



Operation and Maintenance Manual

MMP Series Close-Coupled



Magnetic Drive Sealless Pumps

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!WARNING! - MAG DRIVE PUMP

DO NOT WORK ON THIS PUMP IF YOU ARE WEARING A MEDICAL DEVICE (DEFIBRILLATOR, PACEMAKER, ETC.) PERSONNEL WHO EXPERIENCE INTERFERENCE WITH THEIR MEDICAL DEVICE SHOULD MOVE AWAY FROM THE PUMP AND REFRAIN FROM HANDLING MAGNETIC PUMP COMPONENTS. SEEK IMMEDIATE MEDICAL ATTENTION IF YOU HAVE EXPERIENCED INTERFERENCE WITH YOUR MEDICAL DEVICE.

The rare earth permanent magnets in this pump have been manufactured such that the magnetic field is directional toward each half of the magnetic coupling. For this reason, the magnetic field that exists outside of the assembled magnetic coupling is minimal. When the two halves are apart, the magnetic field is exposed, which is why we recommend that personnel wearing medical devices **DO NOT HANDLE** the magnetic coupling components. When the pump is assembled, the magnetic fields from the magnetic coupling components are not exposed and it is safe for wearers of medical devices to be in the general proximity of the assembled pump, whether the pump is in operation or not.

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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
MMP 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. For information concerning the handling and operation of the motor, refer to the instruction manual for the motor.

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. A concrete foundation with a solid baseplate is recommended.

LOCATION & PIPING

- A. Locate the pump as close as practical to the source or 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 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 going (see page 5).

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 hearing 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

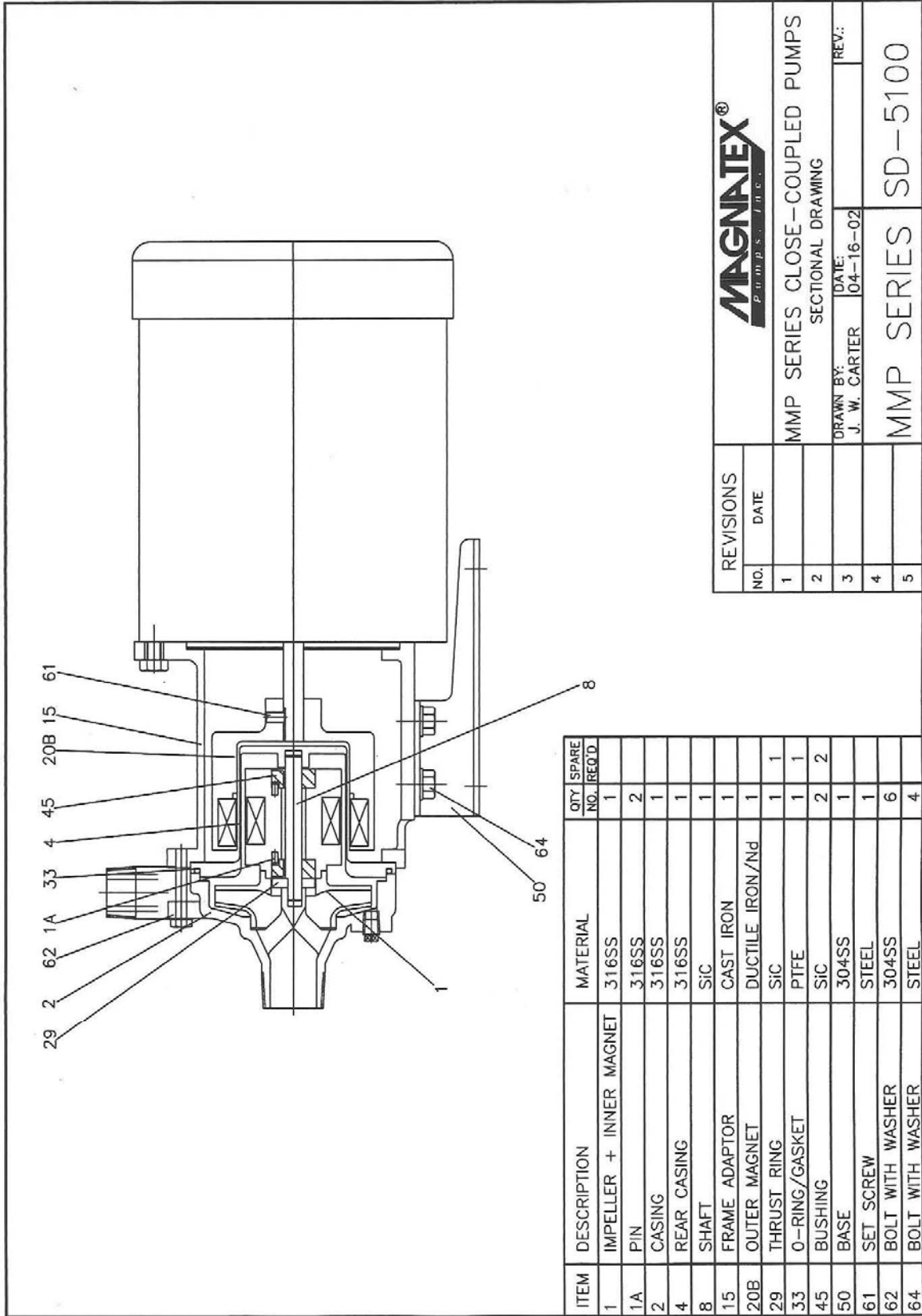
<u>Part to be Inspected</u>		<u>Frequency</u>
Inner Magnet	Check Thrust Rings, Sleeves, and Bushings for wear. Use new gasket upon reassembly.	Every 2 to 3 years (depending on service)
Motor	As directed in the motor operations manual.	As directed in the motor operations manual.

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, INC.** 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 5).



ITEM	DESCRIPTION	MATERIAL	QTY	SPARE NO.	REQ'D
1	IMPELLER + INNER MAGNET	316SS	1		
1A	PIN	316SS	2		
2	CASING	316SS	1		
4	REAR CASING	316SS	1		
8	SHAFT	SIC	1		
15	FRAME ADAPTOR	CAST IRON	1		
20B	OUTER MAGNET	DUCTILE IRON/ND	1		
29	THRUST RING	SIC	1	1	
33	O-RING/GASKET	PTFE	1	1	
45	BUSHING	SIC	2	2	
50	BASE	304SS	1		
61	SET SCREW	STEEL	1		
62	BOLT WITH WASHER	304SS	6		
64	BOLT WITH WASHER	STEEL	4		

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MMP SERIES CLOSE-COUPLED PUMPS
SECTIONAL DRAWING

DRAWN BY: J. W. CARTER
DATE: 04-16-02
REV:

MMP SERIES SD-5100

REVISIONS	
NO.	DATE
1	
2	
3	
4	
5	

Order of Disassembly and Assembly

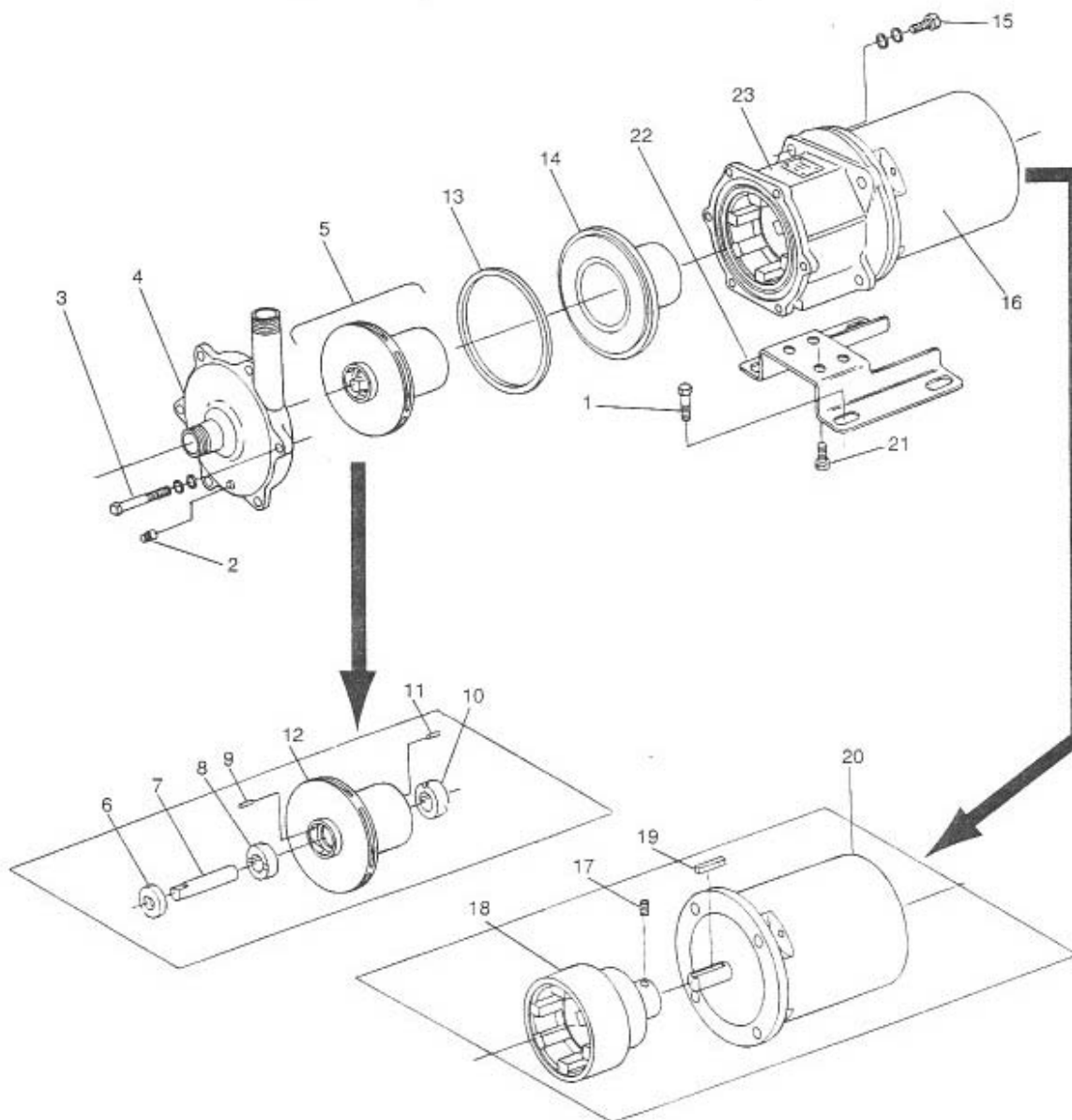
ATTENTION

- The magnet coupling uses powerful magnets which attract metal and other magnetic materials. The workbench, therefore, should be made of wood or plastic.
- We recommend the use of non-magnetic stainless steel tools for disassembling the pump. If using tools made of a material subject to magnetic attraction such as iron, be careful not to allow them to get near the magnetic parts.

Disassembly Order	Parts No.	Parts	Important Suggestions	Assembly Order
1	65	Base Bolts (4 pcs)		23
2	51	Drain Plug (No plug for MMP 10,11)	Completely drain the pump	22
3	62	Casing Bolts (6 pcs)	Tighten equally in 180 deg. pattern & torque per table on page 11	21
4	2	Casing	Remove Carefully	20
5	1,8,45	Impeller & Inner Magnet Assembly	Handle with care	19
6	29	Thrust Ring		18
7	8	Shaft		17
8	45F	Bushing		16
9	1F	Pin		15
10	45R	Impeller		14
11	1R	Pin		13
12	1	Impeller		12
13	33	Casing Gasket/O-Ring		11
14	4	Rear Casing		10
15	63	Motor Bolts (4 pcs)	Torque to 120 in-lbs.	9
16	20B	Motor & Outer Magnet	Motor shaft end flush with inside of magnet hub bore	8
17	61	Set Screw	Use Allen Wrench for M8 Screw	7
18	20B	Outer Magnet	Motor shaft end flush with inside of magnet hub bore	6
19	101	Motor Shaft Key		5
20		Motor	Motor shaft end flush with inside of magnet hub bore	4
21	64	Hexagon Bolts (4 pcs)	No Need to Remove These Bolts	3
22	50	Frame		2
23	15	Frame Adaptor		1

NOTE: Outer magnet mounts on motor shaft with motor shaft key and is positioned with the inside edge of the outer magnet hub bore flush with the end of the motor shaft.

Numbers in the drawing indicate the order of disassembly.

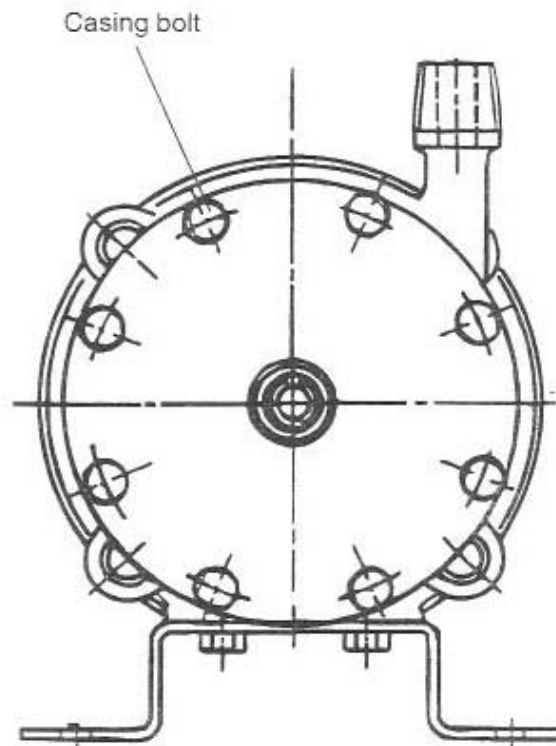


ATTENTION

- If pumping hazardous chemicals, be sure to wash the pump thoroughly after draining the liquid. A small amount of liquid will however remain inside the pump. If handling hazardous chemicals, be sure to wear protective equipment such as glasses and rubber gloves, and proceed with caution while disassembling the pump.
- Be careful of the powerful pull of the magnet. When removing part, be careful not to relax your grip until safely out of range of magnetic force.

Torque for Casing Bolts

Pump Model	Size of Bolt	Normal Torque
MMP-10, 11, 22	M6	3.54 ft./lb.
MMP-21	M8	8.8 ft./lb.
MMH-11, 21, 22	M8	8.8 ft./lb.



Troubleshooting

The following table contains the causes and countermeasures for typical problems that may occur. Items particular to magnet pumps are indicated by a circle (°).

Problem	Possible Causes	Remedy
Pump Will Not Start	• Motor not operating properly	• Repair Motor
	• Wrong power supply	• Inspect and correct
	• Foreign matter in rotating parts	• Disassemble and repair
	• Foreign mater caught in sliding parts	• Remove foreign matter
	° Damaged bushing	° Disassemble and replace bushing
Magnet Coupling Slip	° Demagnetization	° Change the coupling
	° Specific gravity or viscosity of liquid is too high	° Replace with higher torque coupling
	° Power source voltage is too high	
	° Motor output is too high	° Replace with proper motor
Liquid is Initially Discharged but Soon Stops	• Priming is inadequate	• Prime the pump properly
	• Air leak in piping	• Repair the suction piping
	° Magnet coupling is slipping	° Change magnets
Specific Liquid Discharge or Head Cannot be Obtained	• Strainer or foot valve is clogged with foreign matter	• Disassemble strainer or foot Valve for cleaning
	• Clogged impeller	• Remove foreign matter
	• Air leak in piping	• Repair the suction piping
	• Rotation is in reverse	• Interchange two leads of 3-phase motor
	• Piping loss is too large	• Reconsider larger pipe
	• Liquid is volatile or is too hot	
	• Cavitation	• Check suction condition
	• Clogged piping	• Remove foreign matter from piping
	• Speed is too low	• Check speed with tachometer
	• Voltage drop	• Check power supply
• Discharge port of supply tank is blocked	• Remove foreign matter	