

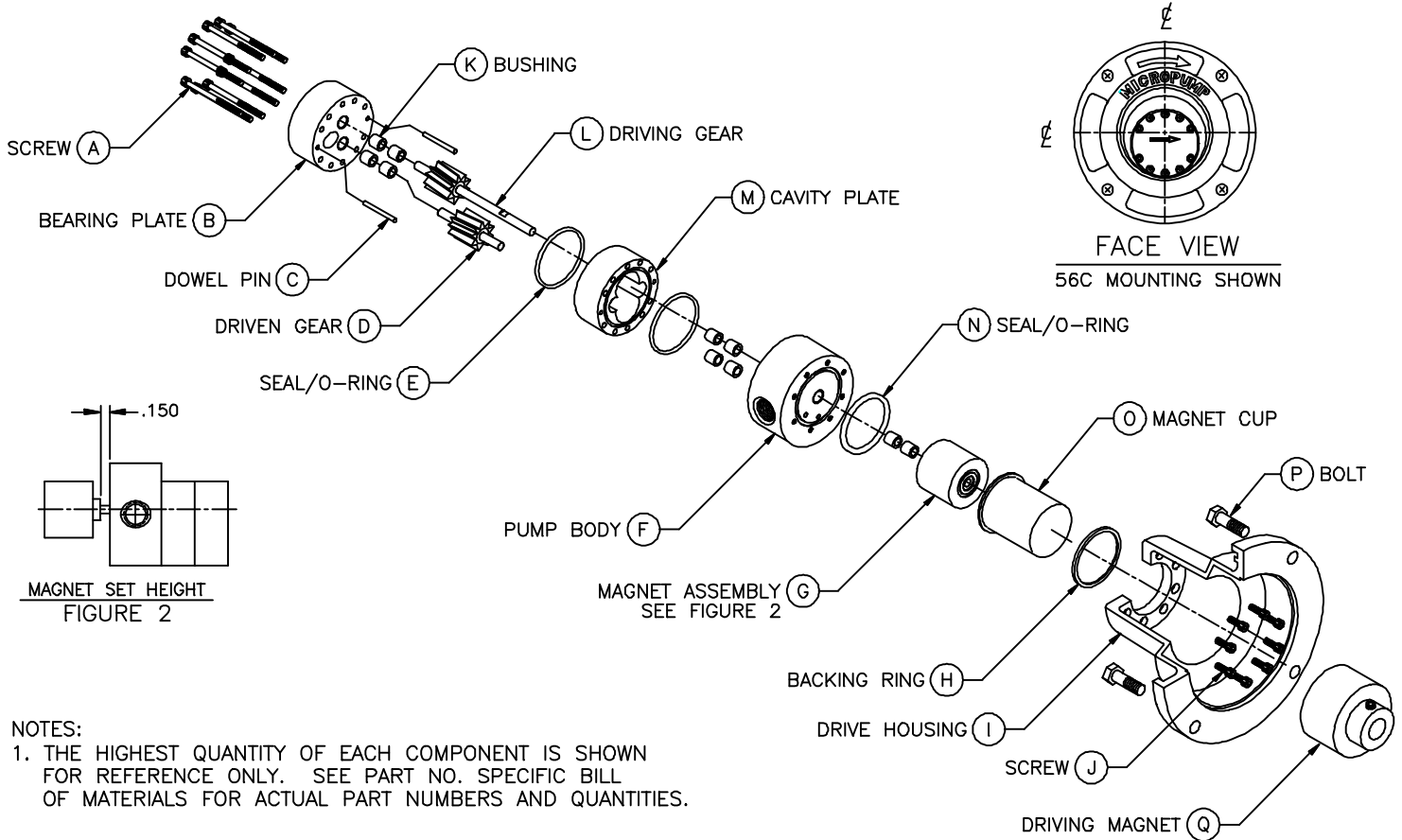


PART NUMBER: 6779

REVISION			
LTR.	DESCRIPTION	DATE	BY
C	REVISED PER ECN 4725	11-11-98	LFK

SERVICE INSTRUCTIONS:

MOD: 5000



NOTES:  
1. THE HIGHEST QUANTITY OF EACH COMPONENT IS SHOWN FOR REFERENCE ONLY. SEE PART NO. SPECIFIC BILL OF MATERIALS FOR ACTUAL PART NUMBERS AND QUANTITIES.

FIGURE 1

1. Description and Operation.

1.1 The Model 5000 pump is a positive displacement gear pump constructed of 316 stainless steel, Teflon, PEEK and or Carbon.

Special pumps may be constructed from alternate materials. The Pump is magnetically driven and is therefore leak-proof and contamination free. The pump is self-priming under normal conditions.

1.2 Drive power for the Pump is provided by the Motor and Drive Housing Assembly via the magnetic coupling. An exploded view is shown in Figure 1. Fluid enters the inlet port and is drawn into the cavity plate by the negative pressure caused by the gear rotation within the cavity plate. The gear teeth then move the fluid around the cavity plate walls to the discharge side of the cavity plate. At the mesh point, fluid is prevented from flowing back to the inlet, and as a result, the fluid is forced out of the cavity

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plate. The fluid then travels into the outlet side of the pump body and is discharged from the outlet port.

## 2. Tool and Materials Required for Disassembly, Repair, and Assembly of Pump Assembly.

- 2.1 Hex Keys (1/8", 5/64" & 9/64").
- 2.2 X-acto knife, or equivalent.
- 2.3 Masking tape.
- 2.4 Sandpaper, #600 grit, wet/dry.
- 2.5 Surface Plate or equivalent flat surface.
- 2.6 Bushing Insertion Tool.
- 2.7 Reamer, Bushing, .251" dia. (6.4 mm dia.)
- 2.8 Vacuum Grease (from service kit).
- 2.9 Stoddard Solvent or liquid detergent.

## 3. Disassembly of Pump Assembly (refer to Figure 1).

**Note: Prepare a clean, flat area, free of metal particles.**

- 3.1 Place pumphead on surface with housing facing up.

**Note: Exercise caution in the following step; Entrapped fluid will be released when Pump Body (F) and Magnet Cup(O) are separated.**

- 3.2 Remove 8 Screws (J) and pull Housing (I), Magnet Cup (O), and Backing Ring (H)(used in low pressure versions only) straight out from Pump Body (F).
- 3.3 Separate Magnet Cup (O), Backing Ring (H) and Housing (I).
- 3.4 Loosen set screw on Driven Magnet Assembly (G) and remove from Driving Gear Shaft (L).

**Note: Store Driven Magnet Assembly (G) in a clean bag (i.e. Service Kit bag).**

- 3.5 Remove 10 (3 for low pressure version) Screws (A), pull Bearing Plate (B), Cavity Plate (M), and 2 Dowel Pins (C) straight away from Pump Body (F).
- 3.6 Separate Bearing Plate (B), Cavity Plate (M), 2 Dowel Pins (C) from each other.

**Note: If Dowel Pin (C) is difficult to remove, protect Dowel Pin (C) with a soft material (I.E. plastic or wood), and then remove with pliers. Replace Dowel Pin if damaged.**

- 3.7 Remove Driving Gear (L) and Driven Gear (D) from Pump Body (F).
- 3.8 See Repair instructions, section 6.5.1 regarding Bushing (K) removal.

**Note: Remove Bushings (K) and O-Rings (E) & (N) only if replacement is necessary.**

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#### 4. Inspection of Pump Assembly components.

##### 4.1 Magnet Cup (O).

4.1.1 Visually check the outside of Magnet Cup (O) for rub marks on the back and sides. Marks on the back indicate Driving Magnet (Q) is incorrectly adjusted axially. Marks on the side of Magnet Cup (O) indicate Driving Magnet (Q) is radially misaligned.

4.1.2 Visually check the inside surfaces of Magnet Cup (O) for rub marks. Marks on the bottom surface indicate that either Driven Magnet (G) or Driving Magnet (Q) is incorrectly adjusted axially. See Assembly instructions, section 7.12 to correct Driven Magnet (Q) adjustment; see Assembly Instructions in Motor and Drive Housing Assembly section of Manual for Driving Magnet (Q) setting. Marks on the inside indicate radial misalignment of Driven Magnet (G); see Repair Instructions, section 6.2.

##### 4.2 Driven Magnet (G)

4.2.1 Visually check Driven Magnet (G) for wear on the outside shell. See Repair Instructions, section 6.2.

4.2.2 Visually check Driven Magnet (G) for metal particles. See Cleaning Instructions, section 5.2.2.

##### 4.3 Driving Gear (L) and Driven Gear (D)

4.3.1 Visually check the gear teeth on both gears for pits, wear, or damage. REPLACE BOTH GEARS if either gear is damaged or worn.

4.3.2 Visually check the gear shafts for wear, pits, scoring, or corrosion. Light wear marks on shaft circumference will normally not impede the operation of pump. REPLACE BOTH GEARS if either gear shaft is scored, or otherwise damaged.

**Note: Always replace all Bushings (K) if either gear shaft is worn or damaged.**

##### 4.4 Bearing Plate (B).

4.4.1 Visually check Bearing Plate (B) surface that contacts gears for scoring. See Repair Instructions, Section 6.4.

4.4.2 Visually check Bearing Plate (B) lube hole (slanted hole) for debris. See Cleaning Instructions, section 5.2.1.

##### 4.5 Cavity Plate (M).

4.5.1 Visually check the gear cavities in Cavity Plate (M) for scoring in the cavity bores. See Repair Instructions, section 6.3.

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4.5.2 Visually check O-Ring (E) for damage. Replace only if damaged. If necessary to remove, very carefully use a point X-acto knife at the outside edge of the O-Ring groove in Cavity Plate (M) to lift O-Rings out of their groove.

#### 4.6 Pump Body (F).

4.6.1 Visually check O-Ring (N) for damage. Replace only if damaged. If necessary to remove, very carefully use a pointed X-acto knife at the outside edge of the O-Ring groove in Pump Body (F) to lift O-Ring out of its groove.

4.6.2 Visually Check Pump Body (F) surface that contacts gears for scoring. See Repair Instructions, section 6.4.

### 5. Cleaning of Pump Assembly.

#### 5.1 Cleaning Agents and Materials.

5.1.1 Stoddard Solvent, or warm, mild solution of liquid detergent and water. Masking tape.

#### 5.2 Cleaning Procedures.

5.2.1 Clean all metal and plastic parts with the detergent solution, or Stoddard Solvent. Rinse in water or solvent and allow to dry, or carefully blow dry with clean, dry compressed air.

**Caution: Do not use detergent solution or solvent on electrical parts or motor bearings.**

5.2.2 Remove all metal particles from Driven Magnet (G) and Driving Magnet (Q) by pressing adhesive side of masking tape against particles and removing tape.

**Note: Loose iron particles and metal fillings will be attracted to the magnet surface and must be forcibly removed to prevent introducing rust into the system.**

### 6. Repair of Pump Assembly.

**Note: Repair of the Pump Assembly is primarily limited to replacing parts.**

6.1 Replace any part that exhibits damage such as wear, cracks, breaks, and excessive scoring; see section 6.4 below regarding scoring of Pump Body (F) and Bearing Plate (B).

6.2 Replace Bushing (K) to correct for side "rub" marks on inside of Magnet Cup (O) and on side of Driven Magnet (G). See Repair Instructions, section 6.5 below.

**Note: Rub marks on Magnet Cup (O) and Driven Magnet (G) may not require replacement of the part if excessive wear is not present.**

6.3 Replace Cavity Plate (M) if gear cavity bores indicate excessive wear or damage.

6.4 Scoring of Pump Body (F) and Bearing Plate (B).

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- 6.4.1 Pump Body (F) and Bearing Plate (B) score marks that are greater than 0.010", (.26mm), cannot be correct by the following procedure. Replace the part.
- 6.4.2 Minor scoring of Pump Body (F) and Bearing Plate (B) in area of gear contact may be corrected by lightly sanding with #600 wet-dry sandpaper. Place dry sandpaper on Surface Plate or equivalent flat surface (i.e. steel plate that has been "sparked out" on a surface grinder). Table top is not flat enough! Do not use creased sandpaper! Lightly sand in a "figure 8" pattern taking care to keep part flat against sandpaper. Avoid rocking the part. Normally, the deepest score marks will be found within a 1/2" (12,7mm) diameter around shaft holes, in the area of contact with gear wear plate. Typically, scoring outside this area of contact will "clean up" in 4-6 passes on the sandpaper, and all but the deepest marks within the 1/2" (12,7mm) diameter will "clean up" in 12-15 passes. If after 20 passes the score marks occupy more than 10% of the total area in contact with the gear, replace the part. Do not attempt to sand out deep score marks. Clean the part thoroughly after sanding; see Cleaning Instructions, section 5.2.1.

## 6.5 Bushing (K) Installation.

- 6.5.1 Remove all Bushings (K) from Bearing Plate (B) and Pump Body (F) using a Tap and handle. Thread tap into Bushing (K) approximately 1/2" (12,7mm) and pull Bushing (K) out.
- 6.5.2 Install 4 Bushings (K) into Bearing Plate (B) 0.010" to 0.020" (0.26mm to 0.51mm) below Bearing Plate (B) sealing surface, using Bushing Insertion Tool and hand press or non-rotating drill press.

**Note: If Pumphead contains Peek or Carbon bushings, one bushing is used for every 2 Rulon (Teflon) Bushings.**

- 6.5.3 Install the first 2 Bushings (K) into Pump Body (F) 0.010 to 0.020" (0.26 to 0.51mm) below sealing surface of the "gear end" of Pump Body (F). Install the remaining 2 Bushings (K) into Pump Body (F) from "Magnet end" of Pump Body (F) until Bushing is flush with Pump Body (F) surface.
- 6.5.4 Check all Bushings (K) for installation depth. Check all Bushings (K) after installation with a new gear shaft to insure that clearance between shafts and bushings is at least a sliding fit.
- 6.5.5 If bushings are tight on shafts, very carefully hand ream Bushings (K) after installation using a 0.251" (6.4mm) diameter reamer. This should be done as straight as possible to obtain maximum perpendicularity. **DO NOT FORCE REAMER INTO BUSHINGS. DO NOT REAM BUSHINGS UNLESS NECESSARY.**

## 7. Assembly of Pump Assembly (refer to figure 1).

**Caution: Do all work on a clean surface free to metal particles.**

- 7.1 Install Driving Gear (L) into center hole in Pump Body (F); the long end of the gear shaft goes into hole. The shaft should slide and rotate easily in bushings. If not, see Repair instructions, section 6.5.5.
- 7.2 Install Driven Gear (D) into the other hole with bushings in Pump Body (F). The shaft should slide and rotate easily in bushings. If not, see Repair Instructions, section 6.5.5. Check that gears rotate easily

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and mesh without sticking. Replace gears if individually gears rotate easily but do not mesh together without sticking.

7.3 Install 2 Dowel Pins (C) into Pump Body (F).

7.4 If elastomer O-Rings are used, apply a light even film of Dow Corning Vacuum Grease or equivalent. Apply vacuum grease from capsule to thumb and index finger of one hand, and transfer a light, even film of vacuum grease to O-Ring (E) by rubbing O-Ring between thumb and index finger. Check that ENTIRE surface of O-Ring (E) is coated with vacuum grease.

7.5 Install 1 O-Ring (E) into O-ring groove on each side of cavity plate (M). Teflon O-rings may need to be slightly stretched in order to fit into O-ring grooves.

7.6 Install Cavity Plate (M) over gears onto Dowel Pins (C). Locate Cavity Plate (M) flush onto Pump Body (F) sealing surface.

7.7 Install Bearing Plate (B) onto gear shafts and dowel pins. Check that Bearing Plate (B) sealing surface is flush against Cavity Plate (M) sealing surface.

7.8 Install 10 (3 for low pressure version) Screws (A) through Bearing Plate (B) into Pump Body (F) and tighten to 28 to 30 in.-lbs. (3,2 to 3,4 N-m). It is advised to apply a light oil to screw threads and under screw head before installation.

**Note: Pump with Teflon O-rings may require screws (A) to be tightened 2 to 3 times, due to the hardness of the Teflon O-rings.**

7.9 Install Teflon O-ring (N) into Pump Body (F), o-ring will require a slight compression to fit into groove.

7.9.1 If elastomer O-ring is used, apply light even film of Dow Corning Vacuum Grease or equivalent. Apply vacuum grease from capsule to thumb and index finger of one hand, and transfer a light, even film of vacuum grease to O-Ring (N) by rubbing O-ring between thumb and index finger. Check that entire surface of O-Ring (N) is coated with vacuum grease.

7.10 Driven Magnet (G) installation.

7.10.1 Position Driven Magnet (G) on Driving Gear (L) shaft locating set screw onto flat on Driving Gear (L) shaft. Magnet Assembly should be located .150" (3.8mm) away from Pump Body (F). (See Figure 2) Tighten set screw to 13 to 15 in.-lbs. (1,5 to 1,7 N-m) when properly adjusted.

7.11 Check that Driven Magnet (G) is free of metal particles; see Cleaning Instructions, section 5.2.2. Check that Driving Gear (L) shaft rotates without sticking; see Repair Instructions, section 6.5.5.

7.12 Install Magnet Cup (O) over Driven Magnet (G), onto O-Ring (N) in Pump Body (F); place Backing Ring (H)(low pressure versions only) over Magnet Cup (O) with the chamfer facing Pump Body (F).

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7.13 Complete the Pump Assembly with 8 Screws (J) through Housing (I) into Pump Body (F), and tighten to 28 to 30 in.-lbs. (3,2 to 3,4 N-m). It is advised to apply a light oil to screw threads and under screw head before installation.

7.14 Check that all screws are seated. There should be no gaps between mating parts.

## 8. Assembly of Pump Assembly to Motor.

8.1 Check that Driving Magnet (Q) setting is correct for Pump Assembly. Driving Magnet (Q) should be attached to the motor shaft using key and set screw. For all motor frames accept 143/145TC the Driving Magnet (Q) is designed so that when placed on motor shaft it will automatically stop at proper setting. For 143/145TC frame Driving Magnets (Q) see Assembly Instruction sheet 7492 for proper set height.

8.2 Install Pump Assembly onto motor. Care should be taken to not allow Driving Magnet (Q) to impact Magnet Cup (O) due to high magnetic attraction.

8.3 Determine proper port location and position Pump Assembly accordingly.

8.4 Install 4 Bolts (P) and tighten to 100 in-lb, (13.4 N-m).

8.5 Test pump to applicable specifications for Pump-Motor combination.

## 9. Storage.

9.1 Prepare pump for storage by installing plugs in inlet and outlet ports.

**Note: Tape can be used in lieu of plugs to seal ports.**

9.2 Store pump in any position in a ambient temperature-humidity environment.

**Note: If storage temperature is below freezing, remove all liquid from pump before storing.**

Contact Micropump Corporation for additional service questions

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