

IWAKI Magnetic Drive Pump

MDK Series

Instruction Manual (Europe Edition)

 Read this manual before use of product

Thank you for selecting IWAKI Magnetic Drive Pump MDK Series. This instruction manual, which is divided into five sections, namely "Safety", "Outline of Product", "Installation", "Operation" and "Maintenance", deals with the correct handling and operation procedures for the pump. To make maximum use of the pump and to ensure safe and long time operation of the pump, please read this manual thoroughly and carefully prior to operating the pump.

Contents

Safety section	1~4
Outline of product	5~9
1. Unpacking and inspection	6
2. Operating principle	6
3. Model identification	6
4. Specification	7
5. Construction and material	7
6. Outline dimension	8
7. Performance curve	8
8. Construction and parts names	9
Installation	10~16
1. Precautions before use of pump	11
2. Plumbing	14
3. Electrical wiring	16
Operation	17~19
1. Precautions on operation	18
2. Preparation for operation	18
3. Operation	19
4. To stop pump	19
Maintenance	20~27
1. Troubleshooting	21
2. Maintenance and inspection	22
3. Consumable parts	24
4. Disassembling and assembling	25

Safety section

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 users from hazardous situations.
- The symbols on this instruction manual have the following meanings:

 WARNING	Nonobservance or misapplication of “Warning” sections could lead to a serious accident which may result in death.
 CAUTION	Nonobservance or misapplication of “Caution” sections could lead to personal injury or property damage.

Types of Symbols



Indicates that “Warning” or “Caution” must be exercised. Inside this triangle, a concrete and practical image provided as a warning or caution message is depicted.



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 section

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.



Turning off power

- **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 MSDS precautions from the solution supplier.



Wear protective gear

- **Use strong ropes (chains) for lifting up the pump**

Serious injury may result if lifting ropes (chains) break. Check lifting ropes (chains) are strong enough before use. Observe the maximum weight.



Caution

- **Do not modify the pump**

Alterations 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.



Prohibited

- **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.



No Remodeling

- **Stop operation**

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



- **When handling hazardous liquid**

For handling harmful liquids as mentioned below, be sure to conduct daily inspection and maintenance for the prevention of liquid leakage. Otherwise personal injury, explosion or fire may result.

1. Explosive or flammable liquid
2. Corrosive or stimulus toxic liquid
3. Health hazardous liquid



Prohibited

- **Do not catch the finger**

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



Safety section

CAUTION

- **Qualified personnel only**

The pump should be handled or operated by qualified personnel with a full understanding of the pump. Any person not familiar with the product should not take part in the operation or management of the pump.



- **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

- **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

- **Ventilation**

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



- **Spill precautions**

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



- **Do not run pump dry**

Do not run pump dry (Operation without liquid). Friction heat builds up during dry running operation and damages internal parts. If the pump is operated with a suction side valve closed or without priming, the pump runs dry.



Prohibited

- **Do not operate the pump in a flammable atmosphere**

Do not place explosive or flammable material near the pump.



Prohibited

- **Do not stand on the pump**

Do not use the pump as a platform. Injury or damage may result when the pump turns over.



Prohibited

- **Do not touch the pump or pipe with bare hands**

Risk of burning. The surface temperature of the pump or pipe rises high along with liquid temperature in or right after operation.



Caution

Safety section

CAUTION

• Grounding

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



• Install a GFCI (earth leakage breaker)

An electrical failure of the pump may adversely affect other devices on the same line. Purchase and install an earth leakage breaker separately.



• Do not install/store the pump:

- In a flammable/explosive/corrosive atmosphere.
- In a dusty/humid environment.
- Where ambient temperature can exceed 0-40°C.
- Under mechanical vibrations.
- In direct sunlight or wind & rain.



• Starting

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



• Foreign matter

When foreign matters enter the pump, turn off power at once and remove them. Using the pump with foreign matters may result in failure.



• 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.



• Preventative maintenance

Follow instructions in this manual for replacement of wear parts. Do not disassemble the pump beyond the extent of the instructions.



• Do not use a damaged pump

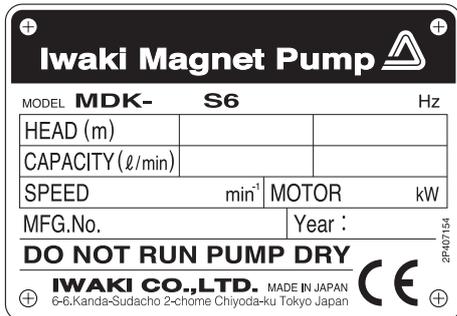
Use of a damaged pump could lead to an electric shock or death.



OUTLINE OF PRODUCT

<i>1. Unpacking and inspection</i>	<i>6</i>
<i>2. Operating principle</i>	<i>6</i>
<i>3. Model identification</i>	<i>6</i>
<i>4. Specification</i>	<i>7</i>
<i>5. Construction and material</i>	<i>7</i>
<i>6. Outline dimension</i>	<i>8</i>
<i>7. Performance curve</i>	<i>8</i>
<i>8. Construction and parts names</i>	<i>9</i>

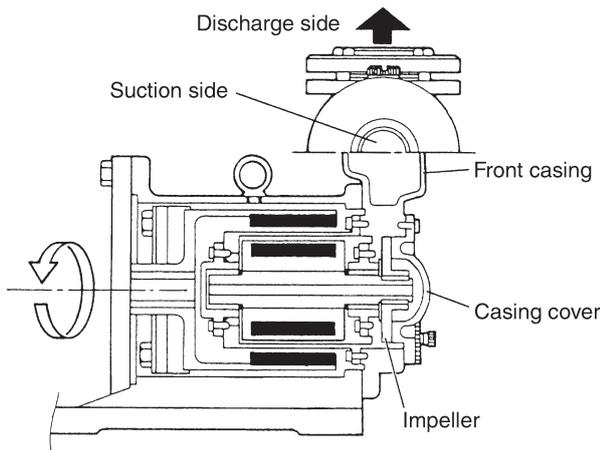
1. Unpacking and inspection



After the product is unpacked, check followings.

- 1) Identify the product
Check nameplate if pump model, head, frequency, discharge capacity, motor power, voltage etc. are correct.
- 2) Damage during transportation
Check if the product is not damaged and bolts and nuts are not loosened during transportation.
- 3) Discharge and suction ports are plugged so that foreign matters do not get into pump chamber. Remove the plug when the product is installed.

2. Operating principle



MDK Series pumps are magnetically driven turbine pump. Impeller is rotated in pump chamber by the magnetic coupling force to suck liquid from suction port and to discharge to outlet.

3. Model identification

MDK – 32 S6 TS EUR

(1) (2) (3) (4)

- (1) Pump bore : 20 ... 20mm, 25 ... 25mm, 32 ... 32mm, 40 ... 40mm
- (2) Pump material : S6 ... SCS14, SUS316, SUS329J1
- (3) Check valve material : TS ... PTFE, SUS316
- (4) Bearing material : EUR ... Carbon
EUR-R ... PTFE

4. Specification

Model	Bore	Standard flow rate (L/min.)		Specific gravity limit	Motor power (kW)
		50Hz	60Hz		
MDK-20	20mm (Rp3/4)	9 - 10	12 - 12.5	1.3	0.2
MDK-25	25mm (Rp1)	12 - 15	16 - 18.5	1.3	0.37
MDK-32	32mm (Rp1-1/4)	25 - 29	30 - 36	1.3	1.5
MDK-40	40mm (Rp1-1/2)	30 - 45	40 - 60	1.3	4.0

■ Pump weight with no motor

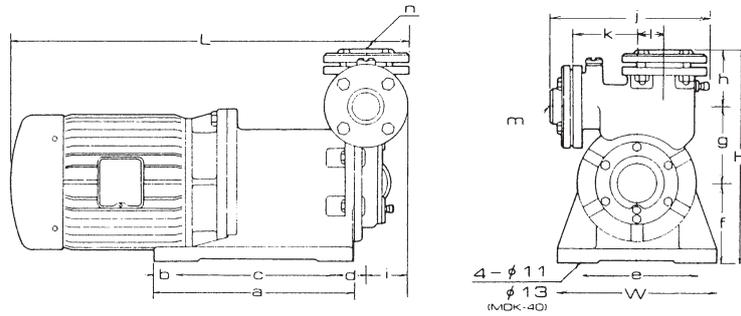
MDK-20	MDK-25	MDK-32	MDK-40
15kg	20kg	25kg	50kg

5. Construction and material

■ Wet end material

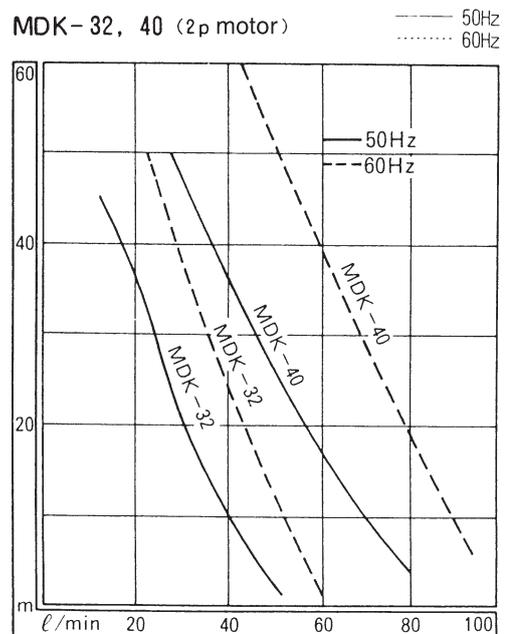
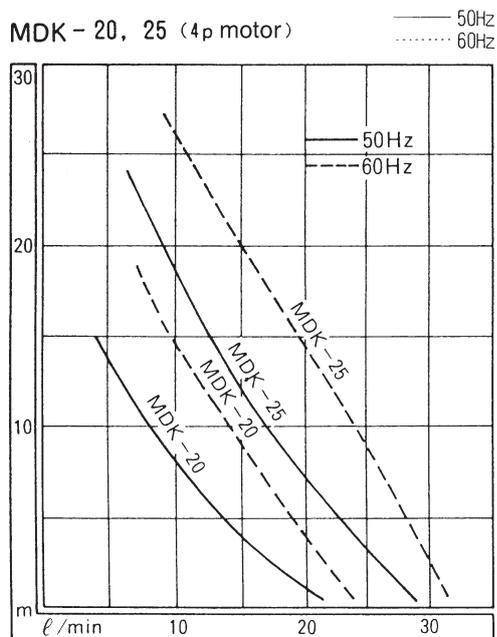
Parts	Material
Casing	SCS14
Casing cover	
Impeller	SUS316
Magnet capsule unit	SUS329J1 + SUS316
Thrust washer	PTFE
Bearing set	Carbon/SCS14,SUS316 or PTFE/SCS14,SUS316
Cover packing	PTFE
Check valve	PTFE/SUS316

6. Outline dimension



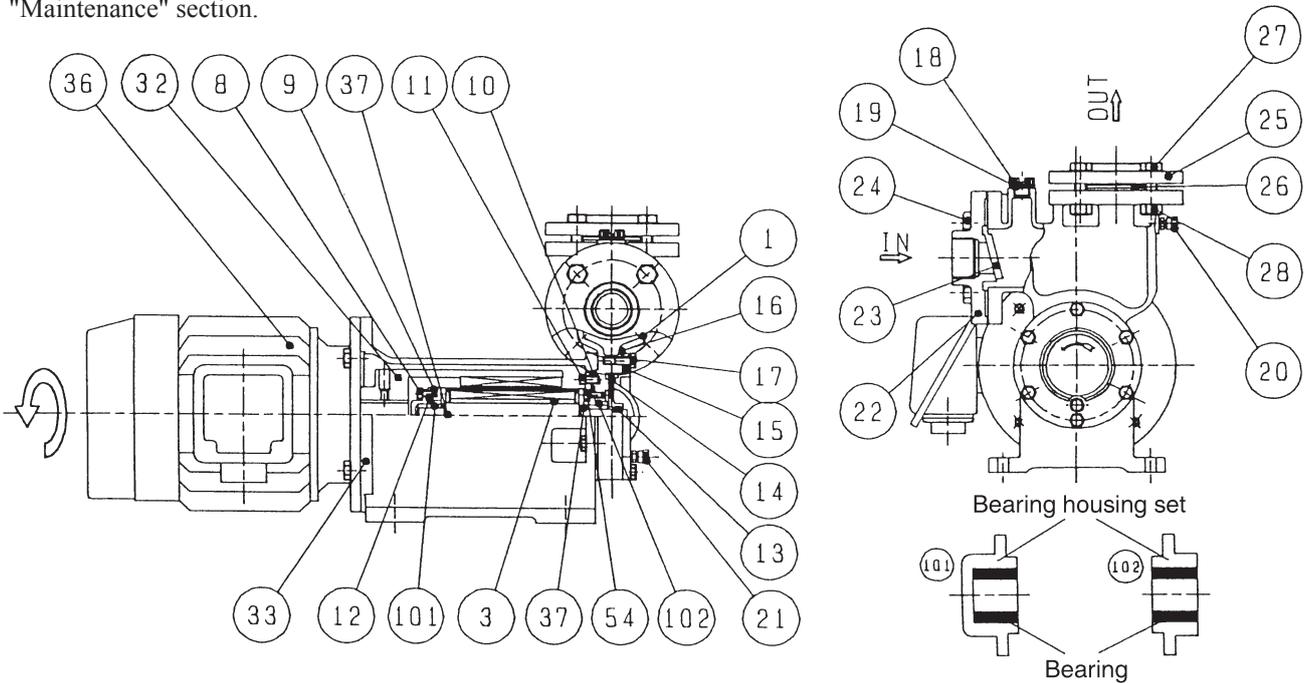
Model	W	H	a	b	c	d	e	f	g	h	i	j	k	l	m	n
MDK-20	180	260	140	30	80	44	150	90	95	75	50	209	90	20	(Rc3/4)	
MDK-25		267	200		140	50			100	77	63	228	96	27	(Rc1)	
MDK-32		317	235		175	46			110	110	68	234	90	40	(Rc1-1/4)	
MDK-40	270	362	310	20	270	44	230	135	130	97	70	269	110	45	(Rc1-1/2)	

7. Performance curves



8. Construction and parts names

The drawing shows every composing parts. Disassembling of pump must be limited to the extent shown on "Maintenance" section.



No.	Parts	Q'ty	Material	Remarks			
				MDK-20	MDK-25	MDK-32	MDK-40
1	Front casing	1	SCS14				
3	Magnet capsule	1	SUS316/SUS329J1				
8	Hex. socket head bolt	4	Stainless steel		M6 × 12		M8 × 16
9	Rear casing	1	SUS316				
10	Packing	1	PTFE				
11	Hex. socket head bolt	4	Stainless steel	M6 × 12		M8 × 16	
12	O ring	1	PTFE				
13	Key	1	SUS316				
14	Impeller	1	SUS316				
15	Casing cover	1	SCS14				
16	Gasket	5	PTFE				
17	Hex. head bolt	6	Stainless steel			M8 × 16	
18	Priming plug	1	SUS316			Rp 3/8"	
19	Gasket	1	PTFE				
20	Air vent plug	1	SUS316			Rp 1/8"	
21	Drain plug	1	SUS316			Rp 1/8"	
22	Suction flange	1	SCS14	Rp3/4"	Rp1"	Rp1-1/4"	Rp1-1/2"
23	Check valve	1	PTFE/SUS316				
24	Hex. head bolt	4	Stainless steel			M12 × 30	
25	Discharge flange	1	SCS14	Rp3/4"	Rp1"	Rp1-1/4"	Rp1-1/2"
26	Flange gasket	1	PTFE				
27	Hex. head bolt	4	Stainless steel		M12 × 45		M12 × 50
28	Hex. nut	4	Stainless steel			M12	
32	Drive magnet	1	SS400				
33	Bracket	1	FC150				
36	Motor	1					
37	Thrust washer	2	PTFE				
54	Hex. socket head bolt	4	SUS316		M6 × 12		M8 × 16
101	Bearing housing set B	1	Carbon/SUS316 or PTFE/ SUS316				
102	Bearing housing set A	1	Carbon/ SCS14 or PTFE/ SCS14				

INSTALLATION

<i>1. Precautions before use of pump ...</i>	<i>11~12</i>
<i>2. Plumbing</i>	<i>14</i>
<i>3. Electrical wiring</i>	<i>16</i>

Caution

- **Do not run pump dry**

When you operate pump first time after the installation or after repair works, prime the pump to start. Dry running (running with no liquid) will cause the seizure of rubbing parts resulting in pump failure.

Running parts are self-lubricated and cooled by pumped liquid. Dry running or running with valve closed will damage the impeller because the automatic balancing mechanism does not work.

- If pump runs dry by mistake, turn off power and leave it for one more than one hour without pouring liquid into pump.
- Dry running protective device is recommended to avoid dry running.



Prohibited

- **Keep pump away from fire**

For your safety, do not put dangerous or flammable substance near to pump.



Prohibited

- **Do not use pump for transferring dangerous liquids mentioned as below.**

Explosive and flammable liquids

Corrosive and irritating odor toxic liquid



Prohibited

- **Do not remodel pump**

Remodeled pump may cause accident, electrical shock or pump failure.

Do not remodel pump.



Prohibited

1. Precautions before use of pump

1) Precautions when pump is started or stopped

To avoid water hammer phenomenon, pay attention to followings when pump is started or stopped. Especially, pay special attention in case discharge piping is long.

(1) When pump is started

After pump is primed, open the discharge valve and then turn on power to start pump. After pump starts, gradually close the valve to get desired duty point.

(2) When pump is stopped

When pump is stopped, close the discharge valve gradually to go to minimum flow and then turn off power. The discharge valve must be closed completely after the pump stopped.

Never close the flow suddenly by solenoid valve or so. Sudden shut-down may cause excessive pressure increase resulting in pump damage.

2) Do not install nor store pump at following places

- Places where ambient temperature becomes zero deg. C or below.
- Corrosive or explosive gas environment
- Places where dew drops
- Ambient temperature more than 40 deg. C
- High humid place (Allowable humidity is 35 to 85%RH.)
- Dusty place or place influenced by external shock or vibration

3) Prime pump

Both air-liquid separation tank located top part of pump body and pump chamber must be primed. Before start pump, fill them with liquid. Dry running (pump operation without liquid) may cause pump seizure or shortened pump parts.

4) Max. pressure limit of pump

Max. pressure limit of pump is 0.6MPa for MDK-20,25 and 32, and 0.8MPa for MDK-40.

5) Pumped liquid

1) Slurry liquid

Liquid which contains slurry (solid substance) can not be pumped.

2) Performance influenced by specific gravity and viscosity of pumped liquid

In case handled liquid is heavier and more viscous than water, the shaft power, discharge capacity and head are not the same as pumping water. The pump is made according to the information given to us when we received order from you. If you change the liquid or operating condition, please consult us to confirm if the pump can be used for the changed liquid or conditions.

3) Change of temperature of pumped liquid

Pump performance is not influenced by the change of temperature of pumped liquid but the temperature change of pumped liquid influences viscosity, vapor pressure and corrosiveness of liquid. Pay attention to the change of characteristics of pumped liquid.

● Pumped liquid temperature range : 0 - 80 deg.C (in case of water)
● Allowable ambient temperature range: 0 - 40 deg.C
● Allowable humidity range : 35 - 85% RH

Ask us for the allowable liquid temperature range of chemical liquids.

6) Dimension of bearing

Radial direction wear limit of bearing is 2 mm. Temperature rise value of bearing in standard performance range is 3 deg. C or less.

7) Intermittent operation

So often repeated pump starting and stopping cause pump damage. Starting and stopping pump is limited to six times or less an hour.

8) Dislocated magnet coupling

When the magnet coupling is dislocated, stop the pump within a minute. If pump runs with magnet coupling disconnected, the coupling force is reduced.

9) Installation space

Select a level location, free from vibration, that won't hold liquid.

Allow sufficient space around the pump for easy access and maintenance.

2. Plumbing

2-1. Tightening torque between the pump and pipework

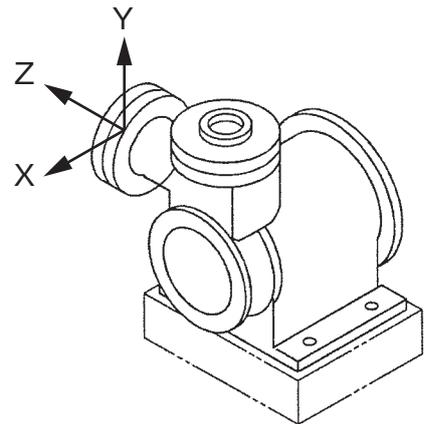
Connect the pump to pipework via inlet and outlet flanges according to the tightening torque below. The table is based on use of metal pipe flanges with rubber gaskets. Tighten bolts diagonally at even torque.

Bolt size	Tightening torque
M16	79N•m

2-2. Piping load and momentum

Try not to apply a heavy load to the inlet and outlet flanges.

Permissible piping weight and moment to the pump are as below.



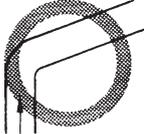
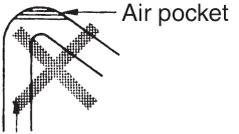
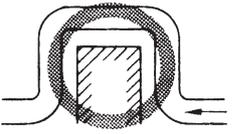
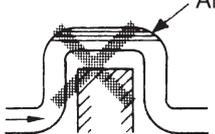
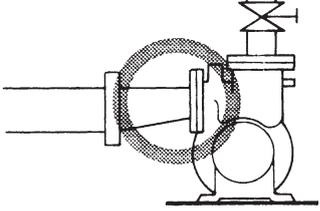
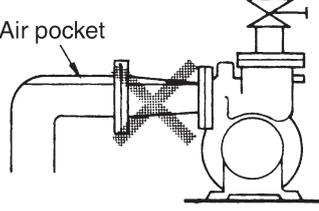
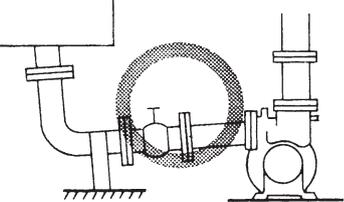
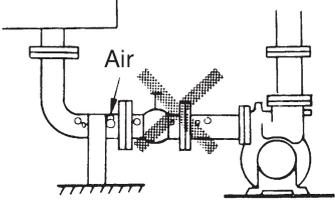
	Load direction	Load (k•N)			
		MDK-20	MDK-25	MDK-32	MDK-40
Inlet flange	Fx (comp.)	0.98	1.35	1.37	1.54
	Fx (tens.)	0.69	0.85	0.73	1.32
	Fy (comp.)	0.43	0.62	0.71	0.93
	Fy (tens.)	0.43	0.62	0.71	0.93
	Fz (comp.)	0.36	0.47	0.62	0.84
	Fz (tens.)	0.36	0.47	0.62	0.84
Outlet flange	Fx (comp.)	0.93	1.24	1.01	1.01
	Fx (tens.)	0.63	0.78	0.62	0.87
	Fy (comp.)	1.02	1.07	1.07	1.70
	Fy (tens.)	1.02	1.07	1.07	1.70
	Fz (comp.)	0.47	0.69	0.50	0.97
	Fz (tens.)	0.47	0.69	0.50	0.97

2-3. Suction side plumbing

- Suction lift height depends on liquid temperature. Refer to following table.

Liquid temperature (deg.C)	0	20	40	60	70	80
Suction lift height (m)	7.6	7.2	5.4	3.2	1.7	0.3

- (1) Flooded suction is recommended if possible. Employ shorter and less bends as possible. Install pipe supports so that the pipe load can not be added to the pump.
- (2) Do not make the air trap where the air stays. Arrange 1/100 or more inclination towards pump.
- (3) Suction pipe must be connected with care so that the air can not get into pump. The air sucked in pump may cause malfunction of pump. When suction flange is removed, pay attention not to damage the polished surface of check valve.
- (4) If the suction pipe is installed underground, test it with approx. 1.6MPa pressure.

Good	No Good
	
	
	
	

- (5) Sink the suction pipe end in the liquid of suction tank by depth of 500mm or double of pipe diameter.
- (6) Install a reducer in case the pump suction port bore is not the same as suction pipe diameter. Install the reducer so that the upper part becomes horizontal as shown above. Do not use the suction pipe of which the diameter is smaller than pump suction bore.
- (7) If slurries or foreign matters possibly get into, install a strainer at the end of suction pipe.
- (8) Install a compound gauge near to pump to check the excessive vacuum due to clogging by foreign matters.
- (9) Take any measure for the foreign matters not to get into the suction tank. Foreign matters may cause pump failure. Keep sufficient distance between the end of suction pipe and the bottom or side wall of suction tank or liquid surface.
- (10) In case of severe suction condition (pressure of suction tank is lower than atmospheric pressure, suction lift is high, long suction side piping), it is recommended that NPSH available value is larger than "1.2 x NPSH required value".
- (11) In case of suction lift application (Pump sucks up liquid.), prime the pump when the pump is operated for the first time.
- (12) In case of suction lift application, incline the suction piping ascending towards pump so that no air pocket is made in suction piping.
- (13) In case of flooded suction (Pumps suction port is below the liquid level.), it is recommended that the valve is installed in suction piping so that the maintenance works can be done easily. Always open this valve during pump operation because it is installed for maintenance works only.

2-4. Discharge side plumbing

- (1) Install pipe support so that the pipe load can not be added to the pump.
- (2) Long piping will increase pipe resistance which may prevent pump from desired performance. Calculate pipe resistance to get suitable pipe size.
- (3) It is recommended to install a check valve in the following cases. Take the permissible pressure into consideration for the selection of check valve.
 - Long discharge piping
 - Discharge head exceeds 15 meters.
 - Discharge pipe end is located at 9 meters or more higher than the liquid level of suction tank.
 - In case two pumps are connected in parallel
- (4) It is recommended to install a gate valve in the discharge piping to adjust flow rate or to avoid overloaded motor. If both check valve and gate valve are installed, it is recommended that they are installed in order of pump → check valve → gate valve.
- (5) Install a pressure gauge in discharge piping.
- (6) If discharge pipe is long horizontally, install a air vent on the way.
- (7) If it is possible the liquid in the discharge piping is frozen, install a drain to remove the liquid in the discharge piping.

3. *Electrical wiring*

Electrical works must be done by qualified person using quality wiring products observing local laws or shop standard.

- (1) Use a electromagnetic switch suitable for the specification of used motor.
(Voltage and capacity etc.)
- (2) If pump is installed outdoor, take measures so that rain or water can not get into the switch.
- (3) Electromagnetic switch and push button switch should be securely installed at the place apart from pump.

OPERATION

<i>1. Precautions on operation</i>	<i>18</i>
<i>2. Precautions on operation</i>	<i>18</i>
<i>3. Operation</i>	<i>19</i>
<i>4. To stop pump</i>	<i>19</i>

1. Precautions on operation

 Caution											
<ul style="list-style-type: none"> ● Dry running or operation with suction side valve closed cause pump damage. 	 <small>Prohibited</small>										
<ul style="list-style-type: none"> ● If pump is operated in cavitation condition, stop it within a minute. Do not run pump with air being sucked in suction port. 											
<ul style="list-style-type: none"> ● Check the rotational direction of the pump. Clockwise seen from the motor end is a correct direction. Operation in a reverse direction may cause pump damage. 											
<ul style="list-style-type: none"> ● If magnet coupling is disconnected, stop the pump within a minute. If pump runs with magnet coupling disconnected, magnet coupling force is reduced. 											
<ul style="list-style-type: none"> ● If the pump is operated for a long time with discharge valve closed, liquid temperature increases resulting in pump damage. 	 <small>Caution</small>										
<ul style="list-style-type: none"> ● If power supply is discontinued during the pump operation, turn off the power switch and open the discharge valve. 											
<ul style="list-style-type: none"> ● Pay attention so that the discharge pressure does not exceed the pump max. allowable pressure during the pump operation. (See page 12 for max. allowable pressure of pump) 	 <small>Caution</small>										
<ul style="list-style-type: none"> ● When high temperature liquid is pumped, the surface of pump body is very hot. Take protective measures to avoid the burn. 											
<ul style="list-style-type: none"> ● Noise level <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 15%;">Model</th> <th style="width: 20%;">MDK-20</th> <th style="width: 20%;">MDK-25</th> <th style="width: 20%;">MDK-32</th> <th style="width: 25%;">MDK-40</th> </tr> </thead> <tbody> <tr> <td>Noise level</td> <td colspan="2" style="text-align: center;">75dB</td> <td colspan="2" style="text-align: center;">80dB</td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;">In case the pump noise affects human health or communication to secure a safety, provide a noise reduction cover. Be careful not to reduce cooling effect by a motor fan.</p>	Model	MDK-20	MDK-25	MDK-32	MDK-40	Noise level	75dB		80dB		
Model	MDK-20	MDK-25	MDK-32	MDK-40							
Noise level	75dB		80dB								

2. Preparation for operation

When the pump is operated first time after it was installed or after a long time of rest, do the preparation works as mentioned below.

- (1) Clean piping and tank before liquid is supplied.
- (2) Re-tighten bolts to connect flange and pump fixing bolts.
- (3) After the pump is primed, fully open the discharge valve. Check to confirm if air vent valve or valve for flushing is closed.
- (4) Direction of rotation of motor

After the pump is primed, check the direction of rotation of motor by rotating it instantly. The direction of rotation is shown on the pump by arrow. If you find the rotation is in reverse, change two phases wires among three phases.

3. Operation

(1) To start pump, fully open the discharge valve and turn on the switch.

Pump sucks up liquid in a few minutes. When pump starts discharging, choke the discharge valve (gate valve) several times to increase the pressure and to check if pump operates normally. If the pump does not suck up liquid within five or six minutes, prime and start pump several times. If the pump still does not suck up liquid, then, check the built-in check valve and check if there is no air leakage through suction piping.

(2) After the pump starts operation without any abnormality, gradually close the discharge valve to get desired pressure. If the valve is closed too much, the motor may be overloaded. Close the valve watching an ammeter. Following is the allowable lowest flow rate of each pump model. Operate the pump at the flow rate more than shown as below.

Pump model	Allowable minimum flow rate (50/60Hz)
MDK-20	4.7/7.5 Litters/min.
MDK-25	7/9 Litters/min.
MDK-32	16/22 Litters/min.
MDK-40	26/43 Litters/min.

(3) When the pump starts to run at the specified duty point, check with flow meter if the pump runs at specified flow rate.

Caution

Do not change the pressure suddenly during pump operation. The sudden pressure change may cause the disconnection of magnet coupling.

It may happen that the magnetic coupling is disconnected if slurries or foreign matters get into pump. If the magnetic coupling is disconnected, turn off motor switch and wait till the motor completely stops to turn on switch again. If the pump is operated with magnetic coupling disconnected, the magnetic force is reduced.

4. To stop pump

(1) Turn off the switch to stop the pump. Check if the pump stops rotation smoothly and if not, check pump inside.

(2) Gradually close the discharge valve. Do not close the valve suddenly by solenoid valve or so.

(3) Precautions when pump is not used

When pump is not operated in the cold season, remove the liquid inside pump to avoid the pump damage due to frozen pump.

If the liquid inside can not be removed, warm the pump by band heater or so for the inside liquid can not be frozen.

Open suction or discharge valve, or open air vent cap, drain cap and priming plug.

(4) If power is failed, turn off motor switch.

MAINTENANCE

<i>1. Troubleshooting</i>	<i>21</i>
<i>2. Maintenance and inspection</i>	<i>22~23</i>
<i>3. Consumable parts</i>	<i>24</i>
<i>4. Disassembling and assembling</i>	<i>25</i>

1. Troubleshooting

If you find any abnormality on the pump, stop the pump immediately and inspect the pump according to following procedure.

Trouble		Cause	Countermeasure
Pump does not discharge liquid.	Motor does not rotate.	<ul style="list-style-type: none"> • Disconnected wires. • Failed motor 	<ul style="list-style-type: none"> • Check fuse wiring. • Repair or replacement
	Pump does not rotate.	<ul style="list-style-type: none"> • Rubbing parts stick or are broken. • Frozen pump 	<ul style="list-style-type: none"> • Repair or replace. • Warm pump.
	Both motor and pump rotate.	<ul style="list-style-type: none"> • Lack of priming water. • Air gets in suction pipe. • Excessive total head compared to pump available performance. 	<ul style="list-style-type: none"> • Prime pump again. • Correct suction piping. • Use the pump of higher total head ability or reduce the required total head.
	Liquid is not kept in pump during it is stopped.	<ul style="list-style-type: none"> • Failed or wrongly mounted built-in check valve 	<ul style="list-style-type: none"> • Repair or replace.
Flow rate is not enough.		<ul style="list-style-type: none"> • Air gets in suction pipe. • Worn impeller. • Reduced rpm due to drop of power voltage. 	<ul style="list-style-type: none"> • Correct suction piping. • Repair or replace. • Check voltage and take measure.
Motor is overheated.		<ul style="list-style-type: none"> • Voltage is reduced. • Overload • Too high ambient temperatures. 	<ul style="list-style-type: none"> • Check voltage and take measure. • Check if voltage and frequency are correct. • Check if specific gravity or viscosity of liquid is within allowable limit. • Check if bearing is not locked or if motor fan rotates smoothly. • Ventilate the operation site.
Pump vibrates.		<ul style="list-style-type: none"> • Installation foundation is not perfect. • Loosened mounting bolts. • Clogged suction pipe or cavitation occurs. • Pump bearing is worn or melted. • Damaged magnet capsule or spindle. • Drive magnet is not balanced. • Impeller or magnet capsule touches other part. • Worn motor bearing. 	<ul style="list-style-type: none"> • Correct foundation and mounting. • Tighten. • Clean or settle reason of cavitation. • Replace • Replace • Replace • Replace • Replace bearing or motor

2. Maintenance and inspection

Warning

- **Wear protector**

Chemical liquid or toxic liquid may harm your eyes or skin. When you work on pump, wear protectors such as protective mask, goggles, gloves.



- **Turn off switch**

If you work with power turn on, you may be electrically shocked. When the works are done, turn off main power to stop pump and relative equipment.



Turning off power

- **Pay attention to strong magnetic field**

The magnet drive pump contains strong magnet. The strong magnet field could adversely affect persons who are assisted by electronic devices such as pacemakers etc.



Caution

2-1. Daily inspection

- (1) Before the pump is operated, check if no liquid is leaked. If any leakage is found, never start the pump.
- (2) Check if the pump runs smoothly without vibration and abnormal sound.
- (3) Check liquid level of suction side tank and suction pressure.
- (4) Compare the discharge pressure and amperage during pump operation with those shown on nameplate of motor to check if pump load is normal.
Open the cocks of pressure gauge and vacuum gauge only when measurement is done and close them when the measurement is finished.
- (5) Sometimes operate stand-by pump for ready to be used always.
- (6) During pump is running, check the discharge pressure, discharge flow rate, power source voltage of motor if they are not changed. If you find large change, settle the change referring to "Trouble shooting".

2-2. Periodical inspection

To use the pump without problem, inspect the pump periodically according to the procedure shown as below. When the pump is disassembled, take care of handling rubbing parts and plastics parts not to damage them.

Caution

Magnet force of driving magnet and magnet capsule is strong. Pay attention for your fingers not to be pinched.

Caution

The magnet drive pump contains strong magnet. Do not put electronic devices which do not like magnet field close to the magnet.

Inspection period	Inspected parts	Inspection item	Remarks
Overhaul once six months	Drive magnet set	<ul style="list-style-type: none"> • Check rubbed trace. • Check if drive magnet set is fixed at correct position of motor shaft and if set screws are not loosened. • Inner surface of magnet and motor shaft are eccentric. 	<ul style="list-style-type: none"> • Consult us if trace is found. • Mount drive magnet on motor shaft and tighten screws again • Max. 5/100mm
Overhaul once three months	Rear casing	<ul style="list-style-type: none"> • Check rubbed trace in inside surface • Check wear of bearing and measure dimensions. • Check dirt and clogging of inside and bearing groove • Check swelling or cracks in PTFE packing. 	<ul style="list-style-type: none"> • Consult us if trace is found. • Replace if it comes to wear limit. • Clean • Replace if swelled or cracked.
	Magnet capsule unit	<ul style="list-style-type: none"> • Check rubbed trace • Check wear, dimension and crack of spindle. 	<ul style="list-style-type: none"> • Consult us if trace is found. • Consult us if abnormal is found.
	Impeller	<ul style="list-style-type: none"> • Check trace of cavitation (wear, seizure) • Check dirt and clog of blades • Check if balance groove is not clogged. 	<ul style="list-style-type: none"> • Settle reason. Replace if abnormality is found. • Clean • Clean
	Front casing	<ul style="list-style-type: none"> • Check rubbed trace • Check dirt, crystal at wet-end • Check cracks in built-in check valve • Check crystal in drain part • Check swelling or cracks in PTFE packing 	<ul style="list-style-type: none"> • Consult us if any abnormality is found. • Clean • Consult us if any abnormality is found. • Clean • Replace if any abnormality is found.

Note: When the overhaul is done, pay attention to rubbing parts and plastic parts not to damage them. Magnet force of drive magnet and magnet capsule is strong. When pump is disassembled, pay attention for them not to attract metallic powder.

2-3. Wear limit of bearing

Wear limit of bearing is 2 mm for all models. Wear limit means: Bearing inner diameter minus spindle outer diameter.

3. Consumable parts

Bearing and magnet capsule unit are consumable parts. Replace them by new ones at every life time to be replaced (actual running time) shown as below.

Pump model	Parts (Material)	Life time to be replaced	Pump model	Parts (Material)	Life time to be replaced
MDK-20 S6 TS EUR	Bearing (carbon)	4500 hrs	MDK-20 S6 TS EUR-R	Bearing (PTFE)	3500 hrs
	Mag. capsule unit	9000 hrs		Mag. capsule unit	7000 hrs
MDK-25 S6 TS EUR	Bearing (carbon)	4000 hrs	MDK-25 S6 TS EUR-R	Bearing (PTFE)	3000 hrs
	Mag. capsule unit	8000 hrs		Mag. capsule unit	6000 hrs
MDK-32 S6 TS EUR	Bearing (carbon)	3500 hrs	MDK-32 S6 TS EUR-R	Bearing (PTFE)	2500 hrs
	Mag. capsule unit	7000 hrs		Mag. capsule unit	5000 hrs
MDK-40 S6 TS EUR	Bearing (carbon)	2000 hrs	MDK-40 S6 TS EUR-R	Bearing (PTFE)	1500 hrs
	Mag. capsule unit	4000 hrs		Mag. capsule unit	3000 hrs

Note 1. Above mentioned life time to be replaced (actual running time) is based on pumping clear water at ambient temperature and the life time is influenced by the pumped liquid, its temperature and other conditions.

2. Bearing must be replaced by new one according to above item "2-3. Bearing wear limit" on page 22 regardless of the life time mentioned as above.
3. Bearing must be replaced as bearing housing set.
4. Gasket and O ring are not consumable parts but replace them every time when pump is disassembled.

4. Disassembling and assembling

Warning

- **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 MSDS precautions from the solution supplier.



- **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. Make sure no one turns on power by mistake while working on the pump, otherwise it may result in a serious accident. If your working area is noisy or dark, let other people know about the situation by displaying a notice such as "POWER OFF (Maintenance)" near a power switch.



Turning off power

- **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.



Caution

Caution

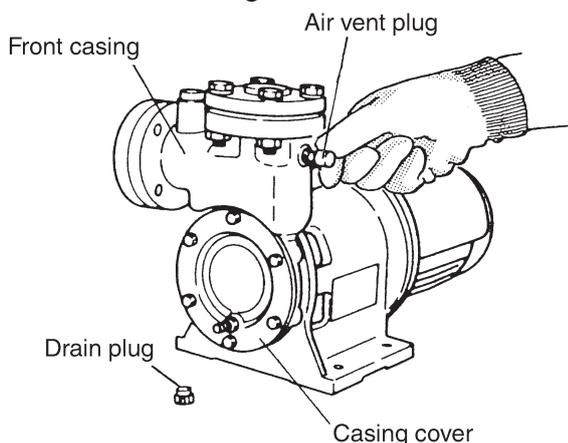
- Strong magnet is used in the pump. Pay attention not to pinch your fingers when you disassemble or assemble the pump. Also pay attention so that iron powder or so can not be attracted by the magnet.
- Do not put the electronic device which does not like magnetic field near to the magnet (drive magnet and magnet capsule).
- Close suction and discharge side valves before the pump is disassembled and assembled.
- Release the pressure and liquid from the pump and piping before disassembly of the pump. Wait until liquid cools down if the temperature is high right after operation.

Tool list

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

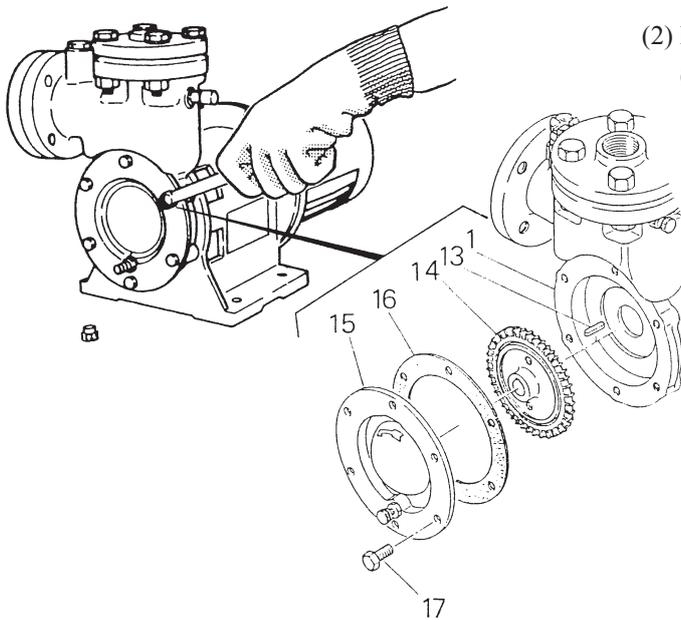
Tool	MDK-20/-25/-32/-40	Remarks
1. Spanner	10mm, 13mm, 17mm	1pc/each
2. Hex wrench	5mm, 6mm	1pc/each

4-1. Disassembling

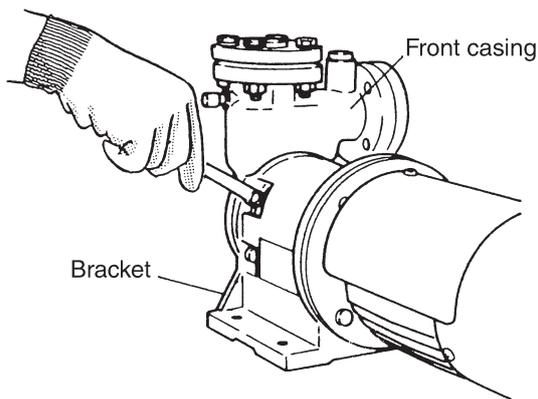


- (1) Close the suction and discharge sides valves and remove a drain cap (21).

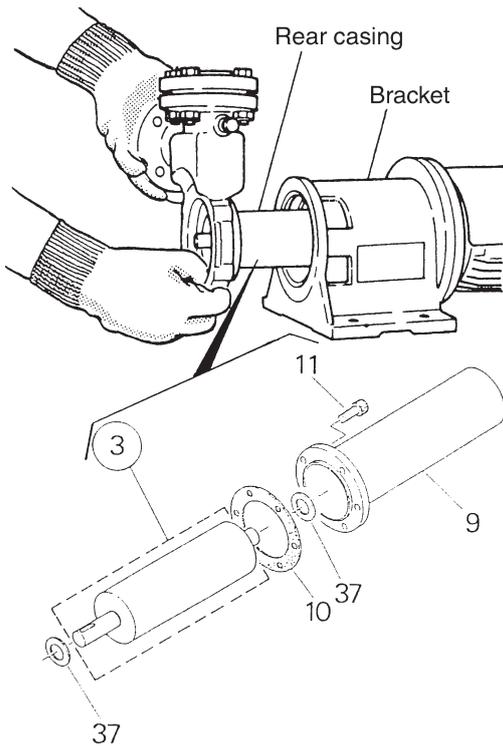
And loosen air vent cap (20) to drain the liquid from front casing (1). And flush the pump inside with clear water.



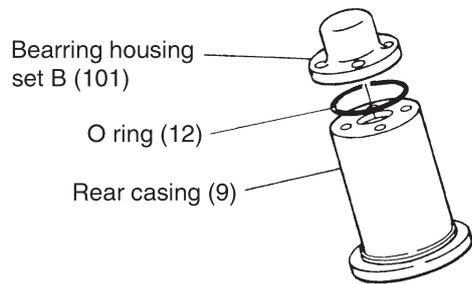
(2) Remove hex. head bolts (17) to take out a casing cover (15), gasket (16), impeller (14) and impeller key (13).



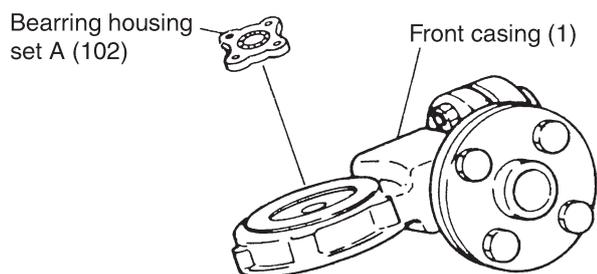
(3) Remove suction and discharge pipes and remove hex. head bolts (34) and pull out front casing (1) together with rear casing (9). If the suction flange (22) is removed, pay attention not to scratch the polished surface of check valve (23).



(4) Remove hex. socket head bolts (11) to remove rear casing (9), magnet capsule unit (3), packing (10) and thrust washers (37).



(5) Remove hex. socket head bolts (8) to remove bearing housing set B (101) and O ring (12).



(6) Remove hex. socket head bolts (8) to remove bearing housing set A (102).

4-2. Assembling

Assemble the pump in the reverse order of disassembling.

- Replacement of O ring and gasket

O ring and gasket must be replaced by new ones every time when pump is disassembled. When putting O ring and gasket, clean the sealing surface and pay attention so that O ring and gaskets can not be distorted or bitten.

- Tightening of bolts

Tighten bolts diagonally and evenly at following tightening torque.

Model	Kind of bolt	Tightening torque (N.m)	Bolt size
MDK-20, 25, 32, 40	Hex. bolt	5.2	M6 × 12L
		12.5	M8 × 12L, M8 × 16L
	Hex. socket head bolt	5.2	M6 × 12L
		12.5	M8 × 12L

- The place where the packing is inserted must be cleaned so that it can not be scratched by dust etc.
- Magnet capsule is magnetized. Before it is assembled, remove iron powder or so.
- After the assembling is finished, turn the motor or drive magnet by hand to check if it rotates smoothly.







<http://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 office / 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

Holland / IWAKI Europe GmbH (Netherlands Branch)
TEL: +31 74 2420011 FAX: +49 2154 9254 48

Italy / IWAKI Europe GmbH (Italy Branch)
TEL: +39 0444 371115 FAX: +39 0444 335350

Spain / IWAKI Europe GmbH (Spain Branch)
TEL: +34 93 37 70 198 FAX: +34 93 47 40 991

Belgium / IWAKI Belgium N.V.
TEL: +32 13 670200 FAX: +32 13 672030

Denmark / IWAKI Nordic A/S
TEL: +45 48 242345 FAX: +45 48 242346

Finland / IWAKI Suomi Oy
TEL: +358 9 2745810 FAX: +358 9 2742715

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 FAX: +47 23 38 49 01

Sweden / IWAKI Sverige AB
TEL: +46 8 511 72900 FAX: +46 8 511 72922

U.K. / IWAKI Pumps (U.K.) LTD.
TEL: +44 1743 231363 FAX: +44 1743 366507

U.S.A. / IWAKI America Inc.
TEL: +1 508 429 1440 FAX: +1 508 429 1386

Argentina / IWAKI America Inc. (Argentina Branch)
TEL: +54 11 4745 4116

Singapore / IWAKI Singapore Pte Ltd.
TEL: +65 6316 2028 FAX: +65 6316 3221

Indonesia / IWAKI Singapore (Indonesia Branch)
TEL: +62 21 6906606 FAX: +62 21 6906612

Malaysia / IWAKI 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 / 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

Vietnam / IWAKI Pumps Vietnam Co., Ltd.
TEL: +84 613 933456 FAX: +84 613 933399