

# **IWAKI Magnetic Drive Pump**

## **MX-70/-100 (Asia Edition)**

### **Instruction Manual**

 Read this manual before use of product

Thank you for selecting an Iwaki MX-70/-100 type Magnetic Drive Pump. This instruction manual deals with "**Safety Instructions**", "**Outline**", "**Installation**", "**Operation**" and "**Maintenance**" sections.

Please read through this instruction manual to ensure the optimum performance, safety and service of your pump.

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*This instruction manual should be kept on hand by the end user for quick reference.*

*Contact us or your nearest dealer if you have any questions.*



## Important Instruction

### For the Safe and Correct Handling of the Pump

- "Safety Instruction" section deals with important details about handling of the product. Before use, read this section carefully for the prevention of personal injury or property damage.
- Observe the instructions accompanied with "WARNING" or "CAUTION" in this manual. These instructions are very important for protecting pump users from dangerous situations.
- The symbols on this instruction manual have the following meanings:

 <b>WARNING</b>	<b>Nonobservance or misapplication of the contents of "Warning" section could lead to a serious accident which may result in death.</b>
 <b>CAUTION</b>	<b>Nonobservance or misapplication of the contents of "Caution" section could lead to a personal injury or damage to the product.</b>

### Types of Symbols

	Indicates a prohibited action or procedure. Inside or near this circle, a concrete and practical image of the activity to be avoided is depicted.
	Indicates an important action or procedure which must be performed or carried out without fail. Failure to follow the instructions herein can lead to malfunction or damage to the pump.

### For exportation

Technology related to the use of goods in this instruction manual falls in the category of technology contained in the Foreign Exchange Order Attachment, which includes complementary export control of technology. Please be reminded that export license, which is issued by the Ministry of Economy, Trade, and Industry could be required, when this is exported or provided to someone even in Japan.

# Safety Instructions

## WARNING

- **Turn off the power.**

Risk of electrical shock. Dismantling/assembling the pump unit without turning off the power may cause an electrical shock. Before engaging in any maintenance or inspection work, be sure to turn off the pump and related devices.



Power off

- **Terminate operation.**

On sensing any abnormal sign, stop operation immediately and inspect/solve problems.



- **For specified application only**

The use of the pump in any application other than those clearly specified may result in injury or damage. Use the pump in a specified condition.



Prohibited

- **No dismantlement/modification**

Do not dismantle/modify the pump. We are not responsible for any accidents or damage due to modification.



No modification  
No dismantlement

- **Wear protective clothing.**

Always wear protective clothing such as safety goggles and protective gloves during pipework or dismantlement.



Wear protectors

## CAUTION

- **Restriction on operator**

The pump should be handled by a qualified person with a full understanding.



Prohibited

- **Specified power only**

Do not apply any power other than the specified one on the nameplate. Otherwise damage, a fire or an electrical shock may result.



Prohibited

- **Do not wet the pump.**

If a liquid spills over electric parts or wires, a fire or electrical shock may result. Install the pump in a place free from liquid spillage.



Prohibited

- **Ventilation**

Poisoning may result when handling a toxic or odorous liquid. Keep good ventilation in your operating site.



Caution

- **Countermeasure against efflux**

Take a protective measure against the accidental efflux caused by pump or pipe breakage.



Caution

- **Do not use a damaged pump.**

Using a damaged pump may lead to an electric leak or shock.



Prohibited

# Safety Instructions

## CAUTION

- **Do not place the pump close to water.**  
The pump is not dust-/water-proof construction. The use of the pump in a humid place or a place where the pump can get wet may result in electrical shock or short-circuit.
- **Do not run pump dry.**  
If the pump runs without a liquid, the pump is damaged by friction heat.
- **Do not damage the power cable.**  
Risk of fire or electrical shock. Do not scratch, modify, or pull the power cable. The cable can also be damaged when it is heated or loaded with a heavy thing.
- **Earthing**  
Risk of electrical shock. Always earth the pump.
- **Do not pressurize the pump over the maximum discharge pressure.**  
A leak may result from the sealing surface of O ring or the pump fails at worst.
- **Install an earth leakage breaker.**  
An electrical failure of the pump may adversely affect related devices. Purchase and install an earth leakage breaker separately.



Prohibited



Prohibited



Caution



Earthing



Prohibited



Electrical shock

## CAUTION

- **Power cable is not replaceable.**  
Do not use any damaged power cable for the prevention of a fire or an electrical shock. The cable is not replaceable, so that the whole pump unit needs to be replaced when the cable is damaged.
- **Limited operating site and storage**  
Do not install or store the pump in the following places where...
  1. Ambient is beyond the range of 0 - 40°C.
  2. Under a flammable/corrosive atmosphere.
- **Disposal of the used pump**  
Dispose of any used or damaged pump in accordance with relevant regulations. Consult a licensed industrial waste products disposing company.
- **Static electricity**  
When low electric conductivity liquids such as ultra-pure water and fluor inactive liquid (e.g. Fluorinert™) are handled, static electricity may generate in the pump and may cause static discharge. Take countermeasures to remove static electricity.



Electrical shock



Prohibited

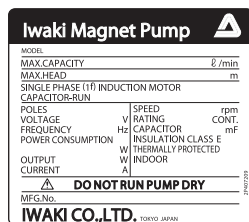


Before use, check the specification, limitation and hazardous nature of the pump.

## 1. Unpacking & Inspection

On unpacking the product, check the following points. If you find any problems, contact your nearest dealer.

1. Check the information on the name-plate such as model, discharge capacity, discharge head and voltage to see that the product is delivered as per order.

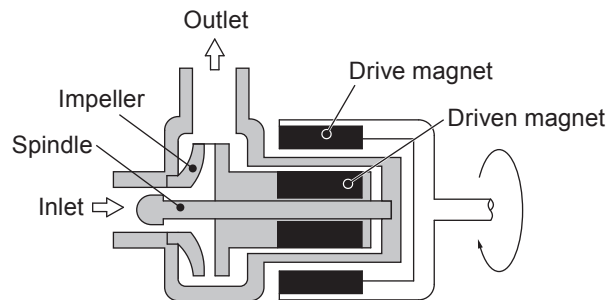


2. Check for transit damage, deformation, and loose bolts.

## 2. Operating principle

The MX is a magnetic drive centrifugal pump.

The magnetic force between drive and driven magnets rotates the impeller in the pump chamber, where a liquid is transferred from the inlet to outlet.



## 3. Identification code

**MX - 100 V M - 32**  
a      b      c      d      e

- a. Series model  
GFRPP casing material
- b. Pump size  
70  
100
- c. O ring material  
V: FKM  
E: EPDM
- d. Inlet/Outlet  
No code: Tube connection  
M :      Thread type (G)  
FL :      Flange connection
- e. Motor power voltage  
No code: 1 phase 100V  
32 :      3 phases 200/220V

## 4. Specification

50/60Hz

Model	Max flow (L/min)	Max head (m)	Norm flow (m-L/min)	Max SG	Motor		Mass (kg)
					Power (V)	Rated output (W)	
MX-70	90/100	8/11	5.4-50/7.8-50	1.0	100	150/180	6.5
					200 or 220		
MX-100	110/125	8.4/11.7	6-70/9-70	1.2	100	260/260	8.2
					200 or 220		

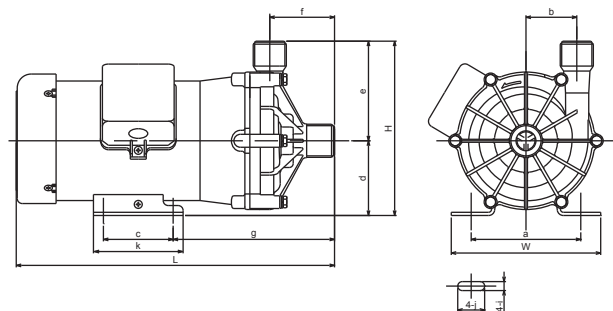
Model	Tube connection		Thread connection		Union connection		Flange connection	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
MX-70	26mm		G1		20mm		25A	
MX-100	26mm		G1		20mm		25A	

### NOTE:

- a. Performance data is based on pumping of clear water at ambient temperature.
- b. Allowable liquid temperature is 0-80°C (0-55°C for union connection). Note that the temperature range may change with liquid property. Avoid a precipitous fluctuation of temperature even in the liquid temperature range above.
- c. The maximum head is a shutoff head. Note that shutoff operation is not allowed, or it may adversely affect a life period.
- d. The maximum specific gravity is obtained at the normal flow and changes with a duty point, room-/liquid-temperatures and liquid viscosity.
- e. A single-phase capacitor-start induction motor and a 3-phase motor are selectable.
- f. See the specification label on the pump for detail info.
- g. Performance and dimension are subject to change without prior notice.

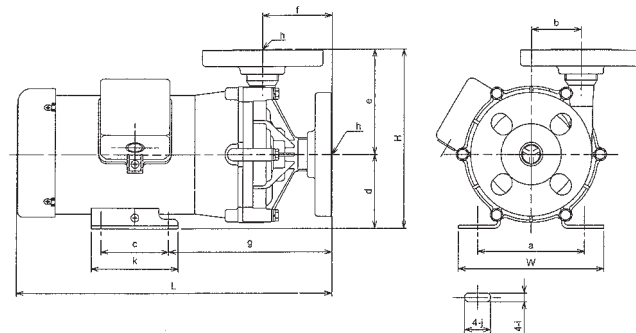
## 5. Outer dimensions

MX-70(M)/-100(M)



Model	W	H	L	a	b	c	d	e	f	g	i	j	k
MX-70(M)	130	155	258.5	110	48	40	65	90	53	159.5	7	11	60
MX-100(M)	150	175	319.5	110	51	70	75	100	65	162	9	27	90

MX-70FL/-100FL



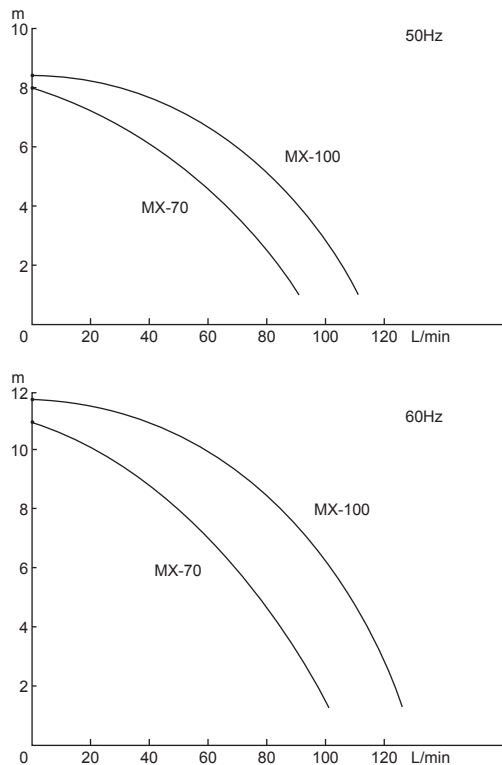
Model	W	H	L	a	b	c	d	e	f	g	h	i	j	k
MX-70FL	130	162	266	110	48	40	65	97	53	167	25A	7	11	60
MX-100FL	150	182	327	110	51	70	75	107	65	169	25A	9	27	90

## ■ Accessories

Optional unions are available as a coupling devise. Contact us for detail.

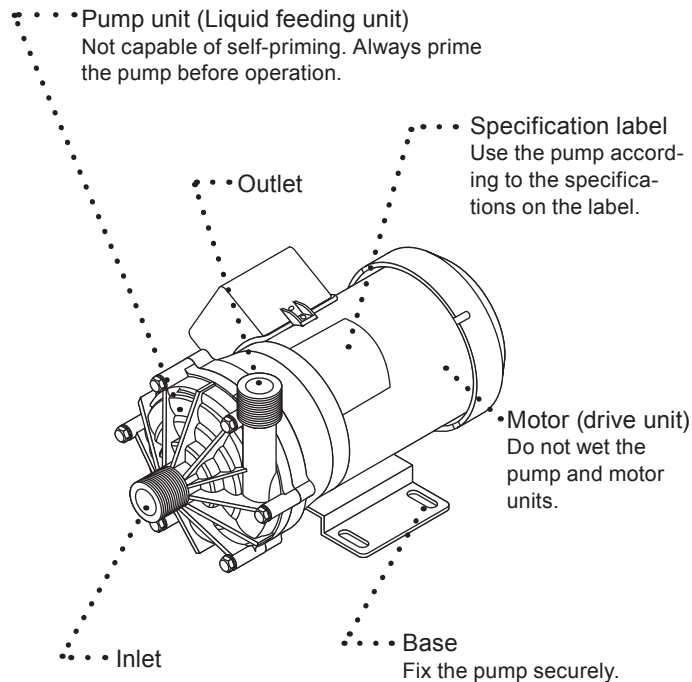
Model	Union fitting	O ring	Union bore (Nominal dia)
MX-70M	G1	AS-568-020	20mm
MX-100M	G1	AS-568-020	20mm

## 6. Performance curves



\*Performance data is based on pumping of clear water at ambient temperature.

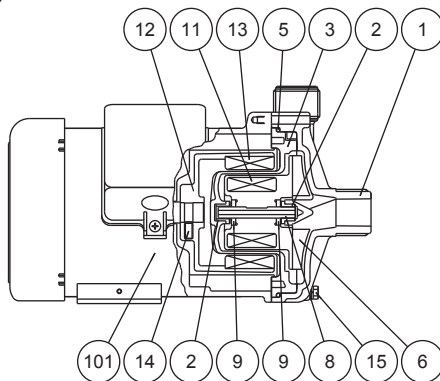
## 7. Overview & Label





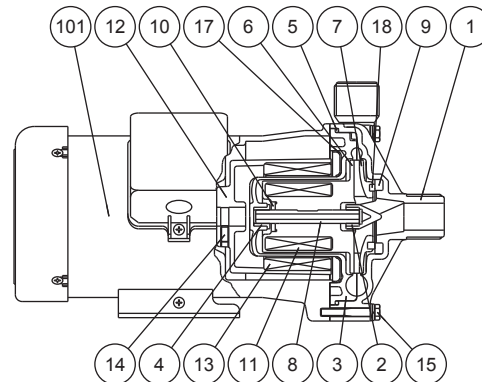
## 8. Part names & Structure

MX-70(M)



No.	Part names	Q'ty	Materials	
			MX-70(M)	MX-100(M)
1	Front casing	1	GFRPP	
2	MX-70: Bearing	2	PPS	-
	MX-100: Bearing A	1	-	PTFE
3	Rear casing	1	GFRPP	
4	Bearing B	1	-	PTFE
5	O ring	1	V: FKM E: EPDM	
6	Impeller	1	CFRPP	
7	Shroud	1	CFRPP	
8	Spindle	1	Alumina ceramics	
9	MX-70: Thrust	2	Alumina ceramics	-
	MX-100: Front thrust ring	1	-	Alumina ceramics

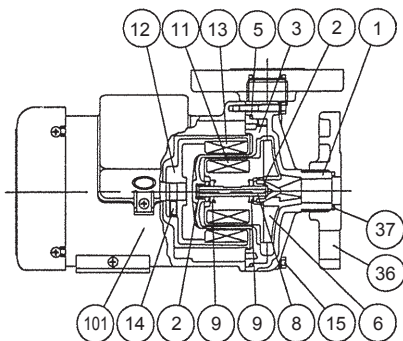
MX-100(M)



No.	Part names	Q'ty	Materials	
			MX-70(M)	MX-100(M)
10	Rear thrust ring	1	-	Alumina ceramics
11	Driven magnet	1		
12	Drive magnet unit	1		
13	Drive magnet	1		
14	Hex. sock set screw	2	Steel	
15	Hex. head bolt	6	Stainless steel	
17	Retainer ring	1	-	SUS304
18	Mouth ring	1	-	PTFE
101	Motor	1		

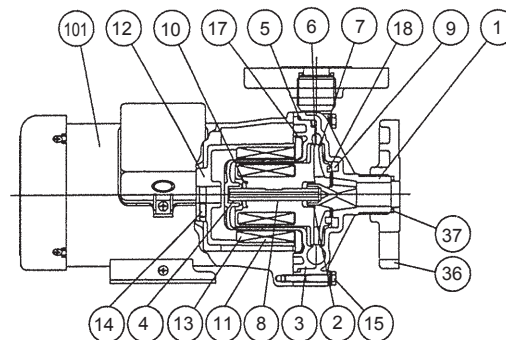
# Outline

MX-70FL



No.	Part names	Q'ty	Materials	
			MX-70FL	MX-100FL
1	Front casing	1	GFRPP	
2	MX-70: Bearing	2	PPS	-
	MX-100: Bearing A	1	-	PTFE
3	Rear casing	1	GFRPP	
4	Bearing B	1	-	PTFE
5	O ring	1	FKM	
6	Impeller	1	CFRPP	
7	Shroud	1	CFRPP	
8	Spindle	1	Alumina ceramics	
9	MX-70: Thrust	2	Alumina ceramics	-
	MX-100: Front thrust	1	-	Alumina ceramics

MX-100FL



No.	Part names	Q'ty	Materials	
			MX-70FL	MX-100FL
10	Rear thrust ring	1	-	Alumina ceramics
11	Driven magnet	1		
12	Magnet housing	1		
13	Drive magnet	1		
14	Hex. sock set screw	2	Steel	
15	Hex. head bolt	6	Stainless steel	
17	Retainer ring	1	-	Stainless steel
18	Mouth ring	1	-	PTFE
36	Flange	2	GFRPP	
37	O ring	2	FKM	
101	Motor	1		

# Installation

## 1. Before Installation

*Read through this instruction manual before use. Carry out installation work with a full understanding.*



### WARNING

- Risk of electrical shock. Turn off power immediately if the pump or any electric parts have got wet.
- Risk of fire. Keep the pump away from a flammable substance.



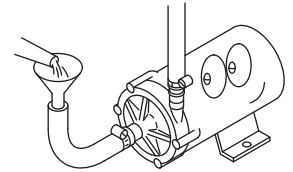
### CAUTION

- A strong magnet is inside the pump. Do not bring a watch or a floppy disk which may be adversely affected by a magnetic force.
- Do not run pump dry. If the pump runs without a liquid, friction heat damages the pump.

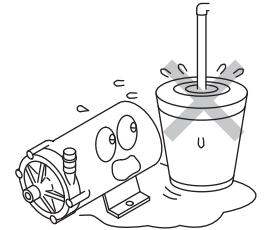
- Dropping or subjecting the pump to strong impact, failure may result. Handle the pump with care.



- The pump is not capable of self-priming. Always prime the pump before operation.



- Do not get the motor wet. The pump is not dust-/water-proof.



- Risk of fire or electrical shock. Do not scratch, modify, or pull the power cable. The cable can also be damaged when it is heated or loaded with a heavy thing.

# Installation

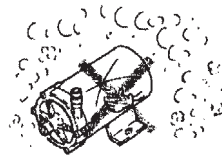
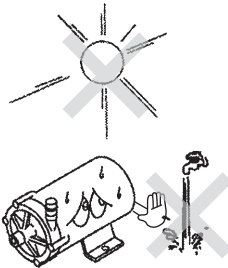
- Banned solutions

- Liquids that significantly swell polypropylene
- Paraffinic hydrocarbons such as gasoline and kerosene
- Halogenated hydrocarbons such as trichloroethylene and carbon tetrachloride
- Ether and low-grade ester
- Slurry (Never use slurry, which wears out the pump bearings.)

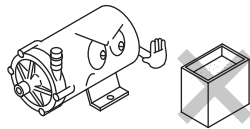
**⚠ CAUTION**

**Do not install or store the pump in the following places where...**

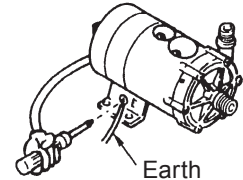
- 1. Ambient temperature is beyond the range of 0 - 40°C.**
  - 2. In a dusty/humid place or corrosive atmosphere.**
  - 3. Under direct sunlight or wind & rain.**
- A strong magnet is inside the pump. Do not use the pump with any liquid which contains metals such as iron and nickel.



Iron or nickel



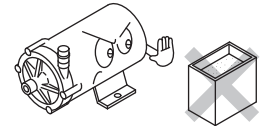
- Risk of electrical shock. Always earth the pump via an earth terminal.



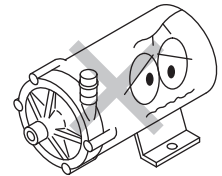
- An electrical failure of the pump may adversely affect related devices. Purchase and install an earth leakage breaker separately.

- Do not clean the pump and nameplate with solvent such as benzine and thinner. This may discolour the pump or erase printing. Use a dry cloth or a wet cloth with water or neutral detergent.

Benzine or thinner



- Do not use any damaged pump. Using a damaged pump may lead to an electric leak or shock.



# Installation

## 2. Installation/ Piping/ Electrical wiring

**Stop working upon sensing a danger in work.**

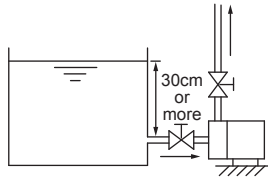
### 2.1 Installation

#### 1. Installation location

Select a convenient place for maintenance and inspection. Observe the allowable room temperature range of 0 - 40°C and the maximum ambient humidity of 90%RH.

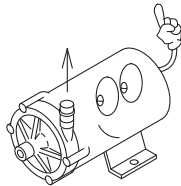
#### 2. Mounting position

This pump is not capable of self-priming. Flooded suction application is ideal. Install the pump 30cm lower than a suction liquid level, or bearing may be worn soon by entrained air.



#### 3. Outlet direction

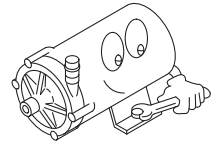
Always direct the outlet upward or entrained air can not be expelled.



Direct the outlet upward

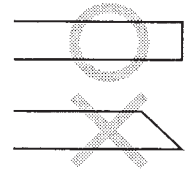
#### 4. Pump fixation

Secure the pump by fixing the base. Do not install the pump vertically.



#### 5. Tube ends

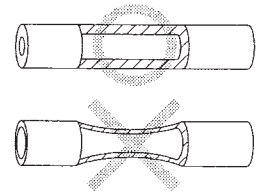
Cut the tube ends flat before connection.



### 2.2 Piping

1. In order to minimize the piping resistance, have piping shortest with the minimum bends. For the prevention of cavitation, have the suction piping bore wide as much as possible.

2. Use a corrosion-/pressure-resistant vinyl tube, otherwise the suction tube can be crushed by the suction force (especially for hot liquid). A braided tube is recommended.

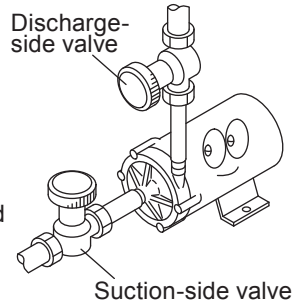


# Installation

3. Select a suitable tube bore for secure connection.

4. Install valves on both discharge and suction lines.

- Suction-side valve:  
For easy pump removal and maintenance.
- Discharge-side valve:  
For adjustment of a flow rate and a discharge head.



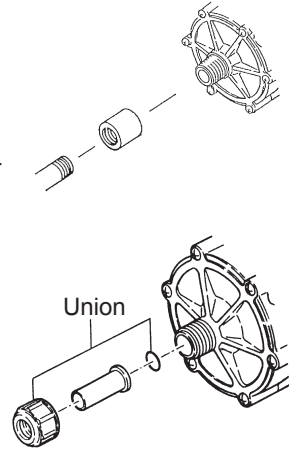
## <Thread connection>

Wrap a thread seal tape around the exposed threads of a pipe before it is screwed in to create an air- and watertight seal.

Do not tighten the pipe too much. Or plastic inlet or outlet may break.

Use optional unions instead if needed.

Do not allow piping system to weigh heavily on the plastic inlet or outlet, otherwise the plastic parts may deform and result in failure.



## ⚠ CAUTION

**Imperfect connection on the suction line introduces air into the inside. Air ingress may cause a poor flow, dry running and consequently impeller seizing.**

# Installation

## <Tube connection>

Slide down tubes onto the inlet and outlet as far as they will go.

Use a tube clamp to secure connection and eliminate the possibility of leakage.

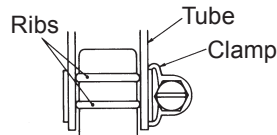
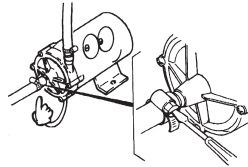
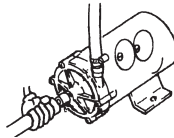
Do not allow piping system to weigh heavily on the plastic inlet or outlet, otherwise the plastic parts may deform and result in failure.

## ⚠ CAUTION

**Imperfect connection on the suction line introduces air into the inside. Air ingress may cause a poor flow, dry running and consequently impeller seizing.**

## ⚠ CAUTION

**The inlet and outlet are made of plastics. Do not tighten the clamp too much.**



## 2.3 Electrical wiring

*Electrical wiring must be done by qualified person who has a full knowledge of safety. We are not responsible for the injury or damage accident due to nonobservance of this warning. Contact us or your nearest dealer for wiring as necessary.*

### ■ Before wiring

1. Confirm that the power is disconnected before work.
2. Wiring work should be done in accordance with relevant regulations, using the recommended wiring accessories.
3. Apply the specified power voltage. See the spec label.
4. The pump doesn't have the ON-OFF switch. The pump starts as the power cable is plugged in.
5. Earth the pump by an earthing wire. Keep good ventilation in your operating site. Do not wet the pump.
6. When a leakage breaker is used.

Always solve the root cause when a leakage breaker operates. Replace the fuse and resume operation. Be sure to unplug the pump before investigation.

### ■ Rated current & Starting current

Model	Rated current (50/60Hz)		Starting current (50/60Hz)	
	100V (1-phase)	200 or 220V (3-phase)	100V (1-phase)	200 or 220V (3-phase)
MX-70	2.8A/3.9A	0.9A/1.3A	7.7A/7.1A	3.5A/3.2A
MX-100	4.1A/4.1A	1.2A/1.2A	8.4A/8.2A	3.7A/3.4A

# Operation

## 1. Before operation



### CAUTION

- Before operating the pump, check that the pump is securely fixed.
- If foreign matters enter the pump, turn off the power and remove them, otherwise failure or malfunction may result.
- Do not run pump dry. If the pump runs without a liquid, the pump is damaged by friction heat.

1. Before operation, check that the pump is firmly installed in piping via the inlet and outlet.
2. Do not run the pump with a discharge or a suction valve closed.
3. Do not open or close sharply the discharge or the suction valve, otherwise the magnetic coupling may disconnect (In this case turn off the power.).

## ■ Operation

After installation, piping and wiring work are completed, operate the pump in accordance with the following procedures.

No.	Procedure	Points to be checked
1	Check piping, wiring and voltage.	<ul style="list-style-type: none"> <li>• See "2.2 Piping" and "2.3 Electrical wiring" sections.</li> <li>• Check the spec label to see if the power supply voltage is correct.</li> </ul>
2	Open or close a valve.	<ul style="list-style-type: none"> <li>• Fully open a suction-side valve.</li> <li>• Fully close a discharge-side valve.</li> </ul>
3	Prime the pump chamber.	<ul style="list-style-type: none"> <li>• Prime the pump with liquid especially if it is in suction lift application.</li> </ul>
4	Supply power to the pump.	<ul style="list-style-type: none"> <li>• Check the item 1, 2 and 3. Then turn on power and start the pump.</li> </ul>
5	Adjust a discharge capacity & a discharge head to the specified level.	<p>Open a discharge-side valve gradually till a flow and a head reach the specified level. <u>Do not open or close the valve sharply.</u></p> <p>Note: Do not keep the discharge-side valve closed more than 1 minute.</p> <p>Note: Check that the pump transfers a liquid without trouble. If there is a problem, turn off the power immediately and solve the cause. See "Troubleshooting" section.</p>



## Operation

No.	Procedure	Points to be checked
6	Points to be checked during operation	<ul style="list-style-type: none"><li>• Do not allow foreign matters to enter the pump. Foreign matters may cause impeller to be locked, hindering liquid circulation. In this case turn off power immediately (Contact us).</li><li>• Turn off power when the leakage breaker operates. Investigate the root cause on "Troubleshooting" section of page 16.</li></ul>

### ■ Before a long period of storage

Remove the liquid from the pump before it is stored for a long time. In this period of time, run the pump with clean water for 5 minutes every 3 months to prevent the motor bearing from being stuck.

### ■ Shutdown

No.	Procedure	Description
1	Close a discharge-side valve.	Close the discharge-side valve gradually. Do not use the solenoid valve.
2	Turn off power.	Check if the motor stops rotating smoothly as turning off power. If it is not smooth, check the motor. Contact us for detail.

# Maintenance

## 1. Troubleshooting

**Handling of the pump, maintenance and inspection should be carried out within this instruction manual. Do not handle the pump beyond the descriptions in this manual. We are not responsible for any personal injury or property damage due to nonobservance of this warning. Contact us or your nearest dealer as necessary.**

Phenomenon						
	The pump does not run.	Poor discharge head	Overcurrent	Noise and vibration problem	Leakage	
Causes						Measure
Wrong wiring	<input type="radio"/>		<input type="radio"/>			Inspect wiring. Rewire as necessary.
Motor failure	<input type="radio"/>		<input type="radio"/>			Contact us.
Air is trapped.		<input type="radio"/>		<input type="radio"/>		Eliminate air.
Air suction from the inlet		<input type="radio"/>				Check suction piping.
Dry running		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Prime the pump before operation.
Too high SG or viscosity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			Replace with suitable pump.
Impeller magnet hits the rear casing		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Contact us.
Impeller is damaged.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Contact us.
Foreign matters on the impeller.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Contact us.
O ring is damaged					<input type="radio"/>	Contact us
Pump head mounting screws are loose.		<input type="radio"/>			<input type="radio"/>	Tighten the mounting screws.

## 2. Maintenance & Inspection

### ■ Retightening

After a long period of operation or storage, the pump head mounting screws may be loose. Tighten the mounting screws by the following torque as necessary. Be careful not to deform the plastic pump head.

MX-70 : 2.9N•m

MX-100 : 3.4N•m

### ■ Daily inspection

Always check for abnormality in vibration, noise, current value, and discharge capacity. Stop operation on sensing abnormality. And solve problems on the trouble shooting section.

### ■ Wear parts

To run the pump for a long period, wear parts such as impeller and O ring need to be replaced periodically. Contact your distributor for detail.

# Maintenance

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## 3. Drainage



### WARNING

- Turn off power before work.
- Always wear protective clothing such as safety goggles and protective gloves during pipework or dismantlement.



### CAUTION

- Do not get wet with chemical liquid when removing piping or wet the motor/electric parts that are not dust- nor water-proof.
- Do not drain a harmful chemical liquid directly on the ground or the floor. Always use a container.

### ■ Procedure

1. Turn off power. Make sure no one turns on the power while working on the pump.
2. Close a discharge- and a suction-side valves fully.
3. Place a container under the pump and then remove a suction line from the pump inlet. Be careful not to get wet with chemical liquid.
4. Unfix and take out the pump.
5. Drain residual chemical liquid through the inlet. Do not drain a harmful chemical liquid directly on the ground or the floor. Use a container.



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