STAINLESS STEEL MAGNET DRIVE PUMP

MP/MH/ML

INSTRUCTION MANUAL

Request to Users

- **This instruction manual is intended for the actual user, and should be turned over to the supervisor of the area where the pump is to be used.**
- **If required by the builder or equipment installers, copies of the manual will be provided upon request.**

Produced for IWAKI PUMPS

by: **SANWA HYDROTECH CORP.**

Introduction

Thank you very much for selecting a Sanwa Magnet Drive Pump. Our pumps are manufactured under strict quality control standards to ensure that your pump is in perfect operating condition. Improper handling or operation could however inhibit the pump's performance or lead to accidents. To use your Sanwa Magnet Drive Pump in the manner for which it was designed, be sure to closely follow the instructions contained herein. The instruction manual should be kept in a safe place where it can be referred to whenever necessary.
For information concerning handling and operation of the motor, refer to the instruction manual for the motor.

Safety

- Sanwa Hydrotech does not assume responsibility for damage or injury resulting from failure to follow the safety instructions contained herein. Be sure therefore to follow the instructions for safe and correct usage when operating, performing maintenance, or inspecting the pump.
- The degree of potential danger as a result of improper handling or operation is indicated by the following three classifications:

⚠ DANGER

Situation where improper handling or operation would almost certainly result in death or serious bodily injury.

⚠ WARNING

Situation where improper handling or operation could result in death or serious bodily injury.

⚠ ATTENTION

Situation where improper handling or operation could result in bodily injury or equipment damage.

- Items indicated by ⚠ATTENTION could also lead to serious consequences according to the circumstances. Be sure therefore to strictly observe items indicated by any of these labels.

⚠ DANGER

General

- Unless the pump is equipped with an explosion-proof motor, do not use in a potentially explosive atmosphere. Doing so could result in injury or fire.
- If pumping fluid with a low flash or ignition point, be sure to use an explosion-proof motor suitable for the atmosphere.
- Be sure to turn the power off before performing any type of maintenance, repair or inspection. Failure to do so could result in electrical shock.

Operation

- Absolutely do not touch or come close to turning parts. Doing so could result in injury caused by entanglement in the rotating parts.
- In case of power failure, be sure to turn the power off to prevent the pump from starting unexpectedly when the power is restored.

Maintenance and Inspection

- Be sure to connect the power cable in accordance with instruction manual for the motor and the connection diagram in the terminal box. Failure to do so could result in electrical shock or fire.

⚠ WARNING

General

- If using in connection with the food processing, be sure to keep the pump clean by washing. Failure to do so could enable germs to develop in the pump.
- Do not insert your fingers or any other objects in the openings of the pump motor. Doing so could result in electrical shock, injury or fire.

Installation and Adjustment

- Absolutely do not place inflammable materials in the area surrounding the pump. Doing so could result in fire.

Operation

- Be careful of rotating parts.
  Do not insert your fingers, etc., in the openings of the frame adaptor while the pump is operating. Touching turning parts could result in injury.

Disassembly and Assembly

- Be careful with hazardous liquids.
  If pumping dangerous chemicals, be sure to drain and wash well before disassembling. A small amount of fluid may however remain in the screw, faucet joint and engaged parts 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 not to get your hands or fingers pinched by machine parts.
  Parts may be strongly attracted by magnetism when disassembling or assembling the magnet coupling. Be careful not to let your hands or fingers get pinched by magnetized parts.

⚠ ATTENTION

General

- Transport, installation, piping and wiring connections, operation, adjustment, maintenance and inspection should be carried out by qualified personnel. Having unqualified personnel perform these tasks could result in electrical shock, injury or fire.
- Be sure to use only a power source of the voltage indicated on the name plate of the motor. Not doing so could result in electrical shock, injury or equipment damage.
- Do not use a damaged motor. Doing so could result in injury or fire.
- The customer should not modify the pump under any circumstances. Doing so could result in an unexpected accident. Sanwa Hydrotech shall not be responsible for accidents or damage resulting from equipment modified by the customer.
- Do not block name plate or warning labels from view.
- Do not remove the name plate or warning labels.

Transport

- Beware of equipment falling or turning over during transport. Be sure to use the hanger bolt if the pump is equipped with one. After installation, however, you should avoid hoisting the entire machine by the hanger bolt. Before lifting, check the weight of the pump by referring to the catalog, etc. Do not lift a pump which exceeds the rated weight of the hoist. Doing so could result in injury or equipment damage caused by bolt damage, falling or turning over.
- The pump bearing is made of extremely rigid material, and cannot endure rigorous vibration. The pump should be handled with care during transport. The pump should also be handled with care when installing.

Unpacking

- Check the top and bottom of the package before unpacking. Failure to do so could result in injury.
- Check the delivery specifications and name plate to make sure the merchandise is as ordered. Installing the wrong equipment could result in injury or equipment damage.

⚠ ATTENTION

Piping and Wiring

- Be sure to connect the power cable in accordance with instruction manual for the motor and the connection diagram in the terminal box. Failure to do so could result in electrical shock or fire.
- Do not forcibly bend, pull or crimp the power cable or motor lead wires. Doing so could result in electrical shock.

Installation and Adjustment

- Be sure to connect the earth terminal securely. Failure to do so could result in electrical shock.

Operation

- Do not operate with the terminal box cover off. After wiring, be sure to replace the terminal box cover in its original position. Failure to do so could result in electrical shock.
- Beware of high temperatures.
  If handling high temperature fluids, do not place your hands, etc., near the casing or hanger. Doing so could result in skin burning.
- No-Load Operation ⃠
  Absolutely do not operate the pump without a load. Doing so will cause the inside to heat up and damage the bearings. Never operate the pump without liquid inside of the pump. (This applies to when checking rotation direction as well.) If heat is produced in the can, the temperature rises may cause magnetism to reduce.
- Shut-Off Operation ⃠
  Do not perform shut-off operation for more than one minute. Doing so will cause a radical rise in temperature of the liquid in the pump, and could result in an accident.

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● Instructions for Safe Usage

- In order to use your Sanwa Magnet Drive Pump in the manner for which it was designed, be sure to read through and get a thorough understanding of the contents of this manual and the installation instructions before attempting to install, operate, perform maintenance or inspections. You should also have a good understanding of the equipment itself, matters concerning safe operation and handling, and other matters requiring attention before attempting to use the pump.

Equipment Failure / Accident Prevention and Safe Operation Checks

- Pre-Operation Checks
  The power source, wiring and connection, piping, priming, air purging and rotation direction should be checked before starting operation.

- Checks for Test Operation and Actual Operation
  Current, voltage, suction pressure, discharge pressure, and discharge flow rate should be checked when starting test or actual operation. The pump should also be checked for vibration, abnormal noise and leaks when operation is started.

⚠ DANGER

- **Be sure to take special precautions when performing test operation checks if using hazardous, explosive or inflammable liquids.**

Precautions When Pumping Special Liquids

- Sanwa pumps are used in various industries. Our stainless steel magnet drive pumps in particular are frequently used for pumping hazardous, explosive or inflammable liquids, and fluids which tend to produce food germs. Mishandling in any of these cases could lead to serious consequences such as bodily injury, loss of life or property damage. To prevent these from occurring, you should get a thorough understanding of the information contained herein and use the pump in the manner for which it was designed.

⚠ DANGER

- **Special care and safety equipment are required for the following types of liquid:**
  - **Explosive liquids**
  - **Liquids which could produce a chemical reaction**
  - **Liquids which could produce germs in connection with food products, and liquids which are of a dangerous nature**
  - **Inflammable liquids**
  - **Liquids which could directly harm the human body**

- Preventative measures should be taken to protect special pumps and pumps used in the main production line from natural disasters, unexpected accidents or equipment failure, the event of which could have a disastrous effect on your production. If these are impossible, you should keep a spare pump on hand for emergency use. (A pump with a suitable motor unit will be better.)

● Transport and unpacking

1. Transport

⚠ ATTENTION

- **Beware of equipment falling or turning over during transport. Be sure to use the hanger bolt if the pump is equipped with one. After installation, however, you should avoid hoisting the entire machine by the hanger bolt. Before lifting, check the weight of the pump by referring to the catalog, etc. Do not lift a pump which exceeds the rated weight of the hoist. Doing so could result in injury or equipment damage caused by bolt damage, falling or turning over.**
- **The pump bearing is made of extremely rigid material, and cannot endure rigorous vibration. The pump should be handled with care during transport. The pump should also be handled with care when installing.**

2. Unpacking

⚠ ATTENTION

- **Check the top and bottom of the package before unpacking. Failure to do so could result in injury.**
- **Check the delivery specifications and name plate to make sure the merchandise is as ordered.**
  Installing the wrong equipment could result in injury or equipment damage.

● Preliminary Check

When your pump is delivered, you should check the following items:

- Are all of the accessories included in the package?

⚠ ATTENTION

- **Check the name plate to make sure the merchandise is as ordered.**
- **Check to make sure the pump has not been damaged or the bolts and nuts loosened during transport.**

If you discover any accessories to be missing or you find something wrong with the merchandise, please contact your dealer or you may contact us directly.

● Pump Installation

1. Installation

- The position of the pump should be finalized after considering the pump suction capacity.
- The pump should be installed in a place which provides sufficient space for maintenance and inspections.
- The foundation should be strong enough against vibration and should provide enough volume and area to support the weight of the pump and motor. The pump base should be securely fastened to the foundation by anchor bolts.
- Dirt and foreign objects in the suction tank and piping could cause equipment failure. Be sure to clean the tank and piping before introducing liquid.

⚠ ATTENTION

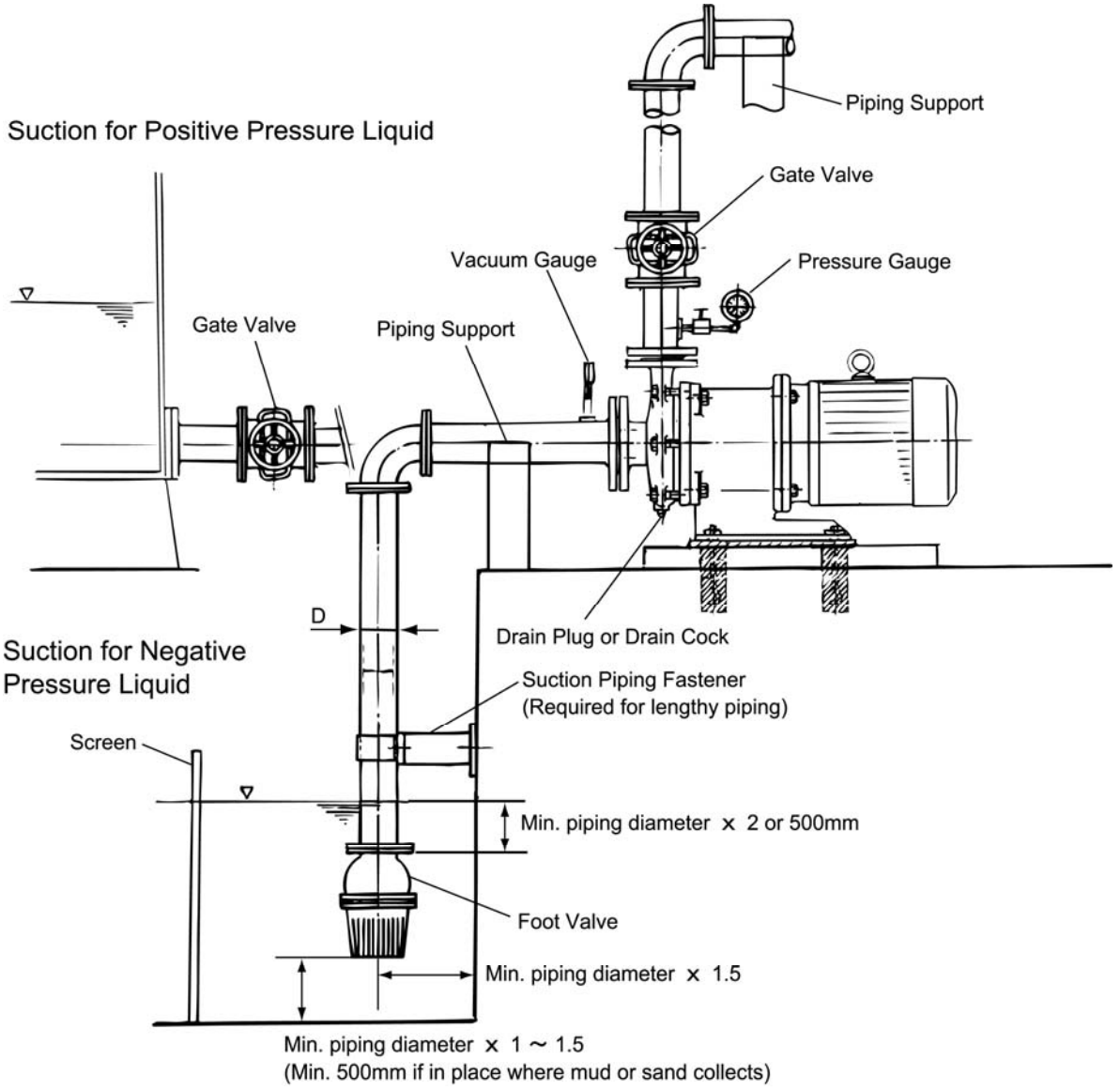
- **Before attempting to hoist the pump, find out the weight of the pump including the motor, and use a rope or hoisting equipment capable of supporting the load in order to prevent the pump from falling.**

2. Piping

- Horizontal suction piping should gradually rise toward the inlet port of the pump. (Minimum gradient of 1/50)
- A foot valve or strainer should be mounted on the ends of pipes to prevent foreign objects from being sucked in.
- Suction piping may be provided with a gate valve to facilitate disassembly and inspection in case of positive pressure of the liquid at suction port. The valve should be fully open while the pump is operating.

NOTE

- **The weight of the suction and discharge piping can cause misalignment or equipment failure. Be sure to provide sufficient support for the piping.**
- **The piping should be as short as possible, with a minimum of bends.**
- **Absolutely do not use piping of a diameter smaller than that of the pump suction bore.**
- **Do not provide protrusions which can form air pockets in horizontal piping.**
- **Be careful not to allow pipe thread cuttings or other foreign objects to enter when laying and fitting piping.**



3. Wiring

⚠ DANGER

- **Power supply equipment, wiring and the earth terminal connection should be in accordance with technical standards for electrical equipment and inner wiring diagrams. Piping or the earth terminal connecting work performed by unqualified personnel is not only in violation of the law, but is extremely dangerous. Absolutely do not allow piping or the earth terminal connecting to be performed by unqualified individuals. You are also obligated by law to provide an earth leakage breaker and overload protection equipment to prevent electrical shock or fire.**

● Operation

1. Pre-Operation Inspections (Be sure to turn the power off before performing inspections!)

1. Tighten flange bolts and machine base bolts.
2. Supply liquid after thoroughly cleaning the inside of piping and tanks.
3. Check if you can turn the motor by hand without applying force.
4. Purge all the air from the pump.
   - Pumping liquids with positive pressure;

     Fully open the suction and discharge valves, and purge all the air remaining in the pump casing. Be sure to install and use the optional cock or valve in case pipe layout might cause air purge difficulty.
   - Pumping liquids with negative pressure;

     A vacuum pump is used for suction pumping. The pump can also be filled with liquid from the discharge piping. When doing so, purge all air by opening the air purge cock while being careful not to allow high pressure to the suction piping or foot valve.

2. Operation

1. After priming, close the discharge valve, turn the switch on and off one or two times, and make sure the rotation direction (clock wise direction when viewed from the motor side) is correct and that the pump operates normally.
   - If it works in reverse, check inside wiring connection of the terminal box of the motor and change wiring connection accordingly. (motor rotation will be checked by "arrow" indication at motor frame adaptor and motor fan's rotating direction.)
   - Be sure to completely close the gate valve of discharge pipe before starting the pump.
2. When the pump arrives at the specified speed, open the gate valve within one minute.
3. When the pump starts, check for abnormal noises, vibration, or rising discharge pressure. When the pump arrives at the specified speed and the discharge pressure gauge reaches shut-off pressure, gradually open the gate valve on the discharge side until it reaches the specified discharge pressure.

NOTE

- **Do not operate the pump with the discharge valve shut for an extended period of time. (Max. 1 minute under ordinary circumstances)**
- **Excessively opening the discharge valve will overload the motor. You should keep an eye on the ammeter while opening the valve to avoid excessive current.**

Operation and handling

- Never perform cavitation or no-load operation. Doing so could damage the bushings. Shut the pump off immediately if you discover the pump to be operating in such conditions.
- If the magnet coupling slips, stop the pump immediately within one minute. Continuing to operate with the magnet coupling slipping may demagnetize the magnet coupling, resulting in engine failure.

  Protection;

  To check the demagnetize problem, cavitation operation and no-load operation, we recommend installing our dry-run monitor .

⚠ WARNING

- **Do not insert your fingers or other parts of your body in the openings of the frame adapter while the pump is operating. Touching the rotating parts inside could result in injury.**

⚠ ATTENTION

- **High Temperature**
  If pumping hot liquids, do not place your hands or other parts of your body near the casing or frame adapter. Doing so could result in skin burns.
- **No-Load Operation Prohibited** ⃠
  The bearings of MP Series pumps are lubricated by liquid pumped. Running the pump without liquid to be pumped should be avoided. If for some reason no-load operation is happened for several seconds, do not introduce liquid right away, but rather let the pump cool for at least an hour before restarting operation with liquid. (Suddenly introducing cool liquid can crack ceramic parts, etc.)
- **Shut-Off Operation Prohibited** ⃠
  Performing shut-off operation for an extended period of time can heat the pump resulting in an accident.

Affects of High Temperature

- Although the performance of the pump itself is not affected by temperature, the specific gravity, viscosity, vapor pressure and corrosiveness of the liquid are affected. You must therefore be aware of changes in the properties of the liquids handled.

Model	Liquid temperature range
MP	−30 to +150°C
MH	R.T. to +280°C
ML	−80°C to R.T.

Variation of Performance by Specific Gravity

- Pump performance is affected by specific gravity of the liquids, then a suitable power unit (motor, inner-magnet coupling and outer magnet coupling) must be applied by considering the specific gravity of the liquid.

Variation in Performance According to Viscosity

- Discharge flow rate and the total head of pumps are lower for high viscosity liquids than when using fresh water, and more power is required to pump viscous liquids. Use a power unit which meet the power required.

Slurry

- The pump is designed to handle some slurry and sludge. Before attempting to pump liquids containing slurry or sludge, find out the slurry content and size of the particles, and consult with us.

3. Shutting Down

1. Shut the discharge valve.
2. Stop the motor. When turned off, the motor should gradually slow down to a smooth stop. (If it does not stop smoothly, check the inside of the pump to see if everything is as it should be.)
3. In case of power failure during operation, turn off the switch and shut the discharge gate valve.

● Maintenance and Inspection

1. Routine Inspection

Item	Advice
Does the pump run smoothly without vibration?	Permissible amplitude of vibration for the pump with 2P motor is 28/33μm as maximum and 47/54μm, maximum for the pump equipped with 4P motor(60/50HZ). If abnormal noise is produced by the bearings or other parts, stop the pump immediately and check each part. Please contact us immediately if you can not find reasons of such noise and vibration.
Suction liquid level and suction port pressure	The pressure gauge reading is proportional to the specific gravity of the liquid. The gauge cock for the pressure and vacuum gauges is to be opened for measurement only. Shut the gauge cock after measuring.
Pump operating load	Discharge pressure under operation must be checked according to the figure showed on the specification plate of the pump. Electric current must be lower than figure showed on the specification plate of the motor.

- A periodic inspection should be performed at least once a year. A record of periodic inspections should be kept.
- If the pump is not to be used for an extended period of time, be sure to remove the drain plug and drain the liquid from the pump. (In frigid regions, the pump could be damaged if liquid freezes in the pump.
- To preserve the life of the pump and motor, be sure not to start the pump more than six times per hour.

2. Configuration and Location of Part

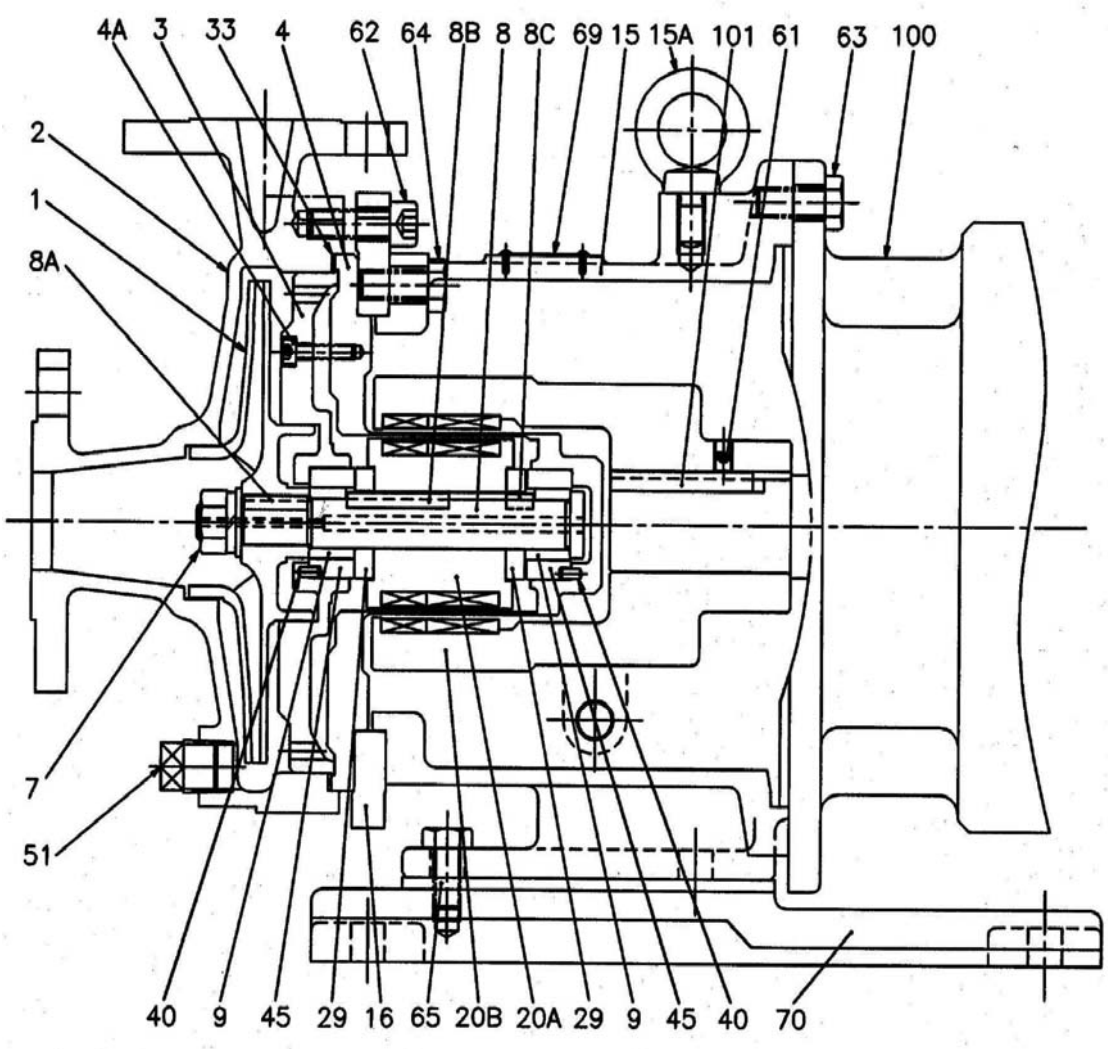
A list of parts (below) and a configuration diagram (following page) are given to provide a general description of the pump. You may refer to these as you read the instruction manual.

Parts

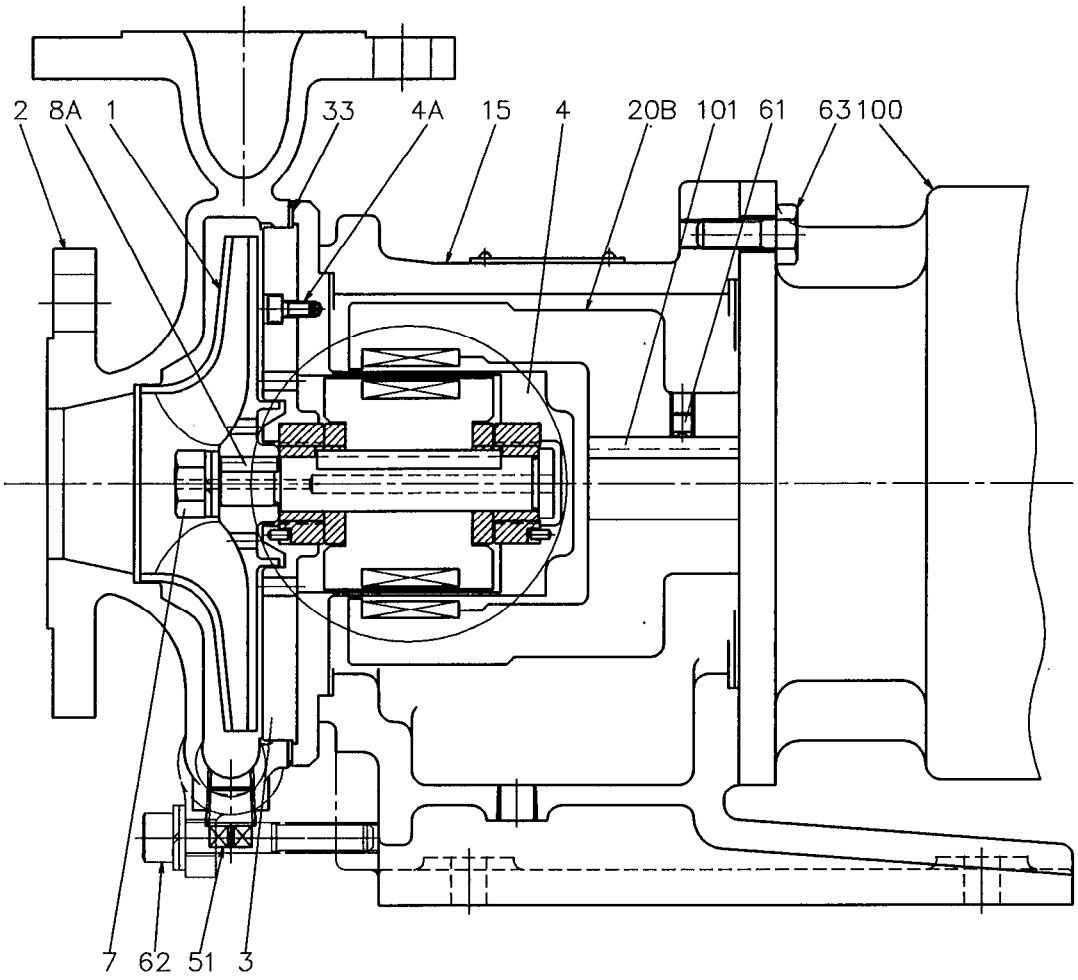
No.	Part	Material	Qty.	Remark
101	Coupling key	S45C	1	
100	Motor		1	
(70)	Base	FC200	1	MP423,MP543,MP842 only
69	Name plate	SUS304	1	
(65)	Hexagon head bolt (base)	SUS304	4	MP423,MP543,MP842 only
(64)	Hexagon head bolt (flange)	SUS304	1	MH,ML and MP423,MP543, MP842 only
63	Hexagon head bolt (motor)	SUS304	4	
(62)	Hexagon socket head cap screw (casing)	SUS304	8	MP423,MP543,MP842 only
62	Hexagon socket head cap screw (casing)	SUS304	6	
61	Set screw	SCM435	1	
51	Plug	SUS	1	
40	Pin	SUS	2	
33	Sheet gasket		1	1.5t
29	Thrust ring	SiC	2	
45	Bushing	SiC	2	
20B	Magnet	RARE EARTH	1^S	
	Magnet coupling (outer)	FCD	1	
20A	Magnet	RARE EARTH	1^S	
	Magnet coupling (inner)	SUS	1	
(16)	Flange (casing)	SCS13	1	MH,ML and MP423,MP543, MP842 only
(15A)	Eye bolt	SF440	1	MP423,MP543,MP842 only
15	Frame adapter	FC200	1	
9	Sleeve	SiC-D	2	
8B	Coupling key	SUS	1	
8A	Impeller key	SUS	1	
8	Shaft	SUS	1	
7	Impeller nut	SUS	1	
4A	Hexagon socket head cap screw	SUS	4	

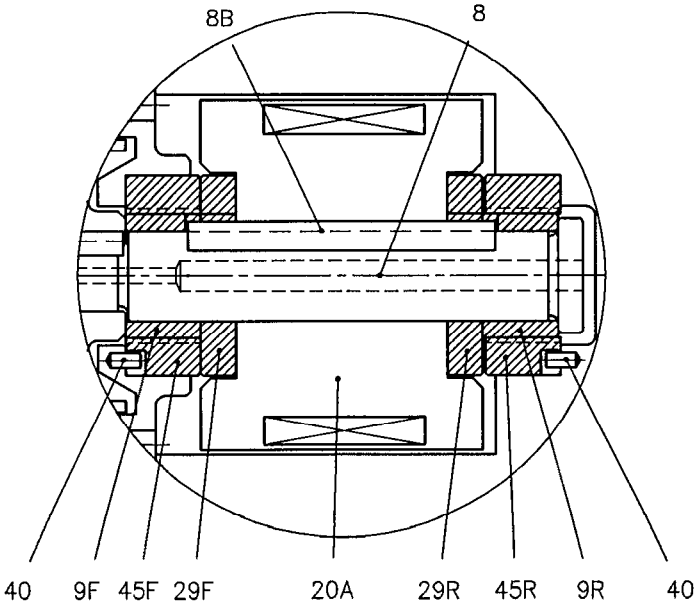
4	Rear casing	SUS	1	
3	Casing cover	SUS	1	
2	Casing	SCS	1	
1	Impeller	SCS	1	

Configuration (MP423,MP543,MP842 Type)



Configuration (MP210,MP220,MP221,MP222,MP420,MP421,MP541,MP542 Type)





3. Order of Disassembly and Assembly

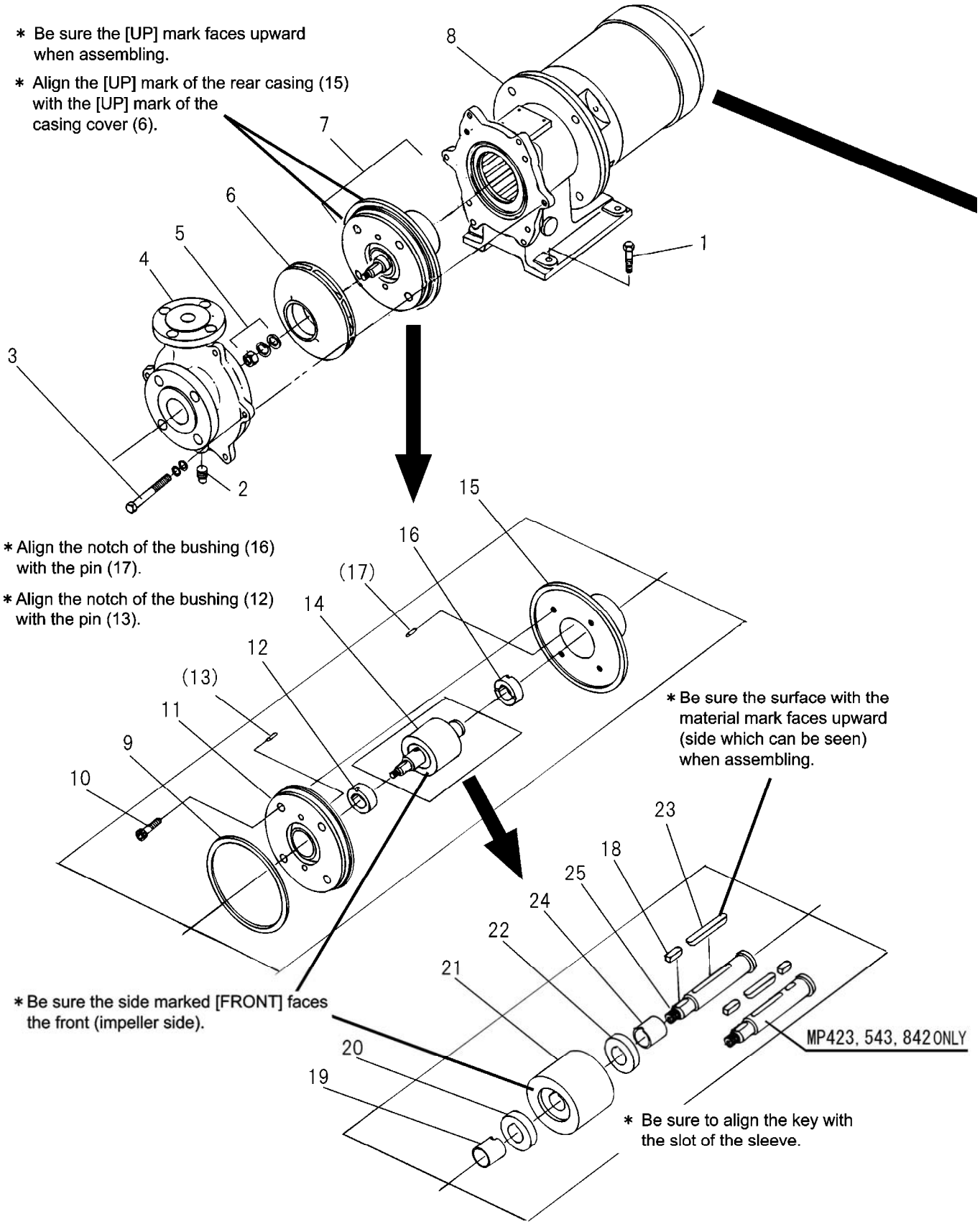
⚠ ATTENTION

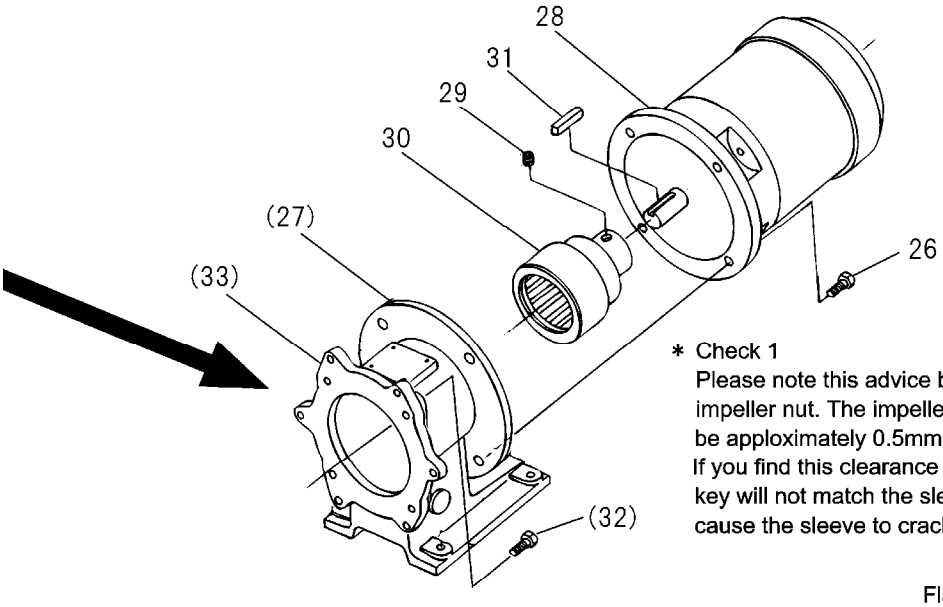
- **The magnet coupling uses powerful magnets which attract metal and other magnetic materials. The workbench, therefore, should be made of wood or plastic.**
- **We recommend the use of non-magnetic stainless steel tools for disassembling the pump. If using tools made of a material subject to magnetic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

Disassembly Order	Part No.	Part	Important Suggestions	Assembly Order
1	65	Hexagon head bolt (4)		35
2	51	Plug	Completely drain liquid from the casing.	34
3	62	Hexagon socket head bolt (6)		33
4	2	Casing		32
5	7	Impeller nut	Uses right-hand threads: Turn to the left to loosen.	31
6	1	Impeller	Keep two levers in case the impeller gets too tight.	30
7	3～4	Casing cover and rear casing	Screw the two casing bolts (62)(It is a M8 bolt in the case of MP423, MP543,MP842) into the screw holes on the casing cover and lift out by pulling with force. The casing cover is attracted by magnetic force, so be extremely careful not to relax your grip until it is completely out of reach of the magnetic force. The can of the rear casing is very thin. Be careful not to damage it while handling.	29
8	15	Frame adapter and motor		28
9	33	Casing gasket		27
10	4A	Hexagon socket head bolt (4)		26
11	3	Case cover	If the case is hard to remove, drive the casing bolts (62)(In is a M8 bolt in the case of MP423,MP543, MP842) further and use as a push bolt. The casing cover is marked with [UP].	25

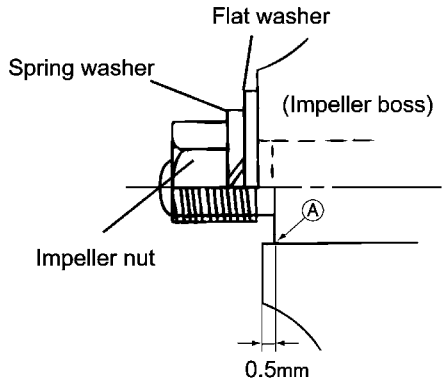
Disassembly Order	Part No.	Part	Important Suggestions	Assembly Order
12	45F	Bushing		24
(13)	40F	Pin	Does not have to be removed.	23
14	8～20A	Inner magnet coupling	The side marked [FRONT] is the impeller side.	22
15	4	Rear casing		21
16	45R	Bushing		20
(17)	40R	Pin	Does not have to be removed.	19
18	8A	Impeller key	Material mark should face upward.	18
19	9F	Sleeve		17
20	29F	Thrust ring		16
21	20A	Inner magnet coupling	Powerful magnetic force requires attention.	15
22	29R	Thrust ring		14
23	8B	Coupling key	Material mark should face upward.	13
24	9R	Sleeve		12
25	8	Shaft		11
26	63	Hexagon head bolt (4)		10
27	15	Frame adaptor		9
28	100	Motor		8
29	61	Set screw	Use hexagonal wrench for M8 screw.	7
30	20B	Outer magnet coupling		6
31	101	Motor shaft key		5
(32)	64	Flange bolts (4)	MH,ML and MP423,MP543,MP842 only	4
(33)	16	Casing flange	MH,ML and MP423,MP543,MP842 only	3
(34)	65	Base bolts (4)	MP423,MP543,MP842 only	2
(35)	70	Base	MP423,MP543,MP842 only	1

Numbers in the drawing indicate the order of disassembly.





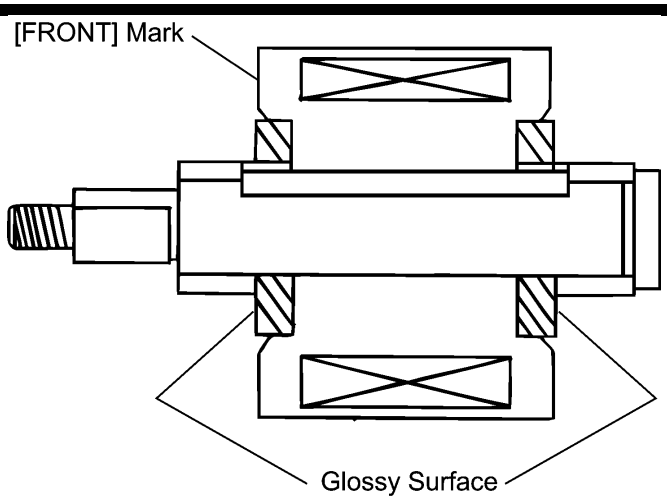
* Check 1
Please note this advice before fastening the impeller nut. The impeller shaft end (Ⓐ) must be approximately 0.5mm behind the impeller boss. If you find this clearance by 1.5mm or more, the key will not match the sleeve key slot, and may cause the sleeve to crack when fastened tightly.



* Check 2
Fasten the impeller nut by correct manner tightly. Then, impeller will rotate smoothly and have about 0.5mm play on shaft direction.

⚠ ATTENTION

- **If pumping hazardous chemicals, be sure to wash the pump thoroughly after draining the liquid. A small amount of liquid will however remain in the screw, faucet joint and engaged parts 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 the magnetic force.**
- **Be careful when handling the thin can of the rear casing.**
- **Be sure to note the orientation of the inner coupling shaft when assembling. The end marked [FRONT] should face the front.**

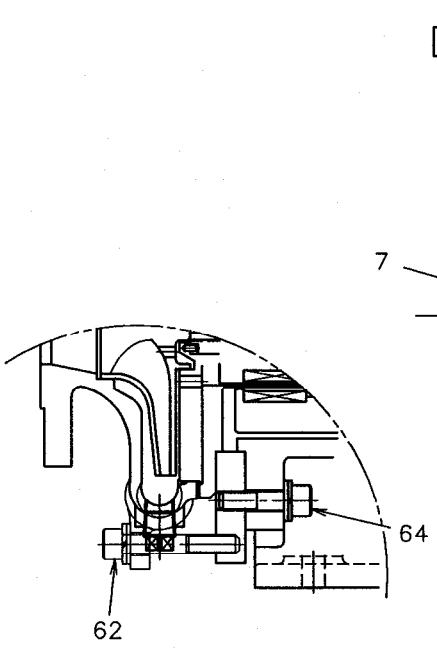


⚠ ATTENTION

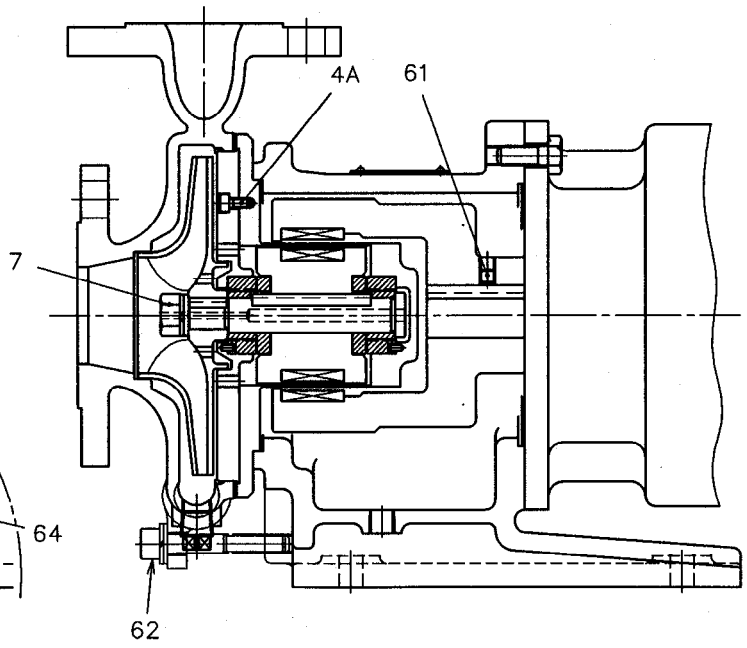
- **The polished surface of the thrust rings should face outward.**

4. Optimal Tightening Torque for Bolts and Nuts

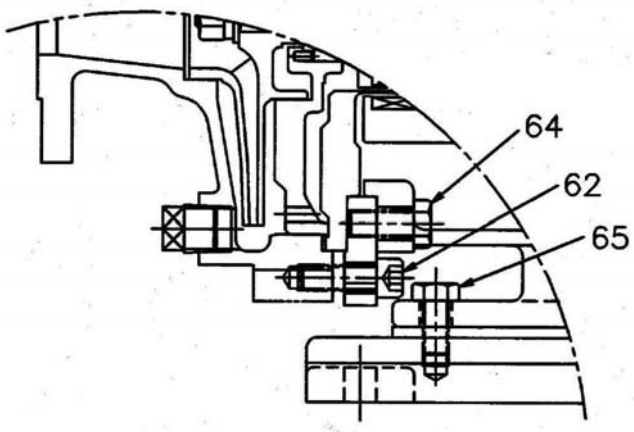
Part No.	7	4A	62	61	64	65
Part / Pump Size	Impeller nut	Hexagon socket head	Casing bolts (hexagon socket head bolt)	Set screw	Flange bolts (hexagon head bolt)	Base bolts (hexagon head bolt)
210 220 221 222 420 421 541 542	M12/ 29.4N•m (3.0kgf•m)	M5/ 2.8N•m (0.29kgf•m)	M10/ 24.0N•m (2.45kgf•m)	M8/ 6.0N•m (0.61kgf•m)	M10/ 24.0N•m (2.45kgf•m) (MH,ML Only)	—
423 543 842	M14/ 47.3N•m (4.83kgf•m)	M6/ 4.8N•m (0.49kgf•m)	M12/ 42.1N•m (4.3kgf•m)	M8/ 6.0N•m (0.61kgf•m)	M12/ 42.1N•m (4.3kgf•m)	M12/ 42.1N•m (4.3kgf•m)



(MH,ML)



(MP)



(MP423,543,842)

●Troubleshooting

The following table contains the causes and countermeasures for typical problems that may occur. You may refer to the table when there seems to be something wrong with your pump. (Items particular to magnet pumps are indicated by a circle (○).

Problem	Possible Causes	Countermeasures
Pump won't start	● Motor not operating properly	● Repair motor.
	● Wrong power supply	● Inspect.
	● Foreign matters in rotating parts	● Disassemble and repair.
	● Foreign matters caught in sliding part	● Remove foreign matter
	○ Damaged SiC bearing etc.	○ Disassemble and replace SiC bearing.
Magnet coupling slip	○ Demagnetization	○ Change the coupling.
	○ Specific gravity or viscosity of liquid is too high.	○ Replace with high 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 is being sucked in.	● Check the suction piping.
	● Head of liquid suction is too high.	● Lower the head of liquid suction.
	○ Magnet coupling is slipping.	○ See item concerning magnet decoupling.
Specified 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 is being sucked in.	● Check the suction piping.
	● Rotation is in reverse.	● Interchange of two leads of 3-phase motor.
	● Piping loss is too large.	● Reconsider planning.
	● Liquid is volatile or is too hot.	
	● Cavitation	● Checking suction condition
	● Clogged piping	● Remove foreign matter from piping
	● Speed is too low.	● Checking indication of tachometer.
	● Voltage drop	● Checking power source
	● Discharge port of supply tank is blocked.	● Remove foreign matters

Problem	Possible Causes	Countermeasures
Overloading	● Head of liquid is too low or too much discharge flow rate.	● Throttle discharge valve.
	● Specific gravity or viscosity of liquid is too high.	● Reconsider planning.
	● Irregular contact at rotating part	● Repair or replace part.
	○ Damaged SiC bearings	○ See item concerning SiC bearings.
Pump vibrates and produces noise.	● Clogged impeller	● Remove foreign matter
	● Cavitation	● Checking suction condition
	● Too much discharge flow rate.	● Throttle discharge valve.
	● Rotation is in reverse.	● Check wiring connections.
	● Resonation of piping	● Improve the piping arrangement.
	● Irregular contact at rotating part	● Be repaired by specified factory.
	● Shut off operation performed for extended period of time	● Stop shut off operation.
	● Damaged bearing	● Replace bearings.
	○ Magnet coupling slipping	○ See item concerning magnet slipping.
	○ Damaged SiC bearings	○ See item concerning SiC bearings.
Demagnetization	○ No-load operation	○ Change coupling.
	○ Shut off operation performed for extended period of time	
	○ Operation with magnet coupling slipping with coagulated liquid	
SiC bearing damage	○ No-load operation (forgot to introduce pumping liquid, forgot to open suction valve, checked rotation direction without introducing pumping liquid, etc.)	○ Replace SiC bearing
	○ Operation started without complete discharge of air inside of the pump.	
	○ Shut off operation performed for extended period of time	
	○ Cavitation	○ Modify piping and check
	○ Solid or other foreign matter caught in SiC bearing.	○ Clean and replace SiC bearing
	○ Operating with coagulated liquid	

● Repairs and Warranty

Sanwa Hydrotech, Ltd., provides repair and maintenance service for your Sanwa Magnet Drive Pump. Terms and conditions of repair and warranty are stated thereto:

1. Warranty Repair
   Equipment failure and/or damage resulting from defective design or workmanship shall be repaired at no cost to the owner. The period of guarantee shall be one year operating or 1.5 year starting from the date of delivery which ever shorter. This warranty repair shall not cover failure and/or damage of equipment resulting from improper usage, long-term storage, natural disasters, accidents or unauthorized modification/attachment on/to the equipment.

2. Repair With Charge
   The following repairs or parts replacements are available for a fee:
   2−1) Equipment failure or damage occurring after the period of guarantee expires
   2−2) Equipment failure or damage occurring as a result of improper usage or long-term storage
   2−3) Equipment failure or damage occurring as a result of natural disaster, fire or unpreventable accident
   2−4) Equipment failure or damage occurring as a result of repairs or modifications performed by anyone other than Sanwa Hydrotech Corp., or contractor appointed by Sanwa Hydrotech Corp.,

3. Sanwa Hydrotech Corp., shall not assume responsibility for expenses or damage incurred as a result of failure of this product while being used.

IWAKI PUMPS

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