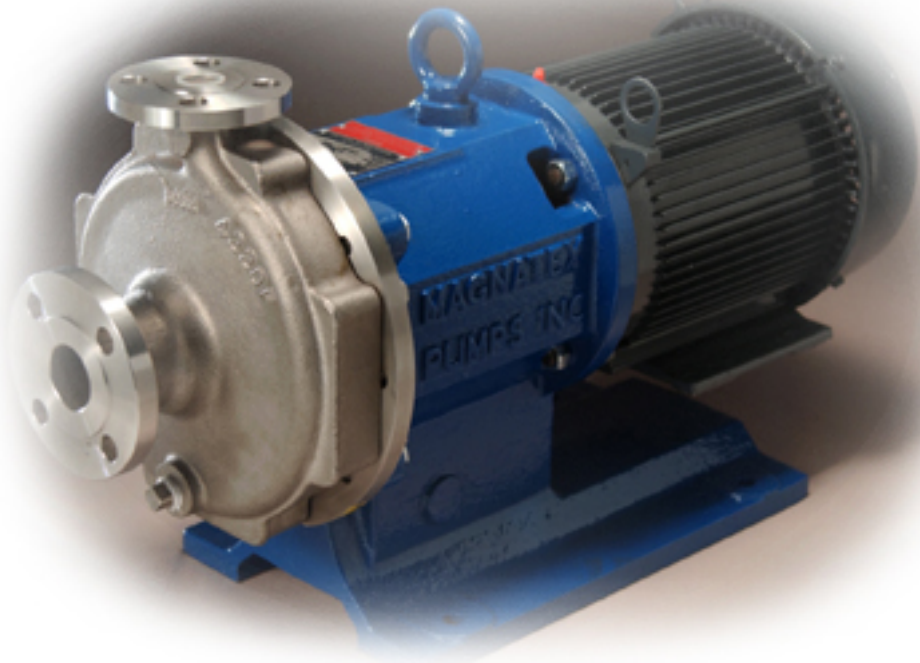




## **OPERATION AND MAINTENANCE MANUAL**

### **MPL SERIES CLOSE-COUPLED**



### **MAGNETIC DRIVE SEALLESS PUMPS**

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**WARNING:**  
**WHEN WORKING ON MAGNETICALLY DRIVEN PUMPS**

- ◆ Strong magnetic fields may damage watches, credit cards, computer disks, calculators and computer tapes.
- ◆ People with pacemakers should be cautioned that the strong magnetic field may upset the timing or cause the pacemaker to malfunction.
- ◆ When working on the pumps, be aware that tools or metal parts brought within proximity to the magnets may suddenly be attracted, trapping fingers in the process.

**OPERATING INSTRUCTIONS**  
**MPL SERIES CLOSE-COUPLED PUMPS**

This instruction manual is intended to help those responsible for the installation, operation and maintenance of **MAGNATEX** Magnetic Drive Sealless Pumps. We recommend thoroughly reading this manual and reviewing the Hydraulic Institute Standards regarding Horizontal Centrifugal Pump installation before installing and operating your pump.

**RECEIPT OF EQUIPMENT**

- A. Before uncrating, check for physical damage to the pumping system and notify the common carrier **IMMEDIATELY** if any damage is found.
- B. Check the nameplate on the pump against receiving and purchase order documents to be sure that the correct size pump and materials of construction have been supplied. If a motor has been supplied, check for correct horsepower, speed and voltage.
- C. Check to see if flange protectors are intact. If not, check for foreign objects that may have found their way into the pump casing through the flange openings.
- D. Check for free rotation of the pump. Remove the motor fan cover and rotate the pump using the motor shaft. Only slight resistance should be felt. If the pump has heavy resistance, or if any noise is heard, call your **MAGNATEX** representative or **MAGNATEX PUMPS INC.** at (713) 972-8666.

## FOUNDATION

The foundation should be firm and heavy to reduce vibration. The foundation bolts should be mounted in concrete to provide a firm and positive support.

## LOCATION & PIPING

- A. Locate the pump as close as practical to the source of liquid supply.
- B. The suction line should be as short and straight as possible and contain a minimum number of elbows. Any elbow should be the large radius type. Elbows and fittings should be no closer than 10 pipe diameters to the pump suction to allow undisturbed flow to the pump impeller.
- C. Generally, suction piping should be one or two sizes larger than the pump suction. This will keep friction losses to a minimum. This becomes more important as the distance between the pump and the liquid supply increases, or if fittings are located closer than 10 pipe diameters to the pump's suction.
- D. The suction piping should have no high spots where air pockets can collect. All joints in the suction line should be tight to prevent air from entering into the system and creating the possibility of vapor locking. This is especially important when suction pressure is lower than the atmospheric pressure. A pressure gauge should be installed in the suction line as close as possible to the suction flange.
- E. An air vent should be installed at the initial high point in the pump discharge line. A check valve and shut-off valve should be installed as close as possible to the pump discharge nozzle. The check valve is installed to protect the pump from excessive back pressure, including reverse flow / rotation, and back flow during shut down or driver failure. The discharge valve is at the pump discharge to regulate flow and isolate the pump for servicing. A pressure gauge should also be installed as close as possible to the discharge nozzle between the pump and the discharge valve.
- F. Large particles can block the bearing lubrication ports in the pump causing serious damage. In addition, metallic particles can magnetically attach to the inner magnet also resulting in damage. If possible, a temporary start-up strainer with a 40 X 40 mesh screen should be installed in the pump's suction line. **BE VERY CAREFUL** not to allow the temporary strainer to be plugged to the point of starving the pump of liquid. This may result in cavitation and the possibility of running the pump dry which can destroy the pump's bearings. It is recommended to install a pressure gauge between the strainer and pump to monitor possible plugging of the strainer. The discharge pressure may also be

closely monitored. Any drop in the discharge pressure without discharge valve throttling could suggest strainer plugging (assuming constant demand to the system).

- G. **MAGNATEX** pumps, although very rugged, are not designed to handle excessive pipe stress. The resulting forces and moments can result in possible damage to the pump. Piping must be anchored and supported as close as possible to, but independent from the pump. Pump and pipe flanges must be positioned together before attempting to tighten flange bolts.
- H. The pump **MUST NOT RUN DRY**. Adequate liquid should always be available to the pump suction. A flow sensor and/or amp/watt monitor should be installed to shut the pump down in the event of dry run. **MAGNATEX** provides an optional Electronic Pump Protector to prevent dry run.

#### **ROTATION CHECK AND START-UP**

To confirm the direction of rotation against the rotation arrow on the pump casing use the following procedure:

- A. Open the suction and discharge valve and allow the pump to be filled with liquid.

#### **WARNING! NEVER RUN THE PUMP DRY**

- B. Remove the motor fan cover for visual inspection of rotation.
- C. Bump the motor by quickly pushing the motor start/stop buttons. Rotation should be clockwise as seen from motor end. If the direction of rotation is incorrect, reverse two of the three-phase power leads to the motor.
- D. After confirming proper rotation replace the motor fan cover.

## PRIMING

- A. Open the suction and discharge valves and allow the pump to fill with liquid. If the direction of rotation has not been checked, this must be done as detailed under Rotation Check and Start-up before proceeding (see page 3).

### **WARNING! NEVER RUN THE PUMP DRY**

- B. Close the discharge valve to 1/4 open.
- C. Start the motor and immediately check the discharge pressure gauge. The pressure should rise quickly and hold steady. If the pressure rises and then falls back, there is air or vapor in the system. **STOP THE PUMP IMMEDIATELY.** Wait 15 to 20 seconds before restarting the pump.
- D. If after repeating Step C several times, the pressure gauge does not hold steady or does not yield the expected pressure (from performance curve), contact your Magnatex representative, or MAGNATEX PUMPS, INC., for assistance. Do not continue to operate the pump under these conditions.
- E. Once the pump is fully primed and the discharge pressure is satisfactory, slowly open the discharge valve until the desired operating point is reached.

## OPERATIONS AND MAINTENANCE

- A. Operators should make frequent visual inspections to insure the pump is running smoothly without noise or vibration. The discharge pressure should hold steady without fluctuation. Any excessive heating of the pump or motor bearings is cause for alarm. The unit should be shut down immediately, an investigation made to find the cause, and corrective action taken.
- B. Follow the motor manufacturer's recommendations and keep the motor bearings lubricated properly.

**WARNING!** Never throttle the pump by closing the valve on the suction side of the pump. Throttling the suction side can cause serious damage to the pump. Throttle only from the discharge valve.

**WARNING!** Never operate the pump against a closed discharge valve. Low flow operation can cause rapid heating of the pumped liquid with possible vaporization and the pump bearings running dry, resulting in serious damage to the pump.

## MAINTENANCE SCHEDULE

<u>Part to be Inspected</u>		<u>Frequency</u>
Inner Magnet Sub-Assembly	Check Thrust Rings, Sleeves and Bushings for wear. Use new gasket upon reassembly.	Every 2-3 years. (depending on service)
Motor	As directed in the motor operations manual.	As directed in the motor operations manual.

## STORAGE PROCEDURES

As shipped, the pumps are suitable for short-term storage only. If long-term storage is necessary before the pump is put into operation, contact your local representative or **MAGNATEX PUMPS** for long-term storage recommendations.

For maximum protection cover the pump with plastic or another protective material. Motors should be greased and rotated by hand every three (3) months.

Before start-up, refer to the section titled Rotation Check and Start-Up (page 3).

## TORQUE CHECK

To determine the static breakaway torque of the magnet coupling, place a torque wrench on the impeller nut and hold the motor fan shaft with channel locks. Slowly turn the torque wrench counterclockwise (as seen from motor end) until the magnets turn over (decouple). The preferred method for checking torque is to insert the torque wrench through the suction nozzle, leaving the casing attached to the pump.

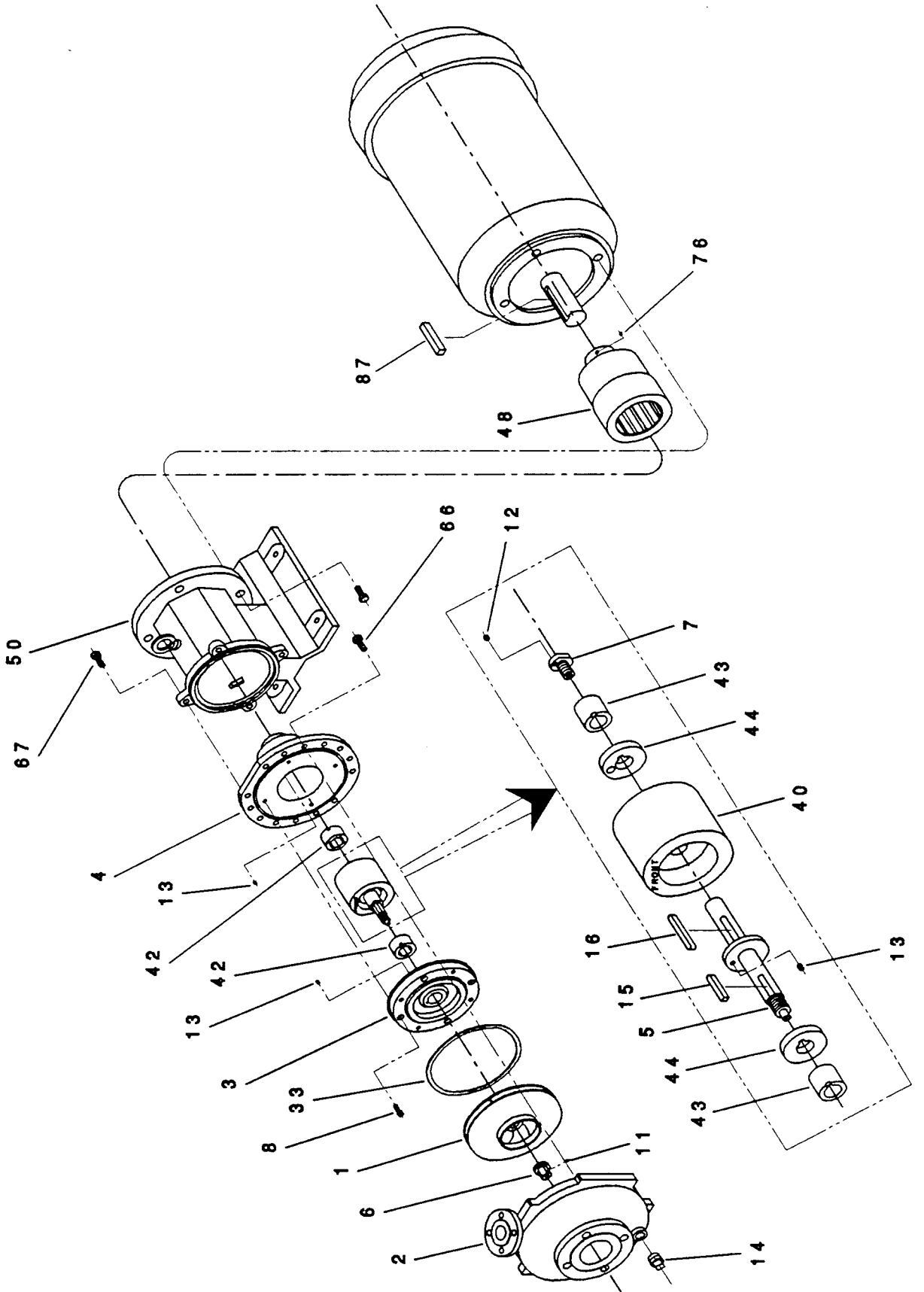
Minimum torque values are as follows:

<u>Magnet Size</u>	<u>Minimum Torque (ft-lb)</u>
N25	4.2
N40	10.6
V25	10.6
V40	21.1
V65	42.3

## PARTS LIST - MPL SERIES PUMPS

ITEM NO.	DESCRIPTION	QTY	SIZE	TIGHTENING TORQUE (ft. lbs.)
1	IMPELLER	1		
2	CASING	1		
3	CASING COVER	1		
4	REAR CASING	1		
5	INNER MAGNET SHAFT W/ KEYS	1		
6	IMPELLER NUT	1	M18	72.3
7	SLEEVE BOLT	1	M14	33.3
8	HEX SOCKET HEAD CAPSCREW	4	M8	8.8
11	IMPELLER NUT SET SCREW	1	M6	1.7
12	SLEEVE BOLT SET SCREW	1	M6	1.7
13	SET SCREW	3	M6	1.7
14	DRAIN PLUG	1	½" NPT	
15	IMPELLER KEY	1		
16	INNER MAGNET KEY	1		
33	GASKET	1		
40	INNER MAGNET	1		
42	BUSHING	2		
43	SLEEVE	2		
44	THRUST RING	2		
48	OUTER MAGNET	1		
50	FRAME ADAPTER	1		
66	HEX HEAD CAPSCREW	8	M12	31.1
67	HEX HEAD CAPSCREW	4	M12	31.1
76	OUTER MAGNET SET SCREW	1	M8	4.4
87	MOTOR KEY	1		

# MAGNATEX MPL SERIES PUMPS





## DISASSEMBLY OF WETTED END - MPL SERIES

1. Disconnect wiring from the motor terminal box. Remove the four bolts attaching the frame adapter (Item 50) to its base.
2. Close the suction and discharge valves. Remove the casing drain plug (Item 14) and empty the pump of any remaining liquid.
3. Remove the eight casing hex head capscrews (Item 66). The pump may be removed leaving the casing (Item 2) attached to its piping.
4. Loosen the impeller nut set screw (Item 11) and remove the impeller nut (Item 6). Pull the impeller (Item 1) off the inner magnet shaft (Item 5). If necessary, use two levers to loosen impeller from shaft.

**Caution:** Be careful to prevent any damage to impeller when removing.

5. Take two casing hex head capscrews (Item 66) and screw into tapped holes of rear casing (Item 4). Hold on to the capscrews and pull out assembly.

**Caution:** Some effort will be required to overcome the strong magnetic forces working that keep the inner and outer magnets together.

6. Remove the casing gasket (Item 33).
7. Remove the four hex socket head capscrews (Item 8).
8. Carefully lift off the casing cover (Item 3). If difficult to remove, screw two M10 hex head capscrews into the casing cover (Item 3) to help separate the casing cover and rear casing (Item 4).

**Caution:** The front bushing (Item 42) and the front sleeve (Item 43) may come loose with the casing cover. Be prepared to hold bushing and sleeve as the casing cover clears the inner magnet shaft (Item 5).

9. Remove the bushing (Item 42) from bearing holder in the casing cover (Item 3). Check if the set screw (Item 13) is securely in place in bearing holder.
10. Hold onto the inner magnet shaft (Item 5) and pull the shaft assembly from the rear casing (Item 4).

**Caution:** The bushing (Item 42) in the bottom of rear casing may come out with inner magnet shaft. Be prepared to hold the bushing as the shaft clears the rear casing.

11. Remove the bushing (Item 42) from bearing holder at the bottom of the rear casing (Item 4). Check if set screw (Item 13) is securely in place in the rear casing.
12. Remove the impeller key (Item 15), a sleeve (Item 43) and a thrust ring (Item 44). Check if set screw (Item 13) is securely in place in the inner magnet shaft (Item 5).
13. Loosen the sleeve bolt set screw (Item 12) and remove the sleeve bolt (Item 7).
14. Remove the other sleeve (Item 43), the other thrust ring (Item 44), the inner magnet (Item 40) and the inner magnet key (Item 16).

### **DISASSEMBLY OF DRY END - MPL SERIES**

1. Remove the four hex head bolts that hold the motor to the frame adapter (Item 50).
2. Remove the motor from the frame adapter (Item 50).
3. Loosen the outer magnet set screw (Item 76) and pull the outer magnet (Item 48) off the motor shaft.
4. Remove the motor key (Item 87).

## ASSEMBLY OF WETTED END - MPL SERIES

1. Slip the inner magnet key (Item 16) into the inner magnet shaft (Item 5) keyway.
2. Slide the inner magnet (Item 40) onto the inner magnet shaft (Item 5) and over the inner magnet key (Item 16).

**Note:** End stamped "Front" on inner magnet must be toward the threaded end (impeller side) of the shaft .

3. Slide a thrust ring (Item 44) onto the inner magnet shaft (Item 5), over the inner magnet key (Item 16) and up against the inner magnet (Item 40) with flat side away from the inner magnet.
4. Slide a sleeve (Item 43) onto the inner magnet shaft (Item 5) and engage the notch on the sleeve with the inner magnet key (Item 16).
5. Thread the sleeve bolt (Item 7) onto the inner magnet shaft (Item 16). Tighten and secure with the sleeve bolt set screw (Item 12).
6. Check if the set screw (Item 13) is securely in place in the inner magnet shaft (Item 5). Slide the other thrust ring (Item 44) onto the shaft, so that the hole fits over the set screw.
7. Slide the other sleeve (Item 43) onto the shaft so the notch exposes the impeller key (Item 15) keyway. Check that all contact surfaces lay flat with each other.
8. Insert the impeller key (Item 15) and engage the sleeve (Item 43) notch with the rounded part of the key.
9. Check if the set screw (Item 13) is securely in place in the bearing holder in the bottom of the rear casing (Item 4).
10. Place a bushing (Item 42) into the bearing holder in the bottom of the rear casing (Item 4) so that the notch on the bushing engages the set screw (Item 13).

11. Hold onto the threaded end of the inner magnet shaft (Item 5) and carefully slide the assembly into the rear casing (Item 4).
12. Check if the set screw (Item 13) is securely in place in the bearing holder in the casing cover (Item 3).
13. Place the other bushing (Item 42) into the bearing holder of the casing cover (Item 3) so that the notch on the bushing engages the set screw (Item 13).
14. Hold the loose bushing (Item 42) in place while sliding the casing cover (Item 3) over the inner magnet shaft (Item 5).
15. Bolt the casing cover (Item 3) onto the rear casing (Item 4) using the four hex socket head capscrews (Item 8). Tighten evenly to avoid binding.
16. Install a new casing gasket (Item 33). Gasket faces on both the casing cover (Item 3) and casing (Item 2) must be clean and free from scratches and burrs.
17. Screw two casing hex head capscrews (Item 66) in tapped holes of the rear casing (Item 4). Hold onto capscrews and slide assembly into the frame adapter (Item 50).

**Caution:** Some effort will be required to overcome the strong magnetic forces working that keep the inner and outer magnets together.

18. Remove the two casing hex head capscrews (Item 66) from tapped holes of the rear casing (Item 4). Slip the impeller (Item 1) onto the inner magnet shaft (Item 5). Install the impeller nut (Item 6) and secure with the impeller nut set screw (Item 11).

**Caution:** Hold impeller in place while tightening impeller nut to keep the shaft from rotating.

### **ASSEMBLY OF DRY END - MPL SERIES**

1. Insert the motor key (Item 87) on motor shaft.
2. Slide the outer magnet (Item 48) onto motor shaft and over motor key (Item 87) until outer magnet hub is flush with the end of the motor shaft. . Tighten the outer magnet set screw (Item 76).
3. Attach motor to the frame adapter (Item 50).
4. Bolt the motor to the frame adapter (Item 50).

### **FINAL ASSEMBLY - MPL SERIES**

1. Turn impeller (Item 1) by hand to check for free rotation. If resistance or scraping is felt, or if noises are heard (scraping, etc.), inspect the pump to find the cause and take corrective action.
2. Bolt the casing (Item 2) with the eight casing hex socket capscrews (Item 66). Tighten the bolts evenly to avoid binding.
3. Install the casing drain plug (Item 14) into the casing (Item 2).
4. Torque check pump magnets. If magnets de-couple below minimum torque value, magnets should be replaced. Refer to the section Torque Check (page 5).

## MAGNATEX MAG-DRIVE SEALLESS PUMPS

*Includes:*

**MMP/MP SERIES** - Close-Coupled Pumps for low flow.

**MPL SERIES** - Close-Coupled Pumps for higher flows.

**MPT SERIES** - Regenerative Turbine pumps for high heads and low flows.

**MAXP SERIES** - ANSI Process Pumps.

**MAXP CENTERLINE** - For High Temperature.

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