IWAKI PUMPS

IWAKI Magnetic drive pump

MDE series ISO

Instruction Manual

⚠Read this manual before use of product

Thank you for selecting the IWAKI Magnetic Drive Pump type MDE. This instruction manual has been prepared to ensure correct and safe handling of the pump. Please read this manual carefully and thoroughly prior to operating the pump.

Pay special attention to the "Safety Instruction to Prevent Personal Injuries," "Warning," and "Caution" messages included in this manual.

This instruction manual should be kept by each end user and within reach of the actual operator, for quick reference when needed.

Contents

IMPORTANT INSTRUCTIONS ····· 1~5
Safety Instructions to Prevent Personal Injuries

OUTLINE OF PRODUCT ····· 6~14
1. Before Using Pump ····· 7
2. Operating Principle ····· 7
3. Identification Codes ····· 8
4. Specifications and Outer Dimensions ····· 9
5. Names of Parts ····· 12

PUMP OPERATION ····· 15~28
1. Handling Instructions ····· 16
2. Installation ····· 19
3. Piping ····· 20
4. Wiring ····· 24
5. Operation Step ····· 25

MAINTENANCE ····· 29~46
1. Causes of Trouble and Troubleshooting ····· 30
2. Maintenance and Inspection ····· 33
3. Consumable Parts ····· 36
4. Disassembly and Assembly ····· 37

Please contact the IWAKI sales office or IWAKI dealer for any inquiries or questions regarding this product.

IMPORTANT INSTRUCTIONS

Important notes and statements for safe operation, preventing physical injury, and property damage, are included on the body of the product and in the attached instruction manual.

Always Observe These Safety Instructions!

Safety Instruction to Prevent Personal Injuries

Warning	Ignoring this message can lead to improper handling resulting in death or serious injury to the operator.
Caution	Ignoring this message can lead to improper handling resulting in injury to the operator or damage to the product.

⚠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

- Damaged or deteriorated tools are very dangerous. Use qualified and suitable tools only.


Caution

- Use of protectors: When disassembling, assembling, and conducting maintenance or when handling a dangerous type of liquid or a liquid of unknown property, be sure to wear safety gloves, a helmet, and protective shoes. In addition, when handling wet-end parts, always wear protective goggles, masks, etc.


Wear protective gear

- To prevent death or injury from a falling pump, make sure the rope or chain used for lifting the pump is not accidentally cut or disconnected during installation. Make sure the rope or the chain used to lift the pump has sufficient strength in relation to the pump load. Also, be sure not to stand underneath a lifted or suspended pump.


Caution

- When fixing the pump with rope or chain, be sure to use special bolts (or rings) for lifting. Never use any other points for lifting the pump.


Prohibited

- Always turn off the power supply prior to servicing the pump. Make special provisions so that no other operator mistakenly turns on the power supply while someone is working on the pump. In a noisy or poor visibility environment, display a sign near the power supply switch to notify others that someone is "WORKING" on the pump. Power supply mistakenly turned on during maintenance may lead to personal injury. Each operator must be especially careful of power supply operation.


Turning off power

- To ensure greater safety, check and make sure that there is no one near the pump when switching on the power supply. The pump is not equipped with an ON/OFF switch. Connecting the power cable or power plug supplies the power to the pump and starts the operation.


Caution

- Run the pump at the specified power supply voltage on the nameplate only. Otherwise, fire or electric shock may result.


Prohibited

- If the pump operation is stopped due to a power failure or closure of discharge wire, turn off the power switch at once. After normal conditions return, turn the switch on again.


Caution

- Do not use the pump for anything that it is not designed to do. User's failure to observe this instruction exempts IWAKI from any responsibility for personal injury or damage to the equipment or facility caused by the pump's misuse.


Prohibited

Safety Section

⚠WARNING

- Do not allow toxic substances such as lubricants, solvents, or similar substances to flow into the local sewage system or river systems. Do not drain hazardous liquids such as chemical solutions discharged out of the pump directly onto the ground. Instead, drain such liquids into some kind of container. Observe the laws and regulations related to the application, handling, and processing of hazardous substances.


Prohibited

- Do not pass under a raised pump.
  Never pass under a raised pump. A serious injury could occur if the pump is accidentally dropped.


Requirement

- No remodeling
  Remodeling of the pump by the user may result in serious personal injury, electric shock, or damage to the pump. Do not attempt remodeling as it is very dangerous.


No Remodeling

- Be careful with rotating elements.
  Rotating elements such as the shaft, coupling, etc., can cause a serious personal injury by seizing fingers, hands, hair, etc. Be careful not to touch such rotating elements while the pump is in operation.


Caution

- When the pumps are used to transfer the dangerous liquids mentioned as below, the pumps always must be checked and watched so that the liquids can not be leaked. The operation of the pumps leaking the liquids may result in personal injury and/or explosion, fire accidents.
  • Explosive, fire-spreading and inflammable liquids
  • Corrosive and stimulus toxic liquids
  • Liquids detrimental to health


Requirement

⚠CAUTION

- Qualified operators only
  The pump operator and pump operation supervisor must not allow any operators who have little or no knowledge of the pump to run operate the pump. Pump operators must have a sound knowledge of the pump and its operation.


Requirement

- For specified application only
  The pump is designed and manufactured to the specifications agreed upon by the user and IWAKI. The use of a pump in any application other than those clearly specified may result in injury or damage to the pump. Use the pump strictly in accordance with the pump specifications and application range. If you change any specification, contact IWAKI or your dealer.


Prohibited

Safety Section

⚠ CAUTION

- Ventilate

  Poisoning may result during an operation which involves toxic or odorous liquid. Ventilate the operating site sufficiently.


Caution

- Spill-out prevention measures

  Appropriate protective measures should be taken against any spill-out accidents involving the operating liquid as a result of unexpected damage to the pump or the piping. Never discharge hazardous liquid, including, but not limited to, chemical liquid, over the ground or floor on the pump operating site. Follow local rules and regulations in disposing of hazardous substances.


Caution

- Do not operate the pump dry.

  Do not run the pump dry (without liquid inside the pump). Heat generated as a result of abrasion between elements inside the pump during operation without liquid may damage the inside of the pump. Operating the pump with the suction valve fully closed will result in dry operation.


Prohibited

- Keep away from heat or flame.

  Do not place any open flame or flammable object near the pump.


Prohibited

- Do not stand on the pump.

  Do not stand on the pump or use the pump as a step under any circumstances. Otherwise, you may experience a serious injury.


Prohibited

- Do not touch the pump.

  When the pump is used to feed a hot liquid, do not touch the pump or the piping with your bare hands during and immediately after operation as their surfaces are dangerously hot.


Caution

- Arrange grounding

  Do not operate the pump without connecting the grounding wire. Otherwise, an electrical shock may result. Make sure the grounding wire is connected with the grounding terminal.


Grounding

- Install an earth leakage breaker

  The operation of a pump without using an earth leakage breaker may cause an electrical shock. Please install an optional leakage breaker in the system.


Electrical shock

- Countermeasures for static electricity

  When low electric conductivity liquid such as ultra-pure water and hydro carbon or inactive fluor liquid (e.g. Fluorinert™) is handled, the static electricity may be generated in pump and liquid. (This electric charge does not happen if liquid is mixed with water.) The high electric charge may cause the spark and break down of pump in the worst case.


Requirement

Safety Section

⚠ CAUTION

- Do not install or store the pump in the following places.
  - Places where flammable gas, dust or material is used or placed.
  - Places where corrosive gas (chlorine gas or the like) is generated.
  - Places where the ambient temperature is extremely high (40ºC or higher) or extremely low, 0ºC or lower.
  - Places where the pump is exposed to extreme dust or humidity. (Excluding the outdoor type)
  - Places where vibrations occur.


Prohibited

- Pump start-up
  When connecting a power supply to the pump, make sure there is no person around the pump. The pump has no ON/OFF switch. The pump starts operation when the power is supplied by connecting the power supply cable.


Caution

- Foreign matter
  Should foreign matter enter the pump, turn off the power at once and remove the obstruction. Using the pump with foreign matter inside may cause damage to the pump or a malfunction.


Caution

- Disposal of used pump
  Disposal of used or damaged pumps must be done in accordance with local laws and regulations. (Consult a licensed industrial waste products disposing company.)


Requirement

- The flange type motor is so heavy that it may fall over against the motor following disassembly of the pump. Make sure to support the motor by using a crane or other heavy-duty support system.


Requirement

- Handling of magnet coupling
  The magnet used in the pump has a very high magnetic power. Be careful not to allow your fingers to be seized by the magnet or to allow the magnet near any electronic device which may be affected by the magnet's power.
  As a flange type driving magnet requires special equipment to hold it in place, do not remove it from the shaft . In case removal is necessary, contact IWAKI or your dealer.


Requirement

- Suspending pump operation for a prolonged period
  When suspending pump operation for a prolonged period, drain the pump and clean inside the pump. Take appropriate measures to prevent the entrance of foreign matter into the pump. If the pump is not operated for a period longer than one year, replace the gasket and inspect inside the pump.


Requirement

OUTLINE OF PRODUCT

1. Before Using Pump ····· 7

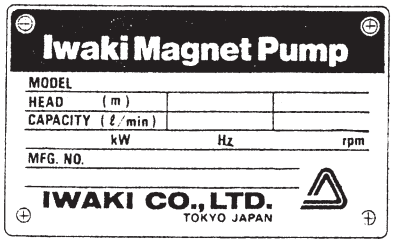
2. Operating Principle ····· 7

3. Identification Codes ····· 8

4. Specifications and Outer Dimensions ····· 9

5. Names of Parts ····· 12

1. Before Using Pump



After unpacking, check the following points to confirm that the delivered product and its accompanying parts and elements are exactly what you ordered.

When lifting the pump please follow the procedure mentioned "2. Installation" of "Pump operation".

[1] Does the model indicated on the nameplate conform to your order?

[2] Has the pump unit or any part of it been damaged or bolts and nuts been loosened during delivery?

[3] MFG.No. shows the year the product was manufactured.

(e.g.1) When first numeral is "7".

7××5×××

The forth numeral of MFG.No. shows the product was manufactured.

"5" shows the product was manufactured in the year 1995.

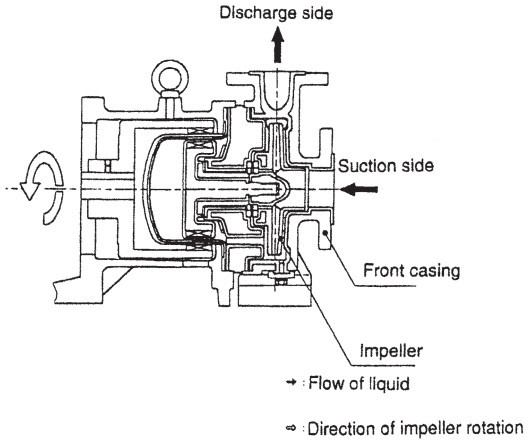
(e.g.2) When first numeral is not "7".

××5×××

The third numeral of MFG.No. shows the year the product was manufactured.

If you find anything wrong, please refer to the dealer you placed your order with.

2. Operating Principle



The MDE pump is a magnet-driven centrifugal type pump developed for various applications.

The impeller inside the pump chamber (front casing) is rotated by magnetic force to transfer liquid from the suction side to the discharge side.

The MDE type pump features excellent corrosion resistance, durability, and safety, and serves as a chemical pump for various processes. Most chemicals can be handled by the pump.

3. Identification Codes

Example:

MDE 32 - 160 E K V F 055 I - A 2 1 a b c d e f g h i j k		
a	Nominal bore size	Suction◊Discharge 32: 50A×32A, 40: 65A×40A, 50: 80A×50A
b	Nominal Impeller size	100 ~ 200
c	Materials of liquid-contact parts	P: PFA, E: ETFE, V: PVDF
d	Materials of bearing and spindle	K: SiC C: Ceramics+Carbon (bearing) R: Ceramics+PTFE (bearing)
e	Materials of O-ring	Z: KALREZ® V: FKM E: EPDM
f	Type of motor	C: Foot mount type motor F: Flange mount type motor
g	Motor output	040: 4.0kW, 055: 5.5kW, 075: 7.5kW, 110: 11kW, 150: 15kW
h	Pump standard	I: ISO
i	Special version	A: Without drain, no element made to order D: With drain, no element made to order S: Without drain, element made to order X: With drain, element made to order
j	The number of motor poles	2: 2P, 4: 4P
k	Option	No core : Without option 1: With leak sensor 2: With bearing temperature monitor 3: With bearing creep sensor 4: With bearing flusher 5: With inducer 9: With two or more option

4. Specifications and Outer Dimensions

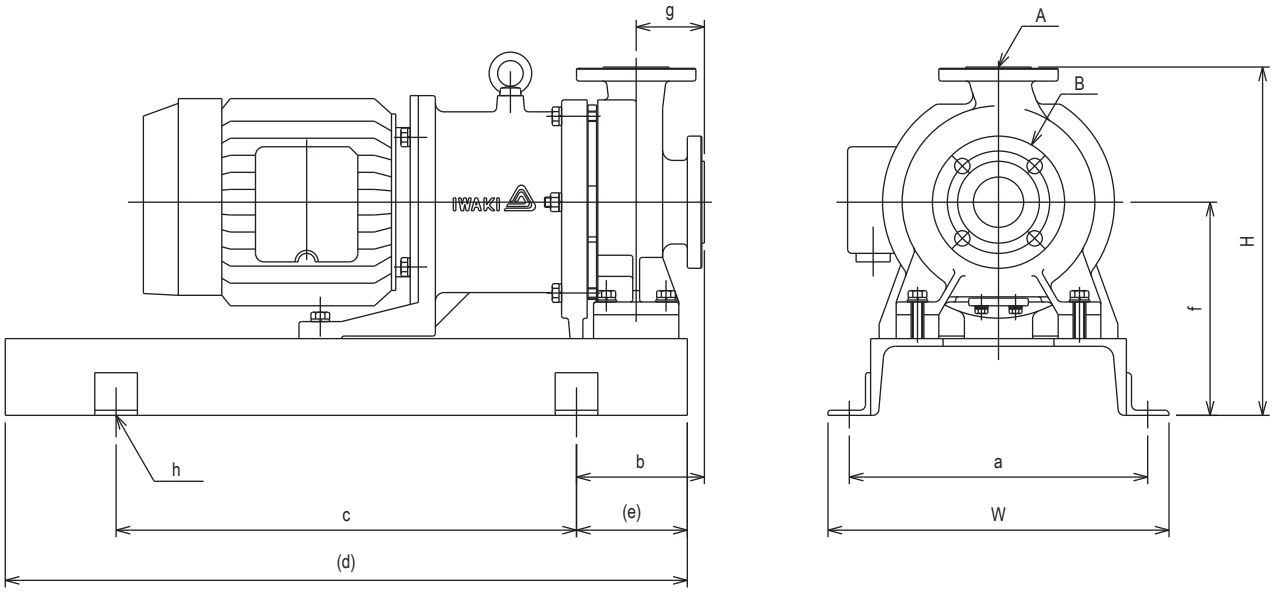
Models	Nominal bore size Suction Port◊ Discharge Port	Capacity *l*/min	Head m
MDE32-100	**50A×32A**	**208**	16.0
110			19.0
120			22.5
130			27.0
140			30.0
150			34.0
160			38.5
170			39.0
180			44.0
190			49.0
200			52.5
MDE40-100	**65A×40A**	**417**	14.0
110			18.0
120			22.0
130			25.0
140			29.5
150			33.0
160			36.5
170			40.0
180			43.5
190			49.0
200			52.5
MDE50-100	**80A×50A**	**833**	9.5
110			12.5
120			19.0
130			23.5
140			28.5
150			33.0
160			36.0

■ Common Specifications

Temperature range of liquid handled	ETFE: 0-100˚C, PFA: 0-120˚C, PVDF: 0-90˚C,
Allowable slurry	Hardness: Below 80Hs Particle size: Below 50μm (Concentration up to 5wt%)
Motor (standard)	3-phase IEC, Foot mounted or Flange mounted type
Color of paint	Munsell 2.5R 3.5/6

■ Outer dimensions in mm

Flange mounted motor type



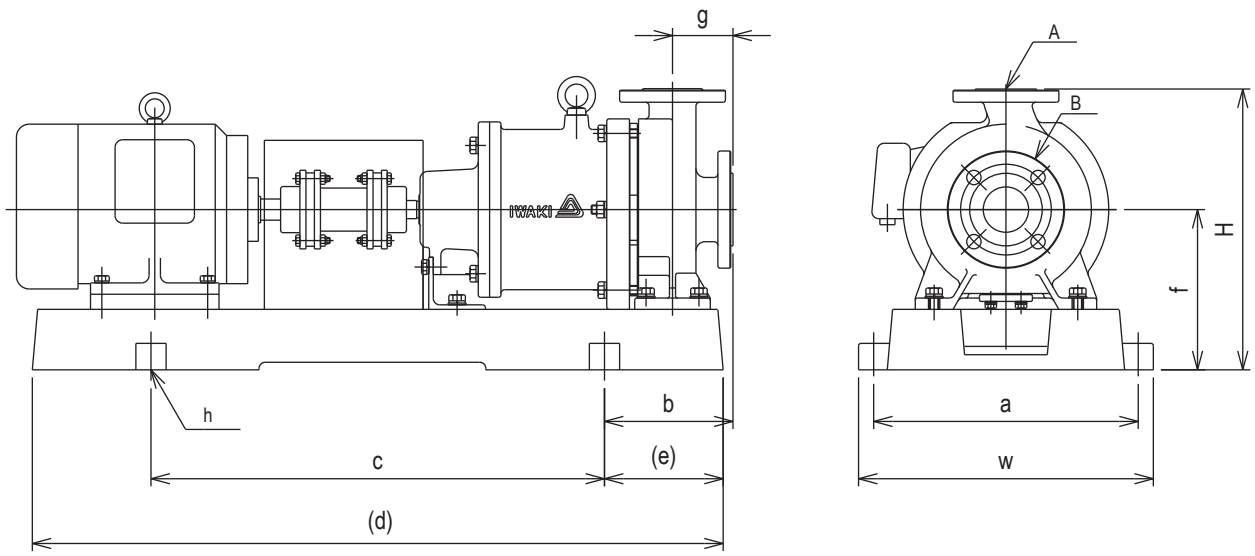
Model		Motor	W	H	a	b	c	d	e	f	g	h	A	B	Mass W/O Motor (kg)
MDE32-160	*1	4.0kw	400	410	350	150	540	800	130	250	80	4-ø19	32A	50A	95
MDE32-160	*1	5.5kw										4-ø23			100
MDE32-160	*1	7.5kw													
MDE32-160	*1	11kw	480	480	430	170	600	900	150	320					135
MDE32-160	*1	15kw													
MDE32-200	*2	5.5kw	400	430	350	150	540	800	130	250	80	4-ø23	32A	50A	105
MDE32-200	*2	7.5kw													
MDE32-200	*2	11kw	480	500	430	170	600	900	150	320					145
MDE32-200	*2	15kw													
MDE40-160	*1	4.0kw	400	410	350	150	540	800	130	250	80	4-ø19	40A	65A	95
MDE40-160	*1	5.5kw										4-ø23			100
MDE40-160	*1	7.5kw													
MDE40-160	*1	11kw	480	480	430	100	600	900	150	320					135
MDE40-160	*1	15kw													
MDE40-200	*2	5.5kw	400	430	350	100	540	800	130	250	100	4-ø23	40A	65A	110
MDE40-200	*2	7.5kw													
MDE40-200	*2	11kw	480	500	430	120	600	900	150	320					145
MDE40-200	*2	15kw													
MDE50-160	*1	5.5kw	400	430	350	100	540	800	130	250	100	4-ø23	50A	80A	110
MDE50-160	*1	7.5kw													
MDE50-160	*1	11kw	480	500	430	120	600	900	150	320					145
MDE50-160	*1	15kw													

*1 Applicable to impellers with nominal diameters of 100, 110, 120, 130, 140, 150 and 160.

*2 Applicable to impellers with nominal diameters of 170, 180, 190 and 200.

■ Outer dimensions in mm

Foot mounted motor type



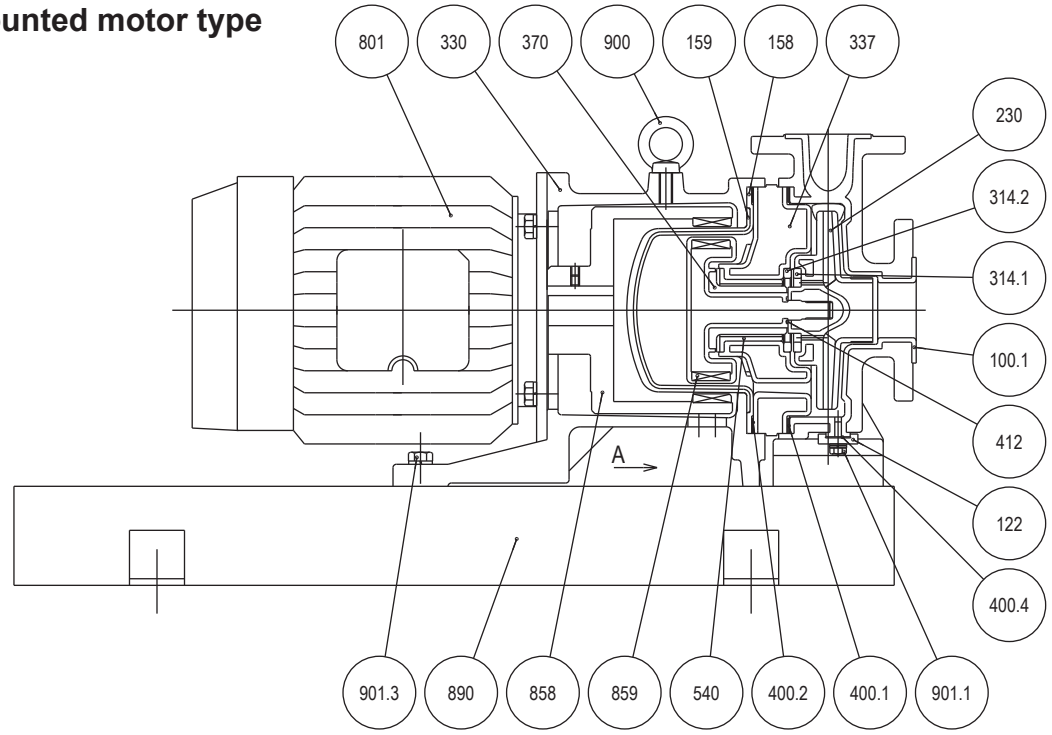
Model		Motor	W	H	a	b	c	d	e	f	g	h	A	B	Mass W/O Motor (kg)
MDE32-160	*1	4.0kw	390	372	350	170	600	915	158	212	80	4-ø19	32A	50A	135
MDE32-160	*1	5.5kw	450		400	190	660	1015	178			4-ø23			150
MDE32-160	*1	7.5kw													
MDE32-160	*1	11kw	490	400	440	210	740	1135	198	240					165
MDE32-160	*1	15kw													
MDE32-200	*2	5.5kw	450	420	400	190	660	1015	178	240	80	4-ø23	32A	50A	165
MDE32-200	*2	7.5kw													
MDE32-200	*2	11kw	490		440	210	740	1135	198						175
MDE32-200	*2	15kw													
MDE40-160	*1	4.0kw	390	372	350	170	600	915	158	212	80	4-ø19	40A	65A	135
MDE40-160	*1	5.5kw	450		400	190	660	1015	178			4-ø23			155
MDE40-160	*1	7.5kw													
MDE40-160	*1	11kw	490	400	440	210	740	1135	198	240					165
MDE40-160	*1	15kw													170
MDE40-200	*2	5.5kw	450	420	400	210	660	1015	178	240	100	4-ø23	40A	65A	165
MDE40-200	*2	7.5kw													
MDE40-200	*2	11kw	490		440	230	740	1135	198						175
MDE40-200	*2	15kw													
MDE50-160	*1	5.5kw	450	420	400	210	660	1015	178	240	100	4-ø23	50A	80A	165
MDE50-160	*1	7.5kw													
MDE50-160	*1	11kw	490		440	230	740	1135	198						175
MDE50-160	*1	15kw													

*1 Applicable to impellers with nominal diameters of 100, 110, 120, 130, 140, 150 and 160.

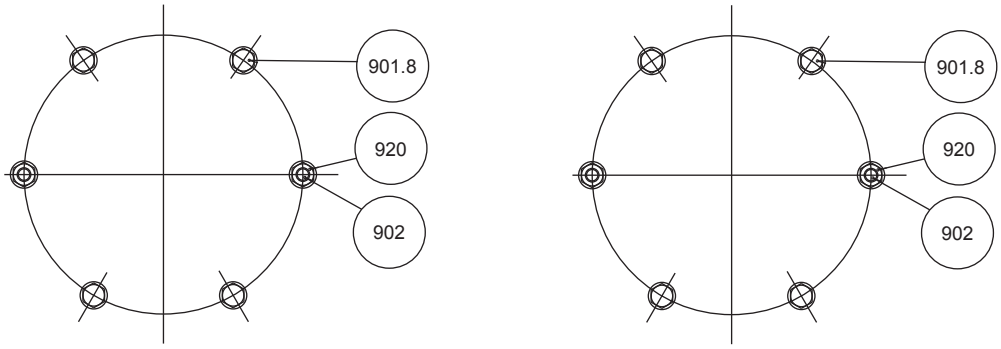
*2 Applicable to impellers with nominal diameters of 170, 180, 190 and 200.

5. Names of Parts

■ Flange mounted motor type



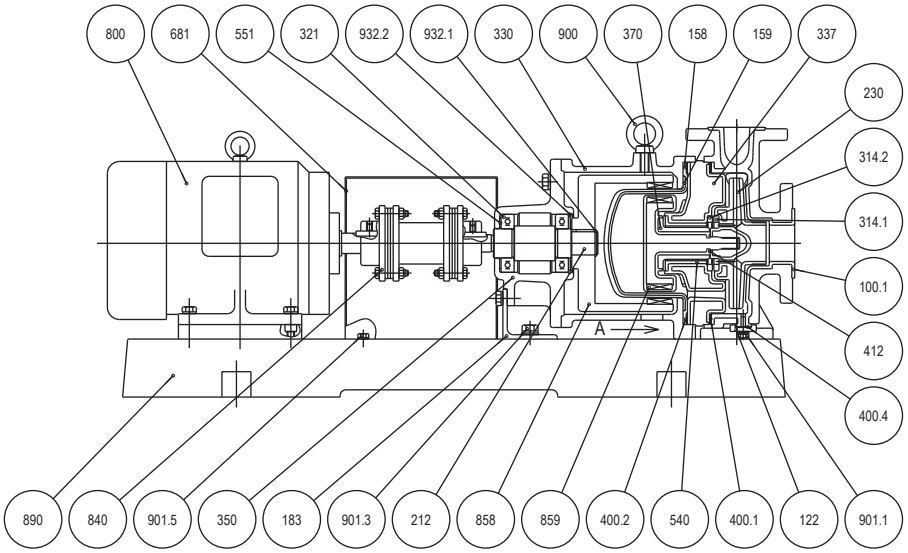
A (Arrangement Of Bolts For Fixing Bracket And Cover)



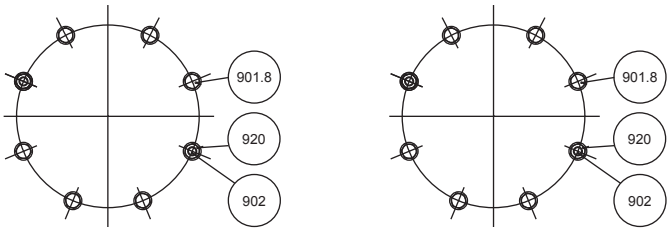
No.	Parts Name	Q'ty	Material	Remarks	No.	Parts Name	Q'ty	Material	Remarks
100.1	Front Casing	1	Fluororesin+FCD400		412	O Ring	1	See **Note 1**	
122	Drain Plate	1	Steel		540	Bushing	1	See **Note 1**	
158	Rear Casing	1	Fluororesin		801	Motor	1		
159	Rear Casing Cover	1	FRP		858	Drive Magnet Unit	1	Rare-Earth+Steel	
230	Impeller	1	Fluororesin+Steel		859	Magnet Capsule Unit	1	Rare-Earth+Fluororesin	
314.1	Thrust Bearing	1	See **Note 1**		890	Base	1	Steel	
314.2	Thrust Bearing	1	See **Note 1**		900	Eye Bolt	1	Steel	M12
330	Bracket	1	FCD400		901.1	Hex. Head Bolt	2	Stainless Steel	M8×20
337	Split Plate	1	Fluororesin+FCD400		901.3	Hex. Head Bolt	2	Stainless Steel	M12×35
370	Sleeve	1	See **Note 1**		901.8	Hex. Head Bolt	4/6	Stainless Steel	M12×65
400.1	Gasket Front	1	PTFE		902	Stud Bolt	2	Stainless Steel	M12
400.2	Gasket Rear	1	PTFE		920	Hex. Nut	2	Stainless Steel	M12
400.4	Gasket Drain	1	PTFE						

Note 1: Varies depending on pump type

■ Foot mounted motor type



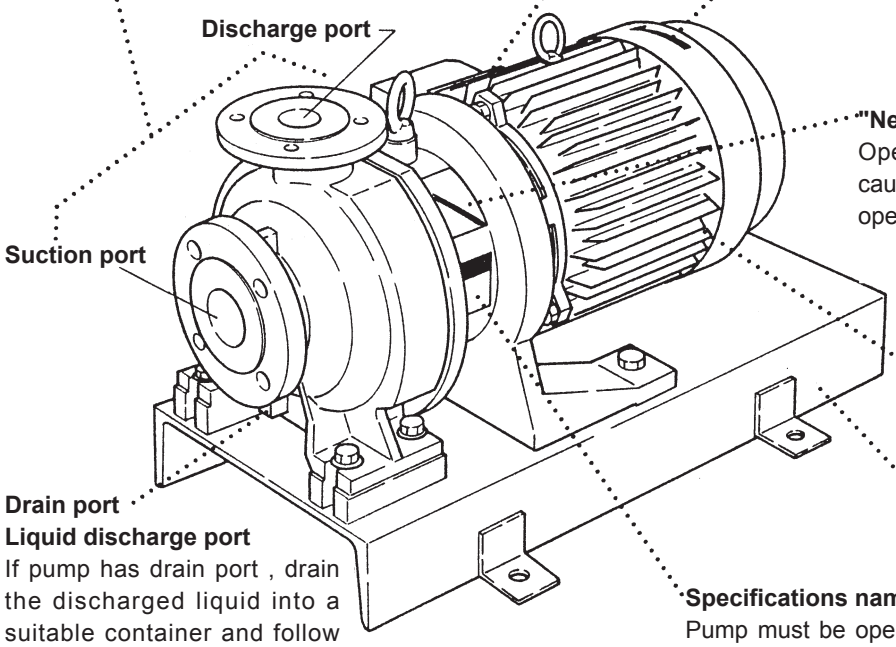
A (Arrangement Of Bolts For Fixing Bracket And Cover)



No.	Parts Name	Q'ty	Material	Remarks	No.	Parts Name	Q'ty	Material	Remarks
100.1	Front Casing	1	Fluororesin+FCD400		540	Bushing	1	See **Note 1**	
122	Drain Plate	1	Steel		551	Wave Washer	1	Spring Steel	
158	Rear Casing	1	Fluororesin		681	Coupling Cover	1	Steel	
159	Rear Casing Cover	1	FRP		800	Motor	1		
183	Support	1	Steel		840	Coupling	1		
212	Drive Shaft	1	Steel		858	Drive Magnet Unit	1	Rare-Earth+Steel	
230	Impeller	1	Fluororesin+Steel		859	Magnet Capsule Unit	1	Rare-Earth+Fluororesin	
314.1	Thrust Bearing	1	See **Note 1**		890	Base	1	FC200	
314.2	Thrust Bearing	1	See **Note 1**		900	Eye Bolt	5	Steel	M12
321	Ball Bearing	2	6208ZZ		901.1	Hex. Head Bolt	2	Stainless Steel	M8×20
330	Bracket	1	FCD400		901.3	Hex. Head Bolt	2	Stainless Steel	M12×20
337	Split Plate	1	Fluororesin+FCD400		901.5	Hex. Head Bolt	4	Stainless Steel	M8×15
350	Bearing Housing	1	FC200		901.8	Hex. Head Bolt	4/6	Stainless Steel	M12×65
370	Sleeve	1	See **Note 1**		902	Stud Bolt	2	Stainless Steel	M12
400.1	Gasket Front	1	PTFE		920	Hex. Nut	2	Stainless Steel	M12
400.2	Gasket Rear	1	PTFE		932.1	Retaining Ring	1	Steel Wire Rod	
400.4	Gasket Drain	1	PTFE		932.2	Retaining Ring	1	Steel Wire Rod	
412	O Ring	1	See **Note 1**						

Note 1: Varies depending on pump type

■ Description on Main Unit Body and Label



Motor nameplate
Use only the power voltage specified on the nameplate. (Follow applicable local power regulations when used outside of Japan.)

Pump unit (liquid feeding section)
Non-self priming type: Before operating the pump, feed priming liquid through the suction or discharge port.

"Arrow" indicator label
The arrow indicates the rotating direction of the motor.
Always make sure that the motor runs in the direction the arrow indicates. (Refer to "Preparation for start-up [6]" in the "Pump operation" chapter.)

Discharge port

"Never Operate Dry" indicator label
Operating the pump without liquid will cause damage inside the pump. Never operate the pump without liquid.

Suction port

Motor (Driving section)
This motor provides power to the pump unit.

Drain port
Liquid discharge port
If pump has drain port , drain the discharged liquid into a suitable container and follow the applicable local regulations in disposing of the liquid. Never allow the discharged liquid to run directly onto the ground.

Base
Setting should be fixed.

Specifications nameplate
Pump must be operated only under the specified conditions.

⚠CAUTION

When cleaning the pump, be careful not to wipe the labels or the pump body with solvent.

PUMP OPERATION

1. Handling Instructions ····· 16

2. Installation ····· 19

3. Piping ····· 20

4. Wiring ····· 24

5. Operation Step ····· 25

1. Handling Instructions

(Observe all the following instructions to prevent injuries and accidents.)

⚠Warning

- **Do not operate the pump for the circulation of hazardous mediums (such as explosive, combustible, flammable, or toxic substances, as well as corrosive or irritating substances considered harmful to human health).**

⚠Caution

- **Read the following information prior to installing the pump.**
- **Protective wear:**
  When operating the pump or working near it, with the pump system loaded with chemical liquid, always wear protective clothing, face guard, goggles, and gloves. Further precautionary measures must be taken depending upon the type of liquid used.
- **Operating the pump dry (without supplying liquid to it) may cause seizure on wear of the inside of the pump section.**
- **Do not repair pump beyond the range specified in this instruction manual.**
  *The pump must be repaired by trained and qualified operators only.

[1] Handle the pump carefully.

Strong impacts caused by dropping the pump on the floor or striking it may result in damage or faulty performance.

[2] Priming water

Be sure to fill the pump unit with feeding liquid as priming water before pump operation.

[3] Do not operate the pump in the following places.

- Places where the temperature falls below 0°C
- Places where corrosive gas or explosive gas (such as chlorine gas) is generated
- Places exposed to splashing water
- Places where the ambient temperature is 40°C or above
- Places where the humidity is excessively high. (Permissible humidity: 35-85%RH)
- Places filled with or likely to be filled with explosive or corrosive atmosphere.
- Danger due to dust, fire, earthquake and/or any externally imposed shock.

[4] Keep the pump away from fire.

To prevent fire and explosions, do not place dangerous or inflammable substances near the pump.

[5] If pump is damaged

Do not operate a damaged pump, otherwise there may be electricity leakage or electric shocks.

[6] No remodeling

Never try to remodel the pump. This may cause a serious accident or damage.

[7] No disassembly or repair

Users are allowed to disassemble and repair the pump to the degree of the given description in "Disassembly and Assembly" in this manual.

[8] No dry running operation

Dry operation of the pump (pump operation without liquid inside) may cause damage to the pump internally. Never operate the pump dry. In the case of MDE type, the sliding parts are self-lubricated and self-cooled. If the pump is operated dry or with the suction-side valve closed, damage may result.

* Countermeasures to be taken in case of dry operation

1. Turn off the power switch of the pump immediately and leave the pump as it is for more than 1 hour.
2. Prime the pump and fill the pump with liquid.

(Note that the pump should be supplied with liquid after leaving the pump empty for more than 1 hour. Sudden supply of liquid may cause a crack in the part due to quenching effects.)

[9] Points to be noted when starting and stopping pump

Pay close attention to the following points to avoid water hammer action when starting and stopping pump operation. When the discharge-side piping is very long, extra attention is required.

(1) When starting the pump, first prime it. Then, close the discharge valve completely and turn on the power switch. After starting up the pump, open the discharge valve gradually and set it to the desired operation level.

(2) When stopping the pump, first close the discharge valve slowly. Turn off the power switch only after completely closing the discharge valve.

⚠Caution

In this procedure, never try to stop the pump quickly using a solenoid valve, etc. Quick closure may cause water hammer action, and the excessive pressure will destroy the pump.

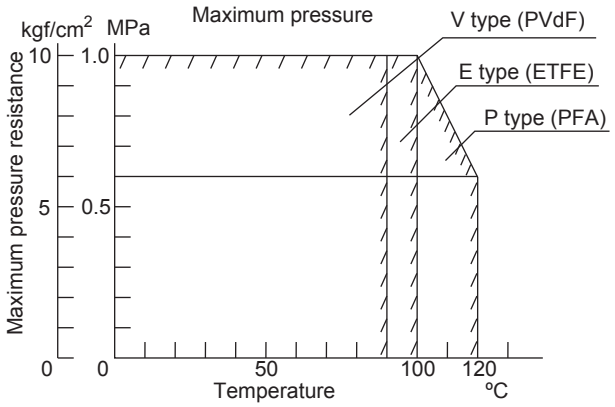
[10] Use of slurry liquid

Pumps can handle the pumping of slurry liquid with a density of 5wt% or less, grain size of 50μm or less, and hardness of 80Hs or less. Prior to pumping such slurry liquid, be sure to confirm the operation feasibility with the supplier.

[11] Influence of specific gravity and viscosity of liquid on pump performance

If the specific gravity or viscosity of the liquid is higher than that of pure water, the shaft power, discharge volume, and pump head may vary somewhat. The delivered pump has been prepared to meet the specifications ordered by the user. To change the operating conditions after delivery, be sure to contact the supplier.

[12] Tolerable pressure and temperature limit



- Maximum pressure resistance

  The table on the left shows the maximum pressure resistance of each model. Take care that the discharge pressure does not exceed the maximum pressure resistance.

[13] Intermittent operation

Frequent start/stop switching considerably shortens the service life of the pump. Try to limit the switching frequency to six times or less per hour.

[14] Temperature humidity fluctuation

Temperature fluctuation may not change the performance of the pump itself. However, the liquid may change in terms of its viscosity, pressure, or corrosion resistance. Pay special attention to changes in liquid characteristics as a result of temperature fluctuation.

Liquid temperature range:	PFA: 0-120ºC ETFE: 0-100ºC PVdF: 0-90ºC
Ambient temperature range:	0-40ºC
Humidity range:	35~85%RH

* Refer to the corrosion resistance table for the temperature ranges recommended for various types of liquid. For inquiries or consultation, contact the dealer you placed your order with.

[15] Disengagement of magnet coupling

Though the motor is running, the liquid is not circulated. (The pressure gauge on the discharge side points to "0" point approximately.)

When the magnet coupling disconnects, stop the pump within 1 minute. If operation is continued with the coupling in the disconnected mode, the power of the coupling will decrease considerably.

[16] Operation within range of drooping head capacity curve

In the case of a pump which generates a drooping head capacity curve in a low-capacity range, do not operate the pump in the section where the line droops to the left. (Refer to the standard performance curve to verify the head capacity.) If the drooping section (left side) of the head capacity curve is part of the pump operation specifications, design the piping with the following points in mind.

a. The discharge piping should have no water tank or air trap.
b. The discharge amount should be adjusted with the valve installed near the discharge port.

2. Installation

[1] Installation position

- Install the pump as close to the suction tank as possible and in the lowest position available (for flooded suction).
- If the suction port of the pump is to be positioned higher than the suction tank (for suction lift), be sure to arrange for a foot valve in the priming pipe and suction pipe.

* The lift head depends upon the liquid properties, temperature, and length of the suction piping. For details of the setup, consult IWAKI or your dealer.

[2] Indoor and outdoor use

The pump can be operated either indoors or outdoors. However, safety measures should be taken so as not to expose the motor and power distribution unit to flooding or other natural hazards.

[3] Installation site

Select an installation site that is flat and free of vibrations caused by nearby machines. Space sufficient for maintenance work should be provided.

■ Lifting

When lifting the pump, please pay attention to the following points.

- Pump must be lifted horizontally using two bolts located at pump and motor.
- In the case that there is no lifting bolt at the motor, rope or such kind materials should be tightly winded to the motor to lift the pump horizontally.
- Please use lifting chain or rope which has enough strength enduring pump weight.
- To prevent any human body accident caused by the pump drop, please do not enter under the lifted pump.

■ Foundation preparation (before pump installation)

[1] The area for anchoring the pump must be greater than the area of the base. If the anchoring area is not enough, the base may be destroyed due to a concentrated load on it.

[2] If pump operation is to be subject to vibration (resonance with the piping, for example), provide an expansion joint between the pump and the piping. Otherwise, the piping, gauge, etc., may be damaged.

[3] Installation advice

- Use anchor bolts to fasten the pump base firmly.
- Install the pump horizontally.
- Sufficient space is required to allow cool air from the motor fan to circulate.
- Allow ample space around the pump for easy and efficient maintenance work.

3. Piping

Tightening torque for piping flange of pump.

Recommended bolt size for piping flange is M16 and tightening torque is 78.4N m.
(In the case of steel flange with rubber gasket.)

Load of piping and momentum of piping for MDE

The permissible stress and moment applicable to pump connection arrangement are as shown below.
The piping should be designed and worked so that stress and moment, higher than those values indicated in the table, should not be applied to the pump.

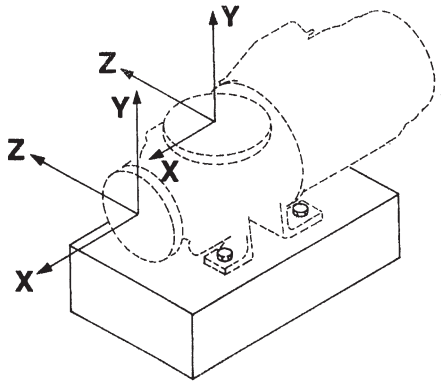


Table 9 : Piping loadings

Forces of discharge piping

	Dia. of pipe (mm)
	32, 40, 50
	Load
Direction of load	kN·m
Fx	0.71
Fy: compression	0.89
Fy: tension	0.44
Fz	0.58

Forces of suction piping

	Dia. of pipe (mm)	
	50	65, 80
	Load	
Direction of load	kN·m	kN·m
Fx	0.89	1.33
Fy	0.58	0.89
Fz	0.71	1.07

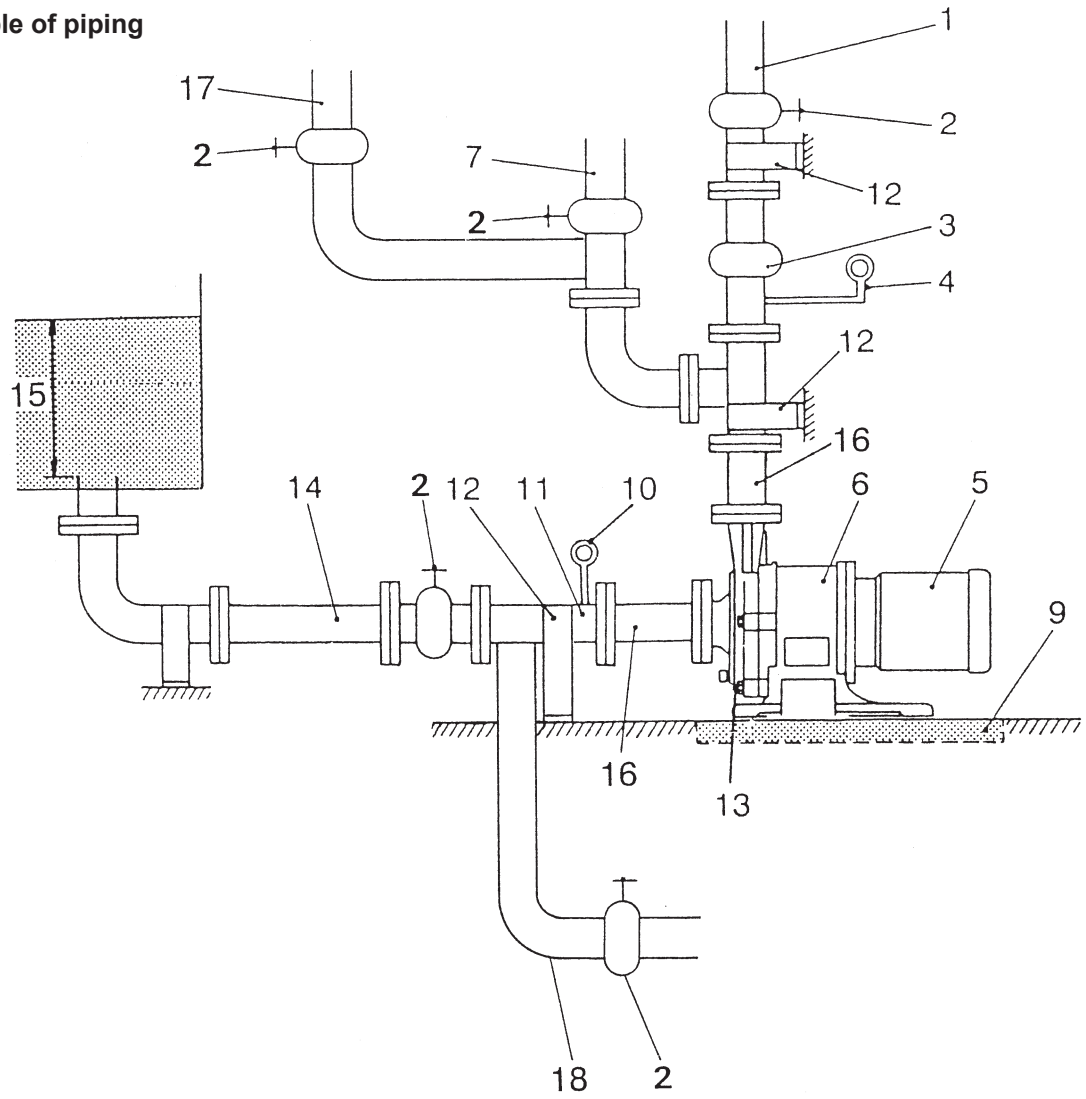
Moments of suction piping

	Dia. of pipe (mm)	
	50	65, 80
	Load	
Direction of load	kN·m	kN·m
Mx	0.46	0.95
My	0.35	0.72
Mz	0.23	0.47

Moments of discharge piping

	Dia. of pipe (mm)
	32, 40, 50
	Load
Direction of load	kN·m
Mx	0.35
My	0.46
Mz	0.23

Example of piping



(1) Discharge pipe (Support the pump to keep the pump free of piping load.)
(2) Valve
(3) Check valve
(4) Pressure gauge
(5) Motor
(6) Pump
(7) Air vent pipe
(9) Drain ditch
(10) Vacuum gauge
(11) Suction pipe (pipe diameter: D)
(The horizontal section should be as short as possible and there should be an ascending gradient of 1/100 toward the pump.)
(12) Pipe support
(13) Pump drain
(14) Suction pipe (pipe diameter: D)
(15) 2D , 500 mm or above
(16) Expansion joint
(17) Piping for flushing (Discharge side)
(18) Piping for flushing (Suction side)

■ Suction piping

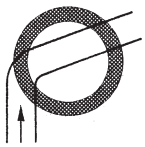
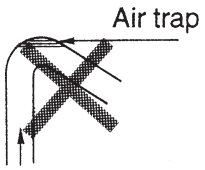
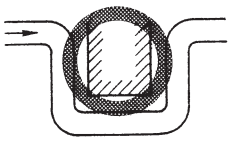
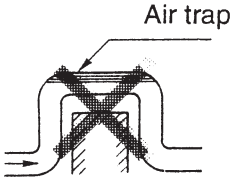
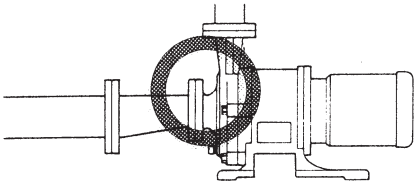
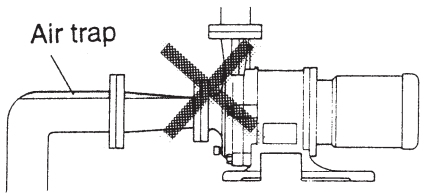
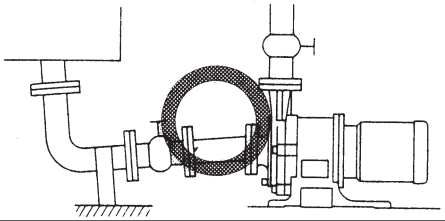
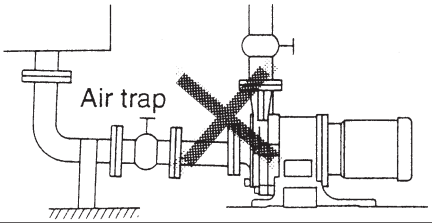
[1] The suction pipe should employ the flooded suction method if possible. The shortest pipe possible, with the minimum number of bends, should be used. Arrange a proper support under the suction pipe such as an expansion joint or the like so that the weight and thermal stress of the pipe are not applied to the pump.

[2] Attach the coupling on the suction pipe carefully so as not to allow air inside the line. Air in the suction pipe may damage the system.

[3] If suction is not good (e.g., the suction tank is a vacuum, the suction head is large, or the suction pipe is long), the condition NPSHa > NPSHr + 0.5 m should be established. For the NPSHr level, refer to the standard performance curve.

[4] When using a bent pipe on the suction side, install a straight pipe with a length of at least 500 mm or 8 times the suction port diameter before the pump suction port. Provide the largest radius possible for the R of the bend.

[5] Do not allow any projection where air may be trapped along the suction pipe. The suction pipe should have an ascending gradient of 1/100 toward the pump.

Good conditions	Unacceptable conditions
○ Good 	× No Good 
○ Good 	× No good 
○ Good 	× No good 
○ Good 	× No good 

[6] If the diameters of the pump suction port and the suction pipe are different, use an eccentric reducer pipe. Connect the eccentric reducer pipe so that the upper surface is level. In any case, never use a suction pipe with a diameter smaller than that of the suction port.

[7] It is also recommended, in the case of flooded suction, that a gate valve be installed on the suction pipe for easier overhaul inspection of the pump. Keep the gate valve fully open during ordinary pump operation; it is required to be closed only during an overhaul inspection.

[8] When circulating a dangerous liquid, arrange the flushing pipes so that internal cleaning is possible when disassembling the pump.

[9] The diameter of the suction pipe must be larger than that of the pump suction pipe.

[10] The end of the suction pipe should be located 500 mm or more below the surface of the liquid.

[11] A screen should be provided at the inlet in the suction tank to prevent the entry of foreign matter into the suction pipe. The end of the suction pipe should be 1-1.5 D (D: diameter of suction pipe) or more away from the bottom of the suction tank. Note that the entry of foreign matter may cause the pump to malfunction.

[12] In the case of the suction lift method, install a foot valve on the suction pipe.

Note: The items [10], [11], and [12] above are applied to the suction lift method.

■ Discharge piping

[1] Use a support so that the weight of the pipe is not applied to the pump as load.

[2] If a method other than flooded suction is employed, install a priming pipe.

[3] If the pipe is too long, the piping resistance may increase, hampering the pump's performance. The diameter of the pipe should be determined by calculating the piping resistance.

[4] A check valve should be installed if any one of the following conditions is present. When selecting the check valve, consider the check valve pressure limit (including the influence of water hammer or back flow onto the pump).

a. The discharge piping is very long
b. The discharge lift exceeds 15 m
c. The end of the discharge pipe is 9 m higher than the surface of the suction tank
d. Several pumps are connected parallel to one another on the same piping

[5] It is recommended that a gate valve be installed on the discharge pipe for the adjustment of discharge volume and for the prevention of overload onto the motor. When installing both a check valve and a gate valve, the check valve should be positioned between the pump and the gate valve.

[6] Do not fail to install a pressure gauge on the discharge piping.

[7] Install an air vent valve if the discharge pipe is very long horizontally.

[8] Install a drain valve for the drainage of liquid if there is a chance that the liquid in the discharge pipe might freeze.

4. Wiring

Electrical connections



ATTENTION

The electrical connection should be carried out by an authorized electrician in accordance with local regulations. Please make sure that the electrical data on the nameplate of the motor correspond to the electricity supply on which it will be used. Motors must be connected to a motor protection switch.

[1] Use an electromagnetic switch that conforms with the specifications (voltage, capacity, etc.) of the pump motor.

[2] If using the pump outdoors, waterproof the wiring to protect the switches from rainwater.

[3] Electromagnetic switches and push buttons should be installed reasonably distant from the pump.

5. Operation Step

■ Operation instructions

[1] Never operate the pump dry or with the suction-side valve (gate valve) closed. Otherwise, the inside of the pump will be damaged.

[2] In the event of cavitation, stop the pump within a minute.
In addition, do not continue pump operation with air mixed into the suction side.

[3] If the magnet coupling disconnects, stop the pump within a minute. The power of the magnet coupling is reduced if operation is continued with the coupling disconnected.

[4] The temperature fluctuation should not exceed 80ºC through the operation modes of starting, stopping, and operating the pump.

[5] Before starting operation, close the discharge valve fully to prevent water hammer action upon start-up.

[6] Note that pump operation with the discharge valve closed fully over a long time will raise the temperature of the liquid inside the pump and finally damage the pump.

[7] In the event of a service power failure, turn off the power switch immediately and close the discharge valve.

[8] Make sure that intolerable pressure levels are not applied to the pump. Refer to page 16 "[12] Tolerable pressure limit" in "1. Handling Instruction."

[9] Maximum pump surface temperature
The max. pump surface temperature of each model is shown in the table. Arrange protective measures in accordance with the temperature levels.

Model	Liquid temp (for PFA version) (ºC)	Maximum surface temperature when ambient temperature is at 40ºC. (ºC)
MDE	120	110

[10] Sound generated by pump

The level of sound generated by each type of pump is shown in the table. Arrange muffling measures in accordance with the sound level. The procedure for sound measurement conforms to the EN 31201 (ISO11201).

(dB)

Model	MDE32	MDE40	MDE50	Rated Speed
Sound Level	85	85	85	2900 min^{-1}
	80	80	80	1450 min^{-1}

■ Preparation for start-up

Preparations should be made, as described below, in the case of initial operation after installation and in the case of restarting of operation after a long period of inactivity.

[1] Thoroughly clean the inside of the pump and pipe. Then, supply liquid.

[2] Tighten the flange connecting bolts and the installation bolts on the base.

[3] After priming the pump, close the discharge valve fully.
Also, make sure the air-vent valve and flushing piping valve are closed.

[4] Run the motor instantaneously to check for correct direction of motor rotation. The motor should run in the direction indicated with the arrow on the nameplate of the pump. If the direction is reversed, exchange any two wires of the three-phase power wires.

■ Operation

Operate the pump by following the steps given below.

<table>
<tr><th>No</th><th>Operation Step</th><th>Remarks</th></tr>
<tr><td>1</td><td>• Close or open the valve.</td><td>• Suction valve - Fully opened
• Discharge valve - Fully closed</td></tr>
<tr><td>2</td><td>• Prime the pump
Preparation for start up</td><td>• Confirm pump is filled with liquid. If pump is not filled with liquid, fill it in accordance with steps [1] and [5] of 'Start-up preparation'. After priming completely, close the discharge valve fully.</td></tr>
<tr><td>3</td><td>• Check the motor for correct rotating direction. Switch on the power and then immediately switch off the power.</td><td>• Supply power immediately to run the pump only when checking the rotating direction of the pump. (Correct direction of pump operation is indicated with arrow on the pump. Check the direction of motor fan by looking at the fan through the fan cover.)
• Observe carefully to see if the motor fan slowly and smoothly stops rotating when the power switch is turned off.
Note: If the motor fan does not stop smoothly, the it is possible chances are that the pump is locked inside.
In this case, contact your IWAKI dealer.</td></tr>
<tr><td>4</td><td>• Turn on the power and start the pump. Then, adjust the discharge pressure and discharge volume.</td><td>• Open valve carefully while paying attention to ampere meter, to prevent motor from being overloaded from excessive opening of valve.
* Within 1 minute, open the discharge valve gradually and adjust the discharge pressure while checking the reading of the pressure gauge on the discharge side. (Otherwise, adjust the flow rate while checking the reading of the flowrate meter.)
⚠Caution
Total discharge pressure is increased to shut-off pressure after start of normal pump operation, open discharge valve gradually to set.</td></tr>
<tr><td></td><td colspan="2">Following discharge volumes should be noted during pump operation.
► 50 l/min. or above

• In case of automatic drive, too, close discharge valve before start-up and open valve slowly after start-up.
⚠Caution
Do not run pump longer than 1 minute against a fully closed discharge valve.</td></tr>
<tr><td>5</td><td>Points to be observed during operation.
If pump enters continuous operation mode, check flow meter and confirm that pump operation is as per specifications.</td><td>• If flow meter is not available, check the values of discharge pressure, suction pressure, and electric current with reference to piping resistance.</td></tr>
</table>

■ Stoppage

	Check/Operation Step	Remarks
1	• Close discharge valve gradually.	• Do not cause sudden closure with solenoid valve, etc., otherwise pump may be destroyed by water hammer action which is likely in case of long discharge piping.
2	• Turn off the power and stop pump operation.	• Observe carefully whether the motor fan slowly and smoothly stops rotating. ⚠**Caution** **If not check inside of pump.**
3	Points to be observed when stopping pump • If the pump operation is stopped during cold weather, liquid in pump may freeze and damage pump. When circulating a dangerous liquid, carry out internal cleaning by using flushing piping. Then drain the liquid fully. • Be sure to remove all liquid after stopping pump. In case of short-term suspension of operation, which does not allow for removal of liquid, use band heater, etc., to prevent liquid inside from freezing. • In event of power failure, turn off power switch and close discharge valve.	

MAINTENANCE

1. Causes of Trouble and Troubleshooting ····· 30

2. Maintenance and Inspection ····· 33

3. Consumable Parts ····· 36

4. Disassembly and Assembly ····· 37

1. Causes of Trouble and Troubleshooting

Refer to "1 causes of Trouble and Troubleshooting" Consult supplier for more information. If you find any troubles, turn off the power supply immediately.

Problem	Symptom on pump		Causes	Inspection and Measures
	When Discharge Valve is Closed	When Discharge Valve is Opened		
Liquid is not lifted.		Pressure gauge and vacuum gauge indicate 'zero'.	● Not enough priming water ● Dry operation.	○ Stop pump, feed sufficient priming water, and restart pump.
	Water goes down at once when priming is carried out.		● Foreign matter is clogging foot valve.	○ Clean foot valve. ○ Check whether seat is clogged with foreign matter.
	Pressure is reduced if discharge valve is opened after start-up step.	Points of pressure gauge and vacuum gauge swing but return to zero at once.	● Air enters through suction pipe or gasket section.	○ Check again whether connecting flange in suction piping is sealed airtight. ○ Check whether suction liquid level is abnormally lowered.
			● Magnet coupling has disconnected.	○ Stop pump and use screwdriver to check for easy and smooth rotation of motor fan. ○ Measure current level to check for overload condition. ○ Check whether the voltage level is normal. ○ Check for foreign matter between impeller and magnet capsule.
	Pointer of pressure gauge never goes up.		● Speed of pump is too low. ● Pump rotates in reverse direction.	○ Check wiring and motor and make necessary repairs. ○ Exchange wires.
Discharge volume is small.		Pointer of vacuum gauge indicates a high value.	● Strainer is clogged with foreign matter and liquid passage is blocked.	○ Eliminate the foreign matter in strainer.

Problem	Symptom		Causes	Inspection and Measures
	When Discharge Valve is Closed	When Discharge Valve is Opened		
Discharge volume is small.	Pointers of pressure gauge and vacuum gauge indicate normal values.	Pointer of vacuum gauge indicates extraordinarily high value.	● Air is trapped in suction pipe.	○ Inspect setup condition of suction pipe and modify it if necessary.
			● Inlet section of impeller unit is clogged with foreign matter.	○ Disassemble unit partially and eliminate foreign matter.
		Pointers of pressure gauge and vacuum gauge swing.	● Air enters through suction pipe or gasket section.	○ Check connecting section of suction pipe and tighten it if necessary.
			● Discharge side of pump is clogged with foreign matter.	○ Eliminate foreign matter in the pump. ○ Eliminate foreign matter or scale inside pipe.
		Pointer of vacuum gauge indicates a high value while that of pressure gauge indicates normal value.	● There is an air trap or resistance in suction pipe.	○ Check whether there is protruding section in suction pipe and take necessary measures.
		Pointer of pressure gauge indicates high value while that of vacuum gauge indicates normal value.	● There is a portion in discharge pipe that causes resistance, or actual head and loss of head are too high.	○ Check actual head and piping loss of discharge pipe and take necessary measures.
	Pointer of pressure gauge indicates low value and that of vacuum gauge indicates extraordinarily low value.	Pointers of pressure gauge and vacuum gauge indicate low values.	● Rotation direction is reversed.	○ Exchange wires.

Problem	Symptom		Cause	Inspection and Measures
	When Discharge Valve is Closed	When Discharge Valve is Opened		
Motor is overheated.			● Voltage is lowered. ● Overload. ● Ambient temperature is high.	○ Check whether the voltage and frequency levels are adequate. ○ Check whether the specific gravity and viscosity of liquid are adequate. ○ Improve air ventilation.
Discharge volume is suddenly lowered.		Pointer of vacuum gauge indicates high value.	● Strainer is clogged with foreign matter.	○ Eliminate foreign matter.
Pump vibrates.			● Foundation is defective. ● Anchor bolt is loose. ● Suction pipe is closed. Cavitation is caused. ● Wear or melting of pump bearing. ● Magnet capsule or spindle is damaged. ● Dynamic balance of drive magnet assembly fluctuates. ● Impeller and/or magnet capsule is in contact with fixing section. ● Wear of motor bearing.	○ Reinstall. ○ Retighten bolts. ○ Clean, and eliminate cause of cavitation. ○ Replace. ○ Replace. ○ Eliminate cause or replace. ○ Replace. ○ Replace bearing or motor.

2. Maintenance and Inspection

Daily inspection

[1] Check whether the pump operates smoothly, without generating any abnormal noise or vibration.

[2] Check the level of the liquid in the suction tank and the suction pressure.

[3] Compare the discharge pressure and electric current measured during operation with the values indicated on the motor nameplate for the verification of normal pump load.

** Note that the values indicated on the pressure gauge vary in proportion to the specific gravity of the liquid. The cock of the pressure gauge or vacuum gauge must be opened only when measurement is carried out. It must be closed upon the completion of each measurement. If the cock remains open during pump operation, the meter mechanism may be affected by abnormal pressure caused by water hammer action.*

[4] If a spare pump is available, activate it from time to time to keep it ready for use any time.

[5] Check to be sure there is no liquid leakage in the pump before operating it. If leakage is detected, never try to operate the pump.

[6] Check to be sure the discharge pressure, discharge flow rate, and motor power supply voltage do not fluctuate during pump operation. If considerable fluctuation of the respective values occurs, refer to "1. Causes of Trouble and Troubleshooting" for correct measures.

Periodic inspection

To ensure efficient and smooth operation of the pump, carry out periodic inspections by following the procedures described below. When inspection, overhauling, or repair work is necessary, stop the pump operation and contact the supplier.

The overhauling and repair work for IWAKI pumps must be performed by qualified personnel who have been trained. User's failure to observe this instruction exempts IWAKI from the responsibility for personal injury or damage to the equipment or facility which result from its misuse.

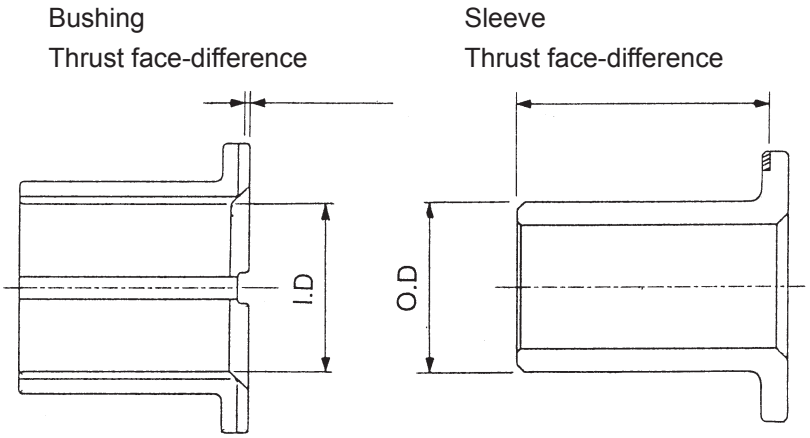
Inspection Timing	Part Name	Check Points
Every 6 months * Inspection record should be kept.	Drive magnet unit	● Are there slide-scratches? ● Is housing fixed normally? Is hex socket set screw loose? ● Are inner perimeter of magnet and motor shaft coaxial? (Max. eccentricity: 1/l0 mm)
	Rear casing, Rear casing cover	● Are there slide-scratches? ● Are there cracks on liquid end part? ● Stains in rear casing. ● Expansion of gasket or cracks.
	Magnet capsule unit	● Are there a slide-scratches in the rear section or in the cylindrical body? ● Are there cracks in resin of rear section or in cylindrical body? ● Wear of sleeve or cracks. (Measure dimensions.) ● Expansion of O ring or cracks.
	Impeller	● Wear of thrust bearing. (Measure dimensions.) ● Are there cracks? ● Are there cavitation marks? ● Stains or clogging inside impeller. ● Dimensional change in impeller. ● Clogging balance hole.
	Front casing	● Stains in liquid contacting part. ● Are there cracks? ● Is drain clogged? ● Are there expansion or cracks on gasket? ● Slide-scratches in unlikely position.
	Split plate	● Stains in liquid contacting part. ● Are there cracks? ● Slide-scratches in unlikely position. ● Wear of bearing or cracks. (Measure dimensions) ● Wear of thrust bearing or cracks. (Measure dimensions)

■ Wear limits of bushing and sleeve

Unit: mm

Part Name \ Model	Dimension	MDE	
		New	Time to be replaced
Bushing	Inner diameter (I.D)	44	45
	Thrust face-difference	2	1
Sleeve	Outer diameter (O.D)	44	43
	Thrust face-difference	65	66

Note: If the difference between I.D of the bushing and O.D of the sleeve exceeds 1mm, replace either the bushing or the sleeve, whichever is worn out, with a new one regardless of the value specified in the table.



3. Consumable Parts

Parts listed below are consumable parts. The parts must be replaced according to the time to be replaced shown as below. When placing an order, supply the following information.

a. Name of parts and parts code
b. Pump model number and manufacturing number (as indicated on the pump nameplate)
c. Drawing number if you have received the IWAKI-approved drawing

■ MDE Type Part Number List

Parts No.	Parts Name	Material	Parts Code					Time to be replaced
			MDE32-160 *1	MDE32-200 *2	MDE40-160 *1	MDE40-200 *2	MDE50-160 *1	
400.1	Gasket	PTFE	MDE0112	MDE0112	MDE0112	MDE0112	MDE0112	10,000 hours operation time
400.2	Gasket	PTFE	MDE0112	MDE0171	MDE0112	MDE0171	MDE0171	
400.4	Drain gasket	PTFE	MDE0149	MDE0149	MDE0149	MDE0149	MDE0149	
412	O ring	KALREZ®	MDE0113	MDE0113	MDE0113	MDE0113	MDE0113	
		FKM	MDE0577	MDE0577	MDE0577	MDE0577	MDE0577	
		EPDM	MDE0578	MDE0578	MDE0578	MDE0578	MDE0578	
540.0	Bushing	Sic	MDE0100					
370.0	Sleeve	Sic	MDE0050					

*1 Applicable to impellers with nominal diameters of 100, 110, 120, 130, 140, 150 and 160.

*2 Applicable to impellers with nominal diameters of 170, 180, 190 and 200.

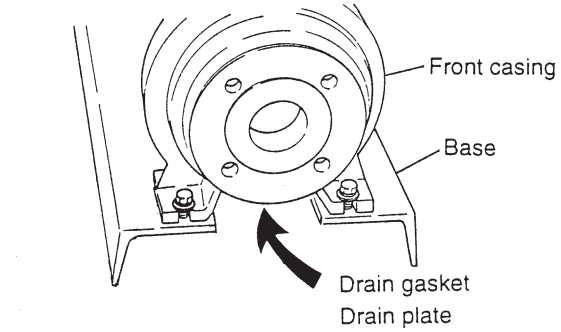
Note 1. Time to be replaced mentioned as above is based on pumping clear water at ambient temperature. The time to be replaced depends on the characteristics, temperature and other condition of pumped liquid.

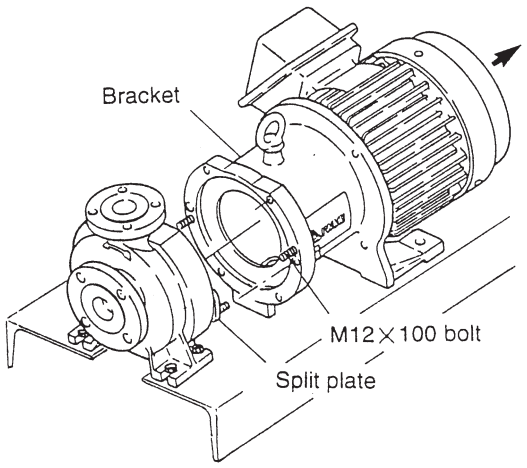
2. Bushing and sleeve must be replaced at the time of wear limit of bushing and sleeve shown on page 35 regardless of the time to be replaced shown as above.
3. Gasket and O ring must be replaced every time when pump is disassembled regardless of the time to be replaced shown as above.
4. Parts No. corresponds to that of construction drawings on pages 12 and 13.

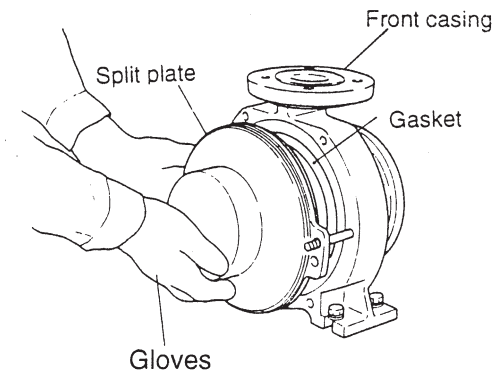
4. Disassembly and Assembly *(Flange mounted Motor type)*

⚠Caution

- **Since the magnet used in the pump is very powerful, be careful not to get your fingers caught between the elements during the disassembly and assembly processes. Also, pay attention to prevent metal pieces or metal powder from adhering onto the pump.**
- **Do not bring any electronic device that may be impacted by strong magnetic power into the pump magnetic field.**
- **Prior to disassembly or assembly, close the suction valve and discharge valve.**
- **The piping and the pump often retain liquid. When a dangerous liquid is handled, wear protectors (goggles, rubber gloves, etc.) when disconnecting the pipes.**







■ Disassembly

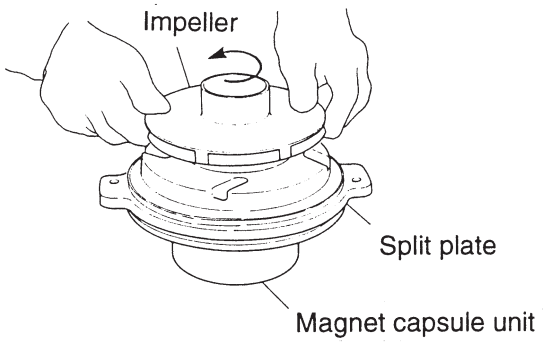
[1] Disassemble only after thoroughly washing out the liquid inside the pump by use of flushing piping, if pump has drain port, remove the hex bolt (901.1) and drain plate (122) and drain the liquid out of the casing. Then, clean the inside of the pump.

⚠Warning
Wear protectors (goggles, rubber gloves, etc.). Certain liquids are dangerous. They may hurt your eyes and skin.

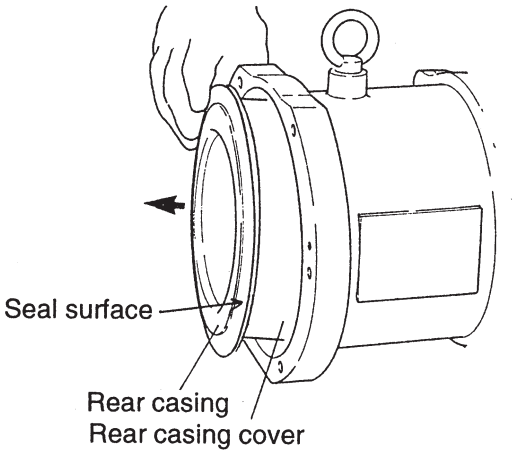
[2] Remove the rear retaining hex bolt (901.3) on the bracket (330). Then, remove the hex bolt (901.8) on the front casing side as well as the nut (920).

[3] Screw the two attached bolts (size is M12×100) from the motor side through the tapped hole on the bracket (330) to push out the split plate (337) so that the plate is separated from the bracket section.

* Turn the screws alternately. If the split plate (337) has been sufficiently driven out, hold it by hand and pull it toward the rear. Then, rotate the plate on the base.
* During disassembly, discharge the liquid from the casing and clean the inside of the pump.



[4] Push a flat-head screwdriver into the engagement between the split plate (337) and the front casing (100.1) to open the jointed section. In this step, be careful not to damage the seal surface and gasket (400.1).



[5] Remove the impeller (230) from the split plate and magnet capsule unit (858) by rotating it counterclockwise.

* Keep in mind the power of the magnet. Also, be careful not to damage the front casing, split plate, rear casing, bearing sleeve, thrust bearing impeller, etc.

This part is fixed tightly with adhesive. If necessary, use belt wrench for loosening impeller from spindle.

[6] Pull the rear casing (158) and rear casing cover (159) out of the bracket.

■ Assembly

The pump should be assembled by carrying out the steps of disassembly in reverse, as described below. Pay attention to the following points.

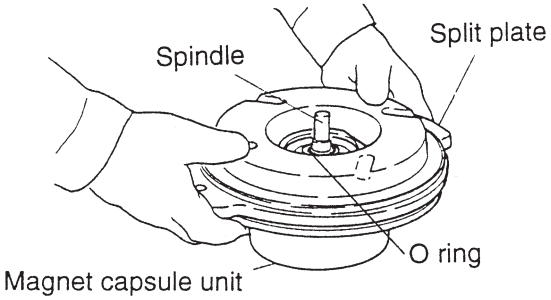
- Keep the sliding and sealed parts clean so that they are free of dust or scratches. When assembling these parts, be sure to attach them in the correct positions.
  Fasten the various bolts evenly. Since the magnet is extremely powerful, make sure there is no metal powder adhered to it before installing it.

- **Replacement of O ring and gasket**
  When replacing the O ring or gasket, be sure to install a new one. In addition, see that the O ring or gasket is not twisted or pressed by another part.

* The sealing section should be cleaned free of dust or scratches before installation

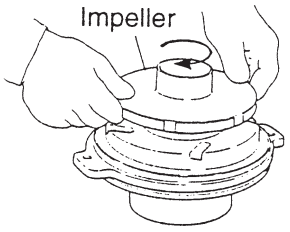
- **Fastening Bolts**
  Fasten the bolts in diagonal order by applying the fastening torque shown in the following table. Apply an equal torque to each bolt.

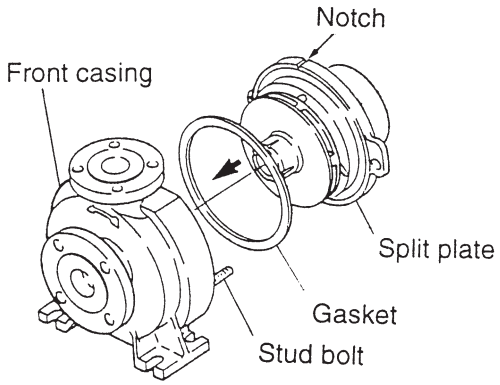
Model	Type	Fastening torque N•m	Size of bolts
MDE	Hex. head bolt	58.8	M12×65
	Hex. Nut	58.8	M12



[1] Install the split plate from the spindle side of the magnet capsule unit (859). Be careful not to damage the sleeve or the sliding section of the bearing. Next, attach the O ring (412) to the magnet capsule unit (859) and after applying a proper quantity (just enough so as not to drip) of adhesive to the threaded portion (three peripheral threads in the threaded portion of the spindle), and screw the impeller (230) in firmly by using a belt wrench to fix it. Fastening torque: 38 N•m
Recommended adhesive: Locktight No. 242 (a product of Nihon Locktight) or equivalent.

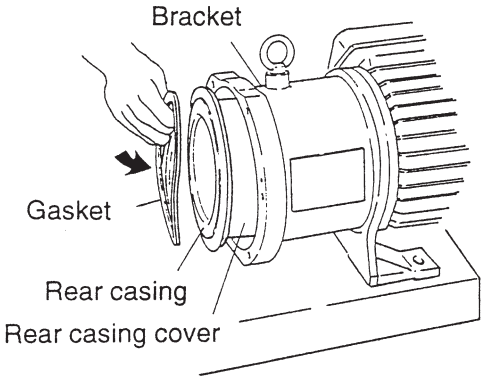
* If adhesive sticks to the O ring or O ring groove, wipe it off immediately.
* Confirm that there is a play of 1 to 2mm on the direction of thrust between the split plate and the impeller.





[2] Insert the gasket (400.1) into the front casing and install the split plate (337).

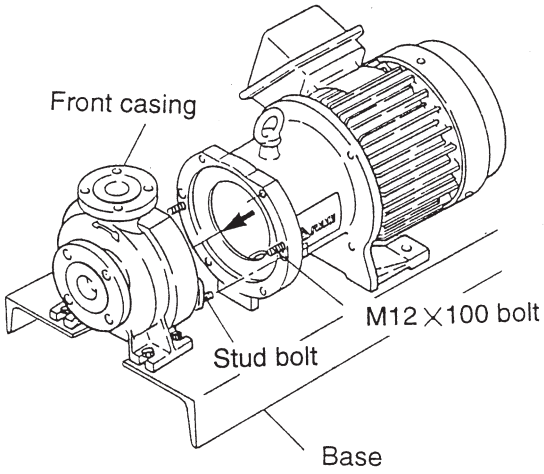
* Screw the stud bolts (902) into the two screw holes in the front casing. Then, insert the split plate along the stud bolt with the positioning notch of the split plate at the top.



[3] Install the rear casing cover (159) and rear casing (158) onto the bracket (330). Next, insert the gasket (400.2) to be fixed on the front casing side.

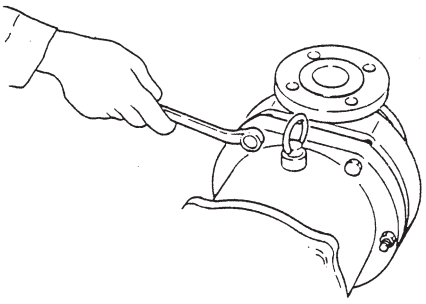
* Previously fit the bolt M12×100 provided for the bracket into it fully to its depth. If this bolt is not used, the magnetic capsule is abruptly attracted by the virtue of magnet and it sometimes causes ceramic and plastic the part to be broken.

In order to prevent this failure, it is necessary to put magnet capsule into rear casing gradually with using this M12×100.



[4] Direct the bracket precisely vertical to the front casing on the base and install it along the stud bolt (902). Loosen the attached bolts (M12×100) alternately to pull the bracket slowly backward, to install it finally onto the front casing.

* Note that the magnetic force of the magnet capsule is very strong.
* When assembling, be careful not to let your fingers or hand get caught.



[5] Fix the bracket firmly with the front casing by tightening both the hex bolt (901.8) and hex nuts (920). Tighten these bolts diagonally to apply an even torque.
Fastening torque: 58.8N•m

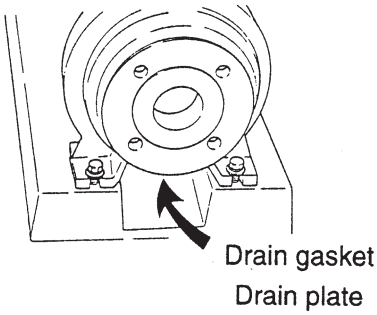
* At regular intervals, increase the fastening of the parts which fix the bracket to the front casing. Fasten them only after the hex head bolt (901.3) is loosened.

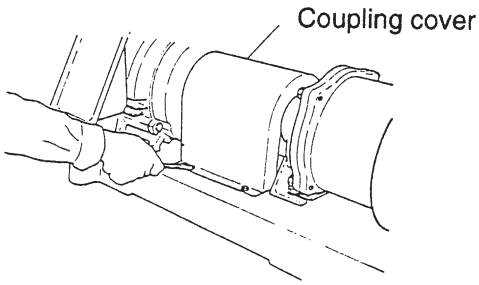
[6] Install the drain plate and fasten the bolts.

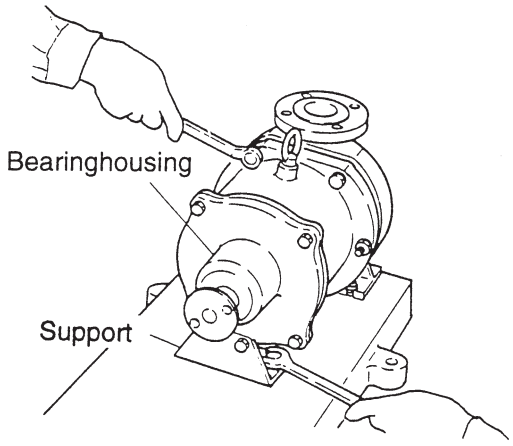
4. Disassembly and Assembly *(Foot mounted motor type)*

⚠Caution

- **Since the magnet used in the pump is very powerful, be careful not to get your fingers caught between the elements during the disassembly and assembly processes. Also, pay attention to prevent metal pieces or metal powder from adhering onto the pump.**
- **Do not bring any electronic device that may be impacted by strong magnetic power into the pump magnetic field.**
- **Prior to disassembly or assembly, close the suction valve and discharge valve fully.**
- **The piping and the pump often retain liquid. When a dangerous liquid is handled, wear protectors (goggles, rubber gloves, etc.) when disconnecting the pipes.**





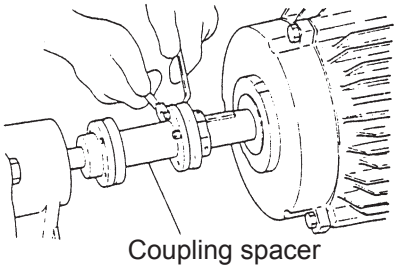


■ Disassembly

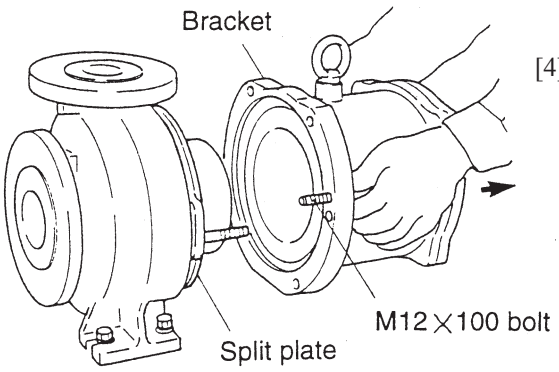
[1] Disassemble only after thoroughly washing out the liquid inside the pump by use of flushing piping, if pump has drain port, remove the hex bolt (901.1) and drain plate (122) and drain the liquid out of the casing. Then, clean the inside of the pump.

⚠Warning
Wear protectors (goggles, rubber gloves, etc.). Certain liquids are dangerous. They may hurt your eyes and skin.

[2] Remove the coupling cover bolts (901.5) and detach the coupling cover (681). Next, remove the coupling bolt and coupling spacer.

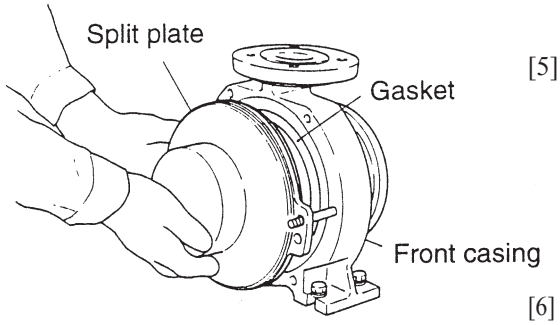


[3] Remove the hex head bolt (901.3) which fastens the support (183) of the bearing housing (350). Then remove the hex head bolt (901.8) and the nuts (920) on the front casing side.

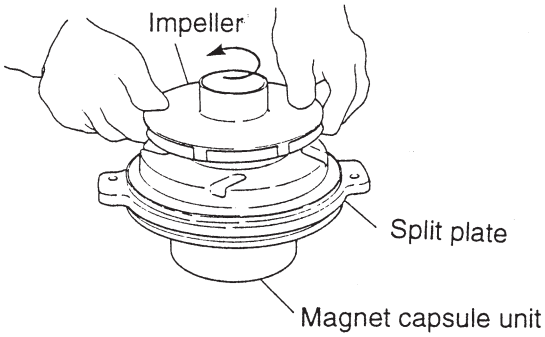


[4] Screw the two attached bolts (size is M12×100) from the motor side through the screw hole on the bracket (330) to push out the split plate (337) so that the plate will be separated from the bracket section.

* Turn the screws alternately. If the split plate (337) has been sufficiently driven out, hold the split plate by hand and pull it toward the rear. Then, rotate the plate on the base.
* During disassembly, discharge the liquid from the casing and clean the inside of the pump.



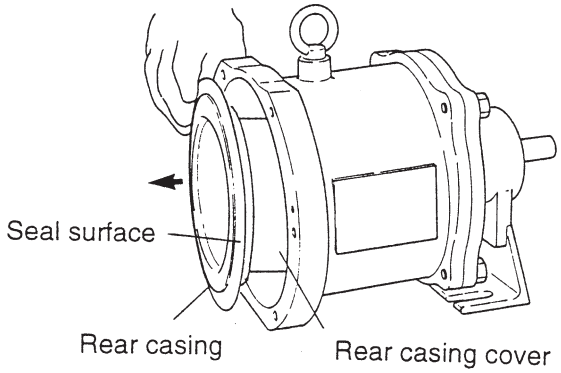
[5] Push a flat-head screwdriver into the joint between the split plate (337) and front casing (100.1) to open the jointed section. In this step, be careful not to damage the seal surface and gasket (400.1).



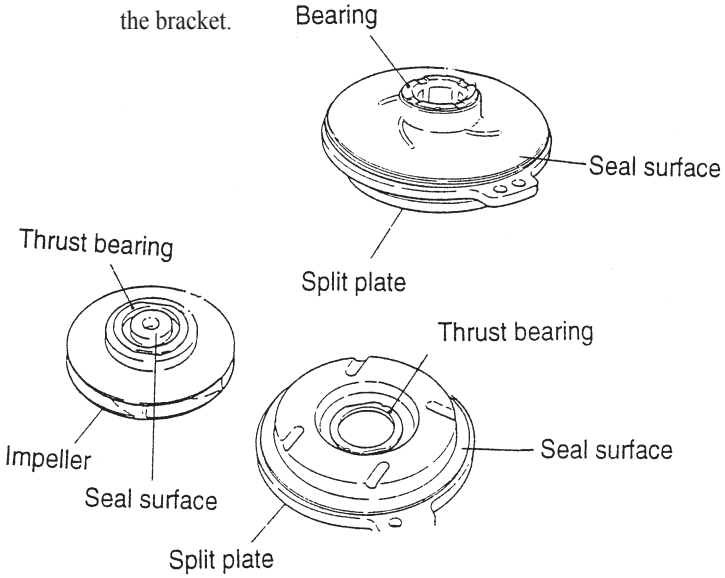
[6] Remove the impeller (230) from the split plate and magnet capsule unit (858) by rotating it counterclockwise.
Detach the impeller by the use of a belt wrench after fixing the magnet capsule.

* Keep in mind the power of the magnet. Also, be careful not to damage the front casing, split plate, rear casing, bearing sleeve, thrust bearing, impeller, etc.

This part is fixed tightly with adhesive, if necessary, use belt wrench for loosening impeller from spindle.



[7] Pull the rear casing (158) and rear casing cover (159) out of the bracket.



■ Assembly

The pump should be assembled by carrying out the steps of disassembly in reverse, as described below. Pay attention to the following points.

- Keep the sliding and sealed parts clean so that they are free of dust or scratches. When assembling these parts, be sure to attach them in the correct positions.
  Fasten the various bolts evenly. Since the magnet is extremely powerful, make sure there is no metal powder adhered to it before installing it.

- **Replacement of O ring and gasket**

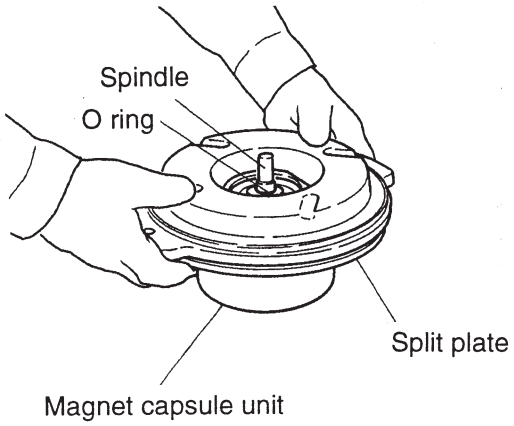
When replacing the O ring or gasket, be sure to install a new one. In addition, see that the O ring or gasket is not twisted or pressed by another part.

* The sealing section should be cleaned free of dust or scratches before installation

- **Fastening Bolts**

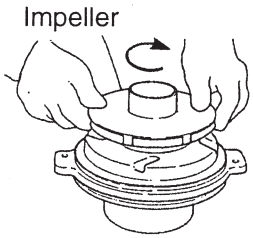
Fasten the bolts in diagonal order by applying the fastening torque shown in the following table. Apply an equal torque to each bolt.

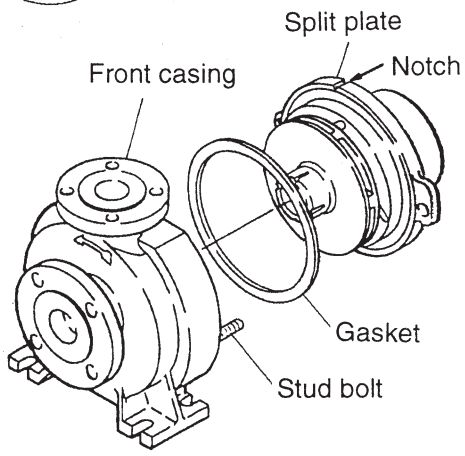
Model	Type	Fastening torque N•m	Size of bolts
MDE	Hex. head bolt	58.8	M12×65
	Hex. Nut	58.8	M12



[1] Install the split plate from the spindle side of the magnet capsule unit (859). Be careful not to damage the sleeve or the sliding section of the bearing. Next, attach the O ring (412) to the magnet capsule unit (859) and after applying a proper quantity (just enough so as not to drip) of adhesive to the threaded portion (three peripheral threads in the threaded portion of the spindle), and screw the impeller (230) in firmly by using a belt wrench to fix it. Fastening torque: 38 N•m
Recommended adhesive: Locktight No. 242 (a product of Nihon Locktight) or equivalent.

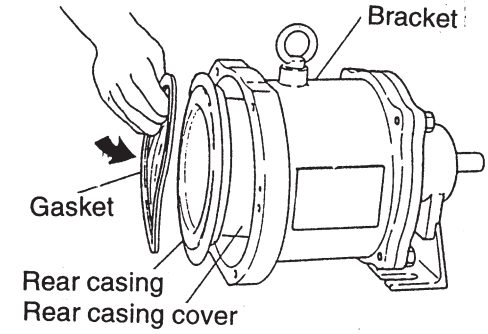
* If adhesive sticks to the O ring or O ring groove, wipe it off immediately.
* Confirm that there is a play of 1 to 2mm on the direction of thrust between the split plate and the impeller.





[2] Insert the gasket (400.1) into the front casing and install the split plate (337).

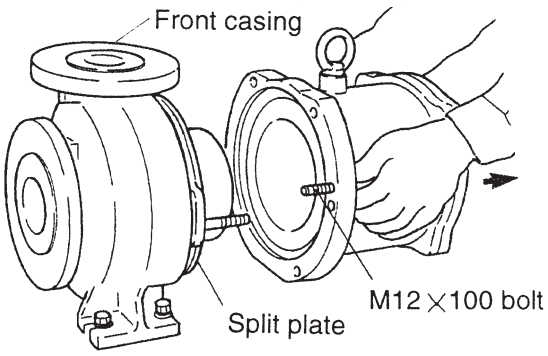
* Screw the stud bolts (902) into the two screw holes in the front casing. Then, insert the split plate along the stud bolt with the positioning notch of the split plate at the top.



[3] Install the rear casing cover (159) and rear casing (158) onto the bracket (330). Next, insert the gasket (400.2) to be fixed on the front casing side.

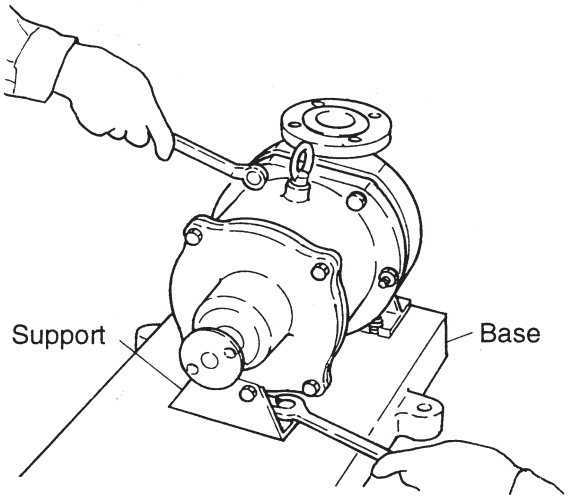
* Previously fit the bolt M12×100 provided for the bracket into it fully to its depth. If this bolt is not used, the magnet capsule is abruptly attracted by the virtue of magnet and it sometimes causes ceramic and prastic parts to be broken.

In order to prevent this failure, it is necessary to put magnet capsule into rear casing gradually with using this M12×100.



[4] Direct the bracket precisely vertical to the front casing on the base and install it along the stud bolt (902). Loosen the attached bolts (M12×100) alternately to pull the bracket slowly backward, to install it finally onto the front casing.

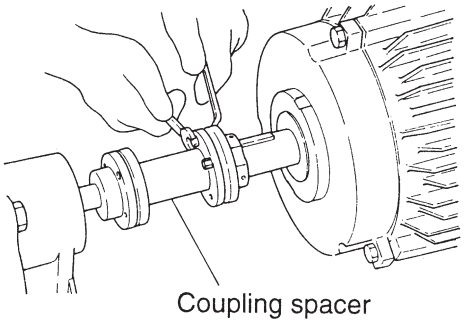
* Note that the magnetic force of the magnet capsule is very strong.
* When assembling, be careful not to let your fingers or hand get caught.



[5] Fix the bracket with the front casing by tightening both the hex bolt (901.8) and hex nuts (920). Tighten them diagonally to apply an even torque.
Fastening torque: 58.8N•m

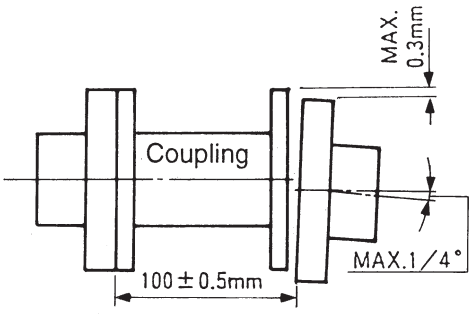
* At regular intervals, increase the fastening of the parts which fix the bracket to the front casing. Fasten them only after the hex head bolt (901.3) is loosened.

[6] Install the drain plate and fasten the bolts.



[7] After the support (183) is attached to the base, connect the pump unit to the motor by means of the coupling spacer.

[8] Adjust the centering of the coupling so as to fall in the following ranges. (The nuts for the coupling and for fixing the coupling spacer cannot be reused more than 10 times.)



Coupling Fastening Torque	4.0kW-7.5kW Motor	8.8N·m
	11kW-15kW Motor 7.5kW safety-increased motor	21.5N·m

[9] After centering adjustment, firmly mount the coupling cover.

IWAKI PUMPS

( )Country codes

IWAKI CO.,LTD. 6-6 Kanda-Sudacho 2-chome Chiyoda-ku Tokyo 101-8558 Japan
TEL:(81)3 3254 2935 FAX:3 3252 8892(http://www.iwakipumps.jp)

Australia	IWAKI Pumps Australia Pty. Ltd.	TEL:(61)2 9899 2411	FAX:2 9899 2421	Italy	IWAKI Europe GmbH, Italy Branch	TEL:(39)0444 371115	FAX:0444 335350
Austria	IWAKI EUROPE GmbH	TEL:(49)2154 92540	FAX:2154 925448	Korea	IWAKI Korea Co.,Ltd.	TEL:(82)2 2630 4800	FAX:2 2630 4801
Belgium	IWAKI Belgium n.v.	TEL:(32)1367 0200	FAX:1367 2030	Malaysia	IWAKIm Sdn. Bhd.	TEL:(60)3 7803 8807	FAX:3 7803 4800
China	IWAKI Pumps (Shanghai) Co., Ltd.	TEL:(86)21 6272 7502	FAX:21 6272 6929	Norway	IWAKI Norge AS	TEL:(47)23 38 49 00	FAX:23 38 49 01
China	IWAKI Pumps (Guangdong) Co., Ltd.	TEL:(86)750 3866228	FAX:750 3866278	Singapore	IWAKI Singapore Pte. Ltd.	TEL:(65)6316 2028	FAX:6316 3221
China	GFTZ IWAKI Engineering & Trading (Guangzhou)	TEL:(86)20 8435 0603	FAX:20 8435 9181	Spain	IWAKI Europe GmbH, Spain Branch	TEL:(34)93 37 70 198	FAX:93 47 40 991
China	GFTZ IWAKI Engineering & Trading (Beijing)	TEL:(86)10 6442 7713	FAX:10 6442 7712	Sweden	IWAKI Sverige AB	TEL:(46)8 511 72900	FAX:8 511 72922
Denmark	IWAKI Nordic A/S	TEL:(45)48 24 2345	FAX:48 24 2346	Switzerland	IWAKI (Schweiz) AG	TEL:(41)26 674 9300	FAX:26 674 9302
Finland	IWAKI Suomi Oy	TEL:(358)9 2745810	FAX:9 2742715	Taiwan	IWAKI Pumps Taiwan Co., Ltd.	TEL:(886)2 8227 6900	FAX:2 8227 6818
France	IWAKI France S.A.	TEL:(33)1 69 63 33 70	FAX:1 64 49 92 73	Taiwan	IWAKI Pumps Taiwan (Hsin-chu) Co., Ltd.	TEL:(886)3 573 5797	FAX:(886)3 573 5798
Germany	IWAKI EUROPE GmbH	TEL:(49)2154 92540	FAX:2154 925448	Thailand	IWAKI (Thailand) Co.,Ltd.	TEL:(66)2 322 2471	FAX:2 322 2477
Holland	IWAKI Europe GmbH, Netherlands Branch	TEL:(31)547 293 160	FAX:547 292 332	U.K.	IWAKI Pumps (UK) LTD.	TEL:(44)1743 231363	FAX:1743 366507
Hong Kong	IWAKI Pumps Co., Ltd.	TEL:(852)2 607 1168	FAX:2 607 1000	U.S.A.	IWAKI AMERICA Inc.	TEL:(1)508 429 1440	FAX:508 429 1386
Indonesia	IWAKI Singapore (Indonesia Branch)	TEL:(62)21 690 6606	FAX:21 690 6612	Vietnam	IWAKI pumps Vietnam Co.,Ltd.	TEL:(84)613 933456	FAX:613 933399

T291-6 '13/05