IWAKI PUMPS

IWAKI Magnetic Drive Pump
MD-R (M) type (built-in type)
Instruction Manual

⚠ Read this manual before use of product

Thank you for selecting an Iwaki MD-R 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.

Contents

Safety Instructions ····· **1**

Outline
1. Unpacking & Inspection ····· 3
2. Operating principle ····· 4
3. Identification code ····· 5
4. Specification ····· 6
5. Outer dimensions ····· 7
6. Performance curves ····· 10
7. Overview & Label ····· 12
8. Part names & Structure ····· 13

Installation
1. Before installation ····· 14
2. Installation/Piping/Electrical wiring ····· 17

Operation
1. Before operation ····· 23

Maintenance
1. Troubleshooting ····· 25
2. Maintenance & Inspection ····· 25
3. Drainage ····· 26
4. Assembly & Disassembly ····· 27

EC DECLARATION OF CONFORMITY ····· 31

UK DECLARATION OF CONFORMITY ····· 31

Information on CE/UKCA conformity ····· 32

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:

⚠ **WARNING**	**Nonobservance or misapplication of the contents of "Warning" section could lead to a serious accident which may result in death.**
⚠ **CAUTION**	**Nonobservance or misapplication of the contents of "Caution" section could lead to personal injury or property damage.**

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.

⚠ Export Restrictions

Technical information contained in this instruction manual might be treated as controlled technology in your countries, due to agreements in international regime for export control.
Please be reminded that export license/permission could be required when this manual is provided, due to export control regulations of your country.

Safety Instructions

⚠ WARNING

- **Turn off power before service**
  Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.


Power off

- **Stop operation**
  If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems.



- **Do not use the pump in any condition other than its intended purpose**
  The use of the pump in any conditions other than those clearly specified may result in failure or injury. Use this product in specified conditions only.


Prohibited

- **Do not modify the pump**
  Alternations to the pump carries a high degree of risk. It is not the manufacturer's responsibility for any failure or injury resulting from alterations to the pump.


Do not rework or alter

- **Wear protective clothing**
  Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a face shield during disassembly, assembly or maintenance work.


Wear protectors

⚠ CAUTION

- **Qualified personnel only**
  The pump should be handled or operated by a qualified personnel with a full understanding of the pump.


Prohibited

- **Use specified power only**
  Do not apply power other than that specified on the nameplate. Otherwise failure or fire may result. Ensure the pump is properly grounded.


Prohibited

- **Keep electric parts and wiring dry**
  Risk of fire or electric shock. Install the pump where it can be kept dry.


Prohibited

- **Ventilation**
  Fumes or vapours can be hazardous with certain solutions. Ensure proper ventilation at the operation site.


Caution

- **Spill precautions**
  Ensure protection and containment of solution in the event of plumbing or pump damage (secondary containment).


Caution

- **Do not use a damaged pump**
  Use of a damaged pump could lead to an electric shock or death.


Prohibited

⚠ CAUTION

- **Do not use the pump in a wet location**
  The pump is not waterproof. Use of the pump in wet or extremely humid locations could lead to electric shock or short circuit.


Prohibited

- **Do not run pump dry.**
  If the pump runs with no liquid, friction heat builds up and damages the internal parts of pump.


Prohibited

- **Do not damage the power cable**
  Do not pull, knot, or crush the power cable. Damage to the power cable could lead to a fire or electrical shock if cut or broken.


Caution

- **Grounding**
  Risk of electric shock! Always properly ground the pump. Conform to local electric codes.


Earthing

- **Do not pressurize the pump**
  If the pump is pressurized over the maximum discharge pressure, O ring seal may be impaired and leakage may result.


Prohibited

- **Install a GFCI (earth leakage breaker)**
  An electrical failure of the pump may adversely affect other devices on the same line. Purchase and install a GFCI (earth leakage breaker) separately.


Electrical shock

⚠ CAUTION

- **Damaged power cable**
  Do not use any damaged power cable for the prevention of a fire or electrical shock. The cable is not replaceable, so that the whole pump unit needs to be replaced when the cable is damaged.


Prohibited

- **Do not install or store the pump:**
  - Where ambient temperature falls below 0°C or exceeds 40°C.
  - In a flammable/corrosive atmosphere.
  - In direct sunlight or wind & rain.


Prohibited

- **Disposal of a used pump**
  Dispose of any used or damaged pump in accordance with local rules and regulations. If necessary, consult a licensed industrial waste disposal 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.



- **Fasten the front casing tight**
  Liquid may leak if front casing fixing screws are loose. Tighten the screws diagonally and evenly by the rated torques (see page 25) before initial operation or at intervals.

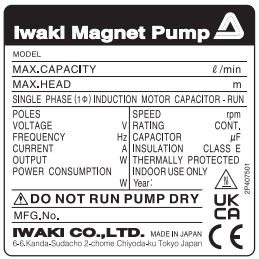

Caution

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

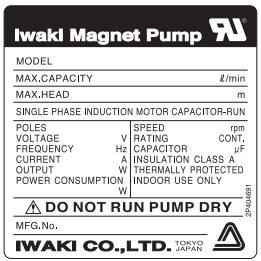
1. Unpacking & Inspection

Open the package and check that the product conforms to your order. If any problem or inconsistency is found, immediately contact your distributor.

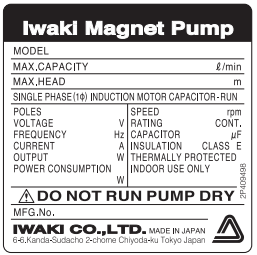
1. Check the nameplate to see if the information such as model codes, discharge capacity and discharge pressure are as ordered.



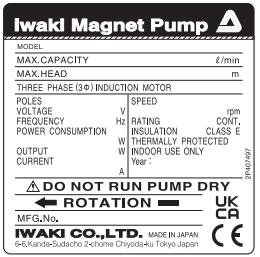
Spec label with CE/UKCA markings
(1-phase induction motor)



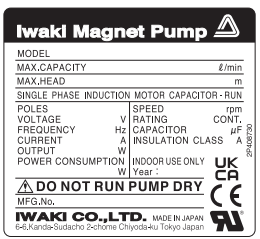
Spec label with UL marking
(1-phase induction motor)



Spec label w/o CE/UKCA/UL markings
(1-phase induction motor)



Spec label with CE/UKCA markings
(3-phase induction motor)



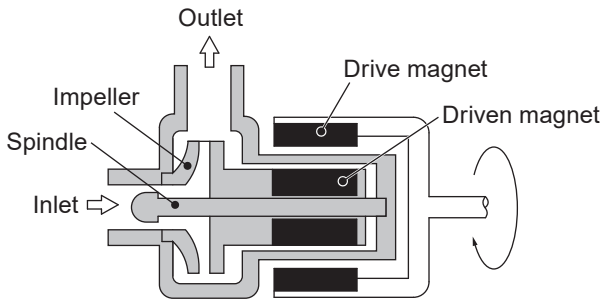
Spec label with CE/UKCA/UL markings
(1-phase induction motor)

*The CE/UKCA markings on our product(s) are for us to market the product(s) into the European Union market / the Great Britain (England, Wales and Scotland) market, however, the CE/UKCA markings do not ensure any safety or conformity of the product(s) outside the EU/GB markets.
When the pump is incorporated into the equipment marketed in the EU/GB markets, such equipment must meet all the requirements of applicable directives/regulations.
In such a case, any person who places the equipment on the markets must carry CE/UKCA marks on the equipment as a manufacturer.

2. Check for transit damage and loose bolts.

2. Operating principle

The MD-R is a magnetic drive centrifugal pump.
The magnetic force of the motor drives the impeller magnet and rotates the impeller in the pump chamber, where a liquid is transferred from the inlet to outlet.



3. Identification code

MD-15R/ -20R/ -30R/ -40R

MD - 15 R Z - 5 M - 220 E N 01
a b a c d e f g h

a. Series model MD-R

b. Pump size (motor output)
15(10W)/ 20(20W)/ 30(45W)/ 40(65W)

c. Delivery head	No code:	Standard
	Z:	High head
	X:	High flow
d. Frequency	No code:	50/60Hz
	-5:	50Hz only
e. Connection	No code:	Tube
	M:	G thread
f. Power voltage	220:	220-240 single phase
g. O ring	No code:	FKM
	E:	EPDM
h. Special version	No code:	Standard
	01-99:	Special design

MD-55R/ -70R/ -100R

MD - 70 R Z - 5 M - 01
a b a c d e f

a. Series model MD-R

b. Pump size (motor output)
55 (90W)/ 70 (150/180W, 180/216W)/ 100 (265W)

c. Delivery head	No code:	Standard
	Z:	High head
d. Frequency	No code:	50/60Hz
	-5:	50Hz only
e. Connection	No code:	Tube
	M:	G thread
	M-FL:	Flange
f. Special version	No code:	Standard
	01-99:	Special design

NOTE: The MD-55R/ -70R/ -100R do not have a power voltage code. See a spec label and check power voltage range.

4. Specification

50/60Hz

Model	Tube connection OD (mm)		Thread size	Union size	Max flow (L/min)	Max head (m)	Max SG	Motor		Mass (kg)
								Power (V)	Rated output (W)	
MD-15R	14		G3/4	13A	16/19	2.4/3.4	1.3	220/240 (1ph)	10	1.6
MD-20R	IN:18	OUT:17	G3/4	16A	27/31	3.1/4.3	1.1		20	2.0
MD-20RX	26		G1	20A	46/52	1.8/2.5	1.3			
MD-20RZ	IN:17.5	OUT:17	G3/4	13A	10/11	4.9/6.9	1.1			
MD-30R	20		G3/4	16A	32/38	3.8/5.4	1.3		45	4.0
MD-30RX	26		G1	20A	62/72	2.9/4.1	1.1			
MD-30RZ	IN:17.5	OUT:17	G3/4	13A	15/17	8/11	1.0			
MD-40R	20		G3/4	16A	45/52	4.6/6.5	1.1		65	3.9
MD-40RX	26		G1	20A	75/85	3.3/4.7	1.1			
MD-40RZ	20		G3/4	16A	22/22	10/13.5	1.0			
MD-40RZ-5	20		G3/4	16A	11/-	11.5/-	1.0			
MD-55R	26		G1	20A	60/70	5.6/8.2	1.2		90	5.4
MD-55R-5	26		G1	20A	70/-	8.2/-	1.2			
MD-70R	26		G1	20A	86/97	6.7/9.7	1.0	220/240 (1ph) 220/380 (3ph) 400/440 (3ph)	150/180	6.0
MD-70RZ	20		G3/4	16A	40/43	14.3/20.3	1.0		180/216	6.0
MD-100R	26		G1	20A	120/135	8.6/11.9	1.2		260/265	8.5
MD-100R-5	26		G1	20A	135/-	11.7/-	1.1			

NOTE:

a. The data above is based on pumping of clean water at ambient temperature.

b. The maximum flow is obtained at zero discharge head, and the maximum head is obtained at the maximum pressure.

c. The maximum viscosity at SG.1.0 is up to 30mPa·s for the MD-15R/-20R/-30R/-40R/-55R/-70R, up to 6mP·s for the MD-100R(M), and up to 4mP·s for the MD-100R-5(M).

d. Allowable ambient temperature range is 0-40°C.

e. Allowable liquid temperature range is 0-80°C.
*Note that the liquid temperature range is based on use of clean water and it changes with liquid property and operating conditions. Non freezing.

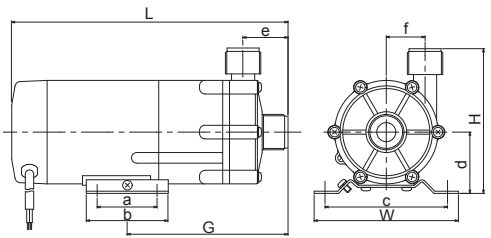
f. The maximum specific gravity is obtained at or near the maximum flow. Note that the limitation varies with a duty point, ambient temperature or liquid viscosity.

g. Motor type
The MD-40RZ-5(M), MD-55R-5(M), MD-100R-5(M) is designed for operation at 50Hz only.

h. All the single-phase motors used for the MD-R series are capacitor-run induction motor.
*The performance and dimensions of the pump may change without prior notice.

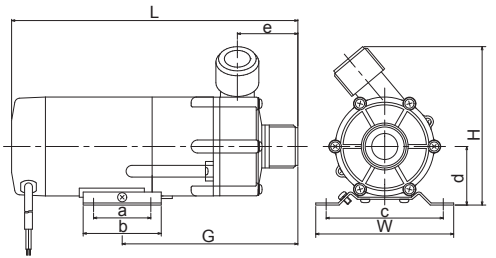
5. Outer dimensions

MD-15RM/-20RM/-30RM/-40RM



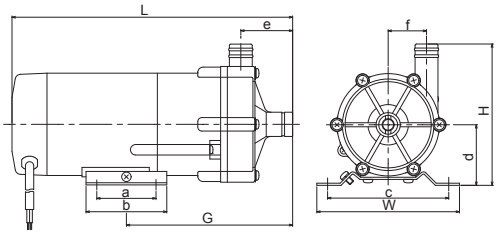
Model	W	H	L	a	b	c	d	e	f	G
MD-15RM	95	114	179	-	50	68	55	39	21.5	117
MD-20RM	85	116	203	30	50	68	55	33	28.5	126
MD-30RM	120	130	248	40	64	100	60	48	31	169
MD-40RM	120	130	250	40	64	100	60	48	31	169

MD-20RXM/-30RXM/-40RXM



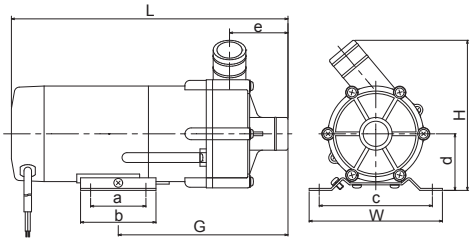
Model	W	H	L	a	b	c	d	e	G
MD-20RXM	85	132	220	30	50	68	55	46.5	143
MD-30RXM	120	140	254	40	64	100	60	50	175
MD-40RXM	120	141	256	40	64	100	60	50	175

MD-15R/-20R/-30R/-40R



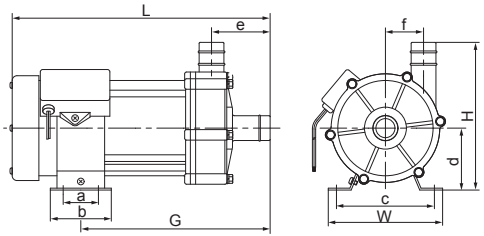
Model	W	H	L	a	b	c	d	e	f	G
MD-15R	95	109	179.5	-	50	68	55	39	21.5	117
MD-20R	85	115	208.5	30	50	68	55	38.5	28.5	131.5
MD-30R	120	130	248	40	64	100	60	48	31	169
MD-40R	120	130	250	40	64	100	60	48	31	169

MD-20RX/-30RX/-40RX



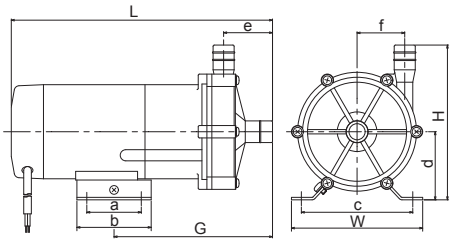
Model	W	H	L	a	b	c	d	e	G
MD-20RX	85	132	220	30	50	68	55	46.5	143
MD-30RX	120	137	254	40	64	100	60	50	175
MD-40RX	120	137	256	40	64	100	60	50	175

MD-55R/-55R-5



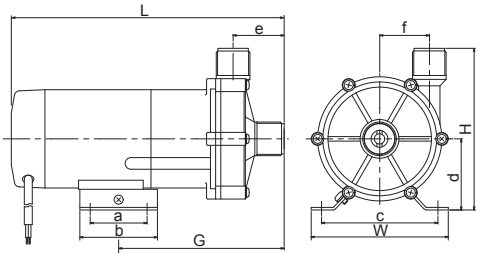
Model	W	H	L	a	b	c	d	e	f	G
MD-55R MD-55R-5	120	155	273.5	40	64	100	65	61.5	40	198.5

MD-20RZ/-30RZ/-40RZ/-40RZ-5



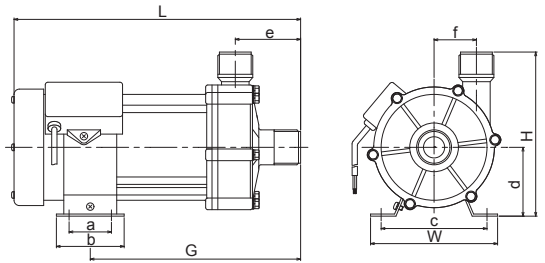
Model	W	H	L	a	b	c	d	e	f	G
MD-20RZ	85	125	211	30	50	68	55	39.5	38.5	134
MD-30RZ	120	130	230	40	64	100	60	39.5	38.5	152
MD-40RZ	120	150	241	40	64	100	60	38.5	44.5	160
MD-40RZ-5	120	150	241	40	64	100	60	38.5	44.5	160

MD-20RZM/-30RZM/-40RZM/-40RZ-5M



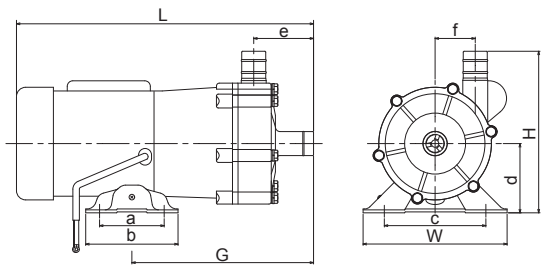
Model	W	H	L	a	b	c	d	e	f	G
MD-20RZM	85	125	211	30	50	68	55	39.5	38.5	134
MD-30RZM	120	130	230	40	64	100	60	39.5	38.5	152
MD-40RZM	120	150	241	40	64	100	60	38.5	44.5	160
MD-40RZ-5M	120	150	241	40	64	100	60	38.5	44.5	160

MD-55RM/-55R-5M



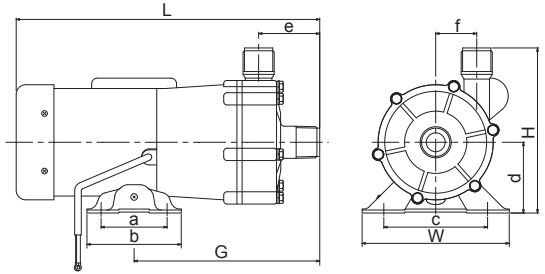
Model	W	H	L	a	b	c	d	e	f	G
MD-55RM	120	155	273.5	40	64	100	65	61.5	40	198.5
MD-55R-5M										

MD-70R/-70RZ/-100R/-100R-5



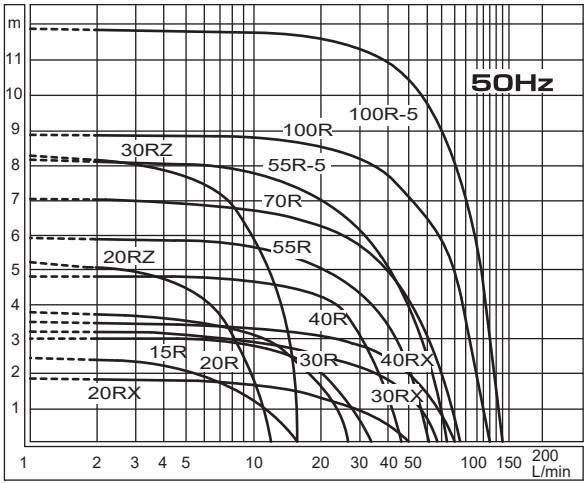
Model	W	H	L	a	b	c	d	e	f	G
MD-70R	130	155	258	40	60	110	65	53	43	179
MD-70RZ		165	247					42	47.5	168
MD-100R	156	175	322	70	100	110	75	65	43.5	197
MD-100R-5										

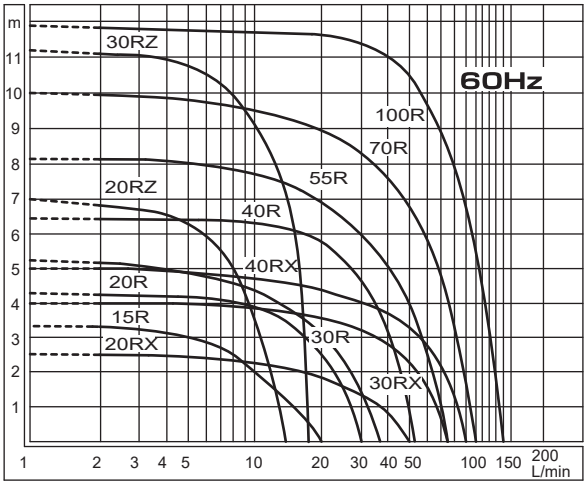
MD-70RM/-70RZM/-100RM/-100R-5M



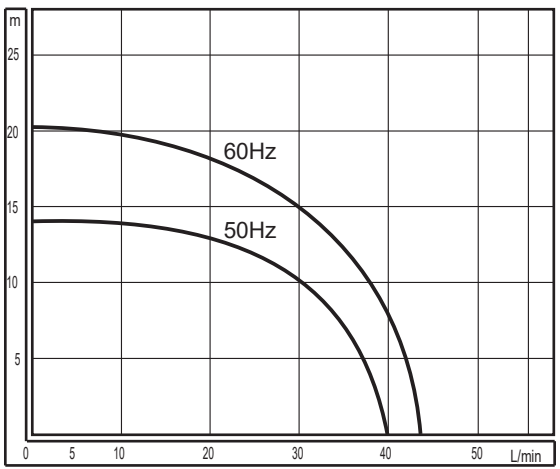
Model	W	H	L	a	b	c	d	e	f	G
MD-70RM	130	155	258	40	60	110	65	53	43	179
MD-70RZM		165	247					42	47.5	168
MD-100RM	156	175	322	70	100	110	75	65	43.5	197
MD-100R-5M										

6. Performance curves

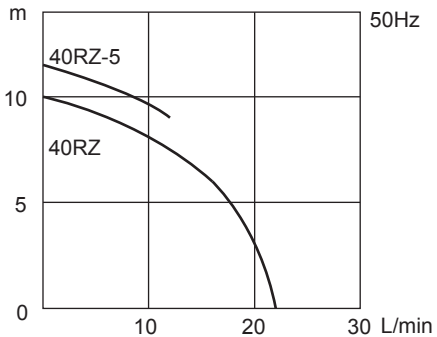




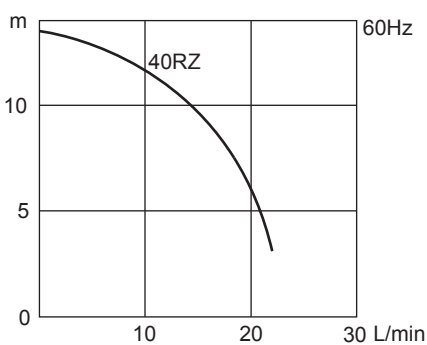
MD-70RZ



MD-40RZ



*A sound level of running water will increase when a delivery head drops to 6m or below.



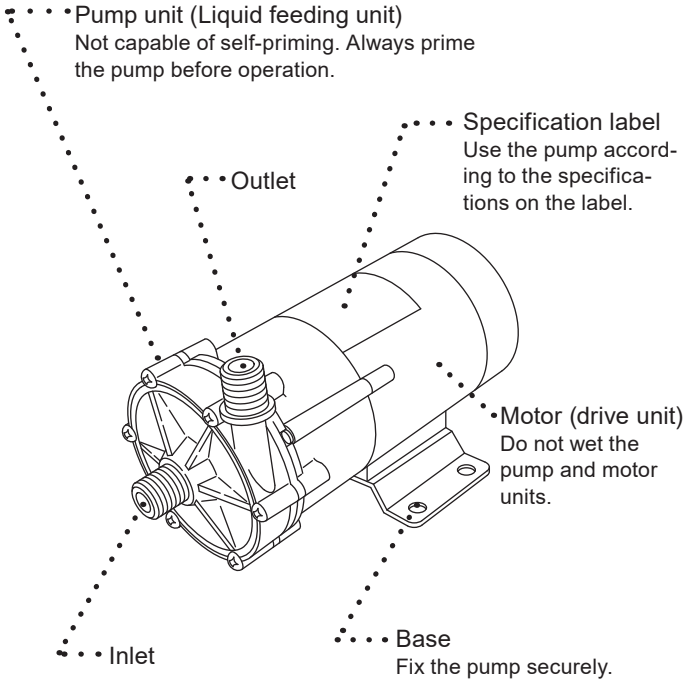
*A sound level of running water will increase when a delivery head drops to 7.5m or below.

■ Accessory

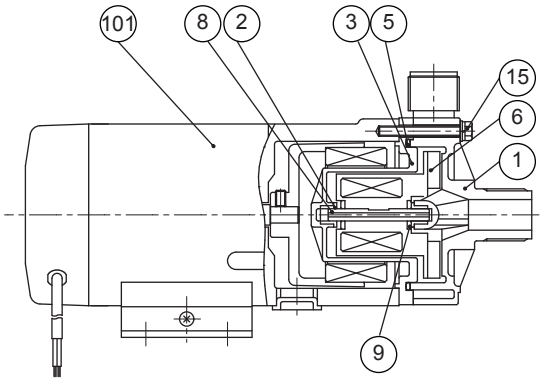
Tube joints are available for pumps with thread connection.

Model	Thread	O ring	Union
MD-15RM	G3/4	AS-568-016	13A
MD-20RM	G3/4	AS-568-017	16A
MD-20RXM	G1	AS-568-020	20A
MD-20RZM	G3/4	AS-568-016	13A
MD-30RM	G3/4	AS-568-017	16A
MD-30RXM	G1	AS-568-020	20A
MD-30RZM	G3/4	AS-568-016	13A
MD-40RM	G3/4	AS-568-017	16A
MD-40RXM	G1	AS-568-020	20A
MD-40RZM	G3/4	AS-568-017	16A
MD-40RZ-5M	G3/4	AS-568-017	16A
MD-55RM	G1	AS-568-020	20A
MD-55R-5M	G1	AS-568-020	20A
MD-70RM	G1	AS-568-020	20A
MD-70RZM	G3/4	AS-568-017	16A
MD-100RM	G1	AS-568-020	20A
MD-100R-5M	G1	AS-568-020	20A

7. Overview & Label



8. Part names & Structure



No.	Part names	Q'ty	Materials	Remarks
1	Front casing	1	GFRPP	
2	Bearing	2	PTFE	
3	Rear casing	1	GFRPP	
5	O ring	1	FKM	
6	Impeller	1	GFRPP	
8	Spindle	1	Alumina ceramic	
9	Thrust ring	2	Alumina ceramic	
15	Machine screw	4-6	Stainless steel	
101	Motor	1		

NOTE1. MD-40RZ/-70RZ/-100R/-100R-5 have a CFRPP impeller.
NOTE2. EPDM O ring is available.
NOTE3. MD-20RZ/-30RZ/-40RZ/-70RZ have a PPS bearing.

1. Before Installation

The pump should be handled or operated by qualified personnel with a full understanding of the pump.

⚠ WARNING

- Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.
- Electrical work should be performed by a qualified electrician. Otherwise, personal injury or property damage could result.

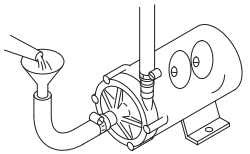
⚠ CAUTION

- Use care handling the pump. Do not drop. An impact may affect pump performance. Do not use a pump that has been damaged to avoid the risk of electrical damage or shock.
- A strong magnet is inside the pump. Do not bring a watch or floppy disk which may be adversely affected by a magnetic force.

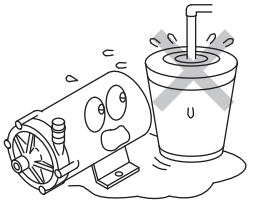
- Use care handling the pump. Do not drop. An impact may affect pump performance.



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



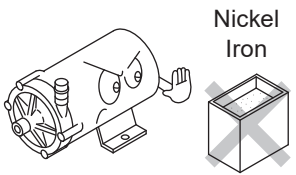
- The pump is not dust-/water-proof. Do not operate the pump while wet with solution or water.



- The pump doesn't have an ON-OFF switch and so starts as a power cable is plugged in.

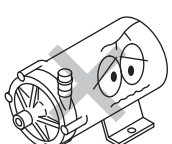
- Banned solutions
  - Halogenated hydrocarbons such as trichloroethylene and carbon tetrachloride
  - Ether and low-grade ester
  - Slurry (never use slurry, which wears out the pump bearings.)

- A strong magnet is inside the pump. Do not use the pump with any liquid which contains metals such as iron and nickel.



- Do not pull, knots, crush, modify, or heat the power cable. Damage to the power cable could lead to a fire or electrical shock if cut or broken. Stop operation and contact us.

- Use of a damaged pump could lead to an electric shock or death.



⚠CAUTION

Do not install or store the pump in the following places:

1. Where ambient temperature exceeds 40°C or falls below 0°C.
2. In a dusty/humid place.
3. In direct sunlight or wind & rain.



- Install the pump as close to a supply tank. Keep a liquid level in the tank higher than the pump at any time.

- An electrical failure of the pump may result in electric shock. Purchase and install an earth leakage breaker separately.

● Noise level during operation is as below.

Model	Noise level
MD-15R	40dB
MD-20R	45dB
MD-20RX	50dB
MD-20RZ	
MD-30R	55dB
MD-30RX	60dB
MD-30RZ	
MD-40R	
MD-40RX	
MD-40RZ	
MD-55R	55dB
MD-70R	70dB
MD-70RZ	
MD-100R	75dB

*Noise level is measured in A scale at a distance of 1m.

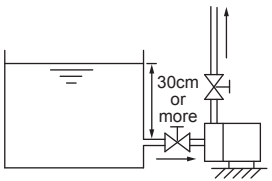
2. Installation/ Piping/ Electrical wiring

If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems.

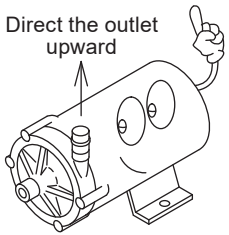
2.1 Installation

1. Install the pump:
   - Where ambient temperature will not falls below 0ºC or exceeds 40ºC.
   - Where ambient humidity is 90%RH or below.
   - Where sufficient space is kept around the pump for easy access and maintenance.

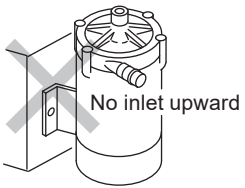
2. Mounting position
   This pump is not capable of self-priming. Flooded suction application is ideal. The pump should be installed 30cm lower than a suction liquid level, or a bearing may be worn soon by entrained air.



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

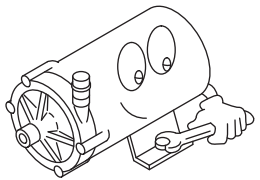


4. Do not mount the pump vertically.



5. Pump fixation
   Secure the pump by fixing its base on a flat and a stable foundation.

NOTE: Use corrosive resistant fixing screws.

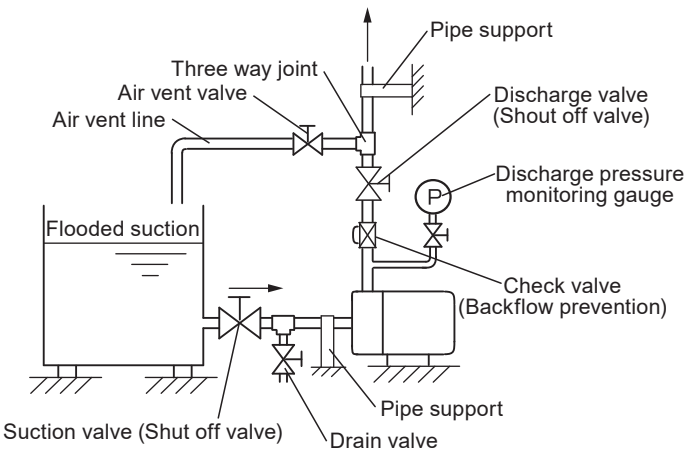


2.2 Piping

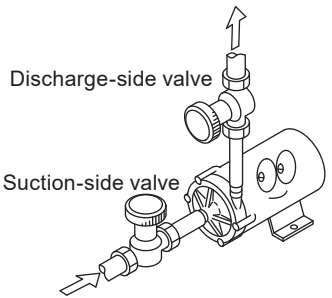
■ Before tubing

- Using a high flow pump and a small supply tank, a liquid level in the tank changes greatly.
- Do not allow a drop of adhesive agent or sealant into pipework. They may cause fatal damage to the pump.
- If pipework directory weighs on the pump, deformation or damage may result. Be sure to install pipe supports.

Plumbing layout



1. Flow/head adjustment & maintenance valves
   Install a ball valve on a discharge line for flow rate adjustment and on a suction line for the convenience of maintenance, as close to the pump as possible.

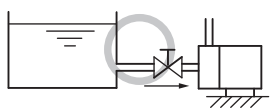
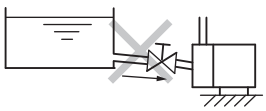
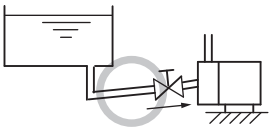
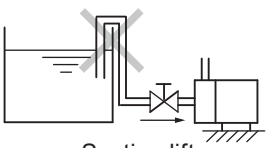
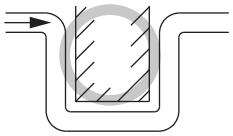
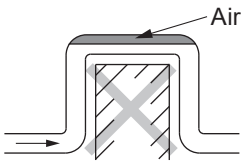


2. Pressure gauge
   Install a pressure gauge for monitoring discharge line pressure.
3. Drain valve
   Install a drain valve in between the pump inlet and a suction valve for blowing down liquid.
4. Air vent line and air vent valve
   Install an air vent line and an air vent valve when a discharge line is laid long in a horizontal direction.
5. Check valve
   Install an check valve when a discharge line is laid long in a vertical direction.

■ Suction line

• Avoid any loops in a plumbing run that could form a vapour trap. A suction line should be laid on a rising gradient of 1/100 toward the pump so as to expel air easily.

Suction line examples

Acceptable	Unacceptable
 Flooded suction	 Descending gradient
 Ascending gradient	 Suction lift
 U-shaped piping	 Arched piping

• In order to minimize plumbing resistance, have plumbing shortest with the minimum bends. Note cavitation*1 tends to occur when plumbing length is too long.
• A liquid level should be at least 30cm higher than the tank outlet for the prevention of air ingress.
• Keep liquid in the supply tank free from foreign matters. Clean the supply tank at intervals.
• Be sure to secure connections on a suction line for the prevention of entrained air. The presence of air in a suction line may prevent liquid delivery.

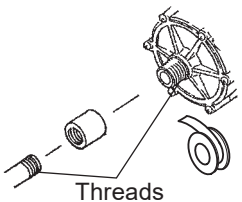
■ Discharge line

• Piping resistance changes with properties of liquid, specific gravity, liquid temperature and pipe length, and may adversely affect pump operation when the resistance is too great. In order to minimize the piping resistance, have piping length shortest with the minimum bends. Contact us for detail.
• When a discharge line is too long, water hammer*2 phenomenon may occur and damage the pump with impact pressure when the pump stops running. Provide a check valve to prevent water hammer.

Word & Terms:
*1 Air bubbles caused by a negative pressure in the pump, accompanied with vibration and noise: Performance deterioration or parts corrosion results.
*2 Shutting off a discharge line at once, liquid pressure change causes an impact pressure, accompanying impact noise and vibration. This phenomenon is called water hammer. Water hammer damages the pump & pipework and may cause leakage.

<Thread connection>

- Use of a Teflon pipe or a Teflon-lined pipe is recommended.
- Select a suitable pipe I.D. for secure connection. See page 6 for applicable connection size.
- Wrap a thread seal tape around the exposed threads of pipes, a pump inlet and outlet to create an air- and water-tightness before connection.

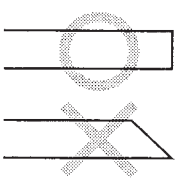


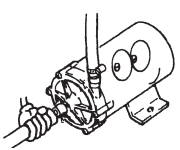
⚠CAUTION

Do not tighten a pipe too much, or a plastic inlet or outlet may break.

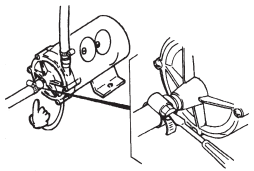
<Tube connection>

- Use temperature-/pressure-resistant braided tubes.
- Flat tube ends and then slide them down to an inlet and an outlet as far as they will go.



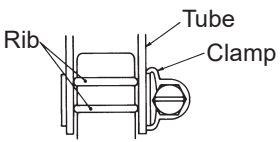


- Use a clamp to secure a tube connection and eliminate the possibility of leakage.



⚠CAUTION

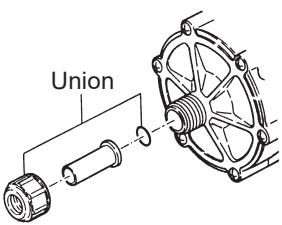
The inlet and outlet are made of plastics. Do not tighten the clamp too much.



<Union connection>

Optional unions are available to pumps with thread connections as a tube coupling device. Purchase separately.

- Use applicable tubes to liquid characteristics.
- Use temperature-/pressure-resistant braided tubes.
- Secure a tube on a union with an applicable screw/band clamp.



2.3 Electrical wiring

Electrical wiring must be performed by a qualified electrician. It is not the manufacture's responsibility for personal injury or property damage resulting from unauthorized service. Contact us or your nearest distributor for wiring as necessary.

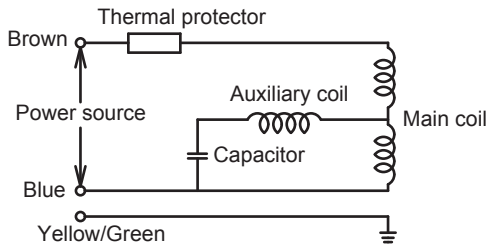
■ Before wiring

1. Check that the main power is turned off.
2. Electrical work should be performed in accordance with local electric codes, with an appropriate wire gauge or so.
3. Apply the specified power voltage. See the spec label.
4. The pump doesn't have an ON-OFF switch. The pump starts as a power cable is plugged in.
5. Earth the pump through the earth terminal.
6. When an earth leakage breaker is used and has tripped, always investigate and solve root causes. Be sure to unplug the pump before investigation is performed.

■ Connection diagram

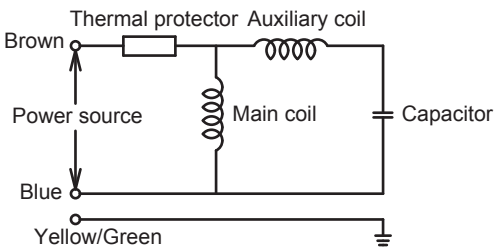
MD-15R/-20R/-20RX/-20RZ/-30R/-30RX/-30RZ types

Single-phase capacitor-run induction motor



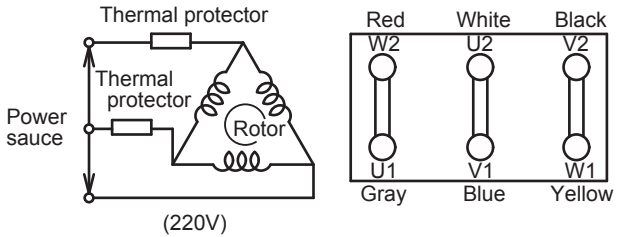
MD-40R/-40RX/-40RZ/-40RZ-5/-55R/-55R-5/-70R/-70RZ/-100R/-100R-5

Single-phase capacitor-run induction motor

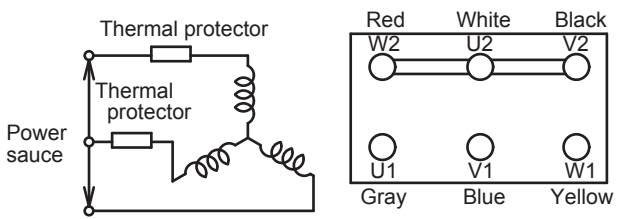


MD-70R/-100R/-70RZ/-100R-5 type

3-phase motor, 220/380V



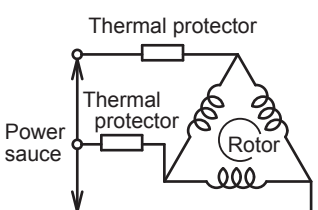
(220V)



(380V)

MD-70R/-100R/-70RZ/-100R-5 type

3-phase motor, 400/440V



■ Rated current & Starting current (50/60Hz)

Model	Rated current			Starting current		
	220/240V Single phase	220/380V 3 phases	400/440V 3 phases	220/240V Single phase	220/380V 3 phases	400/440V 3 phases
MD-15R	0.19 / 0.18	-	-	0.3 / 0.29	-	-
MD-20R	0.24 / 0.28	-	-	0.4 / 0.4	-	-
MD-20RX	0.24 / 0.29	-	-	0.4 / 0.4	-	-
MD-20RZ	0.24 / 0.29	-	-	0.4 / 0.4	-	-
MD-30R	0.4 / 0.5	-	-	1.2 / 1.25	-	-
MD-30RX	0.4 / 0.5	-	-	1.2 / 1.25	-	-
MD-30RZ	0.42 / 0.5	-	-	1.2 / 1.25	-	-
MD-40R	0.52 / 0.7	-	-	1.1 / 1.0	-	-
MD-40RX	0.46 / 0.58	-	-	1.1 / 1.0	-	-
MD-40RZ	0.65 / 0.85	-	-	1.25 / 1.35	-	-
MD-40RZ-5	0.65 / -	-	-	1.25 / -	-	-
MD-55R	0.8 / 0.9	-	-	2.3 / 2.1	-	-
MD-55R-5	1.0 / -	-	-	2.3 / -	-	-
MD-70R	1.21 - 1.21 / 1.64 - 1.50	1.15 - 0.64 / 1.3 - 0.69	0.39 - 0.4 / 0.46 - 0.45	3.15 - 3.55 / 2.9 - 3.2	3.9 - 2.25 / 3.8 - 2.2	1.24 - 2.27 / 1.22 - 1.25
MD-70RZ	1.4 / 1.9	1.2 - 0.7 / 1.3 - 0.8	0.6 -0.7	3.15 - 3.42 / 2.95 - 3.15	4.15 - 2.45 / 4.0 - 2.4	2.15 - 2.3 / 2.05 - 2.27
MD-100R	1.93 - 1.93 / 1.85 - 1.83	1.18 - 0.69 / 1.17 - 0.87	0.62 - 0.6 / 0.6 - 0.58	3.8 - 4.3 / 3.6 - 4.0	3.8 - 2.2 / 3.7 - 2.1	1.9 - 2.2 / 1.85 - 2.1
MD-100R-5	1.93 - 1.93 / -	1.18 - 0.69 / -	0.62 - 0.6 / -	3.8 - 4.3 / -	3.8 - 2.2 / -	1.9-2.2 / -

1. Before operation

Read through this section before use.

⚠ CAUTION

- Before operating the pump, check that the pump is securely fixed.
- If foreign matters enter the pump, turn off power and remove them, otherwise failure or malfunction may result.
- Do not run pump dry (operation with no liquid). Friction heat builds up and damages the internal parts of pump.

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/suction valve closed.
3. Do not open/narrow a discharge or a suction line sharply, otherwise the magnetic coupling*¹ may be disconnected*². (In this case turn off power once. The the drive and driven magnets will be coupled again as the pump is turned on.)

Word & Terms:
*¹ A pair of drive and driven magnets
*² The condition that a driven magnet (combination of impeller and magnet capsule units) does not rotate in sync with the drive magnet.

■ Operation

Operate the pump in accordance with the following procedures.

No.	Procedure	Points to be checked
1	Check piping, wiring and voltage.	• See the "2.2 Piping" and "2.3 Electrical wiring" sections. • Check the spec label to see if power supply voltage is correct.
2	Open or close the valves.	• Fully open a suction-side valve. • Fully close a discharge-side valve.
3	Prime the pump chamber.	• Prime the pump with liquid whether flooded suction application or suction lift application. Note: If the pump is not filled with priming liquid, perform degassing to expel air from the pump. See the ■ Degassing section on the next page.
4	Supply power to the pump.	• Check the item 1, 2 and 3. Then turn on power and start the pump.

No.	Procedure	Points to be checked
5	Adjust a discharge capacity & a discharge head to the specified level.	• Open a discharge-side valve gradually until a flow and a head reach a specified level. Do not open or close the valve sharply. Note: Do not keep a discharge-side valve closed more than 1 minute once the pump has started. Note: Check that the pump transfers a liquid without trouble. If there is a problem, turn off power immediately and solve causes. See the ***1. Troubleshooting*** section.
6	Check the operation.	• Do not allow foreign matters to enter the pump. Foreign matters may cause the impeller to be locked, hindering liquid circulation. In this case turn off power immediately (Contact us). • Turn off power when an earth leakage breaker has operated. Investigate a root cause on the basis of the trouble shooting section.

■ Degassing

Open the discharge line. The end of the line immersed in liquid is not ideal for degassing. Take it out from liquid as necessary. Run the pump for 1 second and repeat the 1-second operation until the trapped air is removed (from 3 to 5 times).

■ Shutdown

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

■ Before a long period of storage

Empty the pump before it is left stopped for a long time. Run the pump with clean water for 5 minutes every 3 months to prevent the motor bearing from being rusty and stuck.

1. Troubleshooting

If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems. Contact us or your nearest distributor as necessary.

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

2. Maintenance & Inspection

Handling of the pump, maintenance and inspection should be carried out within this instruction manual.
It is not the manufacturer's responsibility for personal injury or property damage resulting from unauthorized service. Contact us or your nearest distributor as necessary.

■ Retightening

After a long period of operation or storage, the pump head mounting screws may be loose. Tighten the mounting screws periodically. Do not use excess force. The plastic pump head may deform.

Tightening torque

MD-15R/-20R/-30RZ	1.8N·m
MD-30R/-40R/-55R/-70R	3.0N·m
MD-100R	3.5N·m

■ Daily inspection

Always check for abnormality in vibration, noise, a current value, and a discharge capacity. If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems according to the troubleshooting section.

■ Wear parts

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

3. Drainage

No drain port is provided to this pump. See drainage procedure below.

⚠ WARNING

- Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.
- Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a face shield during disassembly, assembly or maintenance work.

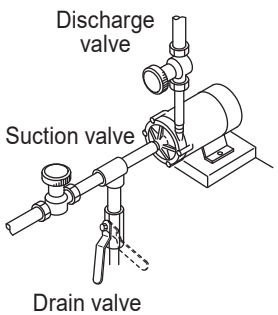
⚠ CAUTION

- Solution in the discharge line may be under pressure. Release the pressure from the discharge line before disconnecting plumbing or disassembly of the pump to avoid solution spray.
- Ensure protection and containment of solution in the event of plumbing or pump damage (secondary containment).
- The pump is not waterproof. Do not operate the pump while wet with solution or water. Failure or injury may result. Immediately dry off the pump if it gets wet.

*Dilute and flush out harmful liquid before removing a pipe.

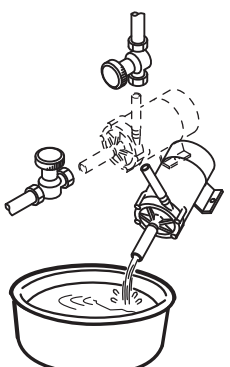
■ Procedure

1. Be sure to turn off power to stop the pump and related devices before service is performed.
2. Fully close a discharge and a suction valve. Open a drain valve to empty the pump. Note liquid can not be removed completely through the drain valve.
3. Place a container under the pump and then remove a discharge and a suction line from the pump.



⚠ CAUTION
Be careful not to get wet with chemical liquid.

4. Unfix and take out the pump.
5. Direct the inlet downwards to run off liquid in a container.



4. Assembly & Disassembly

⚠ WARNING

- **Access limitation**
  The magnet drive pump has a pair of strong magnets. The strong magnet field could adversely affect the persons who are assisted by electronic devices such as the pacemaker.
- **Turn off power before service**
  Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.
- **Wear protective clothing**
  Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a face shield during disassembly, assembly or maintenance work. The specific solution will dictate the degree of protection. Refer to SDS precautions from the solution supplier.

⚠ CAUTION

- **Do not catch the finger**
  Magnetic force of the pump is powerful. Take care not to catch the finger in the bracket.

- Mark each wire so that the wires can be connected correctly to the motor.
- Do not disassemble the pump beyond the extent shown on this manual.
- Make sure to close suction and discharge valves before disassembly/assembly of the pump. Clean the inside of the pump as well.
- Magnetic force of the pump is strong. Be careful not to catch the finger in parts. Do not allow iron pieces or powders to stick to a drive and a driven magnet.
- A pair of strong magnets is mounted in the pump and its magnetic force may affect magnetic disks/cards or wrist watches. Do not bring them close to the pump.

Tool list

The following tools are necessary to disassemble and assemble the pump.

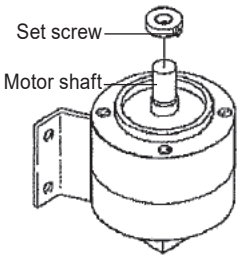
Tools	MD-55R	MD-70R	MD-100R
Hex. wrench (spacer)	1.5mm	1.5mm	2mm
Hex. wrench (motor bracket)	4mm	4mm	4mm
4 hex socket head bolts/washers	M5 1.5-2.0mm	M5 1.5-2.0mm	M6 1.5-2.0mm
Torque wrench (drive magnet)	M6 (4.90N·m)	M6 (4.90N·m)	M6 (4.90N·m)
Torque wrench (pump head)	M5 (3.0N·m)	M5 (3.0N·m)	M6 (3.5N·m)
LOCTITE	#271		

■ IEC motor mounting

1. Fit the spacer to the motor shaft until it is fully seated.

2. Apply a proper amount of the LOCTITE 271 to three (3) thread grooves of the set screw.

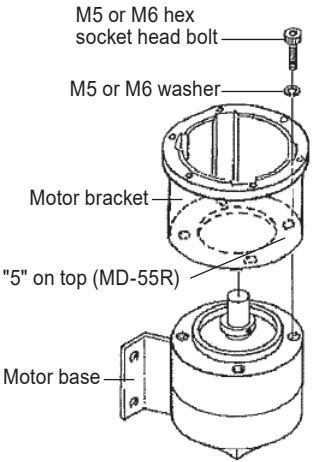
NOTE: Too much use of the adhesive can "lock" the motor shaft.



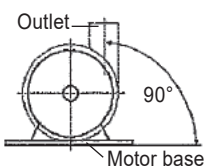
3. Use a 1.5mm (MD-55R/-70R) or 2mm (MD-100R) hexagon wrench to fasten the set screw to hold the spacer onto the motor shaft.

4. Mount the motor bracket to the motor.

NOTE: The motor bracket has a mounting direction as shown right.



NOTE: If the motor bracket is mounted differently, the pump head can not be fitted in a correct way with the outlet upwards.



5. Use four M5 1.5-2.0mm (MD-55R/-70R) or M6 1.5-2.0mm (MD-100R) hexagon socket head bolts and washers to hold the motor bracket to the motor.

6. Check the drive magnet unit is free from metal debris.

7. Unscrew the M6 12mm hex socket set screws until some thread grooves come up.

8. Use the LOCTITE 271 onto three (3) thread grooves.

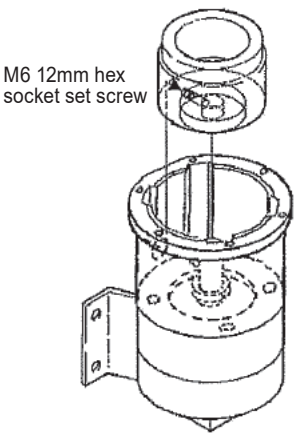
NOTE: Too much use of the adhesive can "lock" the motor shaft.

9. Mount the drive magnet unit onto the motor shaft until it is fully seated.

10. Tighten the hex socket set screw by 4.90N·m.

11. Manually turn the mounted drive unit to see if it rotates freely without "sticking".

Drive magnet: MD-55R has 3 lines around the drive magnet, MD-70R has 4 lines, and MD-100R has 2 lines for identification.

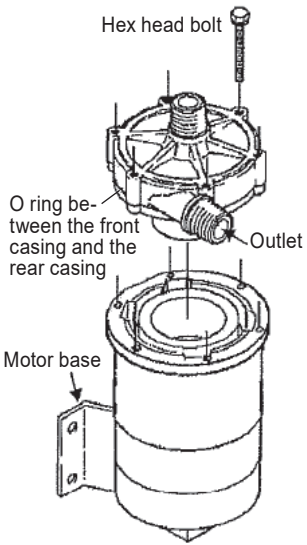


12. Check the retainer ring is not damaged (MD-100R).

13. Check the O ring is in place in between the front casing and the rear casing.

14. Mount the pump head onto the motor bracket.

NOTE: The outlet must come upwards when the motor stands on the base.



15. Tighten the six hexagon head bolts diagonally and evenly at the rated torque below.

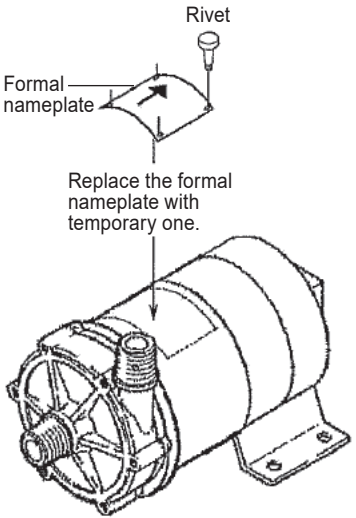
Model	Hex head bolts	Torque
MD-55R	M5 50mm	3.0N·m
MD-70R	M5 40mm	3.0N·m
MD-100R	M6 50mm	3.5N·m

16. Transcribe the MFG. number on the temporary nameplate to the new nameplate.

17. Stamp the motor mounting year on the formal nameplate.

18. Remove the temporary nameplate from the pump and clean that area.

19. Attach the formal nameplate to the pump with four rivets.



EC DECLARATION OF CONFORMITY

A copy of the original Declaration of Conformity

(SUPPLIER'S NAME)
WE
IWAKI CO.,LTD.

(ADDRESS)
6-6 2-CHOME KANDA-SUDACHO CHIYODA-KU TOKYO JAPAN

(PRODUCT)
DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS
MAGNETIC DRIVE PUMP

(MODEL NAME)
MD SERIES

TO WHICH THIS DECLARATION RELATES ARE IN CONFORMITY
WITH THE FOLLOWING STANDARDS OR DIRECTIVES AS FAR AS APPLICABLE

(DIRECTIVES)
MACHINERY DIRECTIVE 2006/42/EC (ANNEX IIA)
RoHS DIRECTIVE 2011/65/EU

(STANDARDS)
EN ISO12100:2010 EN809:1998+A1:2009 EN IEC63000:2018

(A PERSON WHO IS AUTHORISED TO COMPILE THE TECHNICAL FILE
IN THE COMMUNITY)
IWAKI EUROPE GMBH
SIEMENSRING 115 D-47877 WILLICH GERMANY

NOTE: THIS DECLARATION BECOMES INVALID IF TECHNICAL OR OPERATIONAL MODIFICATIONS ARE INTRODUCED WITHOUT THE MANUFACTURER'S CONSENT.

T. Sawada.

TSUTOMU SAWADA
DEPUTY SENIOR GENERAL MANAGER,
QUALITY ASSURANCE HEAD OFFICE

Tokyo, Sep. 2, 2021

(PLACE AND DATE OF ISSUE) **(NAME AND SIGNATURE OR EQUIVALENT MARKING OF AUTHORIZED PERSON)**

DOCUMENT NO. IS-51K-449-4

UK DECLARATION OF CONFORMITY

A copy of the original Declaration of Conformity

(SUPPLIER'S NAME)
WE
IWAKI CO.,LTD.

(ADDRESS)
6-6 2-CHOME KANDA-SUDACHO CHIYODA-KU TOKYO JAPAN

(PRODUCT)
DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS
MAGNETIC DRIVE PUMP

(MODEL NAME)
MD SERIES

TO WHICH THIS DECLARATION RELATES ARE IN CONFORMITY WITH THE
FOLLOWING REGULATIONS OR STANDARDS AS FAR AS APPLICABLE

(REGULATIONS)
S.I. 2008/1597 SUPPLY OF MACHINERY (SAFETY)
S.I. 2012/3032 RESTRICTION OF HAZARDOUS SUBSTANCES

(STANDARDS)
EN ISO12100:2010 EN809:1998+A1:2009 EN IEC63000:2018

(A PERSON WHO IS AUTHORISED TO COMPILE THE TECHNICAL FILE
IN THE GB MARKET)
SENSYS LIMITED
UNIT 9 POND CLOSE WALKERN ROAD
STEVENAGE HERTS SG1 3QP UK

NOTE: THIS DECLARATION BECOMES INVALID IF TECHNICAL OR OPERATIONAL MODIFICATIONS ARE INTRODUCED WITHOUT THE MANUFACTURER'S CONSENT.

T. Sawada.

TSUTOMU SAWADA
SENIOR GENERAL MANAGER,
QUALITY ASSURANCE HEAD OFFICE

Tokyo, Jun. 6, 2023

(PLACE AND DATE OF ISSUE) **(NAME AND SIGNATURE OR EQUIVALENT MARKING OF AUTHORIZED PERSON)**

DOCUMENT NO. IS-51K-603-1

Information on CE/UKCA conformity

■ **Information on CE/UKCA conformity of pump units when the motor is fitted by the customer (dealer/operator)**

We hereby confirm the CE/UKCA conformity of our pump unit provided that the following criteria about intended use are satisfied as described in this instruction manual:

- Motor conformity in accordance with any relevant EC directives/ UKCA regulations which are currently effective.
- The dimensions of a required motor flange and shaft must fit the specified pump.
- The motor must be installed to the pump according to this instruction manual.
- Guaranteed grounding
- The pump must not be repainted over our original upper coating.

Any reseller or dealer who connects the pump with a motor and markets it as a complete unit must conform to all relevant EC directives/UKCA regulations. In such cases, the reseller or dealer then becomes the manufacturer.

https://www.iwakipumps.jp

IWAKI CO.,LTD. 6-6 Kanda-Sudacho 2-chome Chiyoda-ku Tokyo 101-8558 Japan
TEL: +81 3 3254 2935 FAX: +81 3 3252 8892

European Headquarter / IWAKI Europe GmbH
TEL: +49 2154 9254 0 FAX: +49 2154 9254 48
Germany / IWAKI Europe GmbH
TEL: +49 2154 9254 50 FAX: +49 2154 9254 55
The Netherlands / IWAKI Europe GmbH (Netherlands Branch)
TEL: +31 74 2420011 FAX: +49 2154 9254 48
Italy / IWAKI Europe GmbH (Italy Branch)
TEL: +39 0445 561219 FAX: +39 0445 569088
Spain / IWAKI Europe GmbH (Spain Branch)
TEL/FAX: +34 934 741 638
Poland / IWAKI Europe GmbH (East Europe Branch)
TEL: +48 12 347 0755 FAX: +48 12 347 0900
Belgium / IWAKI Belgium N.V.
TEL: +32 13 670200 FAX: +32 13 672030
Denmark / IWAKI Nordic A/S
TEL: +45 48 242345
Finland / IWAKI Suomi Oy
TEL: +358 10 201 0490

France / IWAKI France S.A.
TEL: +33 1 69 63 33 70 FAX: +33 1 64 49 92 73
Norway / IWAKI Norge AS
TEL: +47 23 38 49 00
Sweden / IWAKI Sverige AB
TEL: +46 8 511 72900
U.S.A. / IWAKI America Inc.
TEL: +1 508 429 1440 FAX: +1 508 429 1386
Argentina / IWAKI America Inc. (Argentina Branch)
TEL: +54 911 6477 4116
Brazil / IWAKI Do Brasil Comercio De Bombas Hidraulicas LTDA.
TEL/FAX: +55 19 3244 5900
Singapore / IWAKI Singapore Pte Ltd.
TEL: +65 6316 2028 FAX: +65 6316 3221
Indonesia / IWAKI Singapore (Indonesia Office)
TEL: +62 21 6906606 FAX: +62 21 6906612
Malaysia / IWAKIm SDN. BHD.
TEL: +60 3 7803 8807 FAX: +60 3 7803 4800

Australia / IWAKI Pumps Australia Pty Ltd.
TEL: +61 2 9899 2411 FAX: +61 2 9899 2421
China (Hong Kong) / IWAKI Pumps Co., Ltd.
TEL: +852 2607 1168 FAX: +852 2607 1000
China (Guangzhou) / GFTZ IWAKI Engineering & Trading Co., Ltd.
TEL: +86 20 84350603 FAX: +86 20 84359181
China (Shanghai) / IWAKI Pumps (Shanghai) Co., Ltd.
TEL: +86 21 6272 7502 FAX: +86 21 6272 6929
Korea / IWAKI Korea Co., Ltd.
TEL: +82 2 2630 4800 FAX: +82 2 2630 4801
Taiwan / IWAKI Pumps Taiwan Co., Ltd.
TEL: +886 2 8227 6900 FAX: +886 2 8227 6818
Thailand / IWAKI (Thailand) Co., Ltd.
TEL: +66 2 322 2471 FAX: +66 2 322 2477

T385-9 '23/08