VIKING PUMP

# TECHNICAL SERVICE MANUAL

## VI-CORR® MAG DRIVE® COMPOSITE PUMPS
## SERIES RP-805 & RP-807



## CONTENTS



## MODEL NUMBER CHART

| UNMOUNTED PUMPS | UNITS |
|---|---|
| RP-80525 | Units are designated by the unmounted pump model numbers followed by a letter indicating drive style. |
| RP-80550 | |
| RP-80570 | D = Direct Drive |
| RP-80514 | M = Motor Mounted (Close Coubled C-Flange) |
| RP-80782 | B = Bearing Carrier Mounted |
| RP-80716 | |
| RP-80724 | R = Viking Reducer Drive |
| RP-80732 | P = Commercial Reducer Drive (Example RP-80514-MD-A8B) |

## INTRODUCTION

The illustrations in this manual are for identification purposes only and cannot be used for ordering parts. Obtain a parts list from the factory or a Viking® representative. Due to the nature of the pump and the close manufacturing tolerances, certain replacement parts are only available in assemblies. Always give complete name of part, part number or material with model number and series number of pump when ordering repair parts. The pump or pump unit model number and serial number are on the nameplate.

In the Viking® model number system, the first number "8" indicates a magnetic coupled design. The next two numbers determine the pump series ad the last two numbers indicate pump size.

The RP-805 Series gear pumps mount to the MD-A2 or MD-A8 coupling. The larger RP-807 Series gear pumps are available with the MD-A2, MD-A8, MD-B15 or MD-B40 couplings.

This manual deals only with RP Series composite pumps. Refer to figures 1 thru 20 for general configuration and nomenclature used in this manual. Pump specifications and recommendations are listed in Catalogue Section 343.



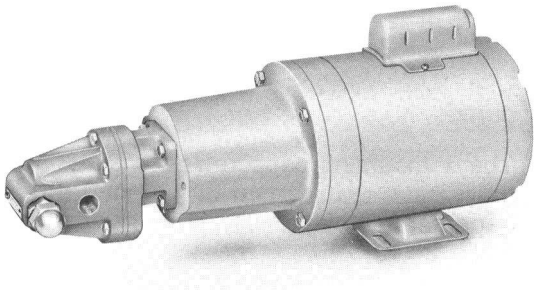


**FIGURE 1**
SERIES RP-805 PUMP
MOTOR CONNECTED TO
FOOTLESS BRACKET AND PUMP

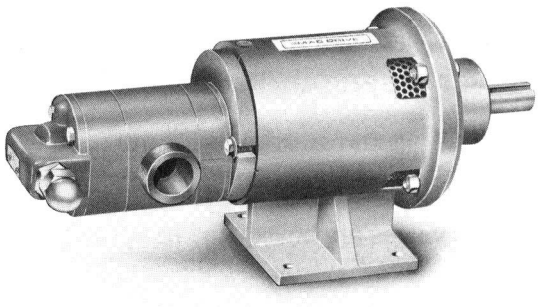


**FIGURE 2**
SERIES RP-807 PUMP
BEARING CARRIER, FOOTED BRACKET
AND MOUNTED PUMP

# SPECIAL INFORMATION

**DANGER**

BEFORE OPENING ANY VIKING PUMP LIQUID CHAMBER (PUMPING CHAMBER, RESERVOIR, RELIEF VALVE ADJUSTING CAP FITTING ETC.) BE SURE:

1. THAT ANY PRESSURE IN CHAMBER HAS BEEN COMPLETELY VENTED THROUGH SUCTION OR DISCHARGE LINES OR OTHER APPROPRIATE OPENINGS OR CONNECTIONS.
2. THAT THE DRIVING MEANS (MOTOR, TURBINE, ENGINE, ETC.) HAS BEEN "LOCKED OUT" OR MADE NON- OPERATIONAL SO THAT IT CANNOT BE STARTED WHILE WORK IS BEING DONE ON PUMP.
3. THAT YOU KNOW WHAT LIQUID THE PUMP HAS BEEN HANDLING AND THE PRECAUTIONS NECESSARY TO SAFELY HANDLE THE LIQUID. OBTAIN A MATERIAL SAFETY DATA SHEET (MSDS) FOR THE LIQUID TO BE SURE THESE PRECAUTIONS ARE UNDERSTOOD.

FAILURE TO FOLLOW ABOVE LISTED PRECAUTIONARY MEASURES MAY RESULT IN SERIOUS INJURY OR DEATH.

## Rotation:

Although shaft rotation determines which port is suction and which is discharge, Viking magnetic drive composite pumps are designed to run in a designated direction (indicated on pump decal).

**DANGER**

RUNNING THE PUMP IN THE OPPOSITE DIRECTION TO THE DESIGNATED DIRECTION MAY RESULT IN SERIOUS INJURY OR DEATH.

## Pressure Relief Valves:

1. Relief valves are mounted on the head or casing of all RP series composite pumps.
2. The RP series is a positive displacement pump and requires some sort of over pressure protection. Without over pressure protection, the following is likely to occur: motor stalls, drive equipment fails, a pump part breaks and the piping and/or equipment in the system bursts. This may be an internal relief valve.
3. If a relief valve is not furnished on the pump, some means of over pressure protection such as an in-line relief valve should be provided.
4. If pump rotation is to be reversed during normal operation, pressure protection must be provided on both sides of pump.
5. Relief valve adjusting screw cap must always point towards suction side of pump.
6. Pressure relief valves cannot be used to control flow to regulate pressure.

For additional information on pressure relief valves, refer to Technical Service Manual TSM 000 and Engineering Service Bulletin ESB-31.

# INSTALLATION

## General

The following items must be considered prior to pump installation:

1. **Location** - locate the pump as close as possible to supply of liquid being pumped. If possible locate pump below liquid supply. Viking pumps are self-priming; but, the better the suction conditions the better the pump will perform.
2. **Accessibility** - pump must be accessible for inspection, maintenance and repair.
3. **Suction/Discharge -** SG Series pumps are designed for clockwise rotation as standard (viewed from end of shaft). Refer to Figure 3.

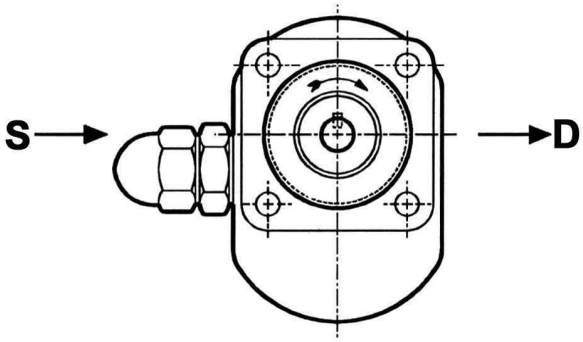
## Mounting

1. The pump mounting surface must be clean and flat.
2. Use SAE Grade 5 or better capscrews to mount pump.
3. The mounting capscrews for RP-05 & RP-07 pumps must have a minimum of ½ inch thread engagement.
4. Mechanical Seal and Lip Seals RP Series pumps are designed to be used with jaw type couplings that do not induce axial thrust on the pump shaft. If an improper type coupling is used, internal damage may result.
5. Do not strike or press inner magnet coupling half to install on the pump shaft. Damage to pump or coupling may result if coupling does not slide onto pump shaft, inspect coupling bore, shaft and key for nicks or burrs and remove if present.
6. Once pump has been mounted, place a small amount of compatible liquid into suction port and turn by hand to ensure pump turns freely.

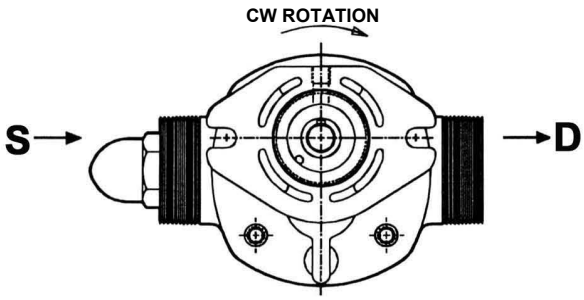
## Alignment

Check alignment after mounting of units with a bearing carrier.

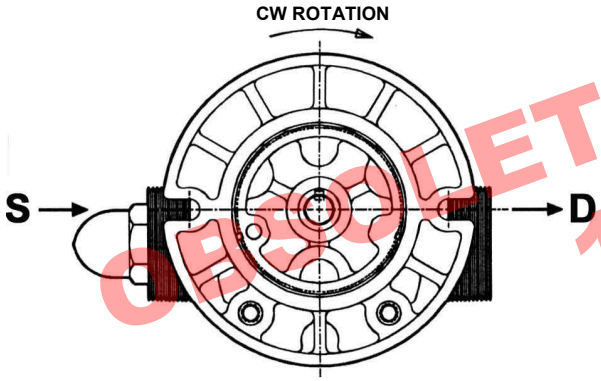
1. If unit has flexible coupling, remove any coupling guards or covers and check alignment of coupling halves. A straight edge (piece of key stalk will work) across coupling must rest evenly on both rims at top, bottom and sides. See Figure 4.
2. Make final check on alignment after piping is hooked up. Replace the guards.




**Clockwise Rotation RP-805**
**(viewed from shaft end)**




**Clockwise Rotation RP-807 (MD-A)**
**(viewed from shaft end)**




**Clockwise Rotation RP-807 (MD-B)**
**(viewed from shaft end)**

**FIGURE 3**

## Piping/Hose

The cause of many pumping problems can be traced to suction piping. It should always be as large in diameter and as short in length as possible.

Before starting layout and installation of your piping system, consider the following points:

1. Never use piping smaller than pump port connections. Piping larger in diameter than the port connection is sometimes is required to reduce suction losses.
2. Be sure the inside of pipe is clean before installing.
3. When approaching an obstacle in the suction line, go around instead of over it. Going over obstacle creates an air pocket. Where practical slope piping, slope piping so no air or liquid pockets will be formed. Air pockets in suction line make it hard for the pump to prime.
4. A strainer on the suction side of the pump should always be considered in any pumping system. The straining will keep foreign matter from entering the pump. The strainer mesh or perforation size should be as fine as possible to protect the pump without causing excessive pressure drop. Use of a strainer is particularly important at start up to help clean the system of weld beads, pipe scale and other foreign objects.
5. A pressure relief valve is required in the discharge line. See Pressure Relief Valves, SPECIAL INFORMATION, page 2.

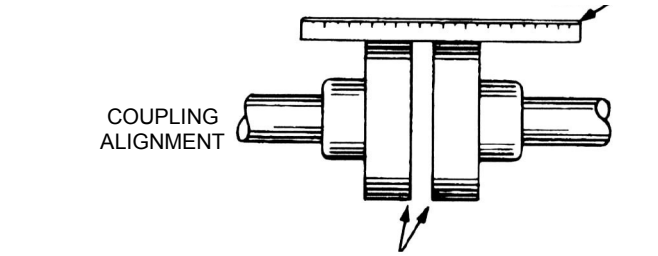



**FIGURE 4**

6. Pump must not be used to support piping. Weight of pipe must be carried by hangers, supports, stands, etc.
7. When fastening to the pump to impose any strain on pump casing. "Springing" or "drawing" piping up to pump will cause distortion; possible misalignment and probable rapid wear of pump. Do not use pipe to correct errors in piping layout or assembly.
8. All joints of piping system must be tight; liquid thread sealant will help assure leak free threaded joints. Loose joints result in liquid leaks or suction side leaks. Air leaks make the pump noisy and reduce flow. ***CAUTION:*** *Be careful not to over tighten fittings as this can cause cracked joints. One full turn beyond hand tight is all that is needed for proper connection. Do not use Teflon tape. Reduced friction makes over tightening very easy and will result in cracked ports.*
9. Drive alignment must be checked after piping is hooked up.
10. Provide a pressure relief device if any part of a pump and piping system that can be valved off, thus completely isolated. A rise in temperature will cause liquid to expand. With no provision for pressure relief in the closed off



**DANGER**

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE ADEQUATE AND IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.

Before pushing "start" button, check the following:

1. Vacuum and pressure gauges (liquid filled) are mounted on or near the pump. Gauges are the quickest and most accurate way of finding out what is happening in the pump.

2. Check Pump alignment (See page 3).

3. Check piping to be sure there is no strain on the pump casing.

4. Rotate the pump shaft by hand to be sure it turns freely.

55. Motor has been jogged and is running in the correct direction. Refer to "General" on page 2.

6. Pressure relief valve is installed properly.

7. Suction piping is connected and tight, and valves are open.

8. Make sure discharge piping is connected and tight, valves are open and, and end of shaft is below liquid level.

9. All guards are in place.

10. The above checklist is a general guideline to be used prior to starting pump. Since Viking pump cannot foresee every application for our product and possible system design, final responsibility is with the user. The pump must be utilized within the catalog specifications and the pump system must be designed to provide safe working conditions.

Push the "start" button. Pump should begin to deliver liquid within 15 seconds!

If the pump does not deliver liquid, push the stop button. **Do not run the pump without liquid flow longer than 30 seconds because pump or coupling could be damaged or ruined.**

Review steps just outlined. Consider what suction and discharge gauges indicate. If everything appears in order, put more liquid in the pump suction port. See item 6 on page 3. Push the start button. If nothing happens within 30 seconds, stop the pump. The pump is not a compressor and will not build up much air pressure. It may be necessary to vent the discharge line until liquid begins to flow. Use a safe venting procedure especially when handling hazardous liquids.

If the pump still does not deliver liquid, consider one or more of the following:

1. Suction line air leaks; vacuum gauge reading should help determine if this is the problem.

2. End of suction pipe not submerged deep enough in liquid.

3. Suction lift is too great or suction piping is too small.

4. Liquid is vaporizing in the suction line before it gets to the pump.

5. Magnetic coupling is decoupling for some reason.

If after consideration of these points, the pump still does not deliver liquid, review all points given under **START UP** and read through the **TROUBLESHOOTING** guide and try again. If pump still will not deliver liquid, contact your Viking Pump supplier.

**SUGGESTED REPAIR TOOLS:** The following are required to properly repair a RP Series Mag Drive pump. The tools are in addition to standard mechanics tools such as open end wrenches, pliers, screw drivers, etc. Most of the items can be obtained from an industrial supply house.

1. Soft face hammer

2. Allen wrenches

3. Internal snap ring pliers (for bearing carriers only) 2-810-029-047-999 (Truarc No. 0500)

4. External snap ring pliers 2-810-029-375 (Truarc No. 0400)

5. Arbor press

6. Torque wrench

## DISASSEMBLY OF MD-A2, MD-A8, MD-B15, or MD-B40 COUPLINGS

1. Read all of the instructions before proceeding with disassembly of the coupling and/or pump. Remove piping to ports and remove the mounting capscrews securing pump to bracket. Support larger pumps with overhead hoist if possible. Remove pump from coupling bracket. See FIGURE 6 on page 4.

2. Canister will probably be full of liquid, use care while removing from pump and pull straight off. Loosen both setscrews and pull off inner magnet assembly. MD-A2 and MD-A8 couplings require removing the pipe plug in pump bracket to gain access to the setscrews holding the inner magnet.

   **Don't forget this is a very powerful magnet.** Do not remove O-ring on bracket unless you plan to replace - especially the encapsulated O-rings. Follow instructions in **ASSEMBLY** for installation of a new Teflon® encapsulated O-ring.

3. You should be able to visually inspect other magnets from end of bracket. If removal is necessary, start by removing (4) capscrews and separating from motor or bearing carrier. Loosen setscrews in outer magnet assembly to pull assembly off shaft.



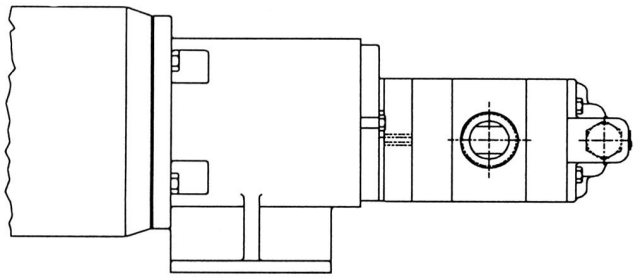


**FIGURE 5**
**RP-80732 - MD-B15 with motor**

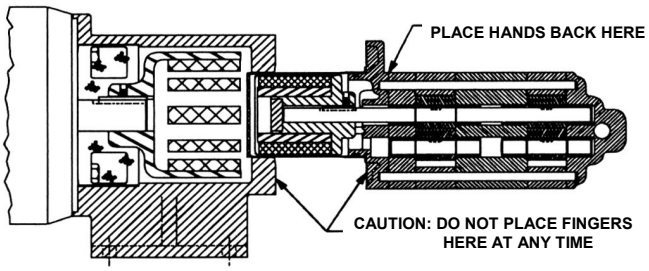



**FIGURE 6**
**Typical Pump Removal from Coupling Bracket**

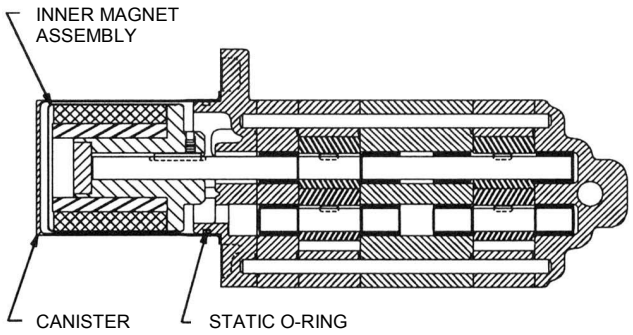



**FIGURE 7**
**Typical Pump Assembly**

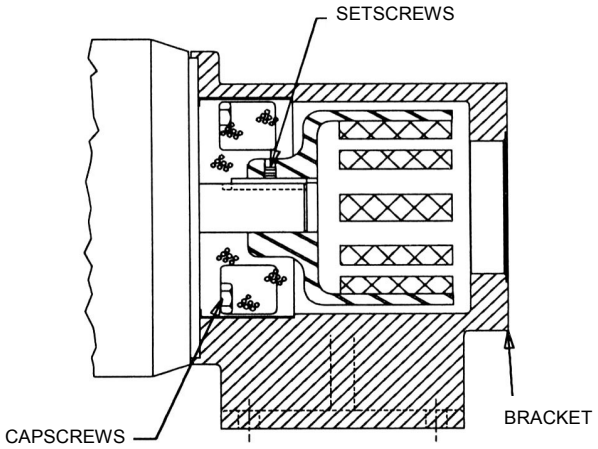



**FIGURE 8**
**Typical Outer Magnet Assembly**

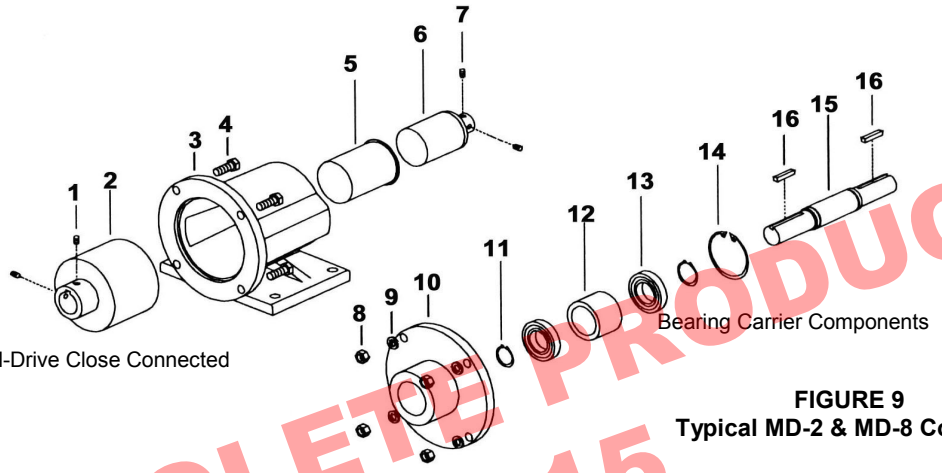



**FIGURE 9**
**Typical MD-2 & MD-8 Coupling**



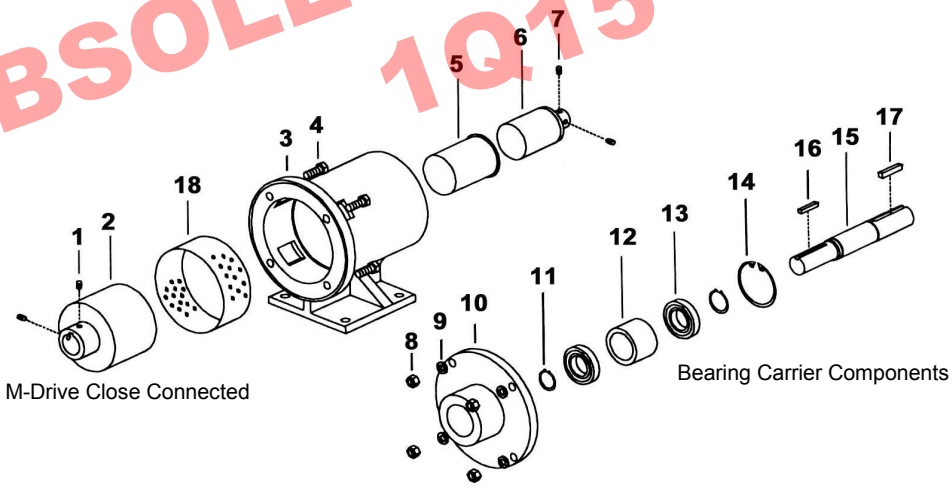
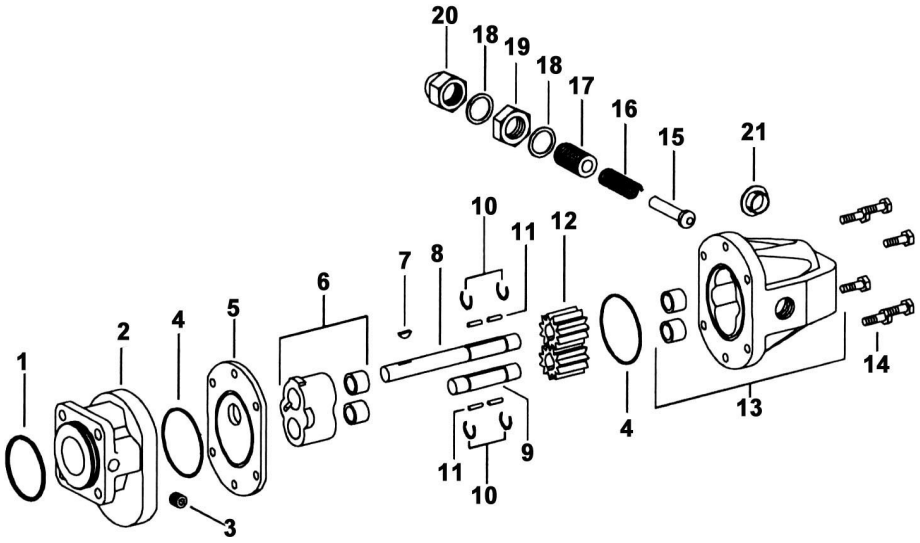



**FIGURE 10**
**Typical MD-15, MD-25 & MD-40 Coupling**

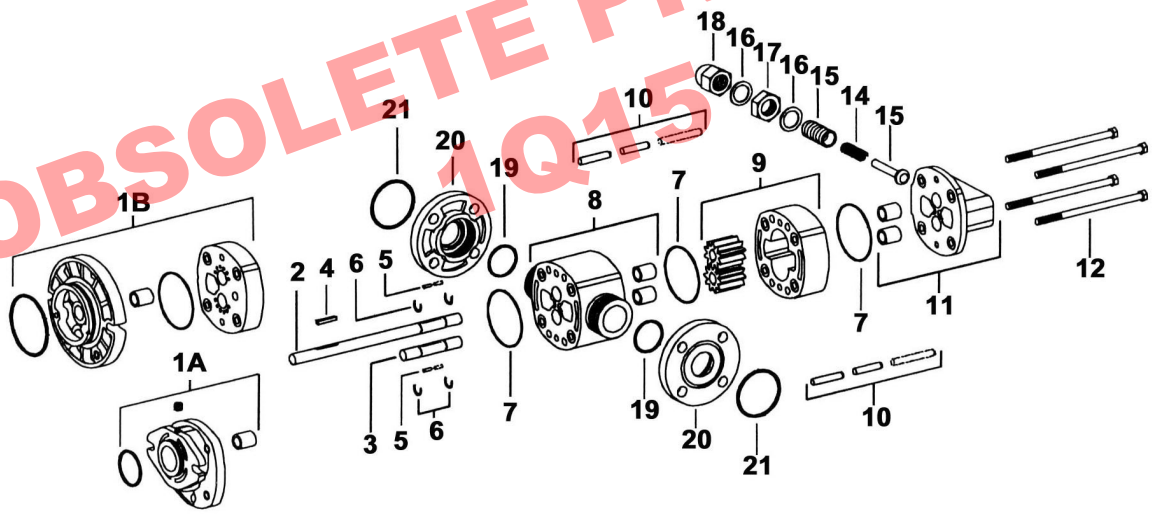
| ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|
| 1 | Setscrew, Outer Magnet - (2Req'd) | 10 | Bearing Housing |
| 2 | Outer Magnet Assembly - (3Req'd) | 11 | Retaining Ring, External - (2Req'd) |
| 3 | Bracket, Footed or Footless | 12 | Bearing Spacer |
| 4 | Capscrew for Motor or B.C. - (4Req'd) | 13 | Ball Bearing - (2Req'd) |
| 5 | Canister | 14 | Retaining Ring, Internal |
| 6 | Inner Magnet Assembly - (2Req'd) | 15 | Shaft |
| 7 | Setscrew, Inner Magnet - (2Req'd) | 16 | Key - (2Req'd for MD-8) |
| 8 | Hex Nut - (4Req'd) | 17 | key-Inner (for MD-15 thru 40) |
| 9 | Lock Washer - (4Req'd) | 18 | Shroud, Bracket (MD-15 thru 40) |




**TYPICAL RP-805 EXPLODED VIEW**
**FIGURE 11**

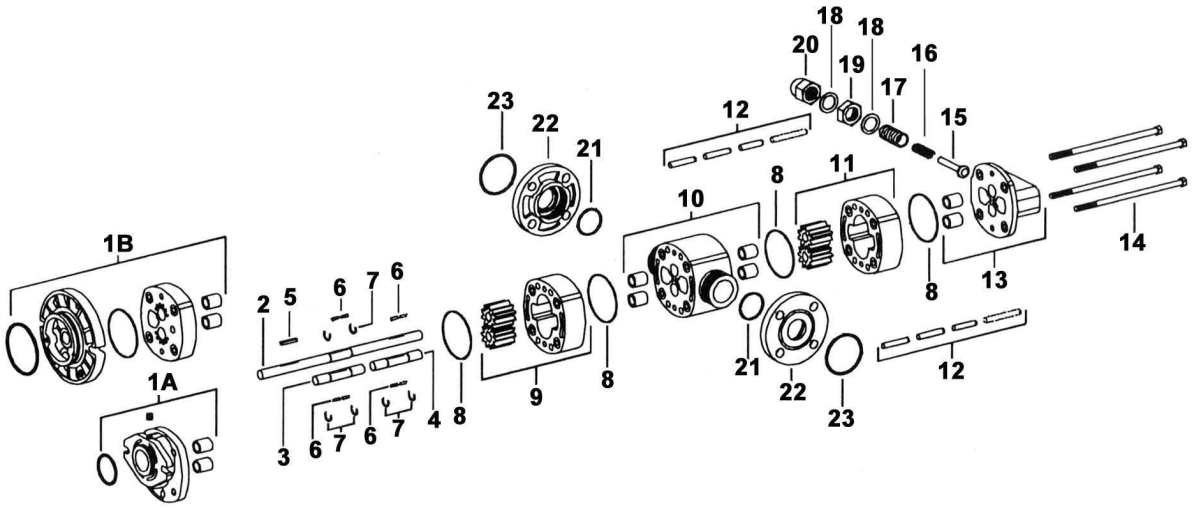
| ITEM | DESCRIPTION | ITEM | DESCRIPTION | ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| **1** | O-ring | **7** | #404 Woodruff Key | **13** | Casing & Bushing | **19** | Lock Nut, Relief Valve |
| **2** | Bracket | **8** | Driver Shaft | **14** | Capscrew | **20** | Cap, Relief Valve |
| **3** | Pipe Plug | **9** | Driven Shaft | **15** | Poppet, Relief Valve | **21** | Casing Plug, for Less Relief Valve |
| **4** | O-ring | **10** | Retaining Ring | **16** | Spring, Relief Valve | | |
| **5** | Separation Plate | **11** | Drive Pin | **17** | Adjusting Screw, Relief Valve | | |
| **6** | Spacer Plate & Bushings | **12** | Gear | **18** | Gasket, Relief Valve | | |






**TYPICAL RP-80782 and RP-80716 EXPLODED VIEW**
**FIGURE 12**

| ITEM | DESCRIPTION | ITEM | DESCRIPTION | ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| **1A** | O-ring, Bracket (A Series) | **4** | Drive Key | **12** | Capscrew | **20** | Flange |
| | Bracket & Bushings (A Series Mag Drive) | **5** | Drive Pin | **13** | Poppet, Relief Valve | **21** | O-ring, Flange |
| | Pipe Plug - 1/8" (A Series) | **6** | Retaining Ring | **14** | Spring, Relief Valve | | |
| **1B** | O-ring, Bracket (B Series) | **7** | O-ring | **15** | Adjusting Screw, Relief Valve | | |
| | Bracket (B Series) | **8** | Separation Plate with Ports and Bushings | **16** | Gasket, Relief Valve | | |
| | Separation Plate and Bushing (B Series) | **9** | Casing and Gears | **17** | Lock Nut, Relief Valve | | |
| **2** | Driver Shaft | **10** | Alignment Sleeves | **18** | Cap, Relief Valve | | |
| **3** | Driven Shaft | **11** | Head and Bushings | **19** | O-ring, Flange to Pump | | |




**TYPICAL RP-80724 and RP-80732 EXPLODED VIEW**
**FIGURE 13**

| ITEM | DESCRIPTION | ITEM | DESCRIPTION | ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1A | O-ring, Bracket (A Series) | 4 | Driven Shaft | 12 | Alignment Sleeves | 20 | Cap, Relief Valve |
| | Bracket & Bushings (A Series Mag Drive) | 5 | Drive Key | 13 | Head & Bushings | 21 | O-ring, Flange to PUMP |
| | Pipe Plug - 1/8" (A Series) | 6 | Drive Pin | 14 | Capscrew | 22 | Flange |
| 1B | O-ring, Bracket (B Series) | 7 | Retaining Pin | 15 | Poppet, Relief Valve | 23 | O-ring, Flange |
| | Bracket (B Series) | 8 | O-ring | 16 | Spring, Relief Valve | | |
| | Separation Plate and Bushing (B Series) | 9 | Casing & Gears | 17 | Adjusting Screw, Relief Valve | | |
| 2 | Driver Shaft | 10 | Separation Plate with Port Bushings | 18 | Gasket, Relief Valve | | |
| 3 | Driven Shaft | 11 | Casing & Gears | 19 | Lock Nut, Relief Valve | | |



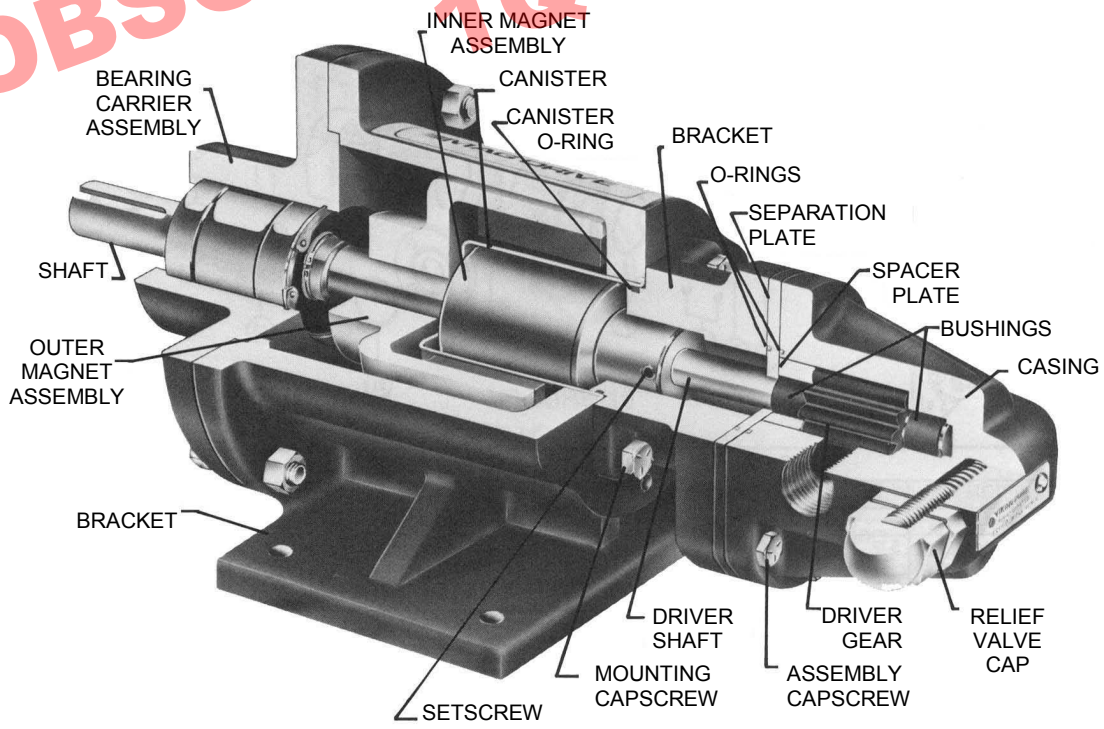



**FIGURE 14**
**TYPICAL SERIES RP-805 WITH MD-A, B DRIVE CUTAWAY VIEW**

**DANGER**

BEFORE OPENING ANY VIKING PUMP LIQUID CHAMBER (PUMPING CHAMBER, RESERVOIR, RELIEF VALVE ADJUSTING CAP FITTING ETC.) BE SURE:

1. THAT ANY PRESSURE IN CHAMBER HAS BEEN COMPLETELY VENTED THROUGH SUCTION OR DISCHARGE LINES OR OTHER APPROPRIATE OPENINGS OR CONNECTIONS.
2. THAT THE DRIVING MEANS (MOTOR, TURBINE, ENGINE, ETC.) HAS BEEN "LOCKED OUT" OR MADE NON-OPERATIONAL SO THAT IT CANNOT BE STARTED WHILE WORK IS BEING DONE ON PUMP.
3. THAT YOU KNOW WHAT LIQUID THE PUMP HAS BEEN HANDLING AND THE PRECAUTIONS NECESSARY TO SAFELY HANDLE THE LIQUID. OBTAIN A MATERIAL SAFETY DATA SHEET (MSDS) FOR THE LIQUID TO BE SURE THESE PRECAUTIONS ARE UNDERSTOOD.

FAILURE TO FOLLOW ABOVE LISTED PRECAUTIONARY MEASURES MAY RESULT IN SERIOUS INJURY OR DEATH.

## GENERAL PUMP DISASSEMBLY

Before attempting to repair the pump, make sure that all the details are covered in **"TROUBLESHOOTING" on page 12** have been checked out because disassembling a good pump should be avoided. Typically, due to the construction and close tolerances in manufacturing the pump, repair is seldom economically feasible unless it is an O-ring. Often, when some internal parts such as a bushing, shaft or gear; this will cause excessive wear in other mating parts and generally requires mare components to rebuild back to original condition than expected at first.

Replacement parts are only available as displayed in the table of parts. Contact your local distributor to obtain replacement parts. Be sure to supply the pump model number and serial number.

Mark all sections of the pump before disassembly to make sure they will be assembled in the proper order and orientation.

## RP-805 SERIES PUMP DISASSEMBLY

1. Remove key from driver shaft.
2. Remove the 6 assembly capscrews.
3. Hold the casing of the pump and gently tap on the sides of the pump bracket with a soft hammer, alternating sides of pump. This should slowly separate the sections. Do not hit the sections hard or use a screwdriver to pry them apart as this may damage the mating surfaces.
4. After pump is apart, inspect all parts for signs of wear. Look carefully at the shaft, bushings, inside of casing, gear teeth, spacer plate, and the inside face of the casing for signs of wear.
5. If replacing shafts, remove retaining rings from both sides of gear. Press gear off shaft and remove drive pin(s) or balls from shaft.
6. Visually inspect the pump O-rings. If the O-rings are Teflon® (appear to be white), it strongly recommended to replace rather than reuse. Do not remove the bracket O-ring unless planning to replace, especially if it is an encapsulated O-ring.
7. If pump has relief valve, remove the acorn nut covering the relief valve adjusting screw. Measure the distance of the relief valve adjusting screw to the pump surface and record this length. Finish disassembling relief valve and inspect the seat in the casing and the poppet for signs of wear or foreign matter on either surface.

## RP-805 SERIES PUMP ASSEMBLY

- The pump is ready to be reassembled after all parts have been changed and worn parts replaced.
- Use a suitable lubricant compatible with the fluid being handled when reassembling the pump.
- Make sure all holes machined in the bracket are clean and that the mating surfaces of each section are free of any dents or burrs.

1. Lubricate bushings in casing.

   CLOCKWISE PUMP SHAFT ROTATION -
   Place the driven gear and shaft into the casing gear bore opposite the notch in casing face.

   COUNTER-CLOCKWISE PUMP SHAFT ROTATION -
   Place the driven gear and shaft into the casing gear bore nearest the notch in casing face.

   Place driver gear and shaft in remaining casing bore.
2. Lubricate exposed shafts and gears. Install spacer plate into casing bore ensuring tab on spacer plate fits into notch in casing. Place O-ring into O-ring groove in casing.
3. Place separation plate on casing with O-ring groove facing away from casing. Place O-ring into O-ring groove in separation plate.
4. Install the bracket O-ring. If it is encapsulated (purple or orange appearance) then follow the special instructions below.

   Do not attempt to reuse this type of O-ring if it has been removed. Immerse a new O-ring in boiling water for a few minutes. Remove from water and stretch out in hands a little larger so it will fit onto the bracket hub, without forcing over a sharp edge. When in place, run hot water over O-ring until it shrinks down tight into the hub O-ring groove. Dry area with compressed air.
5. Check driver shaft keyway for burrs and removed any if found. Slide bracket over shaft.
6. Install the 6 capscrews and tighten with torque wrench to 7-8 ft-lbs.

7. If pump has relief valve, reassemble relief valve, setting the adjusting screw while tightening the locknut. Recheck dimension, install second gasket on other side of locknut and install acorn nut.

8. Install the drive key into the drive cast key set.

## RP-807 SERIES PUMP DISASSEMBLY

1. Remove key from driver shaft.

2. Remove the 4 assembly capscrews. Pump is now held together by alignment sleeves.

3. Hold the head of the pump and gently tap on the sides of the pump bracket with a soft hammer, alternating sides of the pump. This should separate the sections. do not hit the sections hard or use a screwdriver to pry them apart as this may damage the mating surfaces.

   **NOTE:** If pump has two casing and gear sets (RP-80724 and RP-80732), keep individual casing and gear together.

4. After pump is apart, inspect all parts for signs of wear. Look carefully at the shaft, bushings, inside of casing, gear teeth, lip seal, spacer plate, and inside face of casing for signs of wear.

5. If replacing shafts, remove retaining rings from both sides of gear. Press gear off shaft and remove drive pin(s) or balls from shaft.

6. Visually inspect the pump O-ring. If O-rings are Teflon® (appear to be white), it is strongly recommended to replace rather than reuse. Do not remove bracket O-ring unless planning to replace, especially if it is an encapsulated O-ring.

7. If pump has relief valve, remove the acorn nut covering the relief valve adjusting screw. Measure the distance of the relief valve adjusting screw to pump surface and record this length. Finish disassembling relief valve and inspect the seat in the casing and the poppet for signs of wear or foreign matter on either surface.

## RP-807 SERIES PUMP ASSEMBLY

- The pump is ready to be reassembled after all parts have been changed and worn parts replaced.
- Use a suitable lubricant compatible with the fluid being handled when reassembling the pump.
- Make sure all holes machined in the bracket are clean and that the mating surfaces of each section are free of any dents or burrs.

1. Install the bracket O-ring. If it is encapsulated (purple or orange appearance) then follow the special instructions below.

   Do not attempt to reuse this type of O-ring if it has been removed. Immerse a new O-ring in boiling water for a few minutes. Remove from water and stretch out in hands a little larger so it will fit onto the bracket hub, without forcing over a sharp edge. When in place, run hot water over O-ring until it shrinks down tight into the hub O-ring groove. Dry area with compressed air.

2. Place bracket mounting face down on blocks to allow stable assembly of pump. Place O-ring into O-ring groove. Install alignment sleeves in proper holes by tapping with soft hammer.

3. Slide the separation plate (pumps used with MD-A2 or MD- A8 couplings do not have separation plate) onto the alignment sleeve with O-ring groove up and the side notch positioned on the inlet side of pump. Place O-ring into O-ring groove.
   **RP-80724 and RP-80732 only.** Lubricate bushings in separation plate or bracket with oil or compatible liquid. Driven gears should be attached to drive with drive pin or pins and snap rings. Install driver and driven shafts and gears into their proper positions. See Figure 12 and Figure 13 for proper positioning of driver and driven shaft assemblies. Slide the casing onto the alignment pins with O-ring groove up and lubricate gears. Place O-ring in O-ring groove.

   **NOTE:** Gears and casing are matched sets and must be assembled in pump together.

4. Slide the separation plate with ports onto the alignment sleeves with O-ring groove up. The pump will require more than one pair of alignment sleeves; install alignment sleeves as necessary. Lubricate bushings in separation plate with ports with oil or compatible liquid. Install O-ring with O-ring groove.

5. Place drive pin or pins in groove on driver shaft and slide gear onto shaft over pins. Install driven shaft and gears into remaining bushing bore. Driven gear should be attached to shaft with drive pin or pins and snap rings. Slide the casing onto the alignment pins with O-ring groove up and lubricate gears. Place O-ring in O-ring groove.

6. Lubricate bushings in head. Slide head onto alignment sleeves with relief valve on inlet side of pump. If pump is not equipped with relief valve, assemble head with side flat on inlet side.

7. Install the 4 capscrews and tighten with torque wrench to 25 ft-lbs.

8. Reassemble relief valve, setting the adjusting screw to previous dimension. Place gasket onto adjusting screw holding the adjusting screw while tightening the lockout. Recheck dimension, install gasket on other side of locknut and install acorn nut.

9. Install the drive key into drive shaft key set.

## ASSEMBLY OF MD-A2, MD-A8, MD-B15, or MD-B40 COUPLINGS

**DANGER**

FOLLOW THESE DIRECTIONS EXACTLY TO AVOID INJURY TO SELF OR DAMAGE TO PUMP UNIT. BE CAREFUL TO KEEP INNER AND OUTER MAGNETS AT LEAST ONE FOOT APART UNTIL STEP 4 DO NOT ENGAGE MAGNETS IN ANY OTHER FASHION.

1. Inspect magnets for any metal objects attached to the magnets. Remove any foreign material. Locate outer magnet assembly per drawing. Reference point for MD-A2 & MD -A8 is the back edge of the "C" face. See Figure 17. Apply loctite to setscrew threads and tighten both setscrews onto motor or bearing carrier shaft. The bearing carrier housing features a machined step on its mounting flange, which is the reference point for setting the position of the outer magnet.

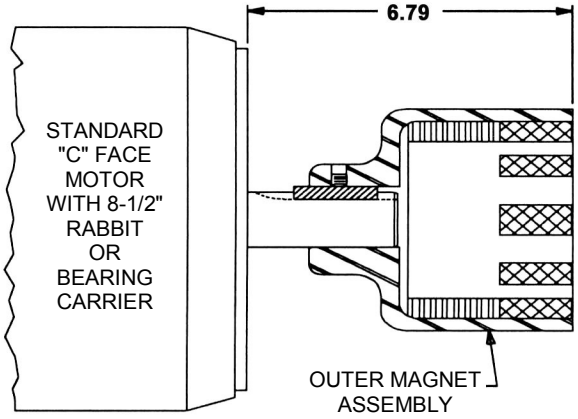



**FIGURE 17**
**MD-B15 and MD-B40**

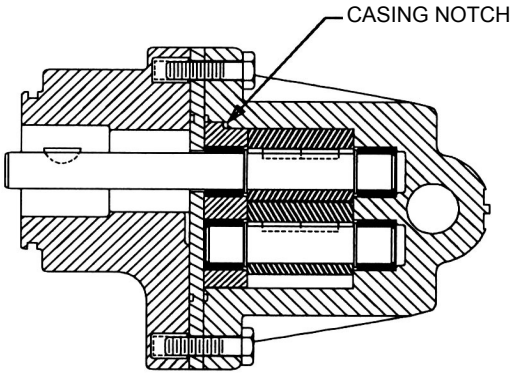



**FIGURE 15**

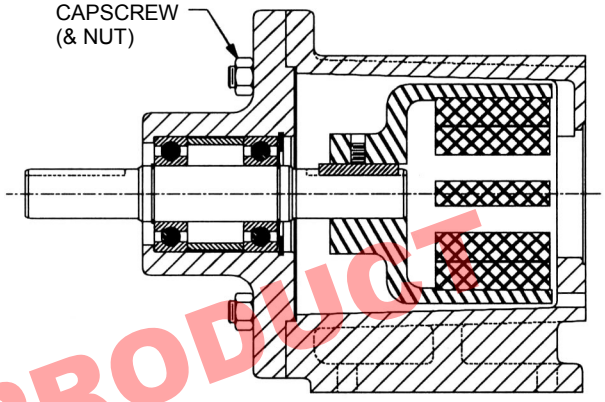



**FIGURE 18**
**Coupling Bracket and Bearing Carrier for MD-A2 and MD-A8**

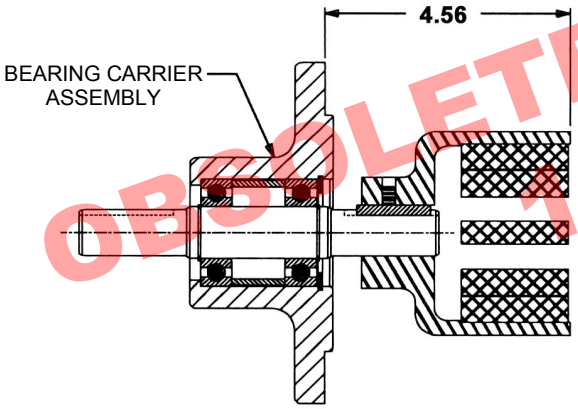



**FIGURE 16**
**MD-A2 and MD-A8**



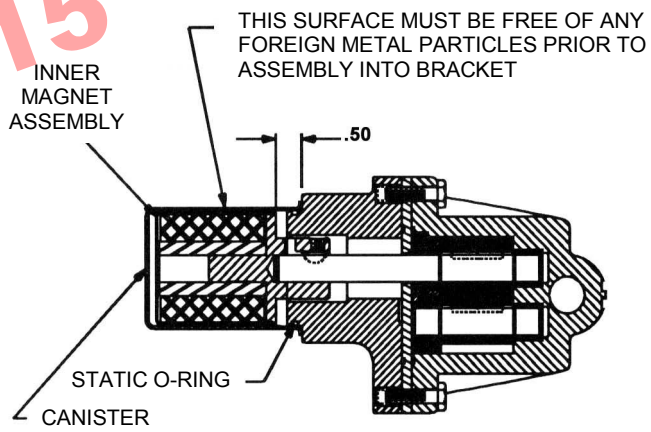



**FIGURE 19**
**MD-A2 and MD-A8**

2. Mount bracket to motor (or bearing carrier to footed bracket) and secure with 4 capscrews. See Figure 18. Reach in and rotate magnets by hand to make sure there is no interference. If rubbing occurs, check dimensions (see Figures 16 and 17) or contact factory.

3. Place inner magnet assembly onto pump shaft and set according to figures. See Figure 19, or (See figure 20). Place Loctite on threads of the two setscrews then tighten. Check the dimension again, then turn the pump over a couple of times to make sure it turns freely. Inspect magnet and make sure it has not picked up any foreign particles which could damage the pump. Make sure bracket O-ring is in good condition and installed. Place canister onto pump and press until canister is in contact with pump bracket.

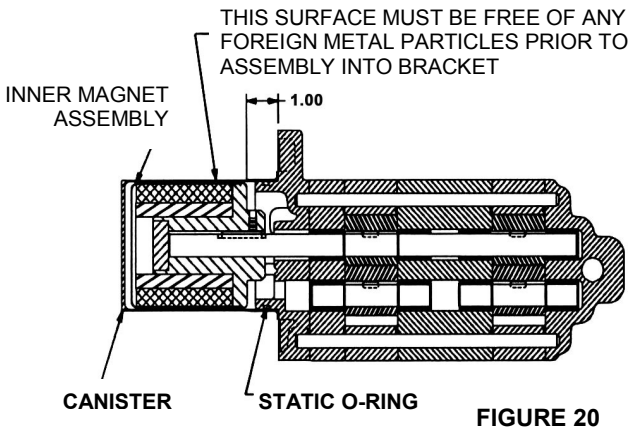



**FIGURE 20**
**MD-B15 and MD-B40**

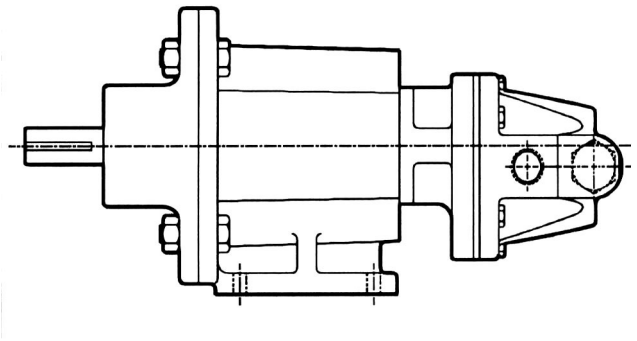


**FIGURE 21**
**RP-80514 - MD-A8**

4. Remove any foreign particles from the outside of the canister then slide the canister into coupling bracket. *USE EXTREME CAUTION, DO NOT PLACE FINGERS NEAR MOUNTING SURFACE NEAR MOUNTING SURFACE TO AVOID PINCHING.* See Figure 6.

Finish assembly by securing pump to bracket. See Figure 21. Make sure the power is disconnected, check to see if the pump turns over freely by spinning the fan motor blades or bearing carrier shaft, which should turn freely.

# TROUBLE SHOOTING

A Viking pump that is properly installed and maintained will give long satisfactory performance.

If trouble does develop, one of the first steps toward finding the difficulty is to in stall a vacuum gauge in the suction line and a pressure gauge in the discharge line. Readings on these gauges often give a clue on where to start looking for trouble.



## Vacuum Gauge - Suction Port

**High vacuum reading would indicate:**

1. Suction line blocked, valve closed, strainer plugged or pinched suction hole.
2. Suction line too small.
3. Liquid too viscous to flow through piping.
4. Lift required too high.

**Low reading would indicate:**

1. Air leak in suction lane
2. End of pipe not in liquid
3. Pump is worn.
4. Pump is dry and should be primed.

**Fluttery, jumping or erratic reading would indicate:**

1. Liquid vaporising.
2. Liquid coming to pump in slugs possibly an air leak or insufficient liquid above the end of the suction pipe.
3. Vibrating from cavitation, misalignment, or damaged parts.
4. Decoupling of magnetic coupling, possibly due to pressure spikes.

## Pressure Gauge - Discharge Port

**High reading would indicate:**

1. High viscosity and small diameter and/or lengthy discharge line.
2. Strainer or filter plugged.
3. Pressure relief valve split too high.
4. Valve in discharge line partially closed.
5. Line partially plugged from build up on inside of pump, solidified product or foreign object.
6. Liquid in pipe not up to temperature.

**Low reading would indicate:**

1. Pressure relief valve set too low.
2. Pressure relief valve poppet not seating properly.
3. Pump assembly bolts not torqued to specifications.
4. Bypass around pump partially open.
5. Too much extra clearance.
6. Pump damaged or worn.
7. Coupling not staying coupled.

**Fluttery, jumping or erratic reading would indicate:**

1. Cavitation.
2. Liquid coming to pump in slugs.
3. Air leak in suction lane.
4. Vibrating from misalignment or mechanical problems.

## Miscellaneous

Some of the following may also pinpoint the problem;

**Pump does not pump:**

1. Lost its prime from air leak or low level in tank.
2. Suction lift too high.
3. Rotating in wrong direction.
4. Motor does not come up to speed.
5. Suction and discharge valves not open.
6. Strainer clogged.
7. Bypass valve open, pressure relief valve set too low or pressure relief valve pocket stuck open.
   Pump worn out.
8. Any changes in liquid, system or operation that would help explain the trouble, e.g. new liquid, additional lines or process changes.
9. Temperature changes either in the liquid or the environment.
10. Magnetic coupling is decoupling. Change in application (temperature, pressure, viscosity, etc.) may require additional torque beyond coupling capabilities.

**Pump starts, than looses its prime:**

1. Supply tank empty.
2. Liquid vaporising in the suction line.
3. Air leak or air pockets in the suction line.
4. Pump is worn out.

**Pump is noisy:**

1. Pump is being starved (heavy liquid cannot get to pump fast enough). Increase suction pump size or reduce length. If pump is above liquid, raise the liquid level to approach the liquid level of the pump. If the liquid level is already above pump, increase the head of liquid.
2. Pump is cavitating (liquid vaporising in suction lane). Increase suction pipe size or reduce length. If pump is above liquid, raise the liquid level to approach the level of the pump. If the liquid level is already above pump, increase the head of liquid.
3. Check alignment.
4. Anchor base or piping to eliminate vibration.

**Pump not delivering up to capacity:**

1. Starving or cavitating - increase suction pipe size or reduce length.
2. Strainer particularly clogged.
3. Air lead somewhere in suction line.
4. Running too slow. Is motor the correct speed and wired up correctly?
5. Pressure relief valve set too low, stuck open or has damaged poppet seat.
6. Bypass line around pump partially opened.
7. Pump worn out.

**Pump takes too much power (stalls motor):**

1. Liquid more viscous than unit sized to handle.
2. System pressure relief valve set too high.
3. Coupling mis-aligned.
4. Bushings and / or magnetic coupling bound by hardened product closing up operating clearances.



## DO'S AND DON'TS

Do's and Don'ts for installation, operation and maintenance of Viking pumps to assure safe, long, trouble free operation.

**Installation:**

1. DO install pump as close to supply tank as possible.
2. DO leave working space around the pumping unit.
3. DO use large diameter pipe with short and straight runs.
4. DO install a strainer in suction line.
5. DO a double check of alignment after unit is mounted and piping is hooked up.
6. DO provide pressure relief valve for discharge side of pump.
7. DO check for proper rotation as indicated on nameplate.
8. DO use piping, hose and fittings rated for maximum system pressure.
9. DO check to make sure all guards are in place.
10. DO handle magnets with extreme caution remembering they will attract to any ferrous objects.

**Operation**

1. DON'T run pump (or coupling especially) at speeds faster than shown in catalog for that size.
2. DON'T allow pump to develop pressure higher than those shown in catalog at that size.
3. DON'T expose pump to coupling or temperatures above or below limits shown in catalog for that design or specific construction.
4. DON'T operate unit without all guards in place.
5. DON'T operate pump without pressure relief valve in discharge piping; be sure valve is mounted and set correctly.
6. DON'T operate the pump with all the liquid bypassing through the internal pressure relief valve or with out any flow of liquid going through the pump for more than 30 seconds. Operate under either of these conditions may result in a heat build up and damage to the pump or coupling.
7. DO have spare parts, pump or complete standby unit available, particularly if the pump is an essential part of a key operation or process.

**Maintenance:**

1. DO make sure any pump that has residual system pressure in it or that has handled high vapour pressure liquids, has been vented through the suction or discharge lines or other openings provided for this purpose.
2. DO make sure that if the pump is still hooked to driver while maintenance is being performed that the driver has been "locked out" so that it cannot be inadvertently started while work is being done on the pump.
3. DO make sure any pump that has handled a corrosive, flammable, vented and/or cooled before it is disassembled.
4. DO record pump model number and serial number and file for further use.
5. DO **obtain**, read and keep all maintenance instructions furnished with pump.

## CAUTION !

**TO REDUCE THE RISK OF LEAKAGE WITH VIKING MAG DRIVE PUMPS, USERS SHOULD COMPLY WITH THE FOLLOWING GUIDELINES AND ADHERE TO THE FOLLOWING PROCEDURES:**

- The pump configuration and materials used in a pump are tailored to the application for which it is ordered. Users should never use a pump for an application that is different from the application specified when the pump was ordered. This includes differences in liquid, speed, pressure, temperature or viscosity.
- Users must understand the characteristics of liquids they are pumping and be especially aware of any particulates in the liquid. Particulates can cause rapid wear of the bushings, especially if carbon graphite bushings are used. Hard bushings and hard shafts can reduce the risk of rapid wear, but the use of hard materials is not always the optimal solution. In applications involving non-abrasive, non-self lubricating liquids, carbon graphite bushings are typically the preferred material.
- Users should periodically inspect their pump for wear. This is especially critical and should be carried out with greater frequency when carbon graphite bushings are used or the same pump has not previously been used for the same application, including the same liquid, speed, pressure, temperature and viscosity. Users should promptly replace worn parts when they are discovered.
- Users should continuously monitor pumps that are handling hazardous liquids. This is especially critical for unmanned, remote locations. If a user does not have in-house expertise in the area of monitoring, it should contact a local engineering firm with monitoring experience.

VIKING PUMP

IDEX CORPORATION

## WARRANTY

Viking warrants all products manufactured by it to be free from defects in workmanship or material for a period of one (1) year from date of startup, provided that in no event shall this warranty extend more than eighteen (18) months from the date of shipment from Viking. The warranty period for Universal Seal series pumps ONLY (Universal Seal models listed below) is three (3) years from date of startup, provided that in no event shall this warranty extend more than forty-two (42) months from the date of shipment from Viking.

UNDER NO CIRCUMSTANCES SHALL VIKING BE LIABLE UNDER THIS WARRANTY OR OTHERWISE FOR SPECIAL, INCIDENTAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING, BUT NOT LIMITED TO, LOST OR UNREALIZED SALES, REVENUES, PROFITS, INCOME, COST SAVINGS OR BUSINESS, LOST OR UNREALIZED CONTRACTS, LOSS OF GOODWILL, DAMAGE TO REPUTATION, LOSS OF PROPERTY, LOSS OF INFORMATION OR DATA, LOSS OF PRODUCTION, DOWNTIME, OR INCREASED COSTS, IN CONNECTION WITH ANY PRODUCT, EVEN IF VIKING HAS BEEN ADVISED OR PLACED ON NOTICE OF THE POSSIBILITY OF SUCH DAMAGES AND NOTWITHSTANDING THE FAILURE OF ANY ESSENTIAL PURPOSE OF ANY PRODUCT.

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See complete warranty at www.vikingpump.com.