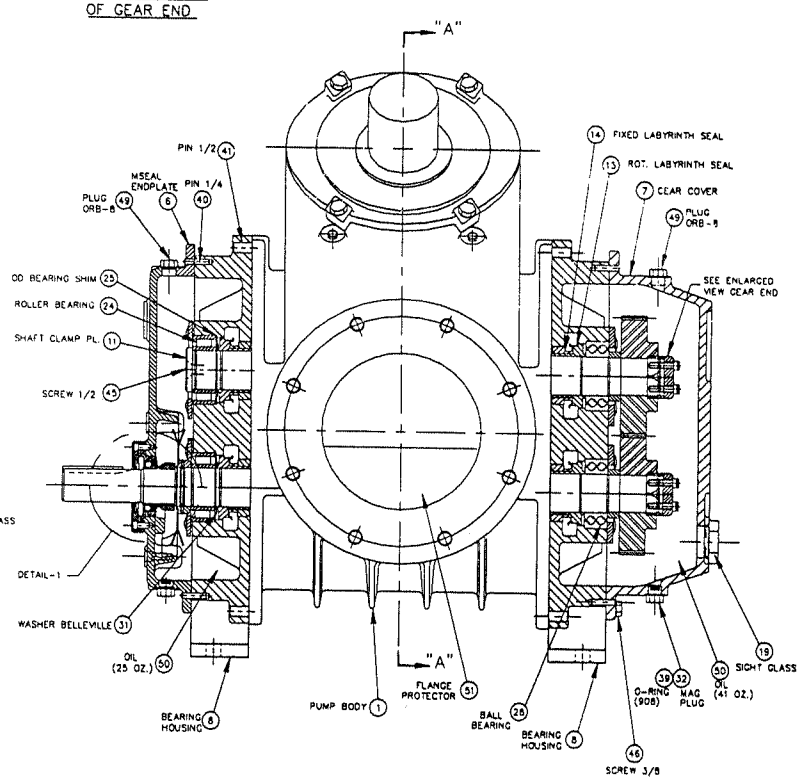



DETAIL 1




ENLARGED VIEW OF GEAR END




# 615 BY-PASS MECHANICAL FACE SEALED BLOWER WITH KEYLESS TIMING HORIZONTAL FLOW (1300-2600 CFM)

ACAD FILE No. 60153717 CREATED BY R.K



| | | |
|---|---|---|
| | | B |
| | | A |
| DATE | APP | REVISIONS |

DESCRIPTIVE TITLE: 615BP HORZ MECH SEAL BLOWER

DRAWN BY R.K. DATE 12/03/99 SCALE: 1=3
CHECKED BY DATE PLOT SCALE: 3=1
APPROVED BY DATE
APPROVED BY DATE
S. O. PRODUCT CODE NO. 900-618-MHR

STOKES VACUUM Inc.
5500 Tabor Road Philadelphia, Pennsylvania 19120

DWG. NO. D-601-537-017

# MODEL 61B-MVR 615BP VERTICAL FLOW MECHANICAL SEAL BLOWER
# LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP |
|---|---|---|---|---|---|---|
| | | | | | | |
| | **601-537-018** | **615BP VERT MECH SEAL BLOWER** | **D-601-537-018** | | | |
| | | | | | | |
| 1 | 432-299-002 | BLOWER BODY 615 BP | D-432-299-002-C | 1 | EA | |
| 2 | 602-181-003 | VALVE PISTON | C-602-181-003-C | 1 | EA | |
| 3 | 602-182-002 | VALVE CAP | D-602-182-002 | 1 | EA | |
| 4 | 424-665-012 | BEARING HOUSING VERTICAL | D-424-665-012-G | 2 | EA | |
| 5 | 424-310-009 | GEAR COVER MACHINING | D-424-310-009 | 1 | EA | |
| 6 | 605-484-002 | MSEAL ENDPLATE (615) | D-605-484-002 | 1 | EA | |
| 7 | 424-312-006 | IMPELLER DRIVEN 615, KEYLESS | D-424-312-006-A | 1 | EA | |
| 8 | 424-311-007 | IMPELLER DRIVE 615, KEYLESS | D-424-311-007-A | 1 | EA | |
| 9 | 605-504-005 | CARRIER, MSEAL | B-605-504-005 | 1 | EA | |
| 10 | 605-510-001 | FLINGER ASSY | B-605-510-001-A | 1 | EA | |
| 11 | 085-052-012 | FELT DUST SEAL STYLE "F" | A-085-052-012 | 1 | EA | |
| 12 | 085-051-794 | GEAR HELICAL SET | | 1 | EA | |
| 13 | 085-051-795 | RING CLAMP | A-085-051-795 | 2 | EA | |
| 14 | 607-387-001 | BEARING RETAINER | B-607-387-001 | 2 | EA | |
| 141 | 424-327-002 | BRG RETAINER PLATE | B-424-327-002A | 2 | EA | |
| 15 | 085-051-796 | GEAR SPACER KEYLESS | A-085-051-796 | 2 | EA | |
| 16 | 428-231-006 | SPLASHER BACK PLATE | B-428-231-006-B | 1 | EA | |
| 17 | 428-134-006 | SPLASHING TROUGH | B-428-134-006-D | 1 | EA | |
| 18 | 424-326-001 | SHAFT CLAMP PLATE | A-424-326-001-B | 1 | EA | |
| 19 | 425-034-002 | LABYRINTH SEAL ROTATING | A-425-034-002-H | 4 | EA | |
| 20 | 425-033-001 | LABYRINTH SEAL FIXED | A-425-033-001-E | 4 | EA | |
| 21 | 603-369-005 | STROKE LIMIT RING{USE W/-6 1EA | A-603-369-005 | 1 | EA | |
| 22 | 603-369-006 | STROKE LIMIT RING{USE W/-5 1EA | A-603-369-006 | 1 | EA | |
| 23 | 085-051-793 | LOCKING ELEMENT ASSEMBLY | | 2 | EA | |
| 24 | 085-051-013 | SEAL, FACE, ANTIMONY CARBON | B-085-051-013 | 1 | EA | |

**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

# MODEL 61B-MVR 615BP VERTICAL FLOW MECHANICAL SEAL BLOWER
# LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP |
|---|---|---|---|---|---|---|
| | | | | | | |
| 25 | 085-051-070 | SIGHT GLASS 1-5/8-12 THD STEEL | | 2 | EA | |
| 26 | 085-027-094 | RING RETAINER EXT SPRING STL | | 1 | EA | |
| 27 | 424-680-002 | KEY PULLEY | A-424-680-002-B | 1 | EA | |
| 28 | 085-044-345 | BRG BALL 50MM X 90MM X30.2MM | * | 2 | EA | |
| 29 | 085-052-055 | BEARING, ROLLER | | 2 | EA | |
| 30 | 085-052-013 | BEARING OD SHIM | A-085-052-013 | 2 | EA | |
| 31 | 430-288-011 | COMPRESSION SPRING | A-430-288-011 | 1 | EA | |
| 32 | 085-023-876 | FPS SS PLUG HXO 3/8 NPT | | 3 | EA | |
| 33 | 085-052-065 | PLUG O-RING BOSS-20 | | 1 | EA | |
| 34 | 085-052-011 | PLUG ORB-8 MAGNETIC | | 2 | EA | |
| 35 | 075-033-472 | PLUG O RING 1/2 X 3/4-16 THD | | 6 | EA | |
| 36 | 075-040-012 | PLUG TUBE 3/16 PORT SZ #3 | | 1 | EA | |
| 37 | 085-037-788 | WASHER SPRING 1.988 ID X 2.658 | | 4 | EA | |
| 38 | 008-002-019 | PIN DOWEL STL 1/4 DIA X1-1/4 | | 4 | EA | |
| 39 | 008-002-044 | PIN DOWEL HARD STL 1/2 X 2 | | 4 | EA | |
| 40 | 085-020-514 | O RING 2-5/8 ID X .139 | | 1 | EA | |
| 41 | 085-005-131 | O RING 3-1/4 ID X 3-1/2 OD | | 1 | EA | |
| 42 | 085-036-358 | O-RING VITON 8 ID X.139 C/S | | 1 | EA | |
| 43 | 085-042-116 | O-RING VITON 6-1/2 ID X 7 OD | | 1 | EA | |
| 44 | 085-037-672 | O RING .644 ID X .087 SECT | * | 2 | EA | |
| 45 | 001-001-053 | SCR HEX 3/8-16 X 4 LG STL | | 43 | EA | |
| 46 | 001-036-018 | SCR SOC 1/2-13 X 1-1/2 LG | | 1 | EA | |
| 47 | 001-002-021 | SCR SOC 1/4-20 X 5/8 LG | | 4 | EA | |
| 48 | 001-002-039 | SCR SOC 5/16-18 X 1-1/4 LG ST | | 12 | EA | |
| 49 | 085-015-684 | SCR BUT HD SOC 3/8-16 X 3/4 | | 16 | EA | |
| 50 | 001-001-041 | SCR HEX 3/8-16 X 1 LG STL | | 4 | EA | |
| 51 | 007-005-006 | WASHER LOCK SPLIT SP 3/8 STD | | 4 | EA | |
| 52 | 001-003-033 | SCR MACH RD HD 8-32 X 3/8 STL | | 5 | EA | |
| 53 | 007-005-002 | WASHER LOCK SPRING SPLIT STL | | 5 | EA | |

**RSP = RECOMMENDED SPARE PART**
**UM = UNIT OF MEASURE**

# MODEL 61B-MVR 615BP VERTICAL FLOW MECHANICAL SEAL BLOWER
# LOT NO. FUTURE
# SERIAL NO.

| SYM | PART NO. | DESCRIPTION | REF. DWG/ COMP. LIT. | QTY | UM | RSP |
|---|---|---|---|---|---|---|
| | | | | | | |
| 55 | 001-011-023 | SCR SET HOLLOW 1/4"-20X3/8LG | | 2 | EA | |
| 56 | 424-051-001 | OIL, V-LUBE H 1 GALLON | | 2 | GAL | |
| 59 | 085-008-032 | FLANGE PROTECTOR,8"PIPE SIZE | | 2 | EA | |
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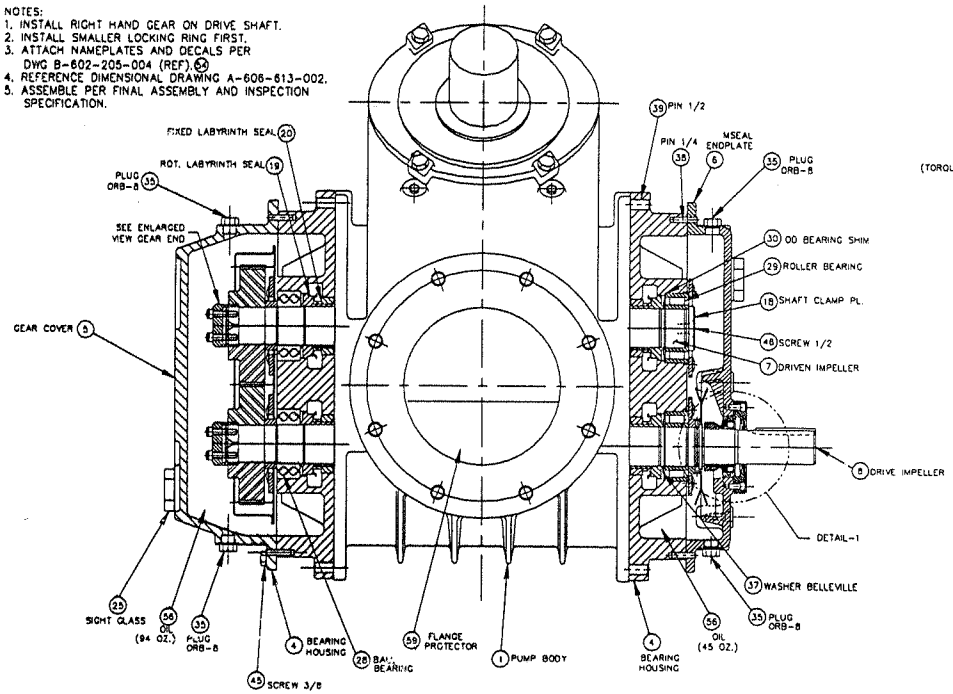
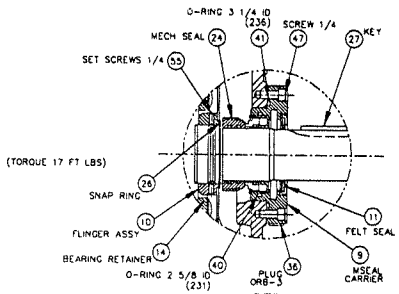
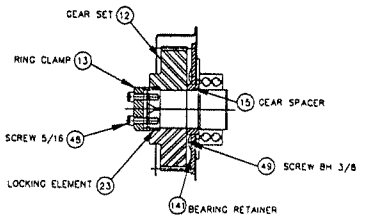
RSP = RECOMMENDED SPARE PART
UM = UNIT OF MEASURE

NOTES:
1. INSTALL RIGHT HAND GEAR ON DRIVE SHAFT.
2. INSTALL SMALLER LOCKING RING FIRST.
3. ATTACH NAMEPLATES AND DECALS PER DWG B-602-205-004 (REF.) (54)
4. REFERENCE DIMENSIONAL DRAWING A-606-613-002.
5. ASSEMBLE PER FINAL ASSEMBLY AND INSPECTION SPECIFICATION.

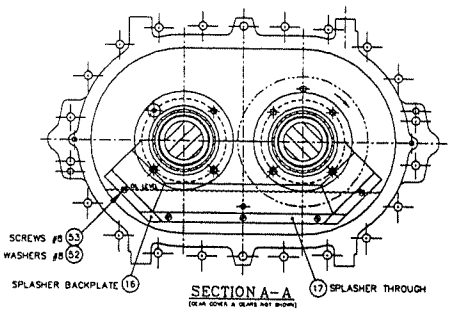


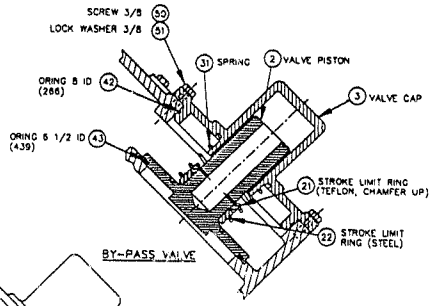

DETAIL 1



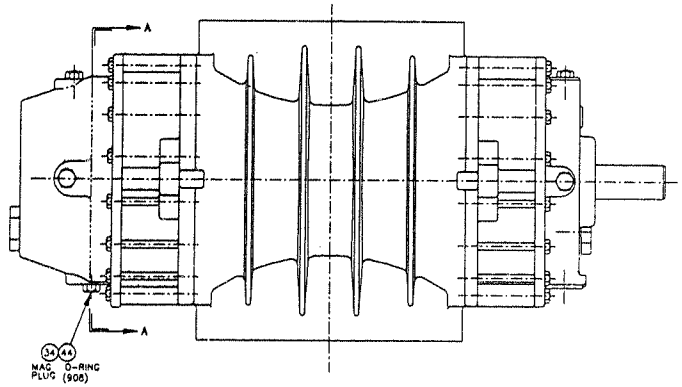

ENLARGED VIEW OF GEAR END

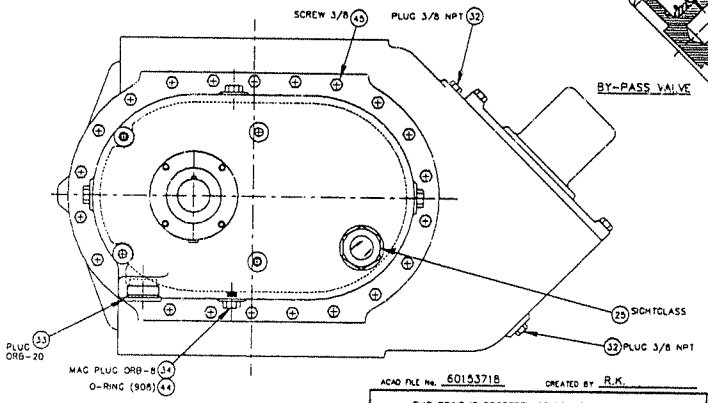



SECTION A-A
(GEAR COVER & GEARS NOT SHOWN)




BY-PASS VALVE




615 BYPASS MECHANICAL FACE SEAL BLOWER
WITH KEYLESS TIMING
VERTICAL FLOW (1300-2600 CFM)

ACAD FILE No. 60153718 CREATED BY R.K.



| | | B |
|---|---|---|
| | | A |
| DATE | APP | REVISIONS |

DESCRIPTIVE TITLE: 615BP VERT MECH SEAL BLOWER

DRAWN BY R.K. DATE 12/6/99 SCALE: 1=3
CHECKED BY ____ DATE ____
APPROVED BY ____ DATE ____ PLOT SCALE: 3=1
APPROVED BY ____ DATE ____
S. O. ____ PRODUCT CODE NO. 900-61B-MVR

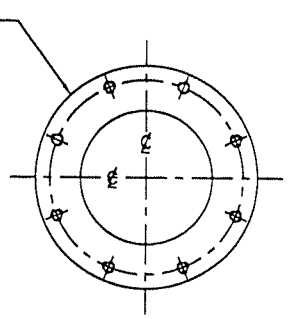
STOKES VACUUM Inc.
3800 Tabor Road Philadelphia, Pennsylvania 19120

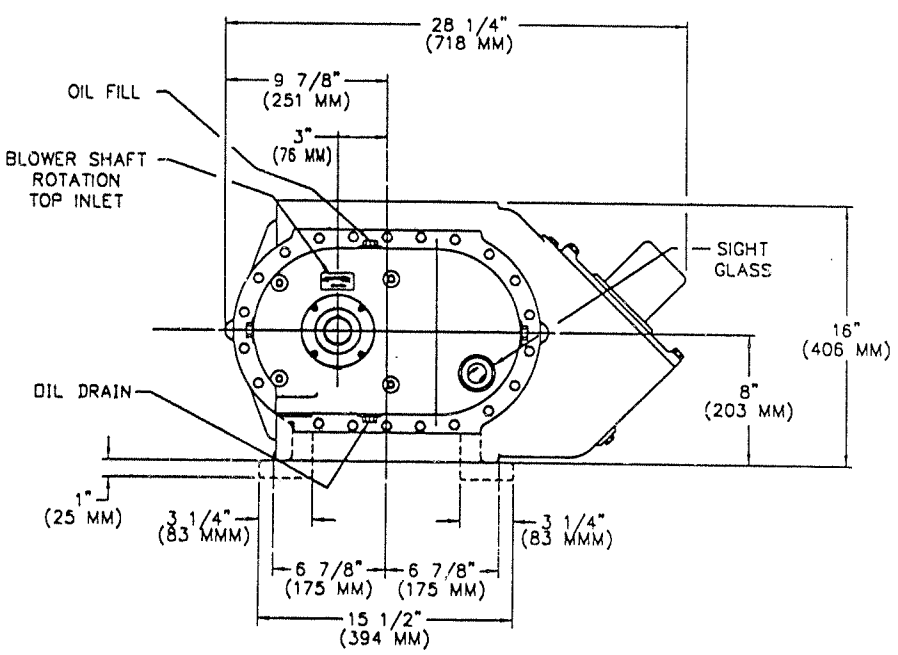
DWG. NO. D-601-537-018

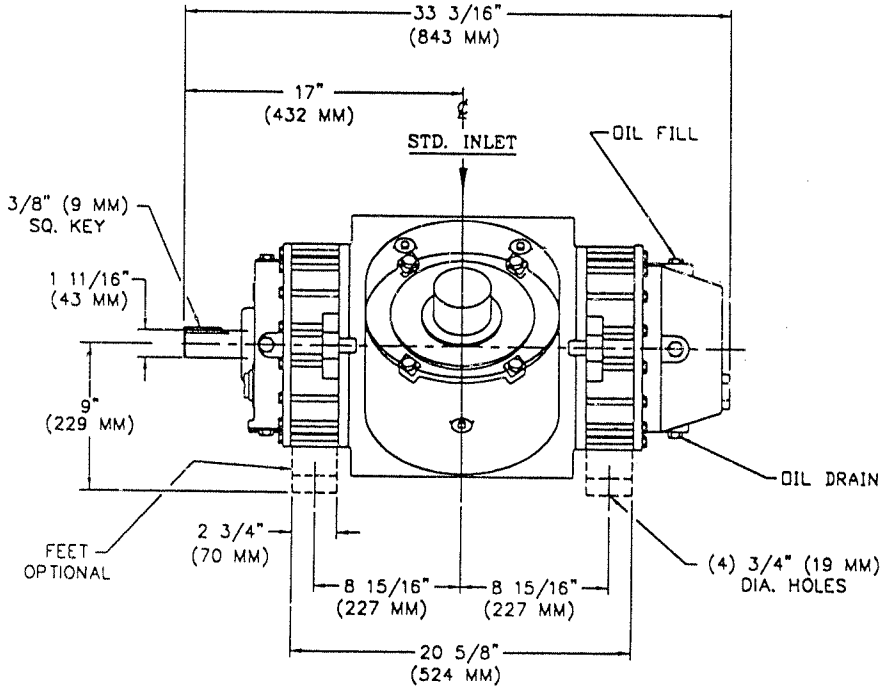
**OIL CAPACITY**
9 1/4 PINTS (4.38 LITERS)

**APPROX. WEIGHT**
625 LBS. (293 KG.)

**PUMPING CAPACITIES**
1300 CFM. AT 1800 RPM.
2000 CFM. AT 2750 RPM.
2600 CFM. AT 3600 RPM.




## MSEAL KEYLESS BLOWER
## PRODUCT CODE 900-61B-MVR

MODEL #615MVRBP
BYPASS BLOWER VERTICAL FLOW
MECHANICAL SHAFT SEAL

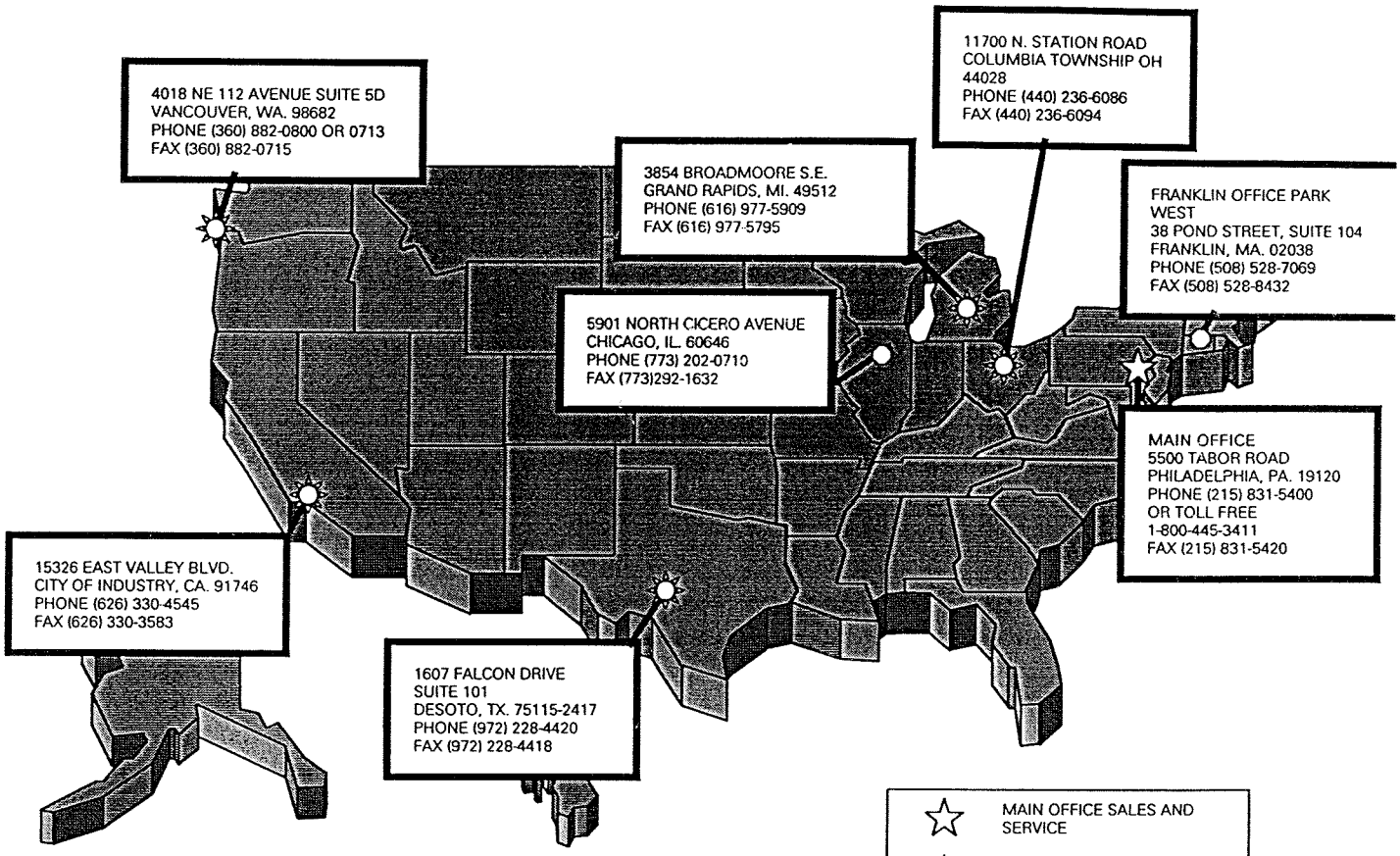
STOKES® VACUUM Inc.

ACAD No. 60661302 (1=11)

DWG. No. A-606-613-002

C/C 12/12/1999

# For FAST Part's Sales and Service for your Stokes Vacuum Equipment, call the office nearest you!!!




## PARTS ORDERING INFORMATION

The Stokes Customer Service Department is organized to assist you in keeping your equipment operating and to provide necessary parts as spares for your critical inventory as well as replacement parts as needed.

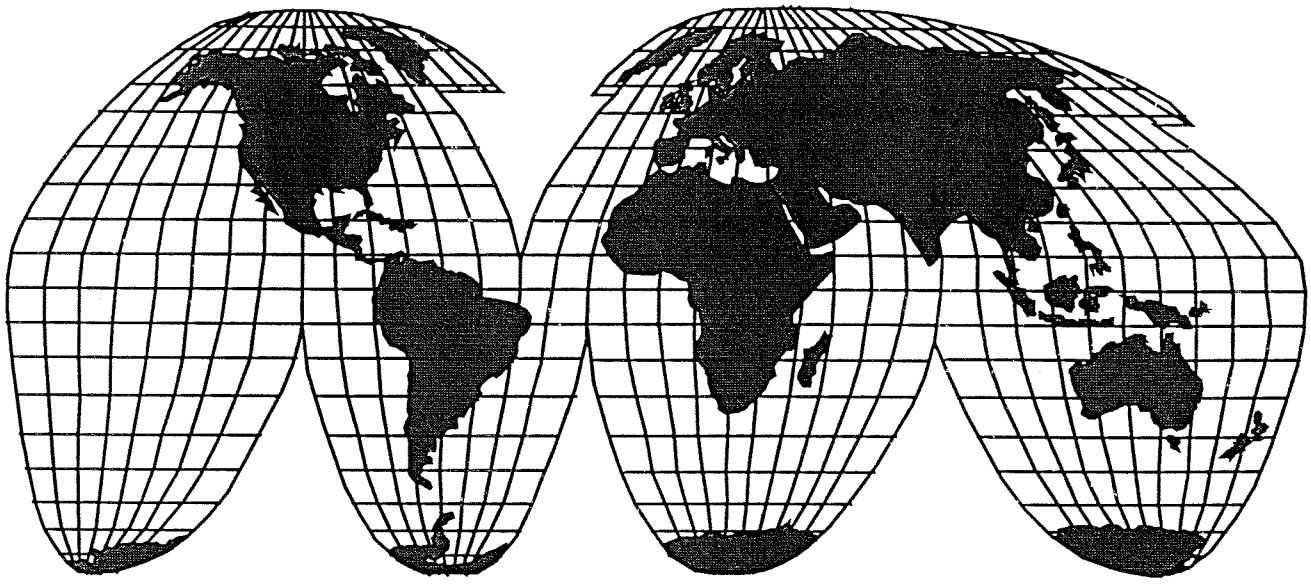
For faster service when ordering parts, please observe the following procedure:

- ✓ Order by part number shown on the parts list.
- ✓ Always include the model, lot and serial number of the equipment. These numbers can be found on the nameplate.
- ✓ Use the same nomenclature as shown on reference drawings and parts list. Also refer to drawing numbers and parts list symbol numbers whenever possible.
- ✓ When ordering electrical parts and solenoid operated valves, be sure to specify voltage, cycles and phase as well as the part number.

**http://www.stokesvacuum.com**

**For FASTPart's Sales and Service for your Stokes Vacuum Equipment, call the office nearest you!!!**

***FOR THE INTERNATIONAL SALES AND SERVICE CENTER NEAREST YOU PLEASE CALL 1-800-445-3411 AND ASK FOR OUR INTERNATIONAL CUSTOMER SERVICE DEPARTMENT.***



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- ✓ When ordering electrical parts and solenoid operated valves, be sure to specify voltage, cycles and phase as well as the part number.


## PARTS ORDERING INFORMATION

The Stokes Customer Service Department is organized to assist you in keeping your equipment operating and to provide necessary parts as spares for your critical inventory as well as replacement parts as needed.

A wide range of critical and wear parts are stocked for your convenience. Special parts, not normally replaced, are not always stocked and Stokes is prepared to manufacture these on a priority basis.

In spite of our very effective Inventory Control System, unusual demands may find us out of stock on critical items and we strongly recommend that you carry an inventory of critical parts, as well as those special parts relative to your equipment. Wear items, those recommended for your inventory, are noted on the Parts List by an asterisk (*). Having these parts readily available will assure maximum "Up-Time" for your equipment and minimum loss of production.

Those parts, marked by a plus sign (+) in the quantity column, are normally stocked in Philadelphia, with smaller quantities in our Service Centers around the country, (Dallas, Chicago, Los Angeles). If your parts list is not clear or seems to be incomplete, please contact the Stokes Customer Service Department, 5500 Tabor Road Philadelphia Pa. 19120, for an updated or clarified list.

For faster service when ordering parts, please observe the following procedure:

1) Order by part number shown on the parts list.

2) Always include the model, lot and serial number of the equipment. These numbers are listed in the instruction manual, on the parts list, and also stamped on the nameplate of the machine.

3) Use the same nomenclature as shown on reference drawings and parts list. Also refer to drawing numbers and parts list symbol numbers whenever possible.

4) When ordering electrical parts and solenoid-operated valves, be sure to specify voltage, cycles and phase as well as the part number.

5) **For faster service send parts orders directly to Stokes Vacuum Inc., Customer Service Dept., 5500 Tabor Road, Philadelphia, Pa. 19120 or contact Customer Service Dept. at 1-800-445-3411.**

## Warranty and Field Service Policy

### INTRODUCTION

The following describe Stokes warranty and service policies. These, in connection with the operating instructions attached, were produced for your benefit.

Maximum results can only be achieved if your technical staff thoroughly familiarizes itself with all features of Stokes equipment, many of which are unique. For this purpose Stokes will provide demonstration and instruction services whenever necessary and will gladly answer any questions that may arise.

Please read the following subject matter for further details of services that are available and provisions under which they can be supplied.

### DEMONSTRATION OF NEW EQUIPMENT

1. With certain Stokes equipment, demonstration service is included for the purpose of checking the installation and operation of the equipment. These services include one round trip from the factory or district service office and include traveling and living expenses. the specified time will be on the basis of an eight hour day (Monday through Friday), holidays excluded.

2. If additional demonstration services are required, a charge will be made for the additional time and expenses.

3. Stokes equipment is shipped with a normal amount of disassembly. It is the responsibility of the purchaser to provide suitable foundations and have the equipment fully assembled, and to have all wiring and piping completed in accordance with Stokes installation instructions before requesting demonstration. At least one week advance notice is requested in order to insure having qualified personnel available.

4. Stokes' responsibility extends only to the equipment it has supplied. In the event that ancillary or auxiliary items are added, the operation of these items by Stokes' Service Personnel will be at the Purchaser's risk.

### GENERAL SERVICE POLICY

1. Stokes provides the serviceperson, upon request, for the purpose of checking machines, recommending replacement parts, overhauling, rebuilding, etc. The customer will be charged for time and expense.

2. On courtesy calls, initiated by Stokes, minor adjustments will be made and instructions given free of charge. Should the customer request service beyond what might reasonably

be defined as "major adjustments and instructions", a charge will be made for the additional time required. Should the request for additional service involve an unscheduled overnight stop-over or other unanticipated expense, the customer will also be billed for the added expenses involved.

3. Stokes servicepersons are specialists. Their primary functions are to demonstrate, to identify sources of trouble and to instruct customers' operating and maintenance personnel in methods of prevention and correction. To obtain maximum unilization of the servicepersons, customers should provide all necessary assistance in the form of movers, mechanics, operators, etc. Customers should also provide any standard tools and facilities that may be required and that cannot readily be carried by a serviceperson such as lifting equipment, electric drills, etc.

## REBUILDING, REPAIRING AND MODIFYING STOKES EQUIPMENT

Customers interested in major overhaul and/or repair work on their existing machines should first consider the age and general condition of the equipment under consideration, the current cost of comparable new equipment and comparable design features. If it is deemed advisable to rebuild rather than replace, the equipment should be returned to the Stokes factory.

Pumps being rebuilt are thoroughly disassembled, cleaned and reassembled with new parts. The rebuilt pump is put on the test block and checked for performance. Only when acceptable performance is demonstrated, is the pump released for shipment.

Pumping units are available for rental, subject to availability, by customers who need additional pumping capacity for short periods or to fill in while the regular equipment is being repaired or rebuilt.

The cost of disassembling, cleaning and inspection is included in the price. The parts for the major repair kit used are included in the parts section of this manual. If the additional parts required or if repairs are found to be so extensive that rebuilding is considered uneconomical and the project is dropped, the customer will be invoiced a previously established fixed fee.

## PUMPING HAZARDOUS GASES

Pumping certain gases or gaseous mixtures is hazardous. Consequently, we cannot assume responsibility for the operational safety of our pumping components. We can only alert you to this hazard and suggest procedures to minimize the possibility of an explosion.

1. The mechanical pump should be located in a safe area so that the reactive gas is unlikely to be present in the atmosphere surrounding the unit.

2. It is essential that the vacuum system, including discharge line, be free of air leaks, so that gases will not leak into or out of the system.

3. The pump should be purged with nitrogen (or other suitable inert gas) prior to, during and after operation. Purge port connections should be made at two locations: Port A - to be at the pump inlet on the pump side of the inlet line valve; Port B - to be in the discharge of the pump.

   Port A (at inlet) is to be used with the inlet valve closed, but with the pump in operation. This will help reduce the percentage of reactive gas present in the unit and the discharge. When the inlet valve is open, Port A should be closed. After the evacuation is complete, the inlet valve should be closed and Port A reopened to purge the pump and to fill all voids in the pump and discharge line.

   Port B (discharge) is to be used while the unit is in operation, with inlet valve open (but with Port A closed). this will assure a continuous positive flow of inert gas though the pump's discharge section to safely carry off the reactive gas being evacuated from the system. the inert gas flow must be sufficient to prevent exhaust gases from back diffusing through the exhaust line into the pump.

4. The discharge line from the vacuum pump should be vented to a suitable safe area outside of any building where it is unlikely that the reactive gas could accumulate. The work area around the pumping equipment should also be ventilated to avoid the possibility of reactive gas accumulations.

5. A suitable flame arrester should be placed in the discharge line. The discharge pipe should be marked to avoid the possibility of workmen welding, or working near the area with open flames or dangerously hot equipment.

6. While it is normally unlikely that the reactive gas will be present in the work area, insurance regulations in a given locality may require special electrical components. Where stricter electrical specifications are dictated, the main control panel for the pump(s) can be located outside the hazardous area with only the vacuum switch with its associated time delay and control relays located on the mechanical booster pump. These small electrical components do not require a very large housing and can be assembled directly on the pump in a safe enclosure. The various motor and control leads can then be fed to the pumps from a safe remote location.

# STOKES EQUIPMENT WARRANTY

| PRODUCT | MICROVAC PUMP | VACUUM BLOWER | MICROVANE PUMP | DRY PUMP |
|---|---|---|---|---|
| NUMBER OF WARRANTY YEARS | TWO YEAR | TWO YEAR | ONE YEAR | ONE YEAR |
| PARTS CONSIDERED EXPENDABLE | EXHAUST VALVE AND GAS BALLAST SPRINGS; SOLENOID VALVE COIL; SHAFT SEALS; "V" BELTS; GASKETS. | "O" RINGS; SHAFT SEALS | SOLENOID VALVE COIL; SHAFT SEALS; GASKETS; "O" RINGS, SHAFT SLEEVE, VALVE SPRINGS, EXHAUST VALVES, VANES | SOLENOID VALVE COIL; SHAFT SEALS; GASKETS; "O" RINGS, SHAFT SLEEVE |

Stokes Vacuum Inc warrants every Stokes product against defects in material and workmanship for a period stated above (number of warranty years) from the date of shipment, as described in our "Condition of Sale."

Every part is covered by the warranty except normally replaceable parts that are considered expendable; their life expectancy being determined by the type of service to which the pump is subjected. However, repair or replacement of any part will be made F.O.B. seller or supplier's plant, if the part in question was defective at the time of delivery.

Stokes Vacuum Inc will honor this warranty for the period stated above (number of warranty years) from the date of shipment, when the user demonstrates that the following basic conditions have been met:

- The equipment must be properly installed and operated in accordance with the established procedures outline in the Instruction Manual supplied with the equipment.
- The equipment must be protected to prevent dirt, foreign materials and corrosive vapors from entering the intake and causing damage to the working parts.
- Service the equipment at proper intervals consistent with its usage. Use the proper grade and quality of recommended oil. Stokes "V" Lube is available in several grades to assure you of meeting the latter requirements.
- Follow preventive maintenance schedule as outlined in the Operating Instruction Manual.

Our Engineering-Advisory Services are available, at no charge, to assist the user and to insure that the user obtains the maximum performance and operating life from the "tried and proven" Stokes Vacuum Equipment. Use this service for advice regarding special or unusual applications of your equipment.

# Quality Survey

*Thank you* for purchasing your equipment from Stokes Vacuum Inc. In our pursuit of complete customer satisfaction we would appreciate your comments on the usefulness and readability of this manual. Please fax (215) 831-5420 or mail this sheet to Stokes Vacuum Inc 5500 Tabor Road, Philadelphia, PA. 19120 Attn: Technical Publications Department. Your cooperation is greatly appreciated.

Thank you again,

Robert J. Landis
Manager, Technical Publications

Stokes Model Number _____ Stokes Order Number _____

Revision Date of Manual _____

Please Rate the Following Items

| | | | |
|---|---|---|---|
| *Compared to similar manuals, this manual is...* | _____ *Good* | _____ *Fair* | _____ *Poor* |
| *Ease of reading is ...* | _____ *Good* | _____ *Fair* | _____ *Poor* |
| *Level of information is ...* | _____ *Good* | _____ *Fair* | _____ *Poor* |
| *Photographs and/or Illustrations are ...* | _____ *Good* | _____ *Fair* | _____ *Poor* |
| *The amount of information was ...* | _____ *Good* | _____ *Fair* | _____ *Poor* |

*Comments?*

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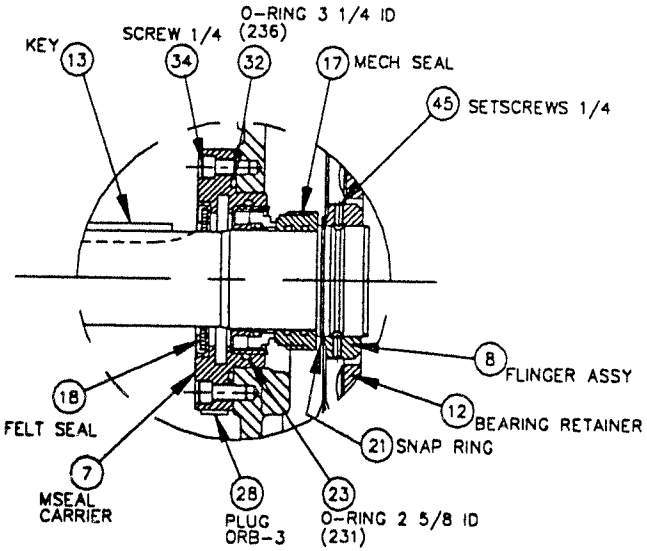
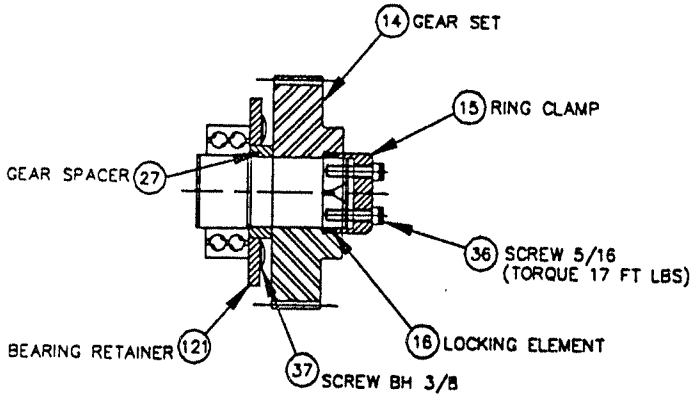



DETAIL 1

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